



Municipal Solid Waste Management services and its funding in Spain



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ABSTRACT

Municipal Solid Waste (MSW) generation and management concern many cities. Several implications, mainly resource-consumption, socio-economic and environmental-sustainability, arise. Concurrently, financial-budgetary constraints in some local governments provoke allegations of “misuse” of Waste-collection-treatment-disposal charges and suggestions that they are used mainly to balance budgets.

The paper first examines traditional forms of levying charges for Waste-collection-treatment-disposal under the coverage of the Polluter-Pays-Principle in OECD countries and Spanish provincial capitals, finding a prevalence of flat fee systems in Spain.

Regarding Madrid specifically, the paper analyses the relationship between its Waste-collection-treatment-disposal charges and some possibly (in-)dependent variables. Relationships between MSW generated and some potentially-linked variables are identified. Analysis rejects that Madrid waste generation-treatment-disposal charges based on dwelling values had a positive relationship with waste generated (more value of the properties in a district does not imply more waste generated), and reveals/-confirms other significant correlations between some variables, it being remarkable that neither age, gender, nationality nor education were found relevant. Conclusions – such as the soundness of the suggested use of the number of dwellings per district as a suitable indicator for the level of waste generated (and its required funding) and the inexistence of a conventional Pay As You Throw system in Madrid – are offered with some policy implications-considerations.

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1. Introduction

Sustainability is a three-tier concept, “social, economic and environmental”, related to meeting the needs of the present without compromising the ability of future generations to meet their own needs (Bruntland Report, UNWCE, 1987; Machado e Silva et al., 2014; Cardoen et al., 2015).

Unwanted impact from waste generation aims to be compensated for by the Polluter Pays Principle (PPP) (UN, 1992; EU, 2008; OECD, 2007, 2013) by means of a charge-tax-fee this charge well might be variable on the weight or volume of waste (Brown and Johnstone, 2014). PPP requires that “the costs of disposing of waste must be borne by the holder of waste, by previous holders or by the producers of the product from which the waste came” (EU, 2008).

Dahlen and Lagerkvist (2010) suggest the existence of a gap in the relevant literature, disclosing empirical evidence of waste collