



# 'Ghost citizens': Using notches to identify manipulation of population-based grants<sup>☆</sup>



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## ABSTRACT

This paper analyzes how local governments misreport population figures to obtain higher per capita grant allocations. In 1998, the allocation of a formula based grant in Spain switched from using the centrally administered census to local population registers administered by municipalities. The value of this per capita grant changes at fixed population thresholds for the entire local population. We exploit these notches to analyze the size distribution of municipalities to detect deliberate manipulation of the grant-assignment variable. This allows us to causally identify the effect of grant generosity on population over-reporting. We document an excess mass of municipalities to the right of the notch threshold and a density hole to the left of it: local registers included a proportion of 'ghost citizens', that is, people who presented no trace of actually residing in the municipalities which benefit the most from inflating population figures to pass the relevant threshold. We document that manipulation (rather than real population responses) is the mechanism at work. The main channel behind manipulation is the incorrect treatment of foreign residents to inflate total local population.

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## 1. Introduction

Local governments across the globe receive a substantial share of their revenues in the form of grants from higher-level governments. In 2010, for example, this share was as high as 70% in the United Kingdom and the Netherlands. In other countries the share is smaller and local governments have more autonomy over their own resources (Foremny, 2014). In Spain, nearly 40% of all local revenues are allocated as grants, high enough to warrant special attention. Not only the quantity, but also the way in which these

grants are allocated to cities and municipalities differs across countries. The optimal allocation of grants has been discussed extensively (see Oates, 1972, 1999; Wildasin, 1986; Bird and Smart, 2002 for surveys) and it is typically concluded that they should be allocated as unconditional block grants, so that local spending and taxation decisions are not distorted. At the same time, it is argued that grants should be formula-based to avoid any political bias in their allocation (Dixit and Londregan, 1995; Persson and Tabellini, 2002). Most formula grants, however, are vulnerable to manipulation by recipients because information needed to apply the allocation criteria is distributed asymmetrically between levels of government (Bordignon et al., 2001; Huber and Runkel, 2006). Although the academic literature has not paid much attention to this issue, the difficulties in gathering reliable data to implement these formulas are a concern for both policy makers and advisers (see, e.g., and Bahl, 2000 and Boex and Martínez-Vázquez, 2007). For instance, grantors, whose equalization formulas rely on measures of tax capacity, need to be able to secure this information, since, if tax collection is in the hands of local governments, there might be incentives to under-report the tax base to the higher tiers of authority. Countries that use complex calculations of spending needs are also particularly vulnerable to incentives to withhold information (e.g., Australia, the UK, and the Nordic countries, see Kim and Lotz, 2008). Ultimately, the failure to address these

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problems can undermine the workings of such grants. According to Bahl (2000):

“A major constraint to designing a formula grants system is finding the data to implement and update the system. An important underlying issue is this: formula grants are appealing because of their transparency and objectivity. These advantages can be taken away if the data to allocate the funds are suspect.” (p.14)

It has often been argued that the least distortionary and manipulable way of allocating grants are schemes based on the number of inhabitants (see again Bahl, 2000, and Boex and Martínez-Vázquez, 2007). After all, counting its citizens through periodical censuses is one of the most basic tasks performed by any country (see Brambor et al., 2016) and having information of comparable quality for other indicators is a task predominantly undertaken by more modern administrations. However, if the collaboration of local governments is required for the collection of population information, even this variable might potentially be manipulated. Such a problem may be especially acute in developing countries, where the central government lacks the capacity to monitor population in the field effectively (as also pointed out by Boex and Martínez-Vázquez, 2007). Therefore, governments seeking to implement a system in which the allocation of grants is based on population face a trade-off between accuracy and manipulability. Increasing accuracy by relying on local government reports (as opposed to using expensive and outdated decennial census data) might create incentives to manipulate population figures, unless the central government can dedicate sufficient efforts to ensure compliance.

In Spain, municipalities are responsible for the administration of their population registers (*Padrón Municipal de Habitantes*). Since 1998, the population registered on January 1st determines the allocation of grants from the central government to the municipalities, while previously this allocation was based on decennial census data, which is administered by the Spanish Statistical Office (INE in what follows), a central government agency. In theory, this agency also coordinates and monitors the municipal register, with the aim of ensuring that population figures reflect the reality. However, for several years, central government monitoring was far from perfect and the registered population was systematically inflated. The population censuses recently carried out uncovered huge numbers of ‘ghost citizens’, i.e., individuals for whom there was no actual evidence of their residing in the respective municipality. Moreover, several scandals have been reported in which city councils have been accused of systematically manipulating population numbers. The most notorious of these took place in Santa Cruz de Tenerife (a major city in the Canary Islands). In an audit released in 2009, the INE found nearly 15,000 ‘ghost citizens’ (around 7% of the population), with evidence of fraudulent use of ID documents, among other irregularities.<sup>1</sup> Immediately following the publication of the audit, the mayor of Las Palmas (the largest city in the Canary Islands) complained about the loss of grants suffered by his city due to the over-reporting of population in Santa Cruz and, more generally, about the harm done to the objectivity of the allocation of grants to municipalities in the region.<sup>2</sup>

