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Quality of government and economic growth at the municipal level: Evidence from Spain

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Abstract

This paper analyzes the relationship between quality of government and economic growth at the municipal level in 1,820 Spanish municipalities during the period 2008–2015. At this level of dis- aggregation, the literature is virtually non-existent due to severe data constraints. To address this limitation, we proxy institutional quality with a measure of local government efficiency, which provides an accurate indicator of how good local authorities are at managing their budgets. This variable is expected to be highly correlated with other more traditional quality of government indicators such as corruption. After computing our measure, we then use it in a growth regression framework. We find a preponderant positive effect for local government quality on income per capita growth, which is robust to a wide variety of scenarios. Our findings also suggest that increases in local government quality are particularly rewarding for the poorest municipalities and in crisis times.

Keywords: economic growth; efficiency; quality of government; municipalities

JEL classification: D04, E02, H7, H11, O43

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Abstract

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1. Introduction

Institutions have been recognized as a central factor to explain economic performance, particularly by prominent scholars such as Douglas North, Oliver Williamson and Daron Acemoglu, among others (North, 1990, 1994, 1989; Williamson, 1985, 1983, 1979; Acemoglu et al., 2005). Institutions are understood as the rules and norms that govern economic systems, and embody the structure of incentives in societies via the creation of markets and other growth-enhancing activities (Fernández and Tamayo, 2017). Indeed, the relevance of the contributions to the field has been substantial, showing positive views on institutions as a fundamental driver of economic growth (Jones, 2003; North, 1981; Easterly and Levine, 2003; Rodrik et al., 2004; Clague et al., 1999; Keefer and Shirley, 2000; Keefer and Knack, 2008; La Porta et al., 2008; Acemoglu et al., 2005).

Regardless on how institutions may affect economic growth, an important issue is how exactly we define and measure institutions and, more specifically, quality and government effectiveness (La Porta et al., 1999). Indeed, poor quality of government in the form of corruption and lack of transparency is usually strongly associated with either the absence of institutions or poor-quality and inefficient institutions. More specifically, some seminal papers (La Porta et al., 1999) have evaluated government performance using measures of government intervention, public sector efficiency, public goods' provision, size of government, and political freedom. In more recent contributions such as, for instance, Charron et al. (2019), the dimensions measured are similar—control of corruption, the rule of law, government effectiveness and protection of property rights. Yet, according to Kaufmann et al. (2011), regardless of the type of data or methodology employed to construct the different indicators of quality of government, they are usually highly correlated.

Unfortunately, most of the measures currently available to evaluate institutions and/or quality of government are only available at limited levels of disaggregation—usually country level (La Porta et al., 1999) and less frequently, regional level (Charron et al., 2019). Therefore, the analysis on their effect on economic performance is necessarily constrained to the highest layers of government, due to the lack of measures for lower levels such as municipalities. The exceptions are few, and almost entirely constrained to the recent studies by Rodríguez-Pose and Zhang (2019) and Hortas-Rico and Rios (2019), focusing on the case of China and Spain, respectively. As we shall see in Section 2, both studies make important contributions to the field, but can be complemented in some respects, particularly in terms of the quality of government measures proposed.

We argue that because one of the proposed measures for government quality in the lit-

erature is public sector efficiency (see, for instance La Porta et al., 1999), we should, ideally, measure it as explicitly and accurately as possible. Since we are focusing on the municipal level, we should therefore look for measures of public sector efficiency at this level, which in this case would be local government efficiency. There is an extensive literature dealing with this issue with a remarkable number of relevant contributions (see, for instance De Borger and Kerstens, 1996; Balaguer-Coll et al., 2007), some of which are very recent (Narbón-Perpiñá and De Witte, 2018a,b; Aiello and Bonanno, 2019). This literature proposes measuring local government performance (as well as a variety of related issues) using, in general, activity analysis techniques (Färe et al., 1994b; Kumar and Russell, 2002). Despite the richness of this literature and the accuracy of the estimations, they have never been considered in quality of government research.

Likewise, the analysis of economic growth and convergence is also relatively limited in terms of the layers making up each country's territorial organization or levels of government. Analysis of economic performance at the sub-national level is most frequently found for layers immediately below the country level—such as, for instance, states in the case of US, and NUTS 2 and NUTS 3 in the case of the European Union, for example. However, if the analysis is extended to lower layers, and more particularly municipalities, there is virtually no empirical evidence for many contexts.

In this article, we combine the literature on the quality of government and that on economic performance at the local level. Specifically, we analyze how the quality of local institutions, measured via their efficiency, might impact on municipal economic growth. To this end, we first construct a quality of government indicator based on local government efficiency, considering frontier analysis methodologies from the benchmarking literature—particularly data envelopment analysis (Charnes et al., 1978). Our novel approach overcomes the limitations found in previous literature regarding the lack of data for quality of government at the local level.

The study is carried out for Spanish municipalities with a population between 1,000 and 50,000 inhabitants for the period 2008–2015. We focus on the particular case of Spain for two main reasons. First, it is a context for which detailed information at the municipal level is available from the survey on local infrastructures and facilities, which yields detailed information on the goods and services (outputs) provided by each munifipality. This allows us to measure public sector efficiency at the local level with in detail. Second, we also have information on municipalities disposable per capita income, which is also rarely available in many contexts.

The empirical strategy proceeds in two stages: first we measure municipal efficiency, which in the second stage is plugged-in as a regressor in the different models considered. Our re-

sults suggest that efficiency improvements have a positive and significant impact on municipal growth, the results of which are robust for a variety of alternative scenarios. These efficiency improvements have a higher impact in poor municipalities, where these improvements lead to faster growth than in richer municipalities. In addition, we observe that the effects of an efficiency improvement on growth are greater in the crisis period, since scarcer resources must be managed more efficiently than during periods of economic prosperity.

The article is structured as follows. After this introduction, we introduce the links between the quality of local government and local economic performance. Section 3 explains how local government efficiency is computed and presents some results for this indicator. Section 4 describes the empirical strategy followed to analyse the relationship between local government quality and growth. Results are presented and discussed in Section 5, and some concluding remarks are given in Section 6.

2. How quality of government affects economic performance at the local level

The links between quality of government and economic performance at the municipal level are largely unexplored partly beacuse the concept of quality of government is difficult to define and even more difficult to measure, but also because data for municipal jurisdictions are scarcer than data for regions and countries. Despite these difficulties, recent evidence is provided by Rodríguez-Pose and Zhang (2019) for the Chinese case. Using public management efficiency and control of corruption as measures of municipal quality of government, the authors report a positive effect of these variables on municipal growth.

We focus on the Spanish case, for which the related evidence is restricted to Hortas-Rico and Rios (2019), who analyzed a wide variety of potential factors of income inequality across Spanish municipalities. Although very limited attention is devoted to government quality, they include a corruption index (based on information for 2001), which reveals that corruption is an important driver of municipal inequality. However, many changes have taken place since this study's period of analysis (2000–06). Attention to government quality has increased substantially in recent years, especially because constrained resources during the economic crisis forced decision units to use them more rationally and efficiently. In addition, public authorities endeavored to expose bad practices at all levels of government during these years. These efforts unveiled several corruption cases which had been hidden for long periods of time. As a result, Spain's rating in the Transparency International Corruption Perception Index[1] fell by 23% between 2005 and 2017, and corruption became a frequent topic in the media and

[1] https://transparencia.org.es

a matter of social concern. These cases of corruption did, however, spur improvements in government quality, firstly because corrupt bureaucrats were fired, and secondly, because their successors are necessarily more committed to good government practices.

The negative effects of bad government practices on municipal wealth are expected to be in line with those at higher aggregation levels such as regions or countries, for which evidence is much more abundant. Good government has been linked to better economic performance at both national (Acemoglu et al., 2005) and regional (Rodríguez-Pose, 2013) levels. It has also been argued that government quality can operate both directly and indirectly through impacts on innovation (Rodríguez-Pose and Di Cataldo, 2014) or investments (Rodríguez-Pose and Garcilazo, 2015). Also, the labor market is less transparent where government quality is low since contracts are based more on personal connections and nepotistic networks than on job candidates' personal merits (Di Cataldo and Rodríguez-Pose, 2017). Similarly, Ezcurra and Rios (201) show that European regions with high government quality were more resilient in terms of employment during the last recession. As noted in the introduction, there are no municipal data on typical dimensions of government quality measures such as control of corruption, impartiality or quality of municipal services (Charron et al., 2014). To overcome this limitation, we measure local government quality with an indicator of efficiency, following the recent contribution by Rodríguez-Pose and Zhang (2019).

Efficiency is expected to be highly correlated with other measures of institutional quality such as corruption, and is therefore a good proxy. Mauro (1998) concluded that corruption modifies the allocation of public spending toward less efficient activities. Dreher and Schneider (2006) showed that corruption is associated with the shadow economy, which is unregulated, uncertain and is more prone to inefficiencies.[2] Among other things, good management of government resources entails their reallocation to identified, transparent strategic priorities, and their effective and efficient use (Angelopoulos et al., 2008). We argue that better use of the available inputs can yield positive impacts for the local economies. If sub-national governments are efficient at producing public goods and services, this will lead to more or better quality public goods and services with the same level of expenditures (Rodríguez-Pose et al., 2009), which is likely to have a positive effect on income and growth (Martínez-Vázquez and McNab, 2003).

Moreover, management quality is likely to reduce uncertainty, which may have a severe effect on the degree of vulnerability of local economies by affecting firms' investment and employment rates (Acemoglu et al., 2003). In fact, the development of the private sector de-

[2]Empirical evidence is more mixed, with papers such as Méon and Weill (2005) finding that moderate levels of corruption might increase efficiency in some particular contexts. However, such evidence is remarkably scant and associated with very particular circumstances.

mands a reliable institutional framework that guarantees private investments. A government perceived as efficient will attract new investments (Hakimi and Hamdi, 2017) and might be among the set of factors a firm takes into account when deciding where to locate or allocate resources. Similarly, higher efficiency might also mean politicians or managers are not favoring particular elites, which can generate considerable social and economic inequalities. A more efficient management of resources can also contribute to a better economic environment, fueled by more trust and interactions that can lower transaction costs and foster economic activity (Ahrend et al., 2017). By contrast, inefficient management practices discourage participation, thereby limiting knowledge sharing and constraining the possibilities of innovation.

In a similar vein, another aspect related to the quality of government is reputation. Agasisti et al. (2019) argues that public institutions such as universities are expected to be efficient and, in turn, this may foster a positive relationship with the activities of other stakeholders. We argue that these ideas can also apply to municipal governments, which might generate new collaborations and economic opportunities for local firms. In contrast, if local government management is perceived as inefficient, companies will be reluctant to establish solid links with public entities. An additional and closely related consideration concerns efficiency incentives for agents that are already interacting with local governments. If local governments carry out their duties efficiently, their partners will be encouraged to improve their own efficiency.

