An Empirical Analysis of Decentralization and Poverty in the Philippines

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Abstract

Decentralization is a popular component of public sector reform in many developing countries. Local governments are thought to be able to adapt more quickly to local conditions and to respond more appropriately to the needs of their citizens. However, decentralization also has drawbacks. Foremost is the efficiency advantage of the central government in providing public services because of economies of scale and better access to resources. The empirical literature on the effect of decentralization on development shows mixed results depending on the decentralization measure, outcome variables, and countries covered. This study looked at the relationship between decentralization and poverty using data from Philippine cities and municipalities. Results suggest that decentralization, as represented by fiscal autonomy and measured by the share of locally-sourced revenues to total local government revenues, is indeed associated with lower poverty. However, this relationship is not linear – the marginal effect of decentralization on poverty diminishes as decentralization increases. Moreover, decentralization moderates the positive effect of good governance on poverty reduction; and the magnitude of the relationship between poverty and decentralization is stronger in poorer municipalities than in richer ones.

Keywords: decentralization; fiscal autonomy, poverty, Philippines

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I. Background and Objectives

Decentralization has become one of the most popular public sector reforms in the past few decades, with at least 60 countries including some form of decentralization in their development plan (Smoke, 2001; Bahl, 1999; Dillinger, 1994). Despite its popularity, its effectiveness remains highly debated, and its effect on development has not been fully studied (Faguet, 2004; Saito, 2008). Bahl (1999) and Von Braun and Grote (2002) argue that decentralization does promote development under certain conditions, but many of these conditions are absent in developing and least-developed countries. For instance, the advantages of a centralized government setup and decentralization politics – e.g. empowering inefficient local governments – are more pronounced in low- and middle-income economies. In addition, monitoring and accountability of local officials are much weaker in developing countries (Bardhan, 2002).

The Philippines implemented a comprehensive decentralization program more than two decades ago through the Local Government Code (LGC) of 1991. The LGC devolved many functions from the national to the local governments. As a result, local government expenditures as share of Gross National Product (GNP) increased from an annual average of 1.6 percent during the period 1985 to 1991 to 2.7 percent in 1993 and 3.3 percent in 1994 (Manasan, 1997). However, as it is in many other countries, there is still a need to study the effect of decentralization on development using domestic data (Llanto, 2009).

The primary economic argument for decentralization is that local governments have better information than the central government on the needs and preferences of citizens as consumers of public goods. Because local governments are closer to the people that they serve, and because the population in a locality and their concerns tend to be more homogenous than that of the whole country, a decentralized form of government can improve the delivery, allocation, and equity of public services (Boadway & Shah, 2009; Shah, 1998; Wallis & Oates 1988; World Bank, 1994a; Oates, 1999; Kubal, 2006). Decentralization can also potentially enhance government responsiveness to consumer needs as it increases participation among citizens (Faguet, 2009; Kubal, 2006).

On the other hand, the main counter-argument against decentralization is that the central government is more effective in producing public goods because of better access to resources, technologies, and other inputs. It is also more efficient due to economies of scale and economies of scope (Bahl, 1999; Faguet, 2004; Prud'homme, 1995; Smoke, 2001; Keating, 1995). In addition, decentralization can exacerbate inequality when functions are devolved to local governments with widely varying resources and capabilities (Bahl, 1999; Prud-homme, 1995). Some sub-national governments are better-governed and have access to more resources than others; thus, decentralizing service delivery puts consumers from less competitive localities at a disadvantage.

Decentralization also increases the risk of resource capture by local elites and special interest groups (Faguet, 2009; Asante & Ayee, 2007). Without adequate safeguards, there is a greater risk that powerful local elites may be able to use captured resources and powers for their own benefit. Decentralization involves transfer of responsibilities, functions, revenue-generating powers, and financial resources from the central to the local governments. If the recipient local governments are inefficient in performing these functions and in using these resources due to bureaucracy, corruption, and lack of technical knowledge, then the advantages of decentralization may be outweighed by its costs. In the Philippines, where data for this study was drawn from, several studies suggest the existence of weak local governance and institutions. Teehankee (2012) argues that clientelism and weak bureaucracy contributed to the proliferation of patronage-based rent-seeking organizations centered around local political clans. In relation to this, Mendoza et al. (2012; 2016) found that these political clans, more formally known as political dynasties, hold a disproportionate share of local government positions; and that political dynasties could be associated with adverse development outcomes.

Decentralization also creates potential for conflict between local and national interests. For example, it weakens the capacity of the central government to stabilize the economy. When revenue and spending assignments are concentrated on the local governments, it weakens the ability of the central government to conduct fiscal policy (Prud-homme, 1995). This is because the latter has fewer resources and spending options to work with.

Bahl (1999) and Azfar et al. (2001) identified some of the conditions wherein decentralization is effective in promoting development. Azfar et al. noted three key institutional factors that makes decentralization effective. The first is voice and mobility – the former is the ability of consumers to make their views known to policy-makers, while the latter is the capacity to switch to other local governments in their search for their preferred public services. The second is inter-governmental discpline, or the ability of different levels of government to act as check and balance to one another. This includes central government supervision over some local government functions, and imposition of budgetary constraints of one government unit to another. The third condition is the ability of the decentralized system to hold government officials accountable for their action. Bahl's (1999) conditions are more specific, and it includes the following: assignment of revenue-collecton functions that corresponds to the decentralized expenditure functions, allocating enough revenue-raising power to local governments, monitoring and evaluation of the decentralization program, and a decentralization pogram that recognizes the differneces in governance and technical abilities of different regions.

With these contrasting effects, the impact of decentralization on development outcomes becomes an empirical question. The primary objective of this paper is to study the relationship between decentralization and poverty incidence using municipal and city data from the Philippines. However, another important assertion in the literature is the role of governance on

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the effectiveness of decentralization in alleviating poverty. Von Braun and Grote (2002), Jutting et al. (2004), and Steiner (2005) all argued that good governance and institutions are needed for decentralization to positively affect development outcomes (more on this later). This motivates the second objective of the paper which is to study the role of governance in the relationship between decentralization and poverty. This paper is organized as follows. The next section reviews the literature on how decentralization is related to indicators and determinants of development, followed by the definition and types of decentralization. This is then followed by a discussion of the theoretical framework and empirical methodology. Finally, results are presented and interpreted, and the paper concludes with a summary.

II. Defining and Measuring Decentralization

Decentralization is defined as the transfer of responsibilities, functions, authority, and accountability from the central government to local governments (Von Braun & Grote, 2002; Litvack et al., 1998). This transfer may take several forms. Administrative decentralization, sometimes referred to as deconcentration, involves the transfer of functions from the center to local governments, while keeping decision-making authority with the central government. Political decentralization provides greater decision-making power to local government, while fiscal decentralization reassigns spending and revenue-raising responsibilities from the central to the lower levels of government (Von Braun & Grote, 2002; Litvack et al., 1998). When the transfer of responsibilities and power involves both administrative as well as political or decision-making authority, the process is often referred to as devolution. Fiscal and administrative decentralization are closely related because more functions could imply greater spending and thus greater need for revenues.

The Philippines' 1991 decentralization program involves both administrative and fiscal decentralization. It transfered some expenditure and revenue-generating responsibilities from the national government to the local governments units (LGUs); although its primary criticism is that the eventual revenue sources of the LGUs were not enough to fund the develoved functions (Manasan, 1992; Capuno, 2017). It also includes a revenue sharing scheme from the national to the local governments, called the Internal Revenue Allottment, to help the LGUs finance the functions devolved to them. The spending functions assigned to the local governments include agricultural extension and research, land use planning, solid waste disposal, environmental management, primary health care, hospital care, social welfare services, municipal enterprise services, local infrastructure, public school buildings, and regulating the operations of businesses in the locality (Manasan, 2005).

Von Braun and Grote (2002) suggested quantifiable indicators that can measure the level of decentralization for each of the three types. Political decentralization can be measured by the

number of government levels that hold an election. This argues that the more levels of government that hold an election, the more representation the citizens have at the local level. On the other hand, the level of administrative decentralization can be measured by the degree of sub-division of a country and the size of sub-national governments relative to population. This can include such indicators as number of local government units per population or per land area.

A possible measure of fiscal decentralization is the expenditures of sub-national governments expressed as share of central government spending. This indicator is commonly used in cross-country studies of decentralization (Davoodi & Zou, 1998; Fisman & Gatti, 2002). Instead of an expenditure-based indicator, fiscal decentralization can also be measured using revenues. One such indicator is sub-national government revenue expressed as share of central or total government revenue (Akai & Sakata, 2002; Zhang & Zou, 1998).

Another revenue-based indicator of decentralization measures the autonomy of the local government, or its ability to raise its own income to fund its functions rather than relying on transfers from the central government (Akai & Sakata, 2002). In many developing countries including the Philippines, inter-governmental fiscal transfers (IFTs) is one of the several sources of funds of sub-national governments. The usual IFT scheme in developing countries is revenue shares – automatic transfers from central to local governments using funds collected by the government from various sources (Shah, 2007; Rao, 2007). In the Philippines, revenue shares come in the form of the Internal Revenue Allotment (IRA). The IRA is the legislated share of local governments in national government revenue collections.

The focus of this paper is on fiscal decentralization using data from Philippine cities and municipalities[1]. The decentralization indicator used was the share of locally-sourced revenues to total city or municipal government revenue. This indicator was similar to the one used by Akai and Sakata (2002) in a study of decentralization and economic growth using state-level data from the United States. Locally-sourced revenues are funds collected by the local government such as business taxes, property taxes, business licenses and fees, and service charges. On the other hand, externally-sourced revenues are composed mostly of the IRA and some other transfers.

This indicator was used for several reasons. As earlier discussed, it measures the fiscal independence and autonomy of the municipality or city government from the national government. There are local government units in the Philippines – usually the poorest municipalities – that are highly dependent on the IRA for its funds. Although the Local Government Code (LGC) of 1991 has decentralized many responsibilities to the local

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[1] The Philippine local government system is organized in the following way. The country is divided into provinces, the largest unit of local government. Nearby provinces are grouped into regions, but regions do not have a local government – they are mere geographical delineations. Provinces, in turn, are divided into cities and municipalities.

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governments, many of them still rely on the IRA from the national government to finance these functions. In addition, more locally-sourced income helps the local government perform its functions, effectively deliver public services, and implement its own programs. This reduces its reliance to central government programs to provide services for its constituents.

III. Literature Review

The empirical literature on the relationship between decentralization and indicators or determinants of development has mixed results. Most of these studies used specific country cases, but a few used cross-country analyses; and they utilized various measures of decentralization. Davoodi and Zou (1998) was one of the few cross-country studies, and it found evidence of a negative effect of decentralization on growth rate of per capita output for developing countries (but none for developed economies). It used panel data of the share of local government spending to total government expenditures as indicator of decentralization.

Other empirical papers that found evidence of decentralization having a negative effect on development used country-specific data. Nguyen (2008) used a panel of Vietnamese provinces and concluded that greater decentralization, as measured by the expenditures of sub-provincial governments expressed as share of total provincial government spending, is associated with lower income of the bottom quintile. A similar cross-provincial analysis in China by Zhang and Zou (1998) also yielded a negative association between decentralization and real income growth rate. Zhang and Zou used similar expenditure-based measures of decentralization: the ratio of provincial budgetary spending to central budgetary spending, expressed in per capita terms; the ratio of provincial extra-budgetary to central extra-budgetary spending, expressed relative to income size; and ratio of consolidated provincial spending to consolidated central spending, expressed in per capita terms.

Tosun and Yilmaz (2008) took a different approach in measuring decentralization and used number of municipalities per capita and number of municipalities per unit area as indicators. These indicators are measures of administrative decentralization as discussed earlier. Using data from Turkish provinces, they found either a negative or no relationship between decentralization and provincial GDP per capita and GDP per capita growth rate. The authors attributed this result to the foregone efficiency of economies of scale.

Using a different econometric approach, Wallis and Oates (1988) studied the determinants of centralization and included per capita income as one of the regressors. Thus, in contrast to the previous studies cited, centralization was the dependent rather than the independent variable. Using state-level data from the United States, the authors used expenditure shares to measure centralization and concluded that higher per capita income is associated with greater

centralization. This supports previously-cited studies that found evidence of a negative decentralization-development relationship.

In contrast to the studies discussed in the preceding paragraphs, there were papers that found a positive relationship between decentralization and development outcomes. Von Braun and Grote (2002) did a basic econometric analysis on a cross-section of countries to see if poverty is related to several decentralization measures. They found some evidence that elections at the lower levels of government (a measure of political decentralization) and a larger share of sub-national government spending to total government spending are associated with lower poverty. Their statistical analyses, however, were very limited in that cross-section data was used with too few control variables. Using state-level panel data from Bolivia, Faguet (2004) concluded that the implementation of a decentralization law redirected human capital investments and social services to areas with greater needs as measured by literacy rate and malnutrition. This is one of the very few studies in the literature that econometrically analyzed the effect of an actual decentralization law rather than relying on indicators of decentralization.

Akai and Sakata (2002) studied the effect of fiscal decentralization on economic growth using state-level data from the United States. The study used three indicators – the first two were the share of local government spending and revenue to combined state plus local government spending and revenue. The third was the ratio of own-sourced revenues of the local government to its total revenues. This third indicator measures fiscal autonomy and is similar to the one used in this paper. The first two indicators yielded a positive relationship with economic growth while the fiscal autonomy variable tuned out insignificant. Stansel (2005) also used United States data but on a metropolitan area level. Using the number of general-purpose governments per 100 thousand people to measure decentralization, the study found a positive relationship with growth of per capita income. This decentralization indicator is similar to the measure of administrative decentralization suggested by Von Braun and Grote (2002).

For developing country cases, Lin and Liu (2000) and Kalirajan and Otsuka (2012) found evidence of a positive effect of decentralization on development outcomes. The former utilized data from China and used per capita GDP growth rate as the outcome variable. Decentralization was measured by the marginal retention rate of locally-collected revenues of the provincial government. This measures how much of the revenues collected by the provincial government is retained rather than remitted to the national government. The latter measured decentralization in the third level of sub-national government in India and yielded a positive relationship with Agricultural GDP.

Some empirical studies also found mixed or insignificant results depending on the decentralization measure and the development outcome. Hammond and Tosun (2011), Jin and Zou (2005), and Xie et al. (1999) were some of these papers. Hammond and Tosun (2011) used

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county-level data from the United States and concluded that decentralization, as measured by the number of single-purpose government per unit area, is positively associated with employment in metropolitan areas but insignificant in non-metropolitan areas. In contrast, the number of general-purpose government per capita is negatively associated with employment in metropolitan areas but insignificant in non-metropolitan areas.

Using data from a panel of Chinese provinces, Jin and Zou (2005) used provincial expenditure and revenue as share of total government expenditure and revenue as indicators of decentralization. The expenditure-based indicator yielded a negative relationship with economic growth, while the revenue-based indicator turned positive. The authors argue that the reason for this divergence in result is that expenditures are much more decentralized than revenues. Because the share of local government collections to total government revenue is generally much smaller than the share of local government expenditures to total government expenditures, a small increase in the former is likely to lead to growth and development.

On the other hand, Xie et al. (1999), found no significant relationship between decentralization and per capita output growth rate using state-level data in the United States. The authors measured decentralization using two indicators: the share of state and local government expenditure to total government spending, and the share of local government expenditure to total government spending.

IV. Framework and Methodology

IV.A. Framework

Jutting et al. (2004) designed a conceptual framework that explains how decentralization can affect poverty alleviation. They characterized poverty to be multidimensional rather than singularly focused on one aspect such as income. The three dimensions of poverty according to Jutting et al. are voicelessness, vulnerability, and limited access to services, each focusing on different types of need or deprivation. Voicelessness refers to the lack of participation of the poor in governance and in decisions pertaining to public service provision. This dimension prevents individuals from participating in public discourse and decision-making in terms of what, for whom, how to, and how much public goods to produce. As a result, individuals suffering from voicelessness may not be able to avail the public services that they need or want; or the public goods that they receive are of inferior quality or quantity. This is especially true if the policy makers have incomplete information on their constituents' needs and wants; or if they are subjected to regulatory capture such that public resources are not used efficiently in producing public services.

Vulnerability, on the other hand, is the lack of protection from and capacity to adapt to risks. Vulnerable individuals include those without access to insurance and other social safety nets. These are the poor and near-poor that are vulnerable to shocks such as natural calamities, loss of job, sudden and large increase in price of basic commodities, and health problems. Vulnerable individuals who are poor are in danger of diving further into poverty – while the near-poor are at risk of becoming poor – when these shocks hit. For instance, severe health problems may prevent an individual from working or may require large out-of-pocket expenses. If the individual has no coping mechanism such as health insurance or savings, either of these can cause the person to breach the poverty line. The same thing can happen when a natural calamity hits and affects one's property or source of income.

The limited access to services dimension includes education, health, and other services crucial to human capital formation and to the ability to escape poverty. This dimension is connected to the first two as voicelessness and vulnerability can lead to limited access to services. Voiceless individuals do not participate in decision-making; therefore, they may not get the public goods and services that they need. Vulnerable individuals, when exposed to shocks, may have no resources to acquire these services. Limited access to services limits the individual's ability to build human capital; and therefore limits one's ability to earn income enough to avoid falling below the poverty line.

To better explain how decentralization can affect poverty alleviation, the Jutting et al. framework identifies two channels by which this effect can materialize. The two channels are political and economic – and they affect the different dimensions of poverty differently. The transmission mechanism from decentralization to poverty reduction is illustrated in Figure 1.

The political channel refers to the increased participation of consumers in decision-making. Political decentralization affects the voicelessness and vulnerability dimensions by allowing the citizens to participate in the decision-making processes through representation. The improved representation, in turn, can help the poor gain better access to public goods and social safety nets. This would reduce vulnerability and improve access to crucial services such as education and health. These two human-capital building factors are crucial in poverty reduction.

The economic channel affects the limited access to services dimension through the better targeting and provision of public goods and services under decentralization. The more efficient public service provision is due to the information advantage of local governments over the central government on the needs and preferences of the people. This information advantage arose from the proximity of the local governments to the people that they serve compared to the central government (Boadway & Shah, 2009; Shah, 1998; Wallis & Oates, 1988; World Bank, 1994a; Oates, 1999; Kubal, 2006). Because of the local governments' information advantage on

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the needs and preferences of consumers, they are better in targeting public goods and social services to those who need it most.

Figure 1. How Decentralization Affects Poverty.
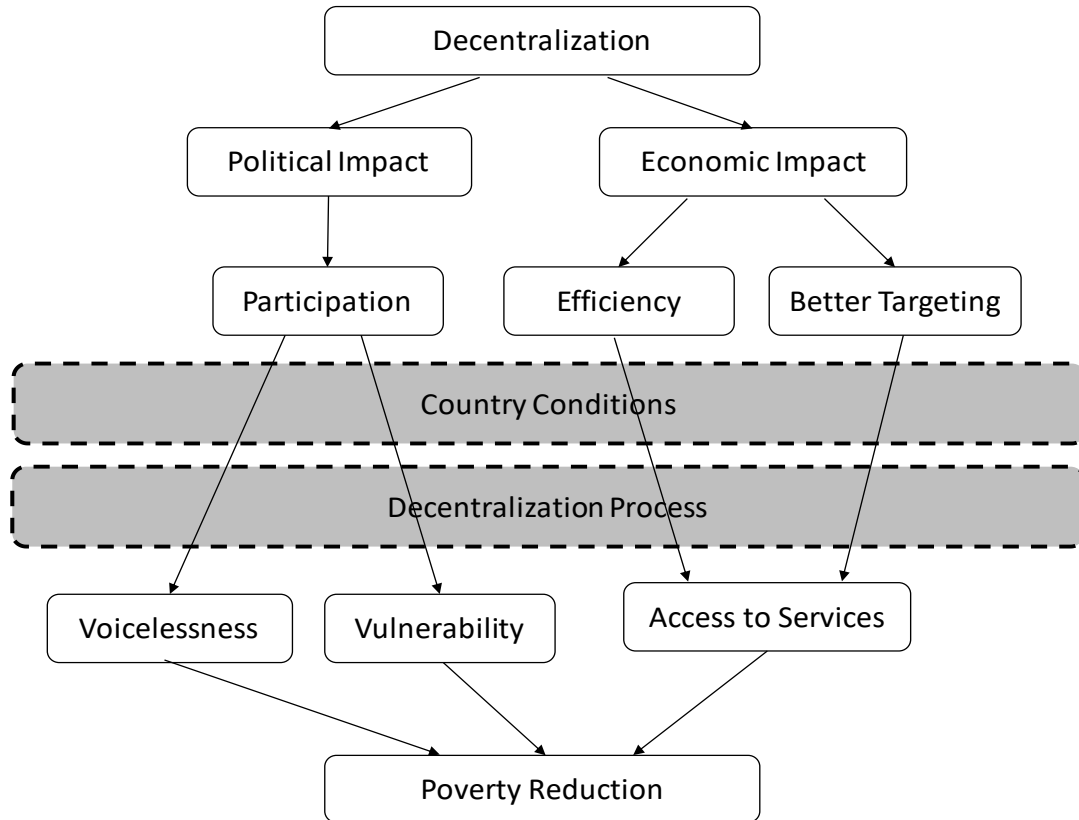
Source: Adopted with modifications from Jutting et al. (2004).

Jutting et al., however, stressed that this transmission mechanism from decentralization to poverty will only work under certain conditions. These conditions can be aggregated into two sets of factors: country conditions and decentralization process. Country conditions include socio-economic variables such as income, infrastructure quality, and population; and quality of governance and institutions. Country conditions play a big part on whether decentralization will be able to help reduce poverty. For instance, if there are many local government units and each has low population, losses from diseconomies of scale may be large. For low-income countries, the cost of implementing a decentralization program may be too high that other poverty-alleviation programs are sacrificed. Governance and institutional quality are important in several ways for decentralization to exhibit its poverty-reducing effect. Good governance keeps local officials accountable, promotes legal enforcement, and maintains checks and balances across different local positions. Good governance and high-quality institutions prevent leakages of scarce resources due to corruption, bureaucracy, incompetence, and other inefficiencies. They

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maximize the returns to these resources, thereby improving the chance that it helps in poverty alleviation.

The decentralization process is similar to governance and institutional quality; but it refers specifically to how the decentralization program was implemented rather than the overall condition in the country. One of these is the ability to implement reforms including political commitment, available resources, and local capacity. These factors ensure that there are enough technical and political resources to properly implement a decentralization program. Without such resources, decentralization may be poorly implemented, and this can weaken its intended effects. Another important set of factors under decentralization process is transparency, elite capture, and corruption. The transfer of functions, responsibilities, and resources from the national to the local government may lead to local elite capture, which will undermine the poverty alleviating effect of decentralization. Finally, policy coherence is important because decentralization may not be effective if there are other programs being implemented that may temper the influence of decentralization.

The importance of governance and institutions on the interaction between decentralization and poverty was also emphasized by Steiner (2005), particularly the absence of corruption and elite capture and the capability to design and implement a good decentralization program. Steiner argues that without these governance factors, the transmission mechanism from decentralization to poverty will not materialize. Indeed, if service delivery functions are transferred to poorly-governed local governments, this may negate the information advantage of the local government on the preferences and needs of the consumers. Good governance ensures that the local government's information advantage is put too good use and prevents leakages of resources due to corruption and bureaucratic inefficiencies. Similarly, Bardhan (2002) underscored the importance of accountability of local government officials for decentralization to be effective in promoting development. Accountability limits local capture and acts as incentive for local officials to truthfully act as agents for their principals – their constituents.

On the other hand, the framework by Von Braun and Grote (2002) argues that the effect of decentralization on poverty is via its effect on governance. That is, decentralization enhances governance by improving accountability and targeting of public services; and in turn, improved governance leads to poverty alleviation. This follows the early works on decentralization drawing from the seminal paper by Tiebout (1956) on competition among local governments. When people (and firms) are mobile, they can 'vote with their feet' and select the locality that provides their most preferred public goods.

Related to this, the effect of decentralization on governance has also been studied empirically in the literature. Arikan (2004) and Fisman and Gatti (2002) both found some evidence that decentralization is associated with less corruption using cross-country data. Similarly, Faguet

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(2004) studied the decentralization program in Bolivia and concluded that it affected the allocation of human capital investments and social services and re-directed some of them to those with greater needs.

The role of governance on the relationship between decentralization and poverty indicates that governance should be taken into account when studying the effect of decentralization on poverty. This possible interaction effect would be crucial in any empirical analysis.

IV.B. Empirical Strategy

Equation (1) was used to estimate the relationship between decentralization, as measured by fiscal autonomy, and city and municipal poverty incidence.

$$poverty_j = \beta_0 + \beta_1{}^* localsource_j + \boldsymbol{\beta}^* \boldsymbol{X_j} + \mu_j \qquad (1)$$

In the equation, $poverty_j$ is the poverty incidence for city or municipality j, $localsource_j$ is locally-sourced revenues expressed as share of total revenues of city or municipal government j, $\boldsymbol{X_j}$ is a vector of control variables, and μ_j is the error term. The control vector $\boldsymbol{X_j}$ is composed of other variables that may affect poverty incidence. This includes the total sales of all firms in the city or municipality to measure the level of economic activity, inflation, percent of paved roads to measure infrastructure quality, percent of households with electricity to measure access to services and utilities, number of banks, and population. These variables have been shown to affect poverty or indicators of poverty in the literature (Marinho et al. 2017; Seetanah et al. 2009; Jacoby 2000; Donou-Adonsou and Sylwester 2016; Rewilak 2017). Included among the set of controls was a dummy variable for cities and municipalities located in Mindanao island which is one of the poorest regions in the country, and regional dummies.

Aside from being grounded on existing empirical literature, the empirical model was also based on the earlier discussed framework on how decentralization can affect poverty reduction. The control variables represent most of the socio-economic country conditions and decentralization process that affect the relationship between decentralization and poverty. They also control for other factors that could affect poverty. This allows for a *ceteris paribus* analysis and isolates the relationship between decentralization and poverty.

The control vector also includes indicators of governance and institutional quality, which studies have shown to effect poverty (Chakravarti, 2005; Tebaldi & Mohan, 2010). Moreover, governance and institutions are the most prominent variables in the identified country conditions and decentralization process that makes decentralization potentially effective for poverty reduction (Jutting et al., 2004; Steiner, 2005). Following this possible role of governance and institutions on the relationship between decentralization and poverty, an interaction term between the indicators of decentralization and governance was included in $\boldsymbol{X_j}$.

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On separate regressions, an interaction term between the decentralization indicator and a dummy variable for third to sixth class municipalities was also included among the controls[2]. The purpose of this regressor is to determine if decentralization has different effects on poverty between relatively higher and lower income municipalities. There could be contextual differences between poor and non-poor localities that can affect the relationship between decentralization and development. Jutting et al. (2004) suggests that decentralization may not be as effective in lower-income territories because implementing it requires resources, and these resources could have been used on other poverty reduction programs. In the case of the Philippines, Manasan (1992) and Capuno (2017) argues that low-income local governments find it hard to fund the functions devolved to them during the 1991 decentralization program. And these difficulties might have adverse consequences on fighting poverty. Manasan (1997) estimated that three years after the implementation of the decentralization law, about half of provincial governments had to decrease their health and social services spending to fund the cost of devolved responsibilities. On the other hand, if the effect of decentralization on poverty is through the better targeting of public services for the poor, then decentralization may even have a larger marginal effect on poorer localities because there is more poverty that it can potentially affect.

Also, on separate regressions, a squared term of *localsource* was included to determine if the relationship between decentralization and poverty is linear or if its subject to 'diminishing returns'. Some models of decentralization such as those of Davoodi and Zou (1998) and Xie et al. (1999) argue that there is an optimal level of decentralization that can maximize development outcomes. Above this level, further decentralization would have adverse effects on development.

The city and municipal poverty incidence statistic is released every three years and the 2012 data – the latest available – was the one used for this study. Most of the independent variables in Equation (1) have data available from 2011 to 2015 or earlier. Most of these variables were expressed in annual averages from 2011 to 2015. Annual average was used to remove the bias from possible short-term fluctuations in the value of the variable in some years.

Two measures of governance were used in Equation (1). One is the Good Governance Index (GGI), an indicator developed by the Philippine Statistical Authority (PSA) to measure the quality of governance in local governments. The World Bank (1992; 1994b) defines governance as the way power is used in managing a country's resources to achieve development. One of the keywords in the World Bank's definition is power – it specifically looks at whether and how power is exercised to help promote development rather than in capturing rent.

Governance is difficult to measure because it has several dimensions; and indicators of governance should not measure only one of these dimensions (Manasan, 1999). The literature

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[2] The Philippine Statistical Authority classifies municipalities into income classes from one to six.

suggests ways to classify these dimensions. Root (1995) identifies accountability, transparency, and predictability as the main aspects of good governance. These are almost similar to the governance aspects identified by the World Bank (1992) – accountability, legal framework suitable for development, and information and transparency. Landell-Mills and Serageldin (1992), on the other hand, defined more specific good governance aspects in political accountability, freedom of association and participation, sound judicial system, bureaucratic accountability, freedom of information and expression, and capacity building. The literature and some development organizations have suggested several ways to measure governance in a multi-dimensional level. For instance, one of the first and most widely-used governance indicators that compares countries is the Worldwide Governance Indicators (WGI) of the World Bank. It uses six sub-indexes – voice and accountability, political stability and absence of violence, government effectiveness, regulatory quality, rule of law, and control of corruption (Kaufmann et al., 2003; 2009). However, some governance indicators used to compare governance across countries may not be appropriate at the local government level, necessitating a separate multi-dimensional measure of governance at the local level (Manasan, 1999).

The GGI was developed to address this need for a multi-dimensional good governance measure in local governments The GGI is composed of three sub-indices – economic governance, political governance, and administrative governance. The Political Governance index measures rule of law, security, administration of justice, people participation, and empowerment. It is the GGI index with the least number of indicators at two, comprised of crime solution efficiency rate and voter turnout during elections. The Administrative Governance, on the other hand, measures the efficiency of delivery of public services such as health, education and power. It is composed mostly of health, education, and infrastructure indicators such as enrollment rates and cohort survival rates in different levels of education, number of health personnel, length of roads, telephone density, and percent of energized barangays. The Economic Governance index measures how well resources are managed to reduce poverty. It includes economic indicators such as unemployment, inflation, poverty, expenditure in social services, and generation of financial resources (Philippine Statistics Authority, n.d.). The GGI takes into consideration the multi-dimensionality of governance and at the same time the limited data available at the provincial level.

The second governance indicator is the number of awards conferred to the city or municipality by national, regional, and international institutions, which was gathered from the Philippine Cities and Municipalities Competitiveness Index data set. While the GGI is composed of clear and specific indicators attached to the different dimensions of governance, the number of awards received can be thought of as an aggregate signal of the local government's performance. In addition, awards can be good indicators of innovation; and it is generally accepted that good governance is one of the contributors to the increasing number of innovations and good practices

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that have been implemented by local governments in the Philippines since the 1991 decentralization (Capuno, 2005). The awards data includes those received from national, regional, and international institutions of any scope and criteria. It therefore signals different aspects of governance and is not limited to one or two dimensions. The summary statistics and the description of all the variables used are detailed in Table 1.

Table 1. Summary statistics and variable descriptions

Variable	Description	Obs	Mean	SD	Min	Max
poverty	City or municipal poverty incidence in percent	1389	26.871	15.559	0.280	79.720
localsource	Share of locally-sourced revenues to total revenues of the city or municipal government, annual average from 2011 to 2015	1388	0.173	0.147	0.002	0.910
ggi	Good governance indicator index, 2008	1155	169.028	85.747	67.19	733.61
awards	Number of awards received by the city or municipal government, annual average from 2011 to 2015	956	2.348	3.207	0	36.400
codbscore	Cost of doing business score	1358	0.792	0.123	0.339	1.000
eodbscore	Ease of doing business score	1042	0.868	0.065	0	1
inflation	Inflation rate, in percent, annual average from 2011 to 2015	1077	3.634	0.801	0.84	5.90
firmsales	Total sales of businesses in the city or municipality, in millions PhP, annual average from 2011 to 2015	1252	7312.158	47168.19	0.011	982493.9
electricity	Share of households in the city or municipality with electricity, in percent, annual average from 2011 to 2015	797	73.441	29.737	0	100
pavedroads	Share of roads in the city or municipality that are paved, annual average from 2011 to 2015	857	0.466	0.319	0	1
banks	Number of banks in the city or municipality, annual average from 2011 to 2015	1070	8.558	37.599	0	721
popn	Population, in thousands	1389	63.213	128.850	1.249	2761.720
localsource_ggi	Interaction term between localsource and ggi	1155	30.717	45.316	0.348	461.308

localsource_award	Interaction term between *localsource* and *awards*	955	0.630	1.718	0	33.133
locsourcetot_3to6mun	Interaction term between *localsource* and a dummy variable = 1 if the municipality is classified as 3rd, 4th, 5th, or 6th class.	1388	0.066	0.090	0	0.535
mindanao	Dummy =1 if city or municipality is in Mindanao; = 0 otherwise	1389	0.244	0.430	0	1
regn_armm	Dummy =1 if city or municipality is in ARMM region; = 0 otherwise	1389	0.001	0.038	0	1
regn_car	Dummy =1 if city or municipality is in CAR region; = 0 otherwise	1389	0.040	0.197	0	1
regn_ncr	Dummy =1 if city or municipality is in NCR region; = 0 otherwise	1389	0.012	0.110	0	1
regn_i	Dummy =1 if city or municipality is in Region 1; = 0 otherwise	1389	0.090	0.286	0	1
regn_ii	Dummy =1 if city or municipality is in Region II; = 0 otherwise	1389	0.066	0.249	0	1
regn_iii	Dummy =1 if city or municipality is in Region III; = 0 otherwise	1389	0.090	0.286	0	1
regn_ivb	Dummy =1 if city or municipality is in Region IV-B; = 0 otherwise	1389	0.042	0.200	0	1
regn_ix	Dummy =1 if city or municipality is in Region IX; = 0 otherwise	1389	0.052	0.222	0	1
regn_v	Dummy =1 if city or municipality is in Region V; = 0 otherwise	1389	0.064	0.245	0	1
regn_vi	Dummy =1 if city or municipality is in Region VI; = 0 otherwise	1389	0.063	0.242	0	1
regn_vii	Dummy =1 if city or municipality is in Region VII; = 0 otherwise	1389	0.077	0.267	0	1
regn_viii	Dummy =1 if city or municipality is in Region VIII; = 0 otherwise	1389	0.070	0.255	0	1
regn_x	Dummy =1 if city or municipality is in Region X; = 0 otherwise	1389	0.067	0.250	0	1
regn_xi	Dummy =1 if city or municipality is in Region XI; = 0 otherwise	1389	0.035	0.185	0	1
regn_xii	Dummy =1 if city or municipality is in Region XII; = 0 otherwise	1389	0.036	0.186	0	1

regn_xiii	Dummy =1 if city or municipality is in Region XIII; = 0 otherwise	1389	0.053	0.223	0	1
regn_nir	Dummy =1 if city or municipality is in Negros Island Region; = 0 otherwise	1389	0.040	0.195	0	1

Source: Authors' elaboration

Equation 1 was initially estimated using cross-section Ordinary Least Squares (OLS). However, it is possible that the variable of interest – locally-sourced revenues as share of total revenue of the local government – is endogenous because of bi-directional causality. While the share of locally-sourced revenue to total revenue can affect poverty incidence, it is also possible that the latter affects the former. In cities and municipalities where poverty incidence is high, economic activity is low resulting in lower levels of local business taxes, property taxes, regulatory fees, and service fees. This limits the ability of the local government to raise its own revenues.

If endogeneity is indeed present, it will cause the coefficient of the endogenous regressor to be biased. An independent variable X is endogenous if it is correlated with the error term μ. One possible solution to address endogeneity is the use of instrumental variables. A variable Z is a valid instrument for the endogenous variable X under two conditions. First is that X and Z must be strongly correlated, also called relevance. Second is Z must not be correlated with μ, also called exogeneity. The test for relevance is straightforward – regress X on Z and test for the significance of the coefficient (joint significance if there are more than two instruments).

Exogeneity is the condition that is more difficult to meet and to test. If the number of endogenous independent variables and instruments are the same, exogeneity cannot be tested statistically and can only be argued intuitively and using economic theory. If there are more instruments than endogenous regressors, exogeneity can be tested using the test for overidentifying restrictions as outlined in Wooldridge (2008). The first step is to obtain the residuals of the 2SLS regression, followed by regressing the residuals on all exogenous variables including the instruments, and then obtaining the R-squared of this regression. If the product of the R-squared and the number of observations is greater than the critical value of the chi-square distribution with degree of freedom equal to the number of instruments less number of endogenous regressors, then at least one instrument is not exogenous.

To address possible endogeneity, Equation (1) was also estimated using two-stage least squares with locally-sourced revenues as share of total revenues being instrumented by two variables. The first instrument is an index that measures the cost of doing business in the city or municipality (*codbscore*), while the second is an index that measures the ease of doing business (*eodbscore*). The relevance and exogeneity of these two instruments can be argued intuitively. Easier and lower cost of doing business encourages greater economic activity and firm creation (Fonseca,et al., 2001; Klapper and Love, 2010; Van Stel et al., 2007), thus increasing the possible sources of

locally-sourced revenues. On the other hand, it is not likely that these can directly affect poverty. Because there are two instruments, both relevance and exogeneity requirements can also be tested statistically. As will be discussed in the Results section, the two instruments passed the two requirements using statistical tests described earlier.

The two instruments were constructed using data from the Cities and Municipalities Competitiveness Index (CMCI) of the Philippines. Published by the National Competitiveness Council annually since 2014, it ranks cities and municipalities based on three pillars – economic dynamism, government efficiency, and infrastructure – with each pillar being comprised of several sub-pillars and indicators. Under Economic Dynamism is the Cost of Doing Business sub-pillar; while under Government Efficiency is the Business Registration Efficiency sub-pillar. Cost of Doing Business is composed of 11 indicators – cost of electricity for commercial users, cost of electricity for industrial firms, cost of water for commercial users, cost of water for industrial firms, price of diesel, daily minimum wage (agricultural plantation, agricultural non-plantation, non-agricultural establishment with 10 or less workers, non-agricultural establishment with more than 10 workers), cost of land in a central business district, and cost of rent for commercial or office space.

Business Registration Efficiency is comprised of eight indicators – number of days it takes to get a permit for new business, number of steps it takes to get a permit for new business, number of days it takes to get a business renewal permit, number of steps it takes to get a business renewal permit, number of days it takes to get a building permit, number of steps it takes to get a building permit, number of days it takes to get an occupancy permit, and number of steps it takes to get an occupancy permit. The cost of doing business score (*codbscore*) was computed from the Cost of Doing Business indicators while the ease of doing business score (*eodbscore*) was from the Business Registration Efficiency indicators. The two instruments were constructed by standardizing the indicators for each city and municipality and computing for their averages. The standardization formula (Equation 2) was a slight modification of the standardization formula used by CMCI.

$$score_{ij} = \frac{maximum\ value\ of\ indicator\ i - actual\ value\ of\ indicator\ i\ for\ city\ or\ municipality\ j}{maximum\ value\ of\ indicator\ i - minimum\ value\ of\ indicator\ i} \qquad (2)$$

Aside from testing for exogeneity and relevance of instruments, the decentralization indicator was also tested if it was indeed endogenous using the method suggested by Hausman (1978). When the regressors are not endogenous, 2SLS is less efficient than OLS and the former's standard errors are large. Thus, OLS should be used instead of 2SLS if there is no endogeneity. Equation (1) was estimated using different combinations of independent variables as robustness

check. For each of these regressions, the instruments were tested for exogeneity and the decentralization indicator was tested for endogeneity.

IV.C. Sources of Data

The source of the city and municipal poverty incidence data was the Philippine Statistical Authority's (PSA) Small Area Poverty Estimates (SAPE). The city and municipal government revenue statistics came from the Bureau of Local Government Finance (BLGF), while the control variables were from the Cities and Municipalities Competitiveness Index (CMCI) data and the PSA.

V. Results and Interpretation

V.A. Data Characteristics

Cities and municipalities in the Philippines have widely varying levels of poverty incidence (see Figure 2). Among those in the dataset, poverty incidence ranges from 0.28 percent to 79.7 percent, with an average of 26.9 percent. The distribution of poverty among regions is also highly uneven, making it essential to control for regional effects. The region with the lowest average city and municipal poverty incidence is the National Capital Region with 2.3 percent. The regions with the second and third lowest poverty incidence, Central Luzon and CALABARZON, are far behind at 10.9 and 14.8 percent, respectively. In comparison, regions with the highest average city and municipal poverty incidence are the Autonomous Region for Muslim Mindanao (46.0 percent), Zamboanga Peninsula (43.9 percent), and Northern Mindanao (43.1 percent). The three regions with the lowest poverty are all located in the main island of Luzon, while those with the highest are located in Mindanao.

Figure 2. Histogram of City and Municipal Poverty Incidence

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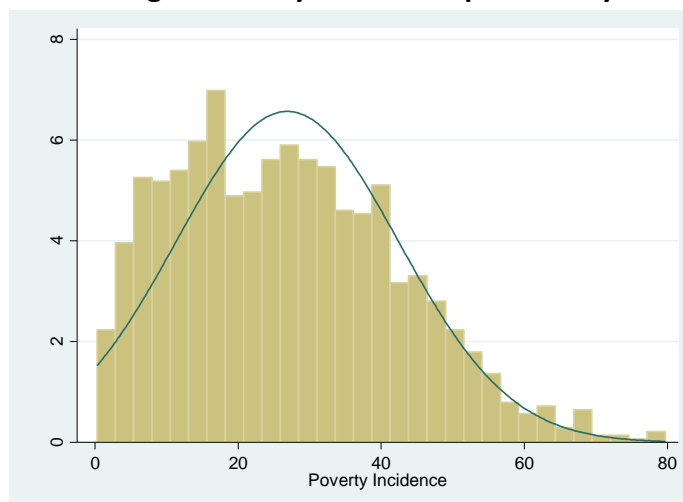
Similar to poverty, the decentralization indicator, *localsource*, varies considerably across cities and municipalities (see Figure 3). This means that the degree of fiscal autonomy or ability to generate own revenue greatly varies across these local governments. The local revenue expressed as share of total revenue of cities and municipalities ranges from 0.002 to 0.91, with a mean of 0.173. This means that on average, 17.3 percent of the revenue of city and municipal governments are locally-sourced and the remaining are financed mostly by revenue shares transfer from the central government.

Figure 3. Histogram of Locally-Sourced Revenue as Share of Total Local Government Revenue
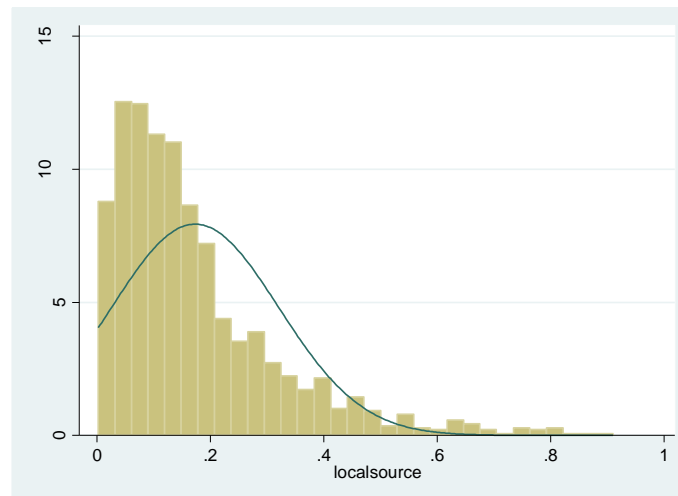
Cities are more fiscally autonomous than municipalities, with the former having an average *localsource* of 0.347 against the latter's 0.153. Poorer municipalities are even less fiscally autonomous on the average. Third to sixth class municipalities have an average locally sourced revenue as share of total revenue of 0.121. The larger *localsource* values of cities is because of their more developed economies, more businesses, and generally higher incomes. These give cities a higher business and property tax base and more sources of permits, license, and service fees – the primary sources of locally-sourced revenues.

The tests described above showed that the independent variable of interest, *localsource*, is indeed endogenous in some of the regressions. To address this, 2SLS was the estimation method used for these regressions, using the instruments described earlier.

V.B. Regression Results

The OLS and 2SLS coefficients are reported in Table 2. To test for stability of results, they were presented with variations in the control variables included in the regression. These variations include reporting regression outcomes with and without the interaction term between the decentralization and governance indicators, with and without regional dummies, and separately

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using the GGI and number of awards as governance indicators. The table also shows the results of the endogeneity test for the decentralization variable. Both OLS and 2SLS runs used robust standard errors.