Theoretically, for a given level of enforcement, over-reporting will be larger the more generous these grants are (i.e., the higher the amount of money linked to an additional resident). To the best of our knowledge, no previous attempt has been made to estimate

the effect of grant generosity on population over-reporting. The reason for this is that it is very difficult to estimate this magnitude for a linear grant scheme, since the marginal effect of an additional resident on the amount of grants is constant across municipalities. Fortunately for our purposes, in Spain, per capita grants to municipalities jump at population thresholds. Specifically, the grant per inhabitant changes discontinuously at thresholds of 5000, 20,000 and 50,000 inhabitants for the entire local population. Per capita grants that increase discontinuously at population thresholds create incentives for municipalities to sort to the right of the threshold, as one additional inhabitant brings additional grants for all existing inhabitants. Although all municipalities might be tempted to misreport population figures, the incentives to misreport are stronger for municipalities close to the threshold. There is considerable anecdotal evidence from the municipalities citing the increase in grants to justify an aggressive policy to boost their populations above one of these thresholds.<sup>3</sup> Moreover, the jump in grants at the threshold provides exogenous variation in the marginal effect of an additional resident. This allows to identify the effect of grant generosity on population misreporting. This effect is estimated for municipalities close to the threshold but can be extrapolated to municipalities far from the threshold in order to quantify the potential effect of linear grant schemes on the incentives to misreport.

Policies that create jumps in governments’ choice sets are commonly referred to as notches (Slemrod, 2010). Notches have been extensively used to study the effects of taxes on the behavior of individuals and firms (Saez, 2010; Chetty et al., 2011; Kleven and Waseem, 2013). This paper is, to the best of our knowledge, the first to exploit notches to study the response of local governments to the incentives introduced by intergovernmental grants. We make use of these notches to estimate the effect of grant generosity on population over-reporting. Specifically, we use the methods developed in the taxation literature to quantify bunching that, in our case, corresponds to the excess density found above the notch points.<sup>4</sup> The method allows us to estimate the implied responses of population over-reporting to grant generosity. We perform several heterogeneity analyses (by period and type of municipality) that, linked to a stylized theoretical model of population reporting, help us to interpret our results.

We find significant responses and heterogeneity in the responsiveness of municipalities to grants. To the left of the 5000 threshold, there is a loss of mass of around 10% of the municipalities. In the most extreme cases, over-reporting can be as high as 1000 additional residents, although on average it is around 60 residents. This implies that, for the most responsive municipalities, the elasticity of population over-reporting to grants is about 0.40, while the average response is around 0.013. The extrapolation of this last number to the whole distribution of municipalities indicates that the leakage of grant money due to population over-reporting could be in the order of 40 million euros per year, suggesting potential gains from improvements in audit policies. In fact, we find that the extent of over-reporting is higher during the period 1998–2005, and almost disappears after 2005, coinciding with an improvement in the enforcement of population numbers by the INE. We also show how the census is able to identify the non-compliers, that is, the

<sup>1</sup> See, for example, “A city with 15,000 ‘ghosts’ [Una ciudad con 15.000 fantasmas]”, in *Canarias* 7, 05/04/2013.

<sup>2</sup> The undue amounts received by Santa Cruz, during a ten-year period, were estimated at around 40 million euros, while the mayor estimated the amount of grants lost by Las Palmas at around 6.5 million euros (see “The mayor of Las Palmas demands compensation for municipalities because of the fraud in the Santa Cruz register [El Alcalde de las Palmas) pide al Gobierno una compensación para los municipios por el fraude del padrón en Santa Cruz]”, in *www.eldiario.es*, 07/02/2014).

<sup>3</sup> This is the case, for example, of Manlleu, a city nearby Barcelona; in 2007 the city jumped over the 20,000 threshold and the effect on the amount of grants was discussed in the city council (see “The 20,000 effect [L’efecte 20,000 habitants]”, in *El 9 nou*, 14/10/2013). In Cardona, another town nearby Barcelona, the mayor called the population to mobilize against the possibility of falling below the 5000 threshold and losing grants from the central government (see “Cardona mobilized in search of more neighbors [La localidad de Cardona se moviliza para buscar más vecinos]”, in *La Vanguardia*, 21/12/2014).

<sup>4</sup> For an updated review of papers studying bunching see Kleven (2016).

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