3. Measuring quality of government at the municipal level

Performance measures have been widely used in the public sector to measure governments' provision, which is the role of rules and institutions. These measures can be used as managerial decision-making tools, and are essential to any economy concerned with accountability, transparency, efficiency and effectiveness of public institutions (Worthington and Dollery, 2000). At the municipal level, performance can be evaluated using a huge variety of indicators, including financial measures (debt ratios, budget stability, expenditures per capita, tax revenue per capita, etc.), efficiency measures (i.e., how well the organization uses resources in service provision) and indexes of effectiveness (i.e., of the degree to which the organization achieves its policy objectives) (De Borger and Kerstens, 2000). However, the focus of performance evaluation will depend on the role, and objectives analyzed, as well as data availability.[3]

As mentioned above, we proxy quality of municipal government with an indicator of gov-

[3]For example, previous studies at the municipal level have used different definitions of performance, including financial measures (Cohen, 2008; Zafra-Gómez et al., 2009), transparency indexes (Albalate, 2013; Da Cruz et al., 2016), or effectiveness aspects such as the urban quality of life (Morais and Camanho, 2011; González et al., 2011). However, the large majority of studies evaluating municipal performance refer to efficiency measures (see, for example, Balaguer-Coll et al., 2007; Narbón-Perpiñá et al., 2019).

ernment performance, specifically, a measure of how efficiently local governments are managing their municipal budgets to provide public services. Municipalities are complex organizations responsible for multiple tasks while at the same time they are subject to financial and budgetary constraints. Efficiency evaluation facilitates the management of municipal resources, and the greater control of the activities carried out by public managers (politicians), who are responsible for implementing efficient policies to meet the demands of different interested parties (i.e., both higher levels of government and citizens), with different objectives and information asymmetries (De Borger and Kerstens, 2000). It therefore seems logical that bad local government practices (such as an extravagant use of public resources, corruption or opportunistic behaviors related to the political agenda), would undermine efficiency.

We use frontier techniques from the benchmarking literature to compute the efficiency estimates for every municipality under analysis for the period 2008–2015 as a proxy of government quality. Estimating efficiency involves relative comparisons among a group of decision-making units or DMUs (Spanish local governments in our case) in order to assess how the available resources (or inputs) are used to provide local services and facilities (or outputs) (Narbón-Perpiñá et al., 2019).[4] In particular, in an input-oriented framework such as the one we consider, the model aims to reduce the input amounts as much as possible while keeping at least the present output level.[5] In public sector institutions such as local governments, outputs are established externally (i.e., the services that local governments must provide by law), and it makes sense to evaluate efficiency in terms of input minimization (Balaguer-Coll and Prior, 2009; Narbón-Perpiñá et al., 2019).

Depending on the focus of the analysis and well as the available data for input and outputs (quantities only, or quantities and prices), different types of efficiency can be measured. If only data on physical units are available, *technical efficiency* can be estimated, while *allocative efficiency* introduces information on prices (Fried et al., 2008). With the product of these two measures we obtain the *economic efficiency*, called *cost efficiency* when the economic objective is cost minimization.[6] However, when data on total costs are available, but not for quantities and input prices separately, cost efficiency can be estimated but not decomposed into its technical and allocative components (Balaguer-Coll et al., 2007). In a public sector environment, as in our particular case, information on prices is frequently unavailable because of its non-market or non-profit nature (Kalb et al., 2012). Accordingly, we measure cost efficiency using data in

[4]For an introduction and further details on efficiency measurement see the excellent contributions by Färe et al. (1994a), Coelli et al. (2005), Fried et al. (2008) and Daraio and Simar (2007), among others.

[5]The output-oriented framework looks at maximizing output levels under at most the present input levels (Daraio and Simar, 2007).

[6]It is called *revenue efficiency* when the economic objective is output maximization.

municipal budgets as input costs.

Two different methodological strands can be distinguished to measure efficiency: parametric and non-parametric methodologies.[7] In this paper, we use non-parametric estimation methods because they require fewer assumptions since they do not impose any particular functional form and allow for the inclusion of several inputs and outputs in the model (Daraio and Simar, 2007). Specifically, we use data envelopment analysis (DEA), the most well-known and commonly applied technique in the non-parametric field. Indeed, this methodology has attracted considerable interest, from both theoretical and applied perspectives (see e.g., Liu et al. (2013), Emrouznejad et al. (2008) and Emrouznejad and Yang (2018) for about 10,300 DEA-related articles with references to applications), and has been widely used in measuring efficiency at municipal level (Narbón-Perpiñá and De Witte, 2018a).

Data envelopment analysis (DEA), initially developed by Charnes et al. (1978) and adapted to the cost measurement by Färe et al. (1994a), is a mathematical programming method used to measure the relative efficiencies of decision-making units. With data on municipal inputs and outputs, DEA defines an empirical frontier which is determined by the "best-practice" or efficient DMUs and "envelopes" all the units under evaluation. The units located in the frontier are the efficient units, and their efficiency score is equal to 1. For the rest of units, located above the frontier in the input-oriented model, the distance from the efficient frontier measures their inefficiency, and they have efficiency scores lower than 1. The linear programming problem used to calculate the minimal cost efficiency for each municipality under evaluation and year is as follows:

$$
\begin{aligned}
&Min_{\theta,\lambda}\theta \\
&\quad s.t. \qquad -y_i + Y\lambda \geq 0 \\
&\qquad\quad\;\; \theta c_i - C\lambda \geq 0 \\
&\qquad\quad\;\; 1'\lambda = 1 \\
&\qquad\quad\;\; \lambda \geq 0 \qquad\qquad i = 1, \ldots, N
\end{aligned}
\tag{1}
$$

where θ represents the cost efficiency coefficient for each n municipality; C and Y are defined as the input (representing the cost or budget level) and output matrices which include information for inputs and outputs for all N municipalities; while c_i and y_i are the observed inputs and outputs corresponding to municipality i under evaluation; λ is the activity vector which describes the relative importance of the unit considered to determine the virtual reference used as a comparison to evaluate unit i. The last two constraints imply variable returns to

[7] Both parametric and non-parametric frontiers have their advantages and disadvantages, as can be seen in the excellent reviews provided by Murillo-Zamorano (2004) and Bogetoft and Otto (2010).

scale (VRS), which assures that each DMU is compared only with others of a similar size, and that the activity vector cannot be negative.

To perform the analysis, we use a sample of Spanish municipalities[8] with populations between 1,000 and 50,000 inhabitants for the period 2008–2015. The final sample contains 1,820 observations for every year (representing 22% of all Spanish municipalities). Specifically, we do not include municipalities from the regions of Catalonia, Madrid, the Basque Country and Navarre, nor for the provinces of Burgos and Huesca, located in the regions of Castile and Leon and Aragon, respectively.[9]

Regarding the variables used to compute the efficiency estimator for each municipality, on the input side the variable represents the total costs of the municipal services and facilities provided (C). The use of budget expenditures as inputs is a common practice in the previous literature given the unavailability of data for the costs of each municipal service and facility (e.g., Balaguer-Coll et al., 2007; Balaguer-Coll and Prior, 2009; Balaguer-Coll et al., 2010; Zafra-Gómez and Muñiz-Pérez, 2010; Da Cruz and Marques, 2014; Bosch et al., 2000; Balaguer-Coll et al., 2013; Narbón-Perpiñá et al., 2019; Narbón-Perpiñá et al., 2019). Our variable is calculated from information retrieved from the municipal budget expenditures published annually by the Ministry of the Treasury (*Ministerio de Hacienda*). Specifically, our input measure includes the following budget items: personnel expenses, expenditures on goods and services, current transfers, capital investments and capital transfers.

On the output side, the selection of variables is a complex task, given the difficulties in the data collecting process, the availability of data, and the accurate and direct measurement of local service and facility provision (Balaguer-Coll et al., 2013). Following previous literature on Spanish municipalities (e.g., Balaguer-Coll et al., 2007; Balaguer-Coll and Prior, 2009; Zafra-Gómez and Muñiz-Pérez, 2010; Bosch-Roca et al., 2012; Balaguer-Coll et al., 2013; Narbón-Perpiñá et al., 2019; Narbón-Perpiñá et al., 2019) and papers analyzing other European countries (e.g., Kalb et al., 2012; Štastná and Gregor, 2015; Doumpos and Cohen, 2014; Da Cruz and Marques, 2014; Cordero et al., 2017), we use proxies for the services and facilities provided to citizens. Specifically, we selected ten output variables which represent the specific services and facilities that municipalities must provide according to the Spanish law regulating the local system (*Ley 7/1985, Reguladora de Bases de Régimen Local*).[10] Table 1 contains the

[8] LAU2 in the European terminology used for the classification of territorial units for statistical purposes.

[9] Data for inputs and/or outputs needed to construct the efficiency measures were unavailable for all these territories.

[10] It is important to note that, given the intricacy of selecting the bundle of output variables to include in the analysis, we also considered an alternative output model with six variables that represent the minimum services that all municipalities must provide, regardless of their population size (Narbón-Perpiñá and De Witte, 2018a; Narbón-Perpiñá et al., 2019). Given that the efficiency results for both output specification models do not affect

list of services and facilities that each local government is legally required to provide with the corresponding available output indicators.

Data on total population (number of inhabitants, $Y1$) for each municipality were obtained from the Spanish Statistical Office (*Instituto Nacional de Estadística, INE*). Population is the most frequently used output indicator in the literature (Narbón-Perpiñá and De Witte, 2018a), and proxies the scope of services that municipalities should provide when more direct outputs are not available. The rest of the output variables used are direct measures of the municipal services and facilities. Specifically, we include the street infrastructure surface area (in km^2, Y_2), the number of lighting points (Y_3), the waste collected (in tons, Y_4), the length of water distribution networks (in km^2, Y_5), the length of sewer networks (in km^2, Y_6), the public parks surface area (in km^2, Y_7), the public library surface area (in km^2, Y_8), the market surface area (in km^2,Y_9) and the sport facilities surface area (in km^2, Y_{10}). Information for these variables was gathered from a survey on local infrastructures and facilities (*Encuesta de Infraestructuras y Equipamientos Locales, EIEL*) published by the Spanish Ministry of the Treasury (*Ministerio de Hacienda*). Table 2 contains the descriptive statistics for the inputs and outputs used in the efficiency measurement.

The cost-efficiency results (averaged for all municipalities for each year) are presented in Table 3. To support the descriptive results, we also provide boxplots for the efficiency scores by year (see Figure 1). DEA results show that average efficiency scores ranged between 0.495 and 0.602 throughout the period 2008–2015. According to these values, on average, inefficient municipalities could have reduced their inputs by 40% to 50% while maintaining their provision of municipal services and facilities. Similarly, results for the first quartile (i.e., the most inefficient municipalities) they range from 0.361 to 0.478, while for the third quartile (i.e., the most efficient municipalities) range from 0.607 to 0.699. The maximum values, equal to 1, correspond to the efficient units (i.e., benchmark units located in the frontier). Moreover, although we do not aim to analyze efficiency scores under a temporal efficiency framework, our results show some trends. Although the average efficiency scores increase slightly during the period, in general, they are quite stable.

further analysis of the impact of efficiency on income per capita growth, in this study we present only the analysis with the most comprehensive output model. However, results using the alternative output model are available upon request.

4. Measuring the effect of quality of government on municipal economic growth

4.1. The model

We run several regression models to analyze the relationship between municipal quality of government and growth. Formally, the most general model can be expressed as follows:

$$\triangle\ INCOME_{it} = \beta EFF_{it} + \gamma X_{it} + \sigma_i + \tau_t + \varepsilon_{it} \tag{2}$$

where i and t represent a municipality and year, respectively; $INCOME$ is the disposable income per capita in euros; EFF is the efficiency score, lying in the interval [0-1]; X is a vector of control variables (explained in detail in the following section); β, γ, σ and τ are the model parameters; and ε stands for the error term.

4.2. Description of variables

Data for our dependent variable, disposable income per capita growth, come from the statistics on personal income tax declarations published by the Spanish Tax Agency *(Agencia Tributaria)* for municipalities with populations over 1,000 inhabitants.

Regarding the control variables, it is worth mentioning that at the municipal level, and especially when creating panel data, data limitations are much more severe than for regional or country level analyses. In some cases data are simply not available. In others, limitations relate to coverage in terms of the number of municipalities (some data are provided only for municipalities with a minimum size) or time (some data are only available for a single year). Despite these difficulties, we were able to collect several variables from which to estimate growth models in line with those used in cross-regional and cross-country studies. These variables capture economic, demographic and political and fiscal factors.

As economic variables, we include the initial disposable income per capita (in logs) to control for the convergence hypothesis (see Barro, 1991; Sala-i Martin, 1996) and also financial development, whose links with growth are widely documented (see King and Levine, 1993; Henderson et al., 2013; Badunenko and Romero-Ávila, 2013), although not all authors concur that the effect should always be positive. Several survey studies have already been published on the issue, including Ang (2008), Valickova et al. (2015) and, extending the analysis to include the role of institutions, Fernández and Tamayo (2017). Although several contributions exist at both the national and the regional level, at the municipal level there are virtually no contributions analyzing the effect of this variable on municipal growth. In our study, financial development is measured by the number of bank branches per 1,000 inhabitants. This indica-

tor is especially interesting for the Spanish case, given that the recent banking restructuring process as a consequence of the financial and economic crisis has led to cases of financial exclusion, that is, municipalities with no bank branches (Martin-Oliver, 2019).

Demographic characteristics can also influence economic performance. In this regard, we control for population growth (in %), which is an essential variable in virtually all neoclassical growth models (Mankiw et al., 1992). We also attempted to measure agglomeration economies (see, for a recent review, McCann and Van Oort, 2019), captured in our paper by population density (inhabitants per km^2). Economic agglomeration in one region spurs growth because it reduces the cost of innovation in that region through a pecuniary externality due to transaction costs (Martin and Ottaviano, 2001). It has been shown that at the municipal level, agglomeration can yield substantial costs savings for local governments. According to De Borger and Kerstens (1996), the degree of population concentration might influence the cost of providing certain public services, with cost inefficiency expected to increase where the population is more dispersed. Greater population concentration can make interrelated local services easier to both manage and consume (Afonso and Fernandes, 2008) as they enjoy the cost advantages associated with agglomeration economies (Geys et al., 2010). Moreover, densely populated areas are expected to generate increased economic activity and can be relevant for distinguishing between rural and urban areas. This is particularly important for the Spanish context, where there is a marked duality between relatively densely populated cities and an increasing number of barely populated rural areas, popularly known as *empty Spain (España vacía)* in Spanish, which has generated an intense debate in recent times (see, for instance Pinilla and Sáez, 2017).

In addition, we also account for the population structure by considering the share of the retired population. The literature is still inconclusive on the potential effect of this variable on growth, as there are several indirect mechanisms in action at the same time and therefore the final effect depends on which one predominates (Nagarajan et al., 2016). In this vein, Hagen and Vabo (2005) find evidence that older people have negative effects on public finance surplus and Rodríguez Bolívar et al. (2016) show that citizens over the age of 65 have a negative effect on the financial sustainability of local authorities. However, Rios et al. (2017) conclude that older people do not have significant effects on municipal spending.

Political factors are captured by political alignment, a binary variable that takes the value of one if the same political party is in control at the regional level and in the municipal government, and zero otherwise. We expect a positive effect of this variable, given that municipalities with an aligned ideology can receive greater transfers and grants from regional governments to carry out investments. In this line, the studies of Solé-Ollé and Sorribas-Navarro (2008) and Migueis (2013) find that institutions politically aligned with upper-levels of government re-

ceive more transfers than their non-aligned counterparts. Also, there might be favoritisms and distortions in the allocation of resources and regulations that can generate positive spillovers for the dynamism of the local economy (Asher and Novosad, 2017).

Finally, we take into account fiscal autonomy, measuring the extent to which municipal revenues come from their own sources (%). The effect of fiscal autonomy on municipal growth is ambiguous. Some studies, including Ebel and Yilmaz (2002) and Meloche et al. (2004) suggest that the degree of revenue autonomy is positively related to per capita GDP. However, others such as Thiessen (2003) observe a hump-shaped relationship between fiscal decentralization and growth.[11] Yet the debate is still inconclusive, as other studies such as Thornton (2007) and Baskaran and Feld (2013) suggest non-significant or even negative impacts.

Despite our comprehensive set of control variables, we accept other factors might be explaining disparities in municipal growth rates. Differences in human capital, innovation or the industrial structure can also have a relevant effect. Unfortunately, data constraints at the local level limited the number of control variables we were able to account for. In order to address this potential limitation, all our models include municipal fixed effects and time effects that might help to capture unobserved municipality-specific characteristics and common shocks in some years of our period such as the economic crisis and subsequent recovery. We argue that because our temporal period is relatively short, fixed effects can appropriately capture these unobserved local features and clean estimates to a large extent from potential omitted variable bias. The first panel in Table 4 provides a complete definition of the variables, their sources and some descriptive statistics.

Finally, in order to control for endogeneity, we run instrumental variable estimations. In some of these, we use the lagged values for the variable efficiency, given the difficulty of finding appropriate external instruments. As efficiency can be relatively persistent over time, when following this strategy we used the second lag. Apart from that, we also ran a model with external instruments, although due to data constraints the model is estimated in a cross-sectional framework.

The first external instrument is a gender-related variable. In Spain, in recent years the inclusion of women in local governments has grown, partly due to policies of gender equality and parity in the list of electoral candidate lists. Although gender-related studies applying the public administration framework are a relatively recent field of research, and the underlying mechanisms still remain unclear, there is abundant literature from the field of management (Pucheta-Martínez et al., 2019), suggesting that gender representation has a significant impact

[11] Thiessen (2003) analyzes fiscal decentralization from the point of view of expenses and income, that is the power of subnational governments to raise tax revenues and decide on spending programs on their own initiative within legal criteria.

on the performance of organizations. For instance, for a wide sample of farms in Ghana, Dadzie and Dasmani (2010) found that farms managed by women are more efficient than those managed by men. Francoeur et al. (2008) analyzed the impact on firms' performance of increased female representation on corporate boards and in top management, finding that companies operating in complex environments with a large share of women have an improved performance. More recently, considering a sample of member-governed community financial institutions in Northern Ireland, Ward and Forker (2017) found that boards with higher female representation have better financial management. Similarly, this is also extended to the public sector. Studies such as Park (2013) determine that an increasing proportion of women in the executive branch leads to higher government performance, while Hernández-Nicolás et al. (2018) conclude that the presence of women in policy affairs may help to improve municipalities' economic situation. Finally, Araujo and Tejedo-Romero (2016) show that women's political representation in municipalities has a positive influence on the level of transparency.

Based on these results, our gender instrument is constructed using available data on municipalities' compliance (Organic Law 3/2007),[12] taking the value of one when the municipality complies, and zero otherwise. However, information is only available for the period 2013–2015 and is restricted to municipalities with populations above 3,000 inhabitants. Our instrumental variable corresponds to the average compliance values for those three years. Accordingly, the variable can take four values: 0, 0.33, 0.66 and 1 when the municipality meets the quota in none, one, two or all three available years, respectively.

Second, we use the political concentration in a municipality as an instrument by calculating a Herfindahl index, which indicates the degree of competition among political parties. Although it is true that low political competition (i.e., high political concentration or strength) can make the implementation of policies easier, and therefore increase efficiency, a large body of literature holds the opposite view: high political concentration can be detrimental to efficiency. For instance, with high political concentration, other parties have less control over public expenditures and efficiency can therefore be reduced. Also, a governing party with a weak opposition can make decisions and implement policies to satisfy voters, regardless of their cost. Some findings in the literature supporting this argument are Balaguer-Coll et al. (2007), Geys et al. (2010), Kalb (2010), Loikkanen et al. (2011), Kalb (2012), Geys et al. (2013) and Helland and Sørensen (2015), to name a few. For our particular case, we calculated political concentration by using information from the municipal elections of 2011 and 2015. We then computed the Herfindahl index and took the average value of the two years. The second panel in Table 4 provides the definition and sources of the instrumental variables as well as

[12] *Ley Orgánica 3/2007, de 22 de marzo, para la igualdad efectiva de mujeres y hombres.*

some descriptive statistics.

Before running the models we first prepared some descriptive results in order to represent the bivariate relationship between our two variables of interest. Panel (a) in Figure 2 shows a moderate, though positive, association between local government efficiency and disposable income per capita growth. Similarly, panel (b) displays two notched boxplots, representing disposable income growth for municipalities with efficiency scores below and above the median, respectively. Observe that growth is slightly higher for the second group, although the notches overlap and, therefore, we cannot affirm that the medians between the two groups are statistically different. However, other interesting aspects lie beyond the median, such as the higher number of outliers for the first group, especially in the lower tail of the distribution and thus corresponding to municipalities with negative growth rates. In contrast, the municipalities with efficiency levels above the median exhibited positive growth rates in all cases.