The instruments used passed the exogeneity test in all 2SLS regressions. They also passed the relevance test – *eodbscore* and *codbscore* were jointly highly significant when the decentralization variable was regressed on them. The variable of interest, *localsource*, turned endogenous in only two regression models – those where GGI was used as the governance indicator and regional dummies were not included among the control variables. For these regression equations, we use and interpret the 2SLS results; for the rest, OLS was the more appropriate method. Indeed, when regional dummies were added to the regression, most of them turned out to be significant. It means that many of the unobserved heterogeneities affecting poverty that could possibly be correlated with *localsource* have been transferred out of the error term and incorporated into the regression model.

The decentralization variable, *localsource*, consistently showed negative and significant coefficient across different runs. After controlling for other factors, poverty incidence is lower in cities and municipalities where the local government has greater fiscal autonomy. A one percentage point increase in locally-sourced revenue of the city or municipality expressed as percent share of its total revenue is associated with at least 0.34 percentage point lower poverty incidence. In the regression equations where *localsource* was found to be endogenous, it is negative and significant in both OLS and 2SLS, although the magnitude of the coefficients were much larger (more negative) in the latter.

Most control variables turned out having their expected signs. Depending on the regression equation, higher share of paved roads, higher share of households with electricity, more banks, and lower inflation are associated with lower incidence of poverty. As mentioned earlier, many regional dummies were also statistically significant. This was expected because of the large disparity in development across Philippine regions.

The individual governance variables mostly have negative and significant coefficients, which means that better governance is associated with lower poverty. This was consistent with the literature concluding that good governance and institutions help promote poverty alleviation (Chakravarti, 2005; Tebaldi & Mohan, 2010). The coefficient of the number of awards variable was negative and significant in three of the four regressions it was used. The other governance indicator, GGI, was less consistent – its coefficient was negative and significant in only two of the four regressions it was used.

The coefficient of the interaction term between decentralization and governance is positive and significant in three of the four equations where it was included. Moreover, the coefficients of both decentralization and governance variables are individually significant and negative in these

regressions. This means that individually, decentralization and governance have positive effect on poverty alleviation; but at least one of them tempers the other's effect.

The set of regressions that included the interaction between decentralization and the dummy for third to sixth class municipalities as control variable were reported in Table 3. Note that, unlike in Table 2, not all OLS and 2SLS runs were reported in Table 3. The 2SLS runs were reported only for the equations where the decentralization variable turned endogenous. For those where the decentralization variable turned exogenous, OLS results were reported.

The interaction term between the decentralization indicator and the third to sixth class municipality dummy was negative and significant in six of the eight regressions. This suggests that decentralization, as represented by fiscal autonomy, has a stronger relationship with poverty on lower income municipalities.

The set of regressions that included a squared decentralization term were reported in Table 4. Like in Table 3, not all OLS and 2SLS regressions were reported in Table 4. Only OLS was reported when the endogeneity test shows that the decentralization variable is not endogenous. The squared *localsource* term was consistently positive and significant, and the level and squared terms were consistently jointly significant. This suggests that the relationship between decentralization, as measured by fiscal autonomy, and poverty is not linear. It starts positive at low levels of decentralization, but the marginal effect decreases as decentralization increases.

Table 2. Regression results

VARIABLES	(1) poverty	(2) poverty	(3) poverty	(4) poverty	(5) poverty	(6) poverty	(7) poverty	(8) poverty
localsource	-83.11***	-220.6***	-41.28***	-97.54***	-71.71***	297.5	-40.75***	-63.49
	(7.671)	(85.04)	(4.727)	(30.45)	(6.578)	(1,207)	(4.602)	(113.6)
ggi	-0.0317***	-0.0798**	0.00592	0.0426*	-0.00904*	0.114	0.0188***	0.0337
	(0.00708)	(0.0327)	(0.00546)	(0.0223)	(0.00547)	(0.404)	(0.00491)	(0.0739)
inflation	1.685***	0.650	1.875***	1.138	-0.369	2.388	-0.388	-0.887
	(0.641)	(1.074)	(0.675)	(0.864)	(0.554)	(8.879)	(0.574)	(2.571)
firmsales	2.20e-05**	-3.30e-05	3.97e-05**	1.93e-05	3.19e-06	0.000159	1.63e-05	6.64e-06
	(1.09e-05)	(4.11e-05)	(1.80e-05)	(2.36e-05)	(6.84e-06)	(0.000509)	(1.10e-05)	(4.90e-05)
electricity	-0.0482***	-0.0170	-0.0577***	-0.0454***	-0.0642***	-0.123	-0.0657***	-0.0581
	(0.0154)	(0.0250)	(0.0158)	(0.0167)	(0.0174)	(0.192)	(0.0183)	(0.0427)
pavedroads	-3.022*	-3.018	-2.095	0.158	-6.292***	-7.415	-5.868***	-5.188
	(1.696)	(1.993)	(1.812)	(2.375)	(1.424)	(5.169)	(1.471)	(3.749)
banks	-0.574***	-0.164	-0.641***	-0.326	-0.311***	-1.412	-0.353***	-0.217
	(0.144)	(0.344)	(0.158)	(0.238)	(0.106)	(3.593)	(0.119)	(0.677)
popn	0.0486***	0.0783***	0.0467***	0.0762***	0.0350***	-0.0346	0.0323***	0.0403
	(0.0145)	(0.0273)	(0.0156)	(0.0260)	(0.0112)	(0.234)	(0.0122)	(0.0432)
localsource_ggi	0.147***	0.459**			0.107***	-0.704		
	(0.0190)	(0.198)			(0.0161)	(2.662)		

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
regn_armm								
regn_car					-0.795	14.53	-0.582	-2.910
					(1.794)	(50.03)	(1.905)	(11.85)
regn_ncr								
regn_i					-0.958	-3.085	-2.146	-3.309
					(1.491)	(8.632)	(1.479)	(6.144)
regn_ii					-4.227***	7.552	-4.341***	-6.630
					(1.466)	(38.23)	(1.532)	(11.35)
regn_iii					-5.675***	-3.236	-5.438***	-5.538***
					(1.309)	(8.637)	(1.430)	(1.649)
regn_ivb					-2.926	7.220	-2.247	-3.117
					(2.218)	(33.74)	(2.308)	(4.816)
regn_ix								
regn_v					15.00***	26.04	15.87***	15.13***
					(1.947)	(36.38)	(2.005)	(4.303)
regn_vi					-1.803	2.505	-1.201	-1.180
					(1.747)	(15.07)	(1.927)	(2.017)
regn_vii					9.872***	4.630	9.694***	10.36***
					(1.926)	(17.75)	(2.024)	(3.922)
regn_viii					17.26***	38.75	18.92***	17.46**
					(1.921)	(70.39)	(2.029)	(7.827)
regn_x					18.16***	21.90	18.64***	18.62***
					(2.246)	(13.96)	(2.327)	(2.259)
regn_xi					13.36***	4.531	12.74***	13.44***
					(2.868)	(30.52)	(2.997)	(4.196)
regn_xii					18.35***	31.91	19.41***	18.46***
					(1.772)	(44.41)	(1.861)	(5.188)
regn_xiii					16.33***	24.47	16.85***	16.13***
					(2.122)	(27.12)	(2.173)	(4.295)
regn_nir					8.852***	10.51	9.047***	9.021***
					(2.853)	(9.316)	(3.132)	(2.957)
mindanao	14.26***	13.91***	14.63***	15.17***				
	(1.156)	(1.403)	(1.191)	(1.321)				
Constant	34.97***	54.85***	26.28***	27.99***	38.11***	-22.62	31.72***	33.86***
	(3.252)	(13.59)	(3.208)	(3.801)	(3.223)	(197.7)	(3.183)	(11.35)
Observations	515	513	515	513	515	513	515	513
R-squared	0.583	0.309	0.544	0.414	0.743		0.724	0.705
Method	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS
Endogeneity Test	Endogenous		Endogenous		Not Endogenous		Not Endogenous	

Notes: Robust standard errors in parenthesis; *significant at 10%, **significant at 5%, ***significant at 1%

Table 2. Continued

VARIABLES	(9) poverty	(10) poverty	(11) poverty	(12) poverty	(13) poverty	(14) poverty	(15) poverty	(16) poverty
localsource	-42.67***	-67.01***	-40.52***	-56.71***	-37.51***	-71.54*	-34.44***	-68.34
	(3.737)	(19.40)	(3.319)	(14.68)	(3.773)	(40.27)	(3.434)	(86.06)
awards	-0.335*	-0.719**	-0.0810	0.0512	-0.626***	-0.977**	-0.232**	0.105
	(0.190)	(0.366)	(0.0981)	(0.163)	(0.153)	(0.441)	(0.0989)	(0.869)
inflation	1.467**	0.909	1.496***	1.090*	-0.602	-1.382	-0.560	-1.395
	(0.569)	(0.705)	(0.570)	(0.661)	(0.545)	(1.057)	(0.548)	(2.155)
firmsales	1.87e-05	1.18e-05	2.76e-05**	3.74e-05**	5.21e-06	-1.04e-05	1.84e-05*	2.50e-05
	(1.19e-05)	(1.90e-05)	(1.23e-05)	(1.72e-05)	(1.08e-05)	(2.80e-05)	(1.05e-05)	(2.21e-05)
electricity	-0.0784***	-0.0646***	-0.0796***	-0.0704***	-0.0872***	-0.0653**	-0.0890***	-0.0671
	(0.0148)	(0.0172)	(0.0148)	(0.0156)	(0.0163)	(0.0312)	(0.0164)	(0.0580)
pavedroads	-3.711**	-1.494	-3.558**	-1.469	-5.695***	-3.117	-5.514***	-2.176
	(1.692)	(2.415)	(1.686)	(2.499)	(1.488)	(3.437)	(1.492)	(8.701)
banks	-0.00138	-0.0114	-0.000256	-0.00648	0.0118	0.00904	0.0134	0.0135
	(0.0216)	(0.0266)	(0.0215)	(0.0242)	(0.0208)	(0.0259)	(0.0194)	(0.0206)
popn	-0.00596	0.00468	-0.00800**	-0.00286	-0.00859**	0.00171	-0.0117***	-0.00547
	(0.00421)	(0.0108)	(0.00395)	(0.00678)	(0.00391)	(0.0134)	(0.00357)	(0.0160)
localsource_award	0.706	2.217			1.070***	2.806		
	(0.449)	(1.372)			(0.401)	(2.084)		
regn_armm					10.10***	2.101	10.52***	1.966
					(1.334)	(9.607)	(1.316)	(21.75)
regn_car					0.871	-3.421	0.839	-4.233
					(1.834)	(5.381)	(1.837)	(12.93)
regn_ncr					3.057	7.542	3.225	8.773
					(2.241)	(6.279)	(2.368)	(14.44)
regn_i					-2.342*	-5.231	-2.329*	-5.677
					(1.296)	(3.763)	(1.299)	(8.568)
regn_ii					-3.516**	-7.065	-3.723***	-8.310
					(1.390)	(4.524)	(1.387)	(11.63)
regn_iii					-4.579***	-6.027**	-4.491***	-6.015
					(1.300)	(2.461)	(1.294)	(4.147)
regn_ivb					-4.580**	-6.874**	-4.676**	-7.546
					(2.033)	(3.486)	(2.052)	(7.673)
regn_ix					21.74***	18.88***	21.76***	18.48**
					(2.218)	(4.139)	(2.211)	(8.593)
regn_v					14.08***	10.23**	13.85***	8.927
					(1.772)	(4.979)	(1.789)	(12.64)
regn_vi					-1.794	-3.504	-1.705	-3.540
					(1.850)	(2.918)	(1.862)	(5.053)
regn_vii					8.170***	7.627***	8.163***	7.518***
					(1.720)	(2.009)	(1.735)	(2.558)
regn_viii					15.78***	11.16*	15.74***	10.28
					(2.014)	(5.900)	(2.028)	(13.98)