5. Results

5.1. Baseline estimations

This section reports the results from the regression analysis. Our baseline results are presented in Table 5. As indicated in previous sections, the dependent variable is disposable income per capita growth. Regarding the exogenous variables, we specify different models depending on which variables we use as controls.

We start with a basic model—Model (i)—in which only our quality of government indicator (efficiency, EFF) is considered from the set of regressors—apart from the intercept. According to this model, which includes both fixed and time effects, the impact of efficiency is positive but significance is relatively modest (10%).

We then add sequentially the rest of the control variables described in the preceding sections. Although growth models tend to start initially from larger sets of covariates until a relatively parsimonious specification is achieved (Sala-i-Martin, 1997), in our case this strategy is more challenging. First, the literature on the determinants of growth at the municipal level is much scarcer than at either country or regional levels; second, the available information (variables) is also more limited; and third, the powers controlled by the different levels of government also vary greatly across countries, which makes international comparisons more complicated and, to some extent, meaningless.

However, a minimum number of relevant controls are necessary to obtain meaningful estimates; these are shown in columns 2 through 5 in Table 5. In Model (ii), the first of these unrestricted models, we add two relevant variables considered in the economic growth literature,

namely, the lagged disposable income per capita, LAG_INCOME, and financial development, FIN_DEV. The impact of local government efficiency on growth is not only maintained but also both its magnitude (from 0.012 to 0.020) and its significance (1%) increase.

When two additional unrestricted models are considered, the impact is analogous. This confirms the importance of adding further relevant variables to our analysis to better understand how our government quality measure might affect municipal economic growth. Specifically, the three most comprehensive models (Models iii, iv and v) extend the basic models by adding demographic, political and fiscal variables, and the magnitude and significance of the effect is greater for all three models. Specifically, the three most comprehensive models (Models iii, iv and v) extend the basic models by adding demographic, political and fiscal variables and the magnitude and significance of the effect is greater for all three models.

All unrestricted models also include fixed and time effects. In the case of Model (iii), we add demographic variables, namely, population density (POP_DENS), population growth (POP_GROWTH) and retired population ($RETIRED$). Their inclusion leads to a slight increase in the magnitude of the effect of efficiency which is even greater when factoring in political and fiscal variables in Models (iv) and (v), respectively, as the inclusion of political alignment with higher levels of government ($ALIGN$) raises the efficiency coefficient from 0.021 to 0.026. The effect of fiscal autonomy ($FISCAL$) captured by Model (v), however, is more involved, due to the U-shape form resulting from the inclusion of its square ($FISCAL^2$), but adding it to the model again increases the efficiency coefficient and the significance is maintained.

Although our main interest is not to analyze in detail the role of the control variables included in the different models, we will briefly evaluate their impact on municipal growth. Overall, most of the results are in line with the previous literature, but we also detect several differences across models. As for the economic variables, the impact of both the lagged disposable income per capita (LAG_INCOME) and financial development (FIN_DEV) has the expected sign—negative for the former, positive for the latter, with few exceptions. In the first case, it is a sign in favor of convergence, as the negative sign indicates that poorer municipalities are growing faster. Financial development has been extensively examined in the literature, as documented in recent contributions such as Hasan et al. (2017, 2019) and, in the Spanish case, by Pastor et al. (2017) and Martin-Oliver (2019). Because of the relevance of the topic, it merits specific investigation.

The impact of the demographic variables is positive for both population density (POP_DENS) and population growth (POP_GROWTH), indicating that the demographic pressure is largely offset by increased economic activity. In the case of the retired popula-

tion ($RETIRED$), whose effect was *a priori* unclear it generally shows a positive sign but with poor significance. In any case, our results can be aligned with the idea that although presumably lower than work incomes, the more permanent nature of retirement subsidies can positively influence growth. One likely explanation is that especially in the recession years, retired people could continue consuming and even investing, given the higher security of their rents.

The only political variable included, political alignment, had a hypothesized positive impact on municipal growth. This is not corroborated, though, since coefficients are not significant for any of the models considered. Finally, the fiscal variable included in the different specifications, namely, fiscal autonomy ($FISCAL$) and its square ($FISCAL^2$), show a negative effect for $FISCAL$ and positive for $FISCAL^2$, indicating that local governments need a substantial amount of fiscal autonomy to influence growth positively.

5.2. Interaction effects

Non-linearities such as those reflected by squared terms can also be unraveled by the inclusion of interaction terms in Table 6. We therefore include interaction terms for the different model specifications in order to add robustness to the analysis provided in Table 5.

The first interaction that we consider is efficiency and fiscal autonomy ($EFF \times FISCAL$). Its coefficient is negative and significant (at the 1% significance level), implying that the higher the fiscal autonomy, the lower the impact of efficiency on growth. This could be related to the fact that higher fiscal autonomy could imply a greater ability to raise revenues and, therefore, a less pressing need to be efficient.

The non-significant effect of political alignment ($ALIGN$) obtained via the baseline specifications in Table 5 is now refined by interacting it with efficiency. However, the irrelevance of the variable is further corroborated, as the lack of significance at the usual levels of $EFF \times ALIGN$ suggests that the effect of political alignment is still irrelevant for different levels of efficiency—see Model (ii) in Table 6. Similarly, it might be argued that being efficient has no additional surplus if the local government is aligned with the regional one. The main effect of efficiency (EFF) is preserved, however.

We include two additional interaction terms to understand how different income levels and the crisis interact with efficiency. The former, $EFF \times INCOME$, has a significant (1%) negative effect, suggesting that improvements in efficiency have more beneficial effects in the poorest municipalities. Access to resources can be more difficult for relatively poorer municipalities and they might have fewer opportunities, so making efficient use of the available resources can

yield extra benefits.

In the case of the crisis, $EFF \times CRISIS$ (fourth column), the effect is positive and also significant. $CRISIS$ is a dummy variable that takes the value of one for years 2008–2013 and zero for years 2014 and 2015. The positive impact for the interaction implies that during the crisis years, being efficient was particularly important, compared to the recovery years. In the specific context of Spain, the crisis entailed notable cutbacks of resources at all government levels. According to our results, being efficient in their use was especially rewarding during those years. Indeed, municipal efficiency increased during the crisis years (Narbón-Perpiñá et al., 2019; Narbón-Perpiñá et al., 2019), which might be well-explained by the need to make the most of the comparatively lower resources municipalities received, together with an intensified pursuit of illegal practices by the Spanish authorities that triggered a better management of resources.

Although the different interactions considered affect the impact of efficiency, regardless of the model considered the main results from the specifications in Table 5 hold: the impact of our quality of government variable is positive and significant throughout.

5.3. Alternative scenarios

To gain a better understanding of whether the mechanisms governing the links between quality of government and efficiency might work differently for municipalities with different levels of development, we consider various scenarios for the most comprehensive model in Table 5 (v). The results for these alternative scenarios are reported in Table 7, and split in three groups of regressions: efficiency above and below the median (columns 2 and 3), growth above and below the median (columns 4 and 5), and disposable income per capita above and below the median (columns 6 and 7).

The first two columns report a positive and significant effect of efficiency on growth throughout the entire distribution of efficiencies. This overall positive effect would indicate that even the least efficient municipalities can reap benefits from the links between efficiency and growth. However, the other columns in Table 7 show that the effect of efficiency is not significant throughout. Although the positive effect on municipal economic growth holds, significance is lost for two specific cases, namely, growth below the median (column 4, model (iv)) and GDP per capita above the median (column 5, model (v)). This result is strongly related to those in the last two columns, forming a sort of palindrome effect, as comparing columns (iii) and (vi) yields very similar outcomes to comparing columns (iv) and (v). On the one hand, there is a positive and strongly significant effect of efficiency for municipalities

that grow above the median and are relatively poorer (their income per capita is below the median); on the other, it is non-significant for municipalities that grow below the median, but are relatively richer (income per capita above the median).

Apart from corroborating findings for the interactions between efficiency and income per capita ($EFF \times INCOME$) reported in Table 6, these results give rise to interesting interpretations. This sort of differential effects at various levels of development has similarities with the findings from other studies examining related issues. It is the case of, for instance, Peiró-Palomino and Tortosa-Ausina (2013), who found that the effects of social trust on development varied according to each country's levels of GDP per capita. In the case of municipalities, there is an additional explanation, as local governments with poorer constituencies will face more difficulties in raising tax revenues and, therefore, must make additional efforts to manage resources more efficiently.

5.4. Instrumental variables

Results for the instrumental variable estimations are reported in Table 8. The first three columns of the table present results using the second lag of efficiency as the instrument for current efficiency levels. The estimations were performed, including, initially, economic controls, then adding demography controls and, finally in our most comprehensive model, political and fiscal controls. In all three cases, results reported in Table 5 hold, as the estimations show a positive and significant coefficient for efficiency. The fourth column corresponds to a 2SLS estimation using as instruments the two external variables explained in detail in the data section. As mentioned, data constraints on the choice of instruments oblige us to perform this regression in a cross-section framework, but we still believe that it can complement the other three specifications well. Estimation coefficients for the first stage, corresponding to the effect of our external instrumental variables—gender and political concentration—are not reported due to space limitations.[13] The gender variable has a positive effect on efficiency. In contrast, we find a negative effect for political concentration: when the municipal power is concentrated, efficiency declines. The two effects are statistically significant at the standard levels. The results reported in the fourth column of Table 8 correspond to the second stage coefficients, which suggest an overall positive effect of efficiency on municipal growth, which is robust to the inclusion of control variables. The results for the tests of the validity of the external instruments are reported at the bottom of the table. First, the F_{STAT} test suggests that the selected instruments have enough explanatory power beyond the purely economic intuition described

[13]These results are available upon request.

in the data section and the individual significance in the first stage regressions. Second, the non-significant Sargan χ^2 and Basmann χ^2 statistics indicate that the instruments are uncorrelated with the error term and that the equation is not misspecified. This makes the instruments valid from a statistical viewpoint.

6. Conclusions

Over the past 20 years, several contributions have demonstrated that economic development and other social indicators such as health, subjective well-being, happiness, or environment, among others, are directly related to the quality of government. The cross-country empirical evidence in this regard is now vast, and generally finds strong support for the hypothesis that socio-economic performance is higher when governments act impartially, efficiently and without corruption.

Whereas several institutions provide measures at the country level, the information for lower levels of government is scarcer—if not directly unavailable. The literature has recently been filling this gap (Charron and Lapuente, 2013; Tabellini, 2010; Charron et al., 2014; Rodríguez-Pose and Garcilazo, 2015), showing that, indeed, disparities in quality of government measures at sub-national levels can be even greater than at the national level. However, if we focus on the (generally) lowest level of government, i.e., municipalities, measures of quality of government are virtually non-existent. In addition to this, the literature on quality of government indicates that among the different dimensions included, one of them is public sector efficiency—i.e., governments must act "in an impartial, efficient way, and without corruption" (Charron et al., 2019). However, this has rarely been measured. Therefore, we combine these two gaps in the literature and analyze how an explicit measure of local government efficiency (as a proxy for quality of government) might impact on economic growth at the municipal level.