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
regn_x					17.38***	15.46***	17.38***	15.14**
					(2.131)	(3.084)	(2.146)	(6.064)
regn_xi					8.341***	8.045***	8.447***	8.294***
					(2.435)	(2.666)	(2.405)	(2.642)
regn_xii					18.75***	15.80***	18.62***	14.92
					(1.716)	(3.949)	(1.732)	(9.532)
regn_xiii					14.24***	11.68***	14.27***	11.34
					(2.137)	(3.762)	(2.138)	(7.775)
regn_nir					7.105***	4.841	6.736***	3.390
					(2.114)	(3.412)	(2.146)	(8.850)
mindanao	14.28***	14.15***	14.32***	14.29***				
	(1.069)	(1.049)	(1.072)	(1.048)				
Constant	32.30***	36.52***	31.66***	34.02***	38.84***	46.92***	37.99***	45.83**
	(2.596)	(4.216)	(2.550)	(3.306)	(2.802)	(9.865)	(2.758)	(19.90)
Observations	664	663	664	663	664	663	664	663
R-squared	0.600	0.569	0.599	0.582	0.727	0.673	0.724	0.662
Method	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS
Endogeneity Test	Not Endogenous		Not Endogenous		Not Endogenous		Not Endogenous	

Notes: Robust standard errors in parenthesis; *significant at 10%, **significant at 5%, ***significant at 1%

Table 3. Regression results with interaction term between decentralization and dummy for third to sixth class municipalities.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
VARIABLES	poverty	poverty	poverty	poverty	poverty	poverty	poverty	poverty
localsource	-229.8**	-95.64***	-66.97***	-38.15***	-41.82***	-39.69***	-37.19***	-34.19***
	(104.6)	(33.52)	(6.532)	(4.449)	(3.625)	(3.235)	(3.690)	(3.348)
ggi	-0.0811**	0.0412*	-0.00859	0.0160***				
	(0.0371)	(0.0242)	(0.00538)	(0.00472)				
awards					-0.418**	-0.166	-0.681***	-0.297***
					(0.196)	(0.105)	(0.155)	(0.104)
inflation	0.459	1.195	-0.315	-0.313	1.589***	1.618***	-0.551	-0.509
	(1.298)	(0.925)	(0.553)	(0.568)	(0.573)	(0.573)	(0.549)	(0.551)
firmsales	-4.12e-05	2.13e-05	7.93e-06	2.11e-05*	1.86e-05	2.73e-05**	4.80e-06	1.76e-05
	(5.34e-05)	(2.49e-05)	(7.27e-06)	(1.17e-05)	(1.22e-05)	(1.27e-05)	(1.10e-05)	(1.09e-05)
electricity	-0.0150	-0.0458***	-0.0665***	-0.0687***	-0.0795***	-0.0807***	-0.0888***	-0.0907***
	(0.0284)	(0.0169)	(0.0176)	(0.0182)	(0.0147)	(0.0147)	(0.0163)	(0.0164)
pavedroads	-3.080	0.113	-6.229***	-5.834***	-4.054**	-3.903**	-5.941***	-5.766***
	(2.025)	(2.392)	(1.417)	(1.455)	(1.681)	(1.674)	(1.473)	(1.476)
banks	-0.173	-0.325	-0.309***	-0.346***	0.00603	0.00715	0.0189	0.0206
	(0.364)	(0.235)	(0.105)	(0.117)	(0.0221)	(0.0223)	(0.0215)	(0.0206)

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	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
popn	0.0951**	0.0711**	0.0240**	0.0178	-0.00904**	-0.0111***	-0.0113***	-0.0143***
	(0.0455)	(0.0322)	(0.0112)	(0.0123)	(0.00418)	(0.00407)	(0.00404)	(0.00386)
localsource_ggi	0.477**		0.0972***					
	(0.239)		(0.0159)					
localsource_award					0.699		1.046***	
					(0.448)		(0.405)	
locsourcetot_3to6mun	18.09	-5.053	-12.98***	-17.53***	-16.24***	-16.26***	-14.19***	-14.37***
	(22.86)	(11.03)	(4.286)	(4.333)	(4.432)	(4.423)	(3.951)	(3.949)
regn_armm							9.125***	9.516***
							(1.338)	(1.325)
regn_car			-1.320	-1.317			0.622	0.588
			(1.760)	(1.847)			(1.799)	(1.802)
regn_ncr							2.903	3.065
							(2.316)	(2.477)
regn_i			-1.475	-2.698*			-2.582**	-2.572**
			(1.440)	(1.420)			(1.246)	(1.250)
regn_ii			-4.698***	-4.963***			-3.830***	-4.036***
			(1.466)	(1.523)			(1.375)	(1.373)
regn_iii			-6.147***	-6.104***			-4.978***	-4.897***
			(1.286)	(1.385)			(1.272)	(1.266)
regn_ivb			-3.629	-3.279			-5.149**	-5.250**
			(2.230)	(2.315)			(2.033)	(2.050)
regn_ix							21.80***	21.83***
							(2.154)	(2.146)
regn_v			14.34***	14.86***			13.61***	13.38***
			(1.946)	(2.013)			(1.772)	(1.788)
regn_vi			-2.087	-1.659			-1.734	-1.646
			(1.732)	(1.873)			(1.792)	(1.806)
regn_vii			9.846***	9.680***			8.273***	8.267***
			(1.917)	(1.998)			(1.709)	(1.723)
regn_viii			16.72***	17.99***			15.12***	15.07***
			(1.917)	(2.007)			(2.003)	(2.015)
regn_x			17.79***	18.08***			17.11***	17.11***
			(2.206)	(2.262)			(2.087)	(2.102)
regn_xi			12.70***	11.92***			8.185***	8.287***
			(2.841)	(2.939)			(2.469)	(2.447)
regn_xii			17.48***	18.10***			17.84***	17.70***
			(1.773)	(1.850)			(1.697)	(1.713)
regn_xiii			15.93***	16.24***			13.98***	14.00***
			(2.103)	(2.141)			(2.137)	(2.138)
regn_nir			8.460***	8.493***			6.679***	6.313***
			(2.864)	(3.108)			(2.089)	(2.119)
mindanao	14.19***	15.07***			14.13***	14.17***		
	(1.415)	(1.369)			(1.066)	(1.069)		
Constant	54.59***	28.34***	39.29***	34.09***	33.26***	32.63***	40.20***	39.38***
	(14.47)	(3.586)	(3.254)	(3.191)	(2.586)	(2.536)	(2.840)	(2.798)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Observations	513	513	515	515	664	664	664	664
R-squared	0.281	0.423	0.747	0.732	0.607	0.605	0.732	0.729
Method	2SLS	2SLS	OLS	OLS	OLS	OLS	OLS	OLS

Notes: Robust standard errors in parenthesis; *significant at 10%, **significant at 5%, ***significant at 1%

Table 4. Regression results with squared decentralization term

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
VARIABLES	poverty	poverty	poverty	poverty	poverty	poverty	poverty	poverty
localsource	-98.81***	-98.18***	-85.88***	-85.51***	-96.71***	-96.73***	-90.98***	-91.09***
	(9.420)	(9.450)	(8.153)	(8.108)	(7.183)	(7.169)	(6.985)	(7.007)
localsource_sqr	78.43***	113.2***	69.23***	86.59***	91.35***	91.15***	90.46***	92.19***
	(23.67)	(16.84)	(19.04)	(12.57)	(9.444)	(9.381)	(9.262)	(9.336)
ggi	-0.0212***	-0.00973*	0.000863	0.00687				
	(0.00634)	(0.00584)	(0.00574)	(0.00482)				
awards					-0.0165	-0.0333	-0.338**	-0.215**
					(0.179)	(0.0964)	(0.145)	(0.0849)
inflation	1.773***	1.846***	-0.366	-0.367	1.549***	1.547***	-0.735	-0.725
	(0.625)	(0.624)	(0.536)	(0.534)	(0.530)	(0.531)	(0.503)	(0.502)
firmsales	2.36e-05	2.76e-05	5.09e-06	7.24e-06	-1.18e-06	-1.69e-06	-6.86e-06	-3.17e-06
	(1.53e-05)	(1.88e-05)	(1.06e-05)	(1.21e-05)	(8.38e-06)	(8.40e-06)	(9.20e-06)	(8.36e-06)
electricity	-0.0481***	-0.0497***	-0.0602***	-0.0594***	-0.0646***	-0.0646***	-0.0797***	-0.0801***
	(0.0152)	(0.0151)	(0.0173)	(0.0172)	(0.0141)	(0.0141)	(0.0152)	(0.0152)
pavedroads	-3.049*	-2.893*	-6.254***	-6.191***	-4.534***	-4.541***	-6.188***	-6.144***
	(1.683)	(1.704)	(1.418)	(1.426)	(1.591)	(1.584)	(1.390)	(1.386)
banks	-0.633***	-0.671***	-0.367***	-0.386***	-0.0213	-0.0213	-0.00367	-0.00347
	(0.141)	(0.144)	(0.104)	(0.106)	(0.0210)	(0.0211)	(0.0217)	(0.0205)
popn	0.0482***	0.0477***	0.0342***	0.0336***	-0.00266	-0.00254	-0.00413	-0.00496
	(0.0144)	(0.0145)	(0.0111)	(0.0112)	(0.00358)	(0.00325)	(0.00391)	(0.00354)
localsource_ggi	0.0637**		0.0323					
	(0.0293)		(0.0268)					
localsource_award					-0.0463		0.333	
					(0.380)		(0.332)	
regn_armm							7.205***	7.273***
							(1.276)	(1.271)
regn_car			-1.626	-1.807			-0.969	-1.014
			(1.731)	(1.711)			(1.648)	(1.644)
regn_ncr							-6.380***	-6.510***
							(2.017)	(2.116)
regn_i			-1.773	-2.128			-2.208*	-2.201*
			(1.453)	(1.393)			(1.208)	(1.206)
regn_ii			-4.392***	-4.448***			-4.162***	-4.236***
			(1.468)	(1.474)			(1.353)	(1.350)
regn_iii			-5.583***	-5.530***			-4.286***	-4.254***

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	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
			(1.290)	(1.315)			(1.120)	(1.118)
regn_ivb			-2.494	-2.300			-4.445**	-4.471**
			(2.145)	(2.127)			(1.828)	(1.828)
regn_ix							21.36***	21.36***
							(2.015)	(2.008)
regn_v			14.80***	14.86***			13.73***	13.65***
			(1.890)	(1.881)			(1.633)	(1.629)
regn_vi			-1.724	-1.628			-1.917	-1.893
			(1.712)	(1.713)			(1.613)	(1.613)
regn_vii			9.807***	9.767***			8.917***	8.929***
			(1.916)	(1.925)			(1.623)	(1.624)
regn_viii			16.92***	17.04***			14.17***	14.12***
			(1.939)	(1.961)			(1.942)	(1.942)
regn_x			18.00***	18.02***			16.99***	16.99***
			(2.211)	(2.210)			(1.970)	(1.970)
regn_xi			13.27***	13.17***			9.386***	9.438***
			(2.883)	(2.891)			(2.367)	(2.349)
regn_xii			18.25***	18.35***			17.95***	17.90***
			(1.728)	(1.730)			(1.561)	(1.563)
regn_xiii			16.29***	16.34***			14.06***	14.06***
			(2.099)	(2.097)			(2.027)	(2.024)
regn_nir			9.000***	9.062***			7.072***	6.962***
			(2.787)	(2.803)			(1.922)	(1.916)
mindanao	14.27***	14.34***			14.14***	14.14***		
	(1.147)	(1.144)			(1.014)	(1.013)		
Constant	35.10***	33.59***	38.35***	37.60***	35.98***	36.01***	43.84***	43.68***
	(3.219)	(3.257)	(3.178)	(3.138)	(2.478)	(2.462)	(2.659)	(2.642)
Observations	515	515	515	515	664	664	664	664
R-squared	0.592	0.589	0.750	0.749	0.639	0.639	0.759	0.758
Method	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS

Notes: Robust standard errors in parenthesis; *significant at 10%, **significant at 5%, ***significant at 1%

V.C. Discussions and Implications

The results suggest that decentralization, as represented by fiscal autonomy — measured by the share of locally-sourced revenues to total local government revenue —, is associated with less poverty. Controlling for other factors, poverty incidence is lower in cities and municipalities where the local governments have greater capacity to raise their own revenues rather than depend on revenue share transfers from the central government. Earlier empirical studies on the effect of decentralization on development outcomes have mixed results, and the findings in this paper cohere with those that found a positive relationship. There is no clear trend on what characteristics or types of countries does a positive or a negative effect appeared. In the literature review, however, the only study that used fiscal autonomy to measure decentralization showed it has no significant result using state-level from the United States (Akai & Sakata, 2002).