We attempt to fill these two gaps in the literature by evaluating the effect that improvements in efficiency have on municipal growth—considering efficiency as a measure of government quality. The study was carried out for Spanish municipalities for the period 2008–2015, a particularly interesting scenario due to the strong impact that the crisis had on the economy during this period. We also analyzed what other factors (economic, demographic or political) can affect municipal growth. This is an additional contribution of the study, since growth at municipal level has rarely been analyzed, in part because information on per capita income has only recently become available at this level of government.

The empirical strategy proceeded in two stages; first we measured municipal efficiency,

and then subsequently incorporated it in the second stage of the analysis as a regressor in the different models considered. We estimated a variety of specifications, including a range of controls, interactions, instrumental variables and alternative scenarios.

The main conclusion we reach is that efficiency improvements have a positive and significant impact on municipal growth, the results for which are robust for all scenarios analyzed. These efficiency improvements have a higher impact in relatively poor municipalities. We also observed greater effects of an improvement in efficiency on growth during the crisis period, since when resources are scarcer, the need to manage them more efficiently is more relevant than during periods of economic prosperity.

In addition to efficiency, the demographic factors that affect municipal growth are population density (agglomeration), population growth and the size of the retired population in the municipality. As an economic factor, fiscal autonomy also affects growth. The effect of this variable is best observed when interacting with efficiency, where we see that when fiscal autonomy increases, municipalities have fewer incentives to efficiently manage their resources.

Our study therefore signals that, at the municipal level, quality of government is as important as it can be for higher layers of government–in the case of Spain, regions (comunidades autónomas), and the central government. The impact of the variable is mostly robust to different specifications, interaction terms, and inclusion of instrumental variables. However, municipal wealth is not only connected to a single factor–efficiency–but to other individual factors, which all contribute to explain the heterogeneity of economic growth found in our sample.

In this regard, it is also important to highlight that this is virtually the first study to analyze the determinants of economic growth at this level of government, and for a large sample (more than 2,000 municipalities). Since Rodríguez-Pose and Zhang's (2019) contribution was practically the only one in this field, we consider that this new contribution in a very different context, and with a larger sample, adds insights to an important issue.

Our measure of quality of government is admittedly crude, in the sense that it reflects only one of its dimensions. Although this can be understood as a limitation, we must bear in mind that, as acknowledged by the quality of government literature, its measures and dimensions are usually highly correlated. In contrast, it has several advantages, among which is the fact that we know exactly what is being measured and, more importantly, that there is a considerable body of literature on its exact measurement, apart from other related issues, which opens up the possibility of exploring how some variables affect urban economic growth via indirect (efficiency) paths.

References

Acemoglu, D., Johnson, S., Robinson, J., and Thaicharoen, Y. (2003). Institutional causes, macroeconomic symptoms: volatility, crises and growth. *Journal of Monetary Economics*, 50(1):49–123.

Acemoglu, D., Johnson, S., and Robinson, J. A. (2005). Institutions as a fundamental cause of long-run growth. In Aghion, P. and Durlauf, S., editors, *Handbook of Economic Growth*, volume 1A, pages 385–472. North-Holland, Amsterdam.

Afonso, A. and Fernandes, S. (2008). Assessing and explaining the relative efficiency of local government. *The Journal of Socio-Economics*, 37(5):1946–1979.

Agasisti, T., Barra, C., and Zotti, R. (2019). Research, knowledge transfer, and innovation: The effect of Italian universities' efficiency on local economic development 2006- 2012. *Journal of Regional Science*, 59(5):819–849.

Ahrend, R., Farchy, E., Kaplanis, I., and Lembcke, A. C. (2017). What makes cities more productive? Evidence from five OECD countries on the role of urban governance. *Journal of Regional Science*, 57(3):385–410.

Aiello, F. and Bonanno, G. (2019). Explaining differences in efficiency: A meta-study on local government literature. *Journal of Economic Surveys*, 33(3):999–1027.

Albalate, D. (2013). The institutional, economic and social determinants of local government transparency. *Journal of Economic Policy Reform*, 16(1):90–107.

Ang, J. B. (2008). A survey of recent developments in the literature of finance and growth. *Journal of Economic Surveys*, 22(3):536–576.

Angelopoulos, K., Philippopoulos, A., and Tsionas, E. (2008). Does public sector efficiency matter? Revisiting the relation between fiscal size and economic growth in a world sample. *Public Choice*, 137(1-2):245–278.

Araujo, J. F. F. and Tejedo-Romero, F. (2016). Women's political representation and transparency in local governance. *Local Government Studies*, 42(6):885–906.

Asher, S. and Novosad, P. (2017). Politics and local economic growth: Evidence from India. *American Economic Journal: Applied Economics*, 9(1):229–73.

Badunenko, O. and Romero-Ávila, D. (2013). Financial development and the sources of growth and convergence. *International Economic Review*, 54(2):629–663.

Balaguer-Coll, M. T. and Prior, D. (2009). Short-and long-term evaluation of efficiency and quality. An application to Spanish municipalities. *Applied Economics*, 41(23):2991–3002.

Balaguer-Coll, M. T., Prior, D., and Tortosa-Ausina, E. (2007). On the determinants of local government performance: a two-stage nonparametric approach. *European Economic Review*, 51(2):425–451.

Balaguer-Coll, M. T., Prior, D., and Tortosa-Ausina, E. (2010). Decentralization and efficiency of local government. *The Annals of Regional Science*, 45(3):571–601.

Balaguer-Coll, M. T., Prior, D., and Tortosa-Ausina, E. (2013). Output complexity, environmental conditions, and the efficiency of municipalities. *Journal of Productivity Analysis*, 39(3):303–324.

Barro, R. J. (1991). Economic growth in a cross section of countries. *Quarterly Journal of Economics*, 106(2):407–443.

Baskaran, T. and Feld, L. P. (2013). Fiscal decentralization and economic growth in OECD countries: is there a relationship? *Public Finance Review*, 41(4):421–445.

Bogetoft, P. and Otto, L. (2010). *Benchmarking with DEA, SFA, and R*, volume 157. Springer Science & Business Media, New York.

Bosch, N., Pedraja, F., and Suárez-Pandiello, J. (2000). Measuring the efficiency of Spanish municipal refuse collection services. *Local Government Studies*, 26(3):71–90.

Bosch-Roca, N., Mora-Corral, A. J., and Espasa-Queralt, M. (2012). Citizen control and the efficiency of local public services. *Environment and Planning C: Government and Policy*, 30(2):248.

Charnes, A., Cooper, W. W., and Rhodes, E. (1978). Measuring the efficiency of decision making units. *European Journal of Operational Research*, 2(6):429–444.

Charron, N., Dijkstra, L., and Lapuente, V. (2014). Regional governance matters: Quality of government within European Union member states. *Regional Studies*, 48(1):68–90.

Charron, N. and Lapuente, V. (2013). Why do some regions in Europe have a higher quality of government? *The Journal of Politics*, 75(3):567–582.

Charron, N., Lapuente, V., and Annoni, P. (2019). Measuring Quality of Government in EU Regions across Space and Time. *Papers in Regional Science*, 98(5):1925–1953.

Clague, C., Keefer, P., Knack, S., and Olson, M. (1999). Contract-intensive money: contract enforcement, property rights, and economic performance. *Journal of Economic Growth*, 4(2):185–211.

Coelli, T. J., Rao, D. S. P., O'Donnell, C. J., and Battese, G. E. (2005). *An Introduction to Efficiency and Productivity Analysis*. Springer Science & Business Media, Heidelberg.

Cohen, S. (2008). Identifying the moderator factors of financial performance in Greek Municipalities. *Financial Accountability & Management*, 24(3):265–294.

Cordero, J. M., Pedraja-Chaparro, F., Pisaflores, E. C., and Polo, C. (2017). Efficiency assessment of Portuguese municipalities using a conditional nonparametric approach. *Journal of Productivity Analysis*, 48:1–24.

Da Cruz, N. F. and Marques, R. C. (2014). Revisiting the determinants of local government performance. *Omega*, 44:91–103.

Da Cruz, N. F., Tavares, A. F., Marques, R. C., Jorge, S., and de Sousa, L. (2016). Measuring local government transparency. *Public Management Review*, 18(6):866–893.

Dadzie, S. K. and Dasmani, I. (2010). Gender difference and farm level efficiency: Metafrontier production function approach. *Journal of Development and Agricultural Economics*, 2(12):441–451.

Daraio, C. and Simar, L. (2007). *Advanced Robust and Nonparametric Methods in Efficiency Analysis: Methodology and Applications*, volume 4. Springer Science & Business Media, New York.

De Borger, B. and Kerstens, K. (1996). Cost efficiency of Belgian local governments: a comparative analysis of FDH, DEA, and econometric approaches. *Regional Science and Urban Economics*, 26(2):145–170.

De Borger, B. and Kerstens, K. (2000). *Public Provision and Performance: Contributions from Efficiency and Productivity Measurement*, chapter What is known about municipal efficiency? The Belgian case and beyond, pages 299–330. Elsevier, Amsterdam.

Di Cataldo, M. and Rodríguez-Pose, A. (2017). What drives employment growth and social inclusion in the regions of the European Union? *Regional Studies*, 51(12):1840–1859.

Doumpos, M. and Cohen, S. (2014). Applying Data Envelopment Analysis on accounting data to assess and optimize the efficiency of Greek local governments. *Omega*, 46:74–85.

Dreher, A. and Schneider, F. (2006). Corruption and the shadow economy: Substitutes or complements? In *The corruption monster. Ethik, Politik und Korruption*, pages 363–370. Czernin.

Easterly, W. and Levine, R. (2003). Tropics, germs, and crops: how endowments influence economic development. *Journal of Monetary Economics*, 50(1):3–39.

Ebel, R. D. and Yilmaz, S. (2002). On the measurement and impact of fiscal decentralization. Policy Research Working Paper 2809, The World Bank, Washington, DC.

Emrouznejad, A., Parker, B. R., and Tavares, G. (2008). Evaluation of research in efficiency and productivity: A survey and analysis of the first 30 years of scholarly literature in DEA. *Socio-Economic Planning Sciences*, 42(3):151–157.

Emrouznejad, A. and Yang, G.-l. (2018). A survey and analysis of the first 40 years of scholarly literature in dea: 1978–2016. *Socio-Economic Planning Sciences*, 61:4–8.