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Although results show that decentralization, as measured by fiscal autonomy, is indeed associated with lower poverty, the sign and significance of the squared decentralization term suggests that the effect of decentralization on poverty is not linear. At low levels of decentralization, it positively affects poverty alleviation. This positive marginal effect, however, diminishes as the level of decentralization increases until it reaches a certain optimal point. Beyond this optimal point, further decentralization becomes associated with higher poverty incidence.

A possible explanation for this non-linear relationship is that local government programs on poverty alleviation are only effective up to a certain point; beyond which, national government programs become more crucial. Some social services that have been shown to contribute to poverty reduction and promoting development such as infrastructure development (Marinho et al., 2017; Seetanah et al., 2009) and improvements in the quality of education and health services (Anand & Ravallion, 1993; Psacharopoulos, 1988; Squire, 1993) are better managed by the central government because they require more resources and economies of scale. As earlier discussed, one disadvantage of decentralization is the ability of the central government to provide public goods more efficiently and even more effectively because of better access to resources and economies of scale (Bahl, 1999; Faguet, 2004). Another possible explanation for the non-linear relationship is migration. Because more fiscally-autonomous local governments are usually located in richer and more economically dynamic cities, they attract migrants from poorer municipalities who are looking for work. This influx of migrants can then increase the city's poverty incidence.

The results also suggest that, as expected, governance has a positive association with poverty reduction. After controlling for other factors, poverty incidence is generally lower in cities and municipalities with better governance. The role of governance and institutional quality has been documented in the literature for its role on poverty alleviation (Chakravarti, 2005; Tebaldi & Mohan, 2010), and findings in this study are no different. Governance also plays a prominent role in the potential of decentralization to affect poverty as discussed in the research framework. Although the framework argues that good governance is a requirement for decentralization to be effective in poverty-alleviation, existing literature and results of this paper show that governance in itself is also associated with lower poverty. Von Braun and Grote (2002) also argues that the effect of decentralization on poverty is through its effect on governance. Decentralization improves governance by improving accountability and targeting of public services; which in turn leads to poverty reduction.

While decentralization and governance positively affect poverty alleviation individually, testing for interaction effects is important given the possible role of governance on the effect of decentralization on development (Jutting et al., 2004; Steiner, 2005). Results suggest that decentralization and governance 'crowd out' each other in alleviating poverty. That is,

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decentralization moderates the effect of good governance on reducing poverty; and/or good governance moderates the effect of decentralization. This means that although governance has a positive effect on poverty reduction, decentralization can weaken this positive effect. Conversely, although decentralization has a positive effect on poverty alleviation, governance can weaken this positive effect. However, drawing from literature and the earlier discussion on the role of governance on how decentralization affects development, it is more likely that only the former holds – that decentralization moderates the effect of good governance on reducing poverty.

Further results suggest that the marginal effect of decentralization on poverty is greater on poorer municipalities than it is on higher-income ones. This is not surprising – when poverty incidence is high, poverty-alleviating measures have 'more poverty' to address than when poverty is low.

It must be noted that this paper covered only one aspect of decentralization, which was the fiscal autonomy of local governments or their ability to raise their own funds. Testing for the effect of other aspects of decentralization on poverty is encouraged and is reserved for further studies. Nonetheless, as explained earlier, there are reasons that this indicator is an appropriate measure of decentralization when using Philippine city and municipal data. On top of this, the local governments' ability to generate their own revenues to fund their functions and responsibilities is one of the key conditions for decentralization to affect development (Bahl, 1999; Manor, 1999). When a city or municipality is more fiscally independent, it has more freedom and more resources to implement its own development and poverty-reduction programs.

In the early years of the Philippine Local Government Code (LGC), Manasan (1992) projected that some low-income local government units (LGUs) may find it difficult to fund the cost of responsibilities transferred from the national government. More than two decades later, Capuno (2017) argues that many LGUs are still dependent on the national government to fund these devolved functions; and this affects the delivery of public services. Shen et al. (2012) observed that a similar situation occurs in China, wherein expenditure functions are not matched by enough revenues, creating vertical fiscal imbalance and limiting the effectiveness of local governments.

Another policy implication of the results is when implementing or designing a decentralization program with the objective of reducing poverty, increasing the functions and expenditure assignments of local governments is not enough. Local governments should also have the capability to generate their own revenues to fund these responsibilities.

V.D. Robustness Check

As robustness check, another measure of fiscal autonomy was used, and then the same econometric methodology was applied. The second measure of fiscal autonomy was own-sourced revenue expressed as ratio of total local government expenditures (*locsourseexp)*. The difference of this variable with the earlier fiscal autonomy measure is the denominator – own-sourced revenue was expressed as ratio of expenditures rather than of total revenues. It measures how much of the local government's spending are funded by revenues that are generated by the local government themselves, rather than by transfers. Results show that the coefficient of *locsourceexp* has a negative and significant coefficient in all of the relevant runs. The signs of the coefficients of the interactions terms were also the same (see Appendix 1).

VI. Summary and Conclusion

The basic economic rationale behind decentralization is that local governments have information advantage over the central government on the needs and preferences of the consumers. However, the primary disadvantage is the central government can be more efficient or effective in providing public services because of economies of scale and better access to resources. Thus, the literature argues that decentralization can indeed be a tool for poverty alleviation but only under certain conditions. This study looked at the relationship between decentralization, as represented by fiscal autonomy and measured by the share of locally-sourced revenues to total local government revenue, and poverty incidence using data from Philippine cities and municipalities. It also attempted to determine if this relationship varies across city and municipal income levels, and if the relationship is linear. The study also looked at possible interaction effects between decentralization and good governance on poverty, given that some literature argues that good governance is a condition for decentralization to contribute to poverty alleviation.

The results suggest that our measure of decentralization has a positive effect on poverty alleviation. Holding other factors constant, poverty incidence is lower in cities and municipalities that are more fiscally autonomous, or those whose local governments are more able to generate their own revenues rather than relying on revenue share transfers from the national government. However, this relationship is not linear – it starts positive at low levels of decentralization and the marginal effect diminishes as decentralization increases. There is an optimal level of decentralization, above which, further decentralization has adverse effects on poverty reduction.

In addition, we found evidence that decentralization 'crowds out' or moderates the positive effect of good governance on poverty reduction. Moreover, the marginal effect of

decentralization on poverty is greater in lower-income municipalities than in higher-income cities and municipalities.

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Appendix 1. Regression results with *locsourseexp* as the dependent variable

VARIABLES	(1) poverty	(2) poverty	(3) poverty	(4) poverty	(5) poverty	(6) poverty	(7) poverty	(8) poverty	(9) poverty	(10) poverty	(11) poverty	(12) poverty
locsourseexp	-164.2**	-175.5**	-50.57***	-89.15***	-159.8***	-91.39**	-49.58***	-54.66***	-46.58***	-22.81***	-51.51***	-20.90***
	(81.86)	(70.48)	(6.146)	(32.60)	(53.99)	(37.05)	(5.043)	(5.326)	(5.171)	(3.813)	(5.198)	(3.676)
locsourseexp_sqr		69.08*			117.9***			22.93***			31.97***	
		(36.53)			(45.50)			(6.444)			(5.248)	
ggi	-0.0647**	-0.0349**	-0.0291***	0.0728**	0.0117	0.0754*	-0.0100*	0.000105	-0.00992*	0.0164***	0.00920*	0.0136***
	(0.0285)	(0.0137)	(0.00679)	(0.0369)	(0.0169)	(0.0415)	(0.00543)	(0.00550)	(0.00538)	(0.00522)	(0.00495)	(0.00507)
awards												
inflation	0.516	0.637	1.864***	0.742	0.891	0.652	-0.301	-0.314	-0.251	-0.241	-0.308	-0.166
	(1.310)	(1.133)	(0.670)	(1.092)	(0.951)	(1.212)	(0.569)	(0.556)	(0.569)	(0.594)	(0.555)	(0.588)
firmsales	-4.15e-05	-2.44e-05	2.87e-05*	1.81e-05	4.17e-06	1.51e-05	2.35e-06	7.76e-06	6.31e-06	2.15e-05	1.36e-05	2.59e-05
	(5.34e-05)	(3.81e-05)	(1.57e-05)	(3.00e-05)	(2.49e-05)	(3.29e-05)	(8.77e-06)	(1.07e-05)	(9.77e-06)	(1.50e-05)	(1.25e-05)	(1.58e-05)
electricity	-0.0148	-0.0162	-0.0512***	-0.0387*	-0.0247	-0.0379*	-0.0661***	-0.0637***	-0.0684***	-0.0684***	-0.0632***	-0.0719***
	(0.0302)	(0.0264)	(0.0161)	(0.0203)	(0.0220)	(0.0211)	(0.0181)	(0.0180)	(0.0183)	(0.0192)	(0.0180)	(0.0192)
pavedroads	-3.133	-2.782	-3.240*	1.554	-1.806	1.622	-6.479***	-6.397***	-6.433***	-6.039***	-6.280***	-6.013***
	(2.059)	(2.075)	(1.744)	(3.099)	(2.141)	(3.204)	(1.443)	(1.434)	(1.440)	(1.501)	(1.440)	(1.487)
banks	-0.0860	-0.280	-0.593***	-0.119	-0.476	-0.115	-0.331***	-0.390***	-0.336***	-0.393***	-0.425***	-0.393***
	(0.457)	(0.366)	(0.153)	(0.368)	(0.293)	(0.379)	(0.114)	(0.110)	(0.113)	(0.132)	(0.113)	(0.131)
popn	0.106**	0.0974***	0.0431**	0.108***	0.0862***	0.116**	0.0449***	0.0412***	0.0363***	0.0357***	0.0380***	0.0226
	(0.0436)	(0.0355)	(0.0183)	(0.0380)	(0.0296)	(0.0520)	(0.0130)	(0.0120)	(0.0139)	(0.0135)	(0.0116)	(0.0145)
localsource_ggi	0.321*	0.177*	0.0905***				0.0797***	0.0335**	0.0742***			
	(0.171)	(0.0988)	(0.0129)				(0.0107)	(0.0165)	(0.0108)			
localsource_award												
localsource_3to6			-8.757**			6.465			-7.401**			-12.17***
			(4.237)			(13.20)			(3.430)			(3.448)
regn_armm												
regn_car							0.823	-0.247	0.490	1.175	-0.601	0.588
							(1.781)	(1.752)	(1.766)	(1.941)	(1.738)	(1.892)
regn_ncr												

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	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
regn_i							0.149	-0.668	-0.135	-1.109	-1.232	-1.433
							(1.533)	(1.508)	(1.502)	(1.509)	(1.457)	(1.469)
regn_ii							-3.354**	-3.897**	-3.669**	-3.151**	-4.072***	-3.692**
							(1.508)	(1.518)	(1.502)	(1.586)	(1.530)	(1.566)
regn_iii							-6.466***	-6.461***	-6.755***	-5.572***	-6.287***	-6.148***
							(1.366)	(1.360)	(1.345)	(1.560)	(1.402)	(1.495)
regn_ivb							-2.403	-2.344	-2.915	-1.494	-2.146	-2.438
							(2.338)	(2.274)	(2.359)	(2.439)	(2.255)	(2.458)
regn_ix												
regn_v							15.59***	15.31***	15.13***	16.68***	15.41***	15.79***
							(1.999)	(1.950)	(1.996)	(2.074)	(1.934)	(2.080)
regn_vi							-1.504	-1.724	-1.733	-0.749	-1.666	-1.211
							(1.836)	(1.816)	(1.837)	(1.985)	(1.816)	(1.952)
regn_vii							10.39***	10.09***	10.39***	10.03***	9.893***	10.05***
							(1.965)	(1.982)	(1.964)	(2.063)	(1.999)	(2.046)
regn_viii							18.19***	17.68***	17.81***	20.19***	17.86***	19.34***
							(1.968)	(2.000)	(1.969)	(2.087)	(2.031)	(2.069)
regn_x							18.24***	17.98***	17.95***	18.86***	17.99***	18.31***
							(2.302)	(2.267)	(2.276)	(2.419)	(2.271)	(2.360)
regn_xi							13.48***	13.23***	12.99***	12.76***	12.99***	12.03***
							(2.927)	(2.928)	(2.926)	(3.110)	(2.944)	(3.069)
regn_xii							18.40***	18.14***	17.80***	20.01***	18.36***	18.85***
							(1.851)	(1.812)	(1.855)	(1.959)	(1.808)	(1.947)
regn_xiii							17.15***	16.63***	16.90***	17.87***	16.57***	17.37***
							(2.276)	(2.258)	(2.271)	(2.292)	(2.246)	(2.281)
regn_nir							8.916***	8.757***	8.652***	9.306***	8.770***	8.827***
							(3.019)	(2.979)	(3.039)	(3.322)	(3.013)	(3.308)
mindanao	13.47***	13.49***	13.88***	15.33***	13.86***	15.49***						
	(1.506)	(1.490)	(1.187)	(1.583)	(1.430)	(1.702)						
Constant	51.39***	50.15***	33.38***	24.49***	43.05***	23.81***	36.33***	36.45***	37.18***	29.39***	35.16***	31.57***
	(14.87)	(11.84)	(3.321)	(4.248)	(8.014)	(4.334)	(3.273)	(3.225)	(3.301)	(3.254)	(3.179)	(3.285)
Observations	513	513	515	513	513	513	515	515	515	515	515	515
R-squared	0.224	0.228	0.563	0.142	0.257	0.118	0.730	0.738	0.733	0.704	0.736	0.711

Notes: Robust standard errors in parenthesis; *significant at 10%, **significant at 5%, ***significant at 1%

VARIABLES	(13) poverty	(14) poverty	(15) poverty	(16) poverty	(17) poverty	(18) poverty	(19) poverty	(20) poverty	(21) poverty	(22) poverty	(23) poverty	(24) poverty
locsourseexp	-24.29***	-125.4***	-51.05***	-45.69***	-123.6***	-46.61***	-20.78***	-51.25***	-20.55***	-19.37***	-51.11***	-19.18***
	(2.768)	(44.07)	(15.77)	(12.74)	(43.11)	(12.45)	(2.797)	(4.456)	(2.738)	(2.503)	(4.388)	(2.441)
locsourseexp_sqr		86.78**			86.36**			30.86***			31.14***	
		(35.58)			(35.46)			(3.887)			(3.978)	
ggi												
awards	-0.294	0.221	-0.953**	0.0829	0.413	0.0422	-0.584***	-0.237	-0.631***	-0.312***	-0.155	-0.370***
	(0.186)	(0.289)	(0.405)	(0.183)	(0.274)	(0.194)	(0.156)	(0.154)	(0.158)	(0.0989)	(0.0991)	(0.104)
inflation	1.737***	0.917	0.989	1.023	0.948	1.049	-0.447	-0.613	-0.404	-0.420	-0.607	-0.378
	(0.591)	(0.760)	(0.802)	(0.740)	(0.748)	(0.751)	(0.566)	(0.524)	(0.568)	(0.566)	(0.523)	(0.568)
firmsales	2.63e-05*	-2.78e-05	1.38e-05	6.07e-05**	-1.84e-05	6.21e-05**	1.34e-05	-4.05e-07	1.33e-05	2.58e-05**	3.07e-06	2.52e-05**
	(1.37e-05)	(3.46e-05)	(2.24e-05)	(2.46e-05)	(2.91e-05)	(2.46e-05)	(1.21e-05)	(1.04e-05)	(1.24e-05)	(1.20e-05)	(8.28e-06)	(1.23e-05)
electricity	-0.0798***	-0.0277	-0.0567***	-0.0596***	-0.0289	-0.0592***	-0.0919***	-0.0792***	-0.0937***	-0.0930***	-0.0794***	-0.0948***
	(0.0155)	(0.0273)	(0.0192)	(0.0179)	(0.0268)	(0.0178)	(0.0171)	(0.0158)	(0.0170)	(0.0171)	(0.0158)	(0.0170)
pavedroads	-4.604***	-1.633	-1.242	-0.531	-1.581	-0.510	-6.217***	-5.885***	-6.435***	-6.132***	-5.858***	-6.356***
	(1.744)	(2.459)	(2.802)	(2.924)	(2.464)	(2.910)	(1.520)	(1.412)	(1.506)	(1.524)	(1.410)	(1.509)
banks	-0.00866	-0.0933	-0.0247	-0.0318	-0.0932	-0.0282	0.00427	-0.0182	0.0104	0.00371	-0.0185	0.00998
	(0.0257)	(0.0610)	(0.0335)	(0.0349)	(0.0575)	(0.0357)	(0.0236)	(0.0244)	(0.0245)	(0.0234)	(0.0239)	(0.0246)
popn	-0.00536	0.0137	0.0139	0.00689	0.0117	0.00566	-0.00687*	-0.00508	-0.00933**	-0.00930**	-0.00577*	-0.0117***
	(0.00453)	(0.0123)	(0.0155)	(0.0104)	(0.0102)	(0.0107)	(0.00415)	(0.00415)	(0.00431)	(0.00392)	(0.00345)	(0.00418)
localsource_ggi												
localsource_award	0.264	0.387	1.920*				0.518*	0.154	0.498*			
	(0.304)	(0.632)	(1.083)				(0.284)	(0.290)	(0.286)			
localsource_3to6			-7.933			-8.042*			-9.880***			-10.02***
			(4.944)			(4.724)			(3.089)			(3.078)
regn_armm							12.09***	8.842***	11.24***	12.35***	8.888***	11.48***
							(1.369)	(1.301)	(1.375)	(1.341)	(1.289)	(1.349)
regn_car							2.385	0.463	2.249	2.297	0.421	2.162
							(1.866)	(1.683)	(1.836)	(1.867)	(1.678)	(1.836)
regn_ncr							0.432	-2.162	0.305	0.544	-2.153	0.411
							(2.205)	(1.678)	(2.305)	(2.335)	(1.717)	(2.452)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
regn_i							-1.340	-1.313	-1.425	-1.362	-1.319	-1.448
							(1.331)	(1.263)	(1.296)	(1.333)	(1.260)	(1.297)
regn_ii							-2.489*	-3.726***	-2.778*	-2.677*	-3.791***	-2.962**
							(1.437)	(1.380)	(1.420)	(1.429)	(1.376)	(1.414)
regn_iii							-4.608***	-4.805***	-4.953***	-4.556***	-4.791***	-4.908***
							(1.413)	(1.230)	(1.384)	(1.397)	(1.230)	(1.369)
regn_ivb							-3.956*	-3.947**	-4.463**	-4.025*	-3.967**	-4.536**
							(2.155)	(1.965)	(2.168)	(2.161)	(1.966)	(2.172)
regn_ix							22.63***	21.97***	22.73***	22.62***	21.96***	22.72***
							(2.286)	(2.074)	(2.229)	(2.273)	(2.069)	(2.216)
regn_v							15.05***	14.05***	14.66***	14.86***	13.98***	14.46***
							(1.828)	(1.708)	(1.831)	(1.836)	(1.708)	(1.837)
regn_vi							-1.330	-1.680	-1.292	-1.363	-1.693	-1.324
							(1.869)	(1.682)	(1.828)	(1.876)	(1.684)	(1.835)
regn_vii							8.825***	9.204***	8.965***	8.785***	9.196***	8.928***
							(1.768)	(1.662)	(1.759)	(1.773)	(1.660)	(1.764)
regn_viii							17.28***	15.41***	16.70***	17.25***	15.38***	16.66***
							(2.027)	(1.970)	(2.020)	(2.027)	(1.969)	(2.018)
regn_x							17.72***	17.14***	17.45***	17.67***	17.12***	17.40***
							(2.230)	(2.042)	(2.190)	(2.234)	(2.040)	(2.193)
regn_xi							7.988***	9.578***	7.880***	8.036***	9.605***	7.925***
							(2.503)	(2.409)	(2.532)	(2.468)	(2.397)	(2.503)
regn_xii							19.31***	18.16***	18.51***	19.18***	18.11***	18.36***
							(1.801)	(1.631)	(1.787)	(1.807)	(1.636)	(1.791)
regn_xiii							15.12***	14.36***	14.95***	15.10***	14.35***	14.92***
							(2.237)	(2.143)	(2.254)	(2.230)	(2.140)	(2.247)
regn_nir							7.505***	7.001***	7.152***	7.193***	6.906***	6.848***
							(2.249)	(2.056)	(2.231)	(2.256)	(2.050)	(2.235)
mindanao	14.09***	13.67***	13.62***	13.86***	13.70***	13.75***						
	(1.108)	(1.094)	(1.114)	(1.106)	(1.088)	(1.109)						
Constant	30.07***	42.26***	36.52***	33.55***	41.71***	34.43***	36.49***	40.38***	37.70***	35.98***	40.27***	37.24***
	(2.644)	(6.495)	(4.295)	(3.475)	(6.203)	(3.386)	(2.859)	(2.670)	(2.904)	(2.823)	(2.642)	(2.870)
Observations	664	663	663	663	663	663	664	664	664	664	664	664
R-squared	0.574	0.474	0.488	0.500	0.481	0.496	0.710	0.746	0.714	0.708	0.746	0.713

Notes: Robust standard errors in parenthesis; *significant at 10%, **significant at 5%, ***significant at 1%