Ezcurra, R. and Rios, V. (201). Quality of government and regional resilience in the European Union. Evidence from the Great Recession. *Papers in Regional Science*, 98(3):1267–1290.

Färe, R., Grosskopf, S., and Lovell, C. K. (1994a). *Production Frontiers*. Cambridge University Press, Cambridge.

Färe, R., Grosskopf, S., Norris, M., and Zhang, Z. (1994b). Productivity growth, technical progress, and efficiency change in industrialized countries. *The American Economic Review*, 84(1):66–83.

Fernández, A. and Tamayo, C. E. (2017). From institutions to financial development and growth: What are the links? *Journal of Economic Surveys*, 31(1):17–57.

Francoeur, C., Labelle, R., and Sinclair-Desgagné, B. (2008). Gender diversity in corporate governance and top management. *Journal of Business Ethics*, 81(1):83–95.

Fried, H. O., Lovell, C. K., and Schmidt, S. S. (2008). *The Measurement of Productive Efficiency and Productivity Growth*. Oxford University Press, New York.

Geys, B., Heinemann, F., and Kalb, A. (2010). Voter involvement, fiscal autonomy and public sector efficiency: evidence from German municipalities. *European Journal of Political Economy*, 26(2):265–278.

Geys, B., Heinemann, F., and Kalb, A. (2013). Local Government Efficiency in German Municipalities. *Raumforschung und Raumordnung*, 71(4):283–293.

González, E., Cárcaba, A., Ventura, J., and García, J. (2011). Measuring quality of life in Spanish municipalities. *Local Government Studies*, 37(2):171–197.

Hagen, T. P. and Vabo, S. I. (2005). Political characteristics, institutional procedures and fiscal performance: Panel data analyses of Norwegian local governments, 1991–1998. *European Journal of Political Research*, 44(1):43–64.

Hakimi, A. and Hamdi, H. (2017). Does corruption limit fdi and economic growth? evidence from mena countries. *International Journal of Emerging Markets*, 12(3):550–571.

Hasan, I., Jackowicz, K., Kowalewski, O., and Kozłowski, Ł. (2017). Do local banking market structures matter for SME financing and performance? New evidence from an emerging economy. *Journal of Banking & Finance*, 79:142–158.

Hasan, I., Jackowicz, K., Kowalewski, O., and Kozłowski, Ł. (2019). The economic impact of changes in local bank presence. *Regional Studies*, 53(5):644–656.

Helland, L. and Sørensen, R. J. (2015). Partisan bias, electoral volatility, and government efficiency. *Electoral Studies*, 39:117–128.

Henderson, D. J., Papageorgiou, C., and Parmeter, C. F. (2013). Who benefits from financial development? New methods, new evidence. *European Economic Review*, 63:47–67.

Hernández-Nicolás, C. M., Martín-Ugedo, J. F., and Mínguez-Vera, A. (2018). Women Mayors and Management of Spanish Councils: An Empirical Analysis. *Feminist Economics*, 24(1):168–191.

Hortas-Rico, M. and Rios, V. (2019). The drivers of local income inequality: a spatial Bayesian model-averaging approach. *Regional Studies*, 53(8):1207–1220.

Jones, E. (2003). *The European Miracle: Environments, Economies and Geopolitics in the History of Europe and Asia*. Cambridge University Press, New York.

Kalb, A. (2010). The impact of intergovernmental grants on cost efficiency: theory and evidence from German municipalities. *Economic Analysis and Policy*, 40(1):23–48.

Kalb, A. (2012). What determines local governments' cost-efficiency? The case of road maintenance. *Regional Studies*, 48(9):1–16.

Kalb, A., Geys, B., and Heinemann, F. (2012). Value for money? German local government efficiency in a comparative perspective. *Applied Economics*, 44(2):201–218.

Kaufmann, D., Kraay, A., and Mastruzzi, M. (2011). The worldwide governance indicators: methodology and analytical issues. *Hague Journal on the Rule of Law*, 3(2):220–246.

Keefer, P. and Knack, S. (2008). Social capital, social norms and the new institutional economics. In *Handbook of new institutional economics*, pages 701–725. Springer, New York.

Keefer, P. and Shirley, M. (2000). Formal versus informal institutions in economic development. In énard, C. M., editor, *Institutions, Contracts and Organizations: Perspectives from New Institutional Economics*, pages 88–108. Edward Elgar, Edward Elgar.

King, R. G. and Levine, R. (1993). Finance and growth: Schumpeter might be right. *Quarterly Journal of Economics*, 108(3):717–737.

Kumar, S. and Russell, R. R. (2002). Technological change, technological catch-up, and capital deepening: Relative contributions to growth and convergence. *American Economic Review*, 92(3):527–548.

La Porta, R., de Silanes, F. L., and Shleifer, A. (2008). The economic consequences of legal origins. *Journal of Economic Literature*, 46(2):285–332.

La Porta, R., López-de Silanes, F., Shleifer, A., and Vishny, R. (1999). The quality of government. *The Journal of Law, Economics, and Organization*, 15(1):222–279.

Liu, J. S., Lu, L. Y., Lu, W.-M., and Lin, B. J. (2013). A survey of dea applications. *Omega*, 41(5):893–902.

Loikkanen, H. A., Susiluoto, I., and Funk, M. (2011). The role of city managers and external variables in explaining efficiency differences of Finnish municipalities. Technical Report No. 312, Helsinki Centre for Economic Research (HECER), University of Helsinki, Finland.

Mankiw, G. N., Romer, D., and Weil, D. N. (1992). A contribution to the empirics of economic growth. *Quarterly Journal of Economics*, 107(2):407–437.

Martin, P. and Ottaviano, G. I. (2001). Growth and agglomeration. *International Economic Review*, 42(4):947–968.

Martin-Oliver, A. (2019). Financial exclusion and branch closures in Spain after the Great Recession. *Regional Studies*, 53(4):562–573.

Martínez-Vázquez, J. and McNab, R. M. (2003). Fiscal decentralization and economic growth. *World Development*, 31(9):1597–1616.

Mauro, P. (1998). Corruption and the composition of government expenditure. *Journal of Public Economics*, 69(2):263–279.

McCann, P. and Van Oort, F. (2019). Theories of agglomeration and regional economic growth: A historical review. In Capello, R. and Nijkamp, P., editors, *Handbook of Regional Growth and Development Theories*, chapter 1, pages 6–23. Edward Elgar Publishing, Cheltenham.

Meloche, J.-P., Vaillancourt, F., and Yilmaz, S. (2004). Decentralization or fiscal autonomy? What does really matter? Effects on growth and public sector size in European transition countries. Policy Research Working Paper 3254, World Bank, Washington, D.C.

Méon, P.-G. and Weill, L. (2005). Does better governance foster efficiency? An aggregate frontier analysis. *Economics of Governance*, 6(1):75–90.

Migueis, M. (2013). The effect of political alignment on transfers to Portuguese municipalities. *Economics & Politics*, 25(1):110–133.

Morais, P. and Camanho, A. S. (2011). Evaluation of performance of European cities with the aim to promote quality of life improvements. *Omega*, 39(4):398–409.

Murillo-Zamorano, L. R. (2004). Economic efficiency and frontier techniques. *Journal of Economic Surveys*, 18(1):33–77.

Nagarajan, N. R., Teixeira, A. A., and Silva, S. T. (2016). The impact of an ageing population on economic growth: An exploratory review of the main mechanisms. *Análise Social*, 51(218):4–35.

Narbón-Perpiñá, I., Balaguer-Coll, M., and Tortosa-Ausina, E. (2019). Evaluating local government performance in times of crisis. *Local Government Studies*, 45(1):64–100.

Narbón-Perpiñá, I. and De Witte, K. (2018a). Local governments' efficiency: a systematic literature review – Part I. *International Transactions in Operational Research*, 25(2):431–468.

Narbón-Perpiñá, I. and De Witte, K. (2018b). Local governments' efficiency: a systematic literature review – Part II. *International Transactions in Operational Research*, 25(4):1107–1136.

Narbón-Perpiñá, I., Balaguer-Coll, M. T., Petrović, M., and Tortosa-Ausina, E. (2019). Which estimator to measure local governments' cost efficiency? The case of Spanish municipalities. *SERIEs*, forthcoming.

North, D. (1990). *Institutions, Institutional Change, and Economic Performance*. Cambridge University Press, New York.

North, D. C. (1981). *Structure and Change in Economic History*. Norton, New York.

North, D. C. (1989). Institutions and economic growth: An historical introduction. *World Development*, 17(9):1319–1332.

North, D. C. (1994). Economic performance through time. *The American Economic Review*, 84(3):359–368.

Park, S. (2013). Does gender matter? The effect of gender representation of public bureaucracy on governmental performance. *The American Review of Public Administration*, 43(2):221–242.

Pastor, J. M., Pavía, J. M., Serrano, L., and Tortosa-Ausina, E. (2017). Rich regions, poor regions, and bank branch deregulation in Spain. *Regional Studies*, 51(11):1678–1694.

Peiró-Palomino, J. and Tortosa-Ausina, E. (2013). Can trust effects on development be generalized? A response by quantile. *European Journal of Political Economy*, 32:377–390.

Pinilla, V. and Sáez, L. A. (2017). La despoblación rural en españa: génesis de un problema y políticas innovadoras. *CEDDAR, Zaragoza*.

Pucheta-Martínez, M. C., Bel-Oms, I., and Olcina-Sempere, G. (2019). Commitment of independent and institutional women directors to corporate social responsibility reporting. *Business Ethics: A European Review*, 28(3):290–304.

Rios, V., Pascual, P., and Cabases, F. (2017). What drives local government spending in spain? a dynamic spatial panel approach. *Spatial Economic Analysis*, 12(2-3):230–250.

Rodríguez Bolívar, M. P., Navarro Galera, A., Alcaide Muñoz, L., and López Subires, M. D. (2016). Risk factors and drivers of financial sustainability in local government: An empirical study. *Local Government Studies*, 42(1):29–51.

Rodríguez-Pose, A. (2013). Do institutions matter for regional development? *Regional Studies*, 47(7):1034–1047.

Rodríguez-Pose, A. and Di Cataldo, M. (2014). Quality of government and innovative performance in the regions of europe. *Journal of Economic Geography*, 15(4):673–706.

Rodríguez-Pose, A. and Garcilazo, E. (2015). Quality of government and the returns of investment: Examining the impact of cohesion expenditure in european regions. *Regional Studies*, 49(8):1274–1290.

Rodríguez-Pose, A., Tijmstra, S. A., and Bwire, A. (2009). Fiscal decentralisation, efficiency, and growth. *Environment and Planning A*, 41(9):2041–2062.

Rodríguez-Pose, A. and Zhang, M. (2019). Government institutions and the dynamics of urban growth in china. *Journal of Regional Science*, 59(4):633–668.

Rodrik, D., Subramanian, A., and Trebbi, F. (2004). Institutions rule: the primacy of institutions over geography and integration in economic development. *Journal of Economic Growth*, 9(2):131–165.

Sala-i-Martin, X. (1997). I just ran two million regressions. *American Economic Review*, 87(2):178–183.

Sala-i Martin, X. X. (1996). The classical approach to convergence analysis. *The Economic Journal*, 106(437):1019–1036.

Solé-Ollé, A. and Sorribas-Navarro, P. (2008). The effects of partisan alignment on the allocation of intergovernmental transfers. differences-in-differences estimates for spain. *Journal of Public Economics*, 92(12):2302–2319.

Štastná, L. and Gregor, M. (2015). Public sector efficiency in transition and beyond: evidence from Czech local governments. *Applied Economics*, 47(7):680–699.

Tabellini, G. (2010). Culture and institutions: economic development in the regions of Europe. *Journal of the European Economic Association*, 8(4):677–716.

Thiessen, U. (2003). Fiscal decentralisation and economic growth in high-income OECD Countries. *Fiscal Studies*, 24(3):237–274.

Thornton, J. (2007). Fiscal decentralization and economic growth reconsidered. *Journal of Urban Economics*, 61(1):64–70.

Valickova, P., Havranek, T., and Horvath, R. (2015). Financial development and economic growth: A meta-analysis. *Journal of Economic Surveys*, 29(3):506–526.

Ward, A. M. and Forker, J. (2017). Financial management effectiveness and board gender diversity in member-governed, community financial institutions. *Journal of Business Ethics*, 141(2):351–366.

Williamson, O. E. (1979). Transaction-cost economics: the governance of contractual relations. *The Journal of Law and Economics*, 22(2):233–261.

Williamson, O. E. (1983). Credible commitments: Using hostages to support exchange. *The American Economic Review*, 73(4):519–540.

Williamson, O. E. (1985). *The Economic Institutions of Capitalism*. Free Press, New York.

Worthington, A. C. and Dollery, B. E. (2000). An empirical survey of frontier efficiency measurement techniques in local government. *Local Government Studies*, 26(2):23–52.

Zafra-Gómez, J. L., López-Hernández, A. M., and Hernández-Bastida, A. (2009). Evaluating financial performance in local government: maximizing the benchmarking value. *International Review of Administrative Sciences*, 75(1):151–167.

Zafra-Gómez, J. L. and Muñiz-Pérez, A. M. (2010). Overcoming cost-inefficiencies within small municipalities: improve financial condition or reduce the quality of public services? *Environment and Planning C: Government and Policy*, 28(4):609–629.

Table 1: Minimum services and facilities defined by the law and corresponding output variables

	Minimum services and facilities	Output indicators
In all municipalities:	Public street lighting	Number of lighting points
	Cemetery	Total population
	Waste collection	Waste collected
	Street cleaning	Street infrastructure surface area
	Supply of drinking water to households	Length of water distribution networks (m)
	Sewage system	Length of sewer networks (m)
	Access to population centres	Street infrastructure surface area
	Paving of public roads	Street infrastructure surface area
	Regulation of food and drink	Total population
In municipalities with populations of over 5,000, in addition:	Public parks	Surface area of public parks
	Public library	Surface area of public libraries
	Market	Surface area of markets
	Treatment of collected waste	Waste collected
In municipalities with populations of over 20,000, in addition:	Civil protection	Total population
	Provision of social services	Total population
	Fire prevention and extinction	Street infrastructure surface area
	Public sports facilities	Surface area of public sport facilities (m^2)
In municipalities with populations of over 50,000, in addition:	Urban passenger transport service	Total population, Street infrastructure surface area
	Protection of the environment	Total surface area

Source: Narbón-Perpiñá et al. (2019).

Table 2: Summary statistics for inputs and outputs to measure efficiency, average values for the period 2008–2015

Variables	Mean	S.d.
Total costs[a] (C)	6,629,357.562	8,036,718.685
Total population (Y_1)	7,097.912	8,174.880
Street infrastructure surface area[b] (Y_2)	334,833.203	331,529.783
Number of lighting points (Y_3)	1,485.161	1,522.432
Tons of waste collected (Y_4)	3,771.651	18,871.600
Length of water distribution networks[b] (Y_5)	47,808.036	85,570.038
Length of sewer networks[b] (Y_6)	29,624.571	32,416.533
Public parks surface area[b] (Y_7)	97,879.857	570,575.685
Public library surface area[b] (Y_8)	349.129	1,621.335
Market surface area[b] (Y_9)	4,044.351	11,116.074
Sport facilities surface area[b] (Y_{10})	92,959.663	648,614.726

Notes:
[a] In thousands of euros.
[b] In square meters.

Table 3: Municipal efficiency, summary statistics 2008–2015

Year	Mean	S.d.	Min	1^{st} quartile	Median	3^{rd} quartile	Max	Number of efficient units
2008	0.495	0.192	0.045	0.361	0.468	0.607	1.000	57 (2.876%)
2009	0.586	0.171	0.098	0.467	0.575	0.690	1.000	57 (2.876%)
2010	0.536	0.169	0.115	0.420	0.513	0.625	1.000	46 (2.321%)
2011	0.535	0.175	0.133	0.417	0.512	0.626	1.000	57 (2.876%)
2012	0.531	0.177	0.109	0.407	0.511	0.627	1.000	51 (2.573%)
2013	0.581	0.168	0.147	0.467	0.569	0.678	1.000	64 (3.229%)
2014	0.602	0.177	0.136	0.478	0.583	0.699	1.000	87 (4.390%)
2015	0.580	0.175	0.109	0.459	0.560	0.680	1.000	68 (3.431%)

Table 4: Descriptive statistics of the control and instrumental variables included in the analysis (average values for the period 2008–2015)

	Description	Mean	S.d.
Control variables			
Disposable income[a]	Disposable income per capita (in €).	13,545.905	2,821.068
Financial development[b]	Number of bank branches per 1000 inhabitants.	1.145	0.655
Population density[c,d]	Total population by km^2.	247.611	952.194
Population growth[d]	Population variation from year t to $t-1$ (in %).	-0.003	0.023
Retired[d]	Population older than 65 years over total population (in %).	0.209	0.074
Political alignment[e]	Dummy variable. If the political party in the regional government is the same as in the municipal government, it equals 1. Otherwise, 0.	0.562	0.496
Fiscal autonomy[f]	Share of tax revenues (chapter expenditures from 1 to 3) over non-financial revenues (chapter expenditures from 1 to 7) (in %).	0.482	0.155
Instrumental variables			
Gender quotas[g]	Dummy variable. If the municipality complies with the gender quotas for effective equality between women and men (OL 3/2007), equals 1. Otherwise, 0.	0.833	0.437
Political concentration (Herfindahl index)[e]	Values between 0 and 1 depending on the number of councillors for each party in the council. High values denote a lower level of political fragmentation or higher political strength.	0.399	0.097

Sources:
[a] Tax Agency, Ministry of the Treasury.
[b] Maestre Ediban.
[c] National Geographic Information Center, Ministry of Development.
[d] Spanish Statistical Institute (INE).
[e] Ministry of Territorial Policy and Public Function.
[f] State Secretariat for Budgets and Expenditure, Ministry of Treasury.
[g] Ministry of Home Affairs.

Table 5: Determinants of municipal growth, baseline estimations

	Dependent variable: $\triangle$ *INCOME*				
Variables	(i)	(ii)	(iii)	(iv)	(v)
Intercept	-0.006^{*}	1.951^{***}	1.913^{***}	1.924^{***}	2.033^{***}
	(0.003)	(0.073)	(0.076)	(0.076)	(0.077)
EFF	0.012^{*}	0.020^{***}	0.021^{***}	0.026^{***}	0.030^{***}
	(0.006)	(0.007)	(0.007)	(0.007)	(0.007)
LAG_INCOME		-0.212^{***}	-0.213^{***}	-0.213^{***}	-0.217^{***}
		(0.007)	(0.007)	(0.007)	(0.007)
FIN_DEV		0.005^{*}	0.005^{*}	0.005	0.007^{**}
		(0.002)	(0.002)	(0.002)	(0.002)
POP_DENS			0.716^{**}	0.674^{**}	0.519^{**}
			(0.336)	(0.325)	(0.259)
POP_GROWTH			0.124^{***}	0.122^{**}	0.144^{***}
			(0.041)	(0.041)	(0.042)
RETIRED			0.135^{*}	0.143^{*}	0.124^{*}
			(0.076)	(0.076)	(0.074)
ALIGN				-0.000	-0.001
				(0.001)	(0.001)
FISCAL				-0.038^{***}	-0.350^{***}
				(0.013)	(0.039)
$FISCAL^2$					0.314^{***}
					(0.037)
N	14,560	12,740	12,740	12,649	12,649
R^2 (within)	0.707	0.736	0.737	0.736	0.738
F_{STAT}	$1,653.97^{***}$	$1,515.04^{***}$	$1,142.46^{***}$	976.00^{***}	991.10^{***}
Fixed effects	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Temporal effects	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*

Notes: Standard errors robust to heteroskedasticity and serial correlation are in parenthesis *, ** and *** denote significance at 10%, 5%, and 1% significance levels, respectively.

Table 6: Determinants of municipal growth, interaction terms

	Dependent variable: $\triangle$ *INCOME*			
Variables	(i)	(ii)	(iii)	(iv)
Intercept	1.986***	2.033***	0.112	2.002***
	(0.079)	(0.077)	(0.100)	(0.078)
EFF	0.089***	0.031***	6.773***	0.013**
	(0.020)	(0.009)	(0.186)	(0.006)
LAG_INCOME	−0.216***	−0.217***	−0.019**	−0.215***
	(0.007)	(0.007)	(0.010)	(0.007)
FIN_DEV	0.007**	0.007***	0.014***	0.007**
	(0.002)	(0.002)	(0.002)	(0.002)
POP_DENS	0.540**	0.516**	1.593**	0.514**
	(0.272)	(0.259)	(0.814)	(0.268)
POP_GROWTH	0.144***	0.144***	0.088**	0.142***
	(0.041)	(0.042)	(0.036)	(0.041)
RETIRED	0.148***	0.124	0.144	0.153***
	(0.074)	(0.074)	(0.089)	(0.075)
ALIGN	−0.000	−0.002	0.000	−0.001
	(0.001)	(0.008)	(0.001)	(0.001)
FISCAL	−0.298***	−0.350***	−0.445***	−0.351***
	(0.042)	(0.039)	(0.044)	(0.039)
$FISCAL^2$	0.323***	0.314***	0.387***	0.314***
	(0.037)	(0.037)	(0.042)	(0.037)
$EFF \times FISCAL$	−0.121***			
	(0.037)			
$EFF \times ALIGN$		−0.002		
		(0.008)		
$EFF \times INCOME$			−0.707***	
			(0.019)	
$EFF \times CRISIS$				0.025***
				(0.004)
N	12,649	12,649	12,649	12,649
R^2 (within)	0.738	0.738	0.739	0.739
F_{STAT}	936.77***	930.50***	1,319.28***	955.42***
Fixed effects	*Yes*	*Yes*	*Yes*	*Yes*
Temporal effects	*Yes*	*Yes*	*Yes*	*Yes*

Notes: Standard errors robust to heteroskedasticity and serial correlation are in parenthesis *, ** and *** denote significance at 10%, 5%, and 1% significance levels, respectively.

Table 7: Determinants of municipal growth, alternative scenarios

Variables	Dependent variable: $\triangle$ *INCOME*					
	(i)	(ii)	(iii)	(iv)	(v)	(vi)
	Efficiency above median	Efficiency below median	Growth above median	Growth below median	Income pc above median	Income pc below median
Intercept	2.127***	3.059***	3.059***	1.403***	1.589***	1.616***
	(0.118)	(0.192)	(0.192)	(0.130)	(0.122)	(0.184)
EFF	0.035***	0.053**	0.053***	0.004	0.007	0.042***
	(0.125)	(0.013)	(0.013)	(0.007)	(0.010)	(0.013)
LAG_INCOME	−0.217***	−0.316***	−0.316***	−0.157***	−0.168***	−0.182***
	(0.011)	(0.019)	(0.019)	(0.013)	(0.012)	(0.018)
FIN_DEV	0.004	0.010**	0.010**	−0.007**	0.001	0.023***
	(0.004)	(0.004)	(0.004)	(0.002)	(0.004)	(0.004)
POP_DENS	0.355*	2.767	2.767***	−0.047	−0.895**	6.955***
	(0.202)	(0.769)	(0.769)	(0.196)	(0.379)	(2.306)
POP_GROWTH	0.128**	0.276*	0.276***	−0.103***	0.096	0.117**
	(0.060)	(0.067)	(0.067)	(0.038)	(0.059)	(0.055)
RETIRED	−0.020	0.037***	0.037	0.090	−0.202	0.060
	(0.124)	(0.167)	(0.167)	(0.031)	(0.126)	(0.131)
ALIGN	−0.001	−0.004*	−0.004*	−0.001	0.006***	−0.004*
	(0.002)	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)
FISCAL	−0.627***	−0.517***	−0.517***	0.009	−0.011	−0.617***
	(0.067)	(0.077)	(0.077)	(0.031)	(0.072)	(0.06)
$FISCAL^2$	0.601***	0.448***	0.448***	−0.013	0.019	0.618***
	(0.063)	(0.074)	(0.074)	(0.029)	(0.065)	(0.061)
N	6,597	6,052	6,425	6,224	4,980	7,665
R^2 (within)	0.738	0.794	0.794	0.425	0.670	0.770
F_{STAT}	391.13***	763.22***	763.22***	232.03***	249.63	688.99
Fixed effects	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Temporal effects	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*

Notes: Standard errors robust to heteroskedasticity and serial correlation are in parenthesis *, ** and *** denote significance at 10%, 5%, and 1% significance levels, respectively.

Table 8: Determinants of municipal growth, instrumental variable estimations

	Dependent variable: $\triangle$ *INCOME*			
Variables	(i)	(ii)	(iii)	(iv)
Intercept	1.515^{***}	1.490^{***}	1.698^{***}	0.630^{***}
	(0.152)	(0.151)	(0.112)	(0.088)
EFF	0.441^{*}	0.395^{*}	0.409^{**}	0.136^{**}
	(0.246)	(0.220)	(0.205)	(0.058)
LAG_INCOME	-0.192^{***}	-0.190^{***}	-0.195^{***}	-0.064^{***}
	(0.010)	(0.101)	(0.010)	(0.010)
FIN_DEV	0.002	0.001	0.007^{**}	0.006
	(0.003)	(0.003)	(0.003)	(0.008)
POP_DENS		-0.407	-0.650	-0.009
		(0.644)	(0.694)	(0.010)
POP_GROWTH		0.174^{***}	0.204^{***}	0.046
		(0.057)	(0.057)	(0.078)
RETIRED		0.257^{*}	0.273^{*}	-0.112^{***}
		(0.014)	(0.146)	(0.024)
ALIGN			0.006	-0.003^{*}
			(0.001)	(0.002)
FISCAL			-0.418^{***}	-0.262^{**}
			(0.136)	(0.134)
$FISCAL^2$			0.211^{***}	0.316^{**}
			(0.067)	(0.138)
N	10,920	10,920	10,842	972
R^2 (within)	0.702	0.714	0.716	
F_{STAT}	$9,495^{***}$	$9,850^{***}$	$9,912^{***}$	
Wald χ^2				257.15^{***}
First stage F_{STAT}				4.068^{**}
First stage R^2				0.249
Sargan test χ^2				0.405
Basmann test χ^2				0.401
Fixed effects	*Yes*	*Yes*	*Yes*	*No*
Temporal effects	*Yes*	*Yes*	*Yes*	*No*

Notes: Standard errors robust to heteroskedasticity and serial correlation are in parenthesis *, ** and *** denote significance at 10%, 5%, and 1% significance levels, respectively. In all models efficiency is assumed to be endogenous. In models (i), (ii) and (iii), the instrument is the second lag of efficiency. Model (iv) corresponds to the second stage results from a 2SLS estimation where we used as instruments two external variables. These are i) a dichotomous variable which is equal to one if the municipality complied with the gender quota law for local government members during the period 2013–2015, and zero otherwise; ii) political concentration, measured with the Herfindahl index. Both variables were constructed from municipal election data for years 2011 and 2015. Lack of temporality obliged us to perform the analysis in a cross-sectional framework. Also note that information on the gender instrument is available only for municipalities above 3,000 inhabitants. Statistics from the first stage estimation are provided at the bottom of the table.

Figure 1: Efficiency scores by years

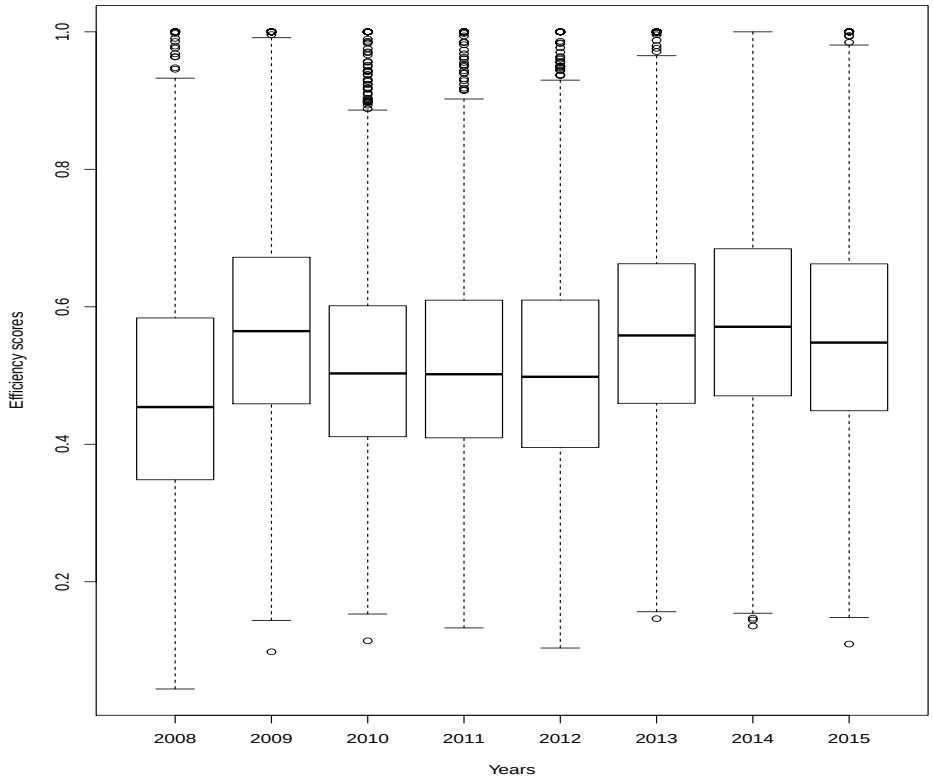
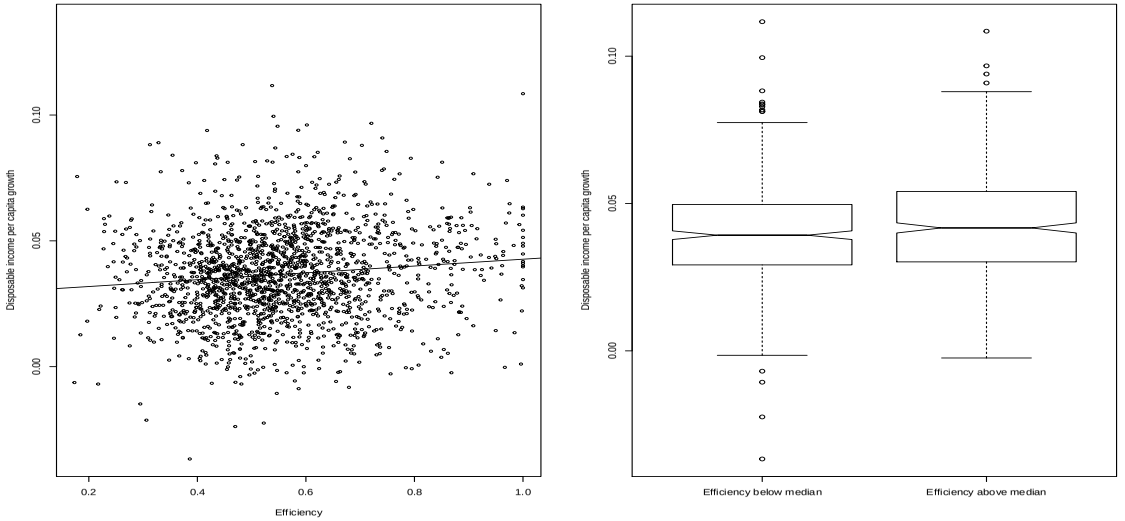


Figure 2: Efficiency and disposable income per capita growth



(a) Scatter plot for efficiency and growth

(b) Boxplots for efficiency and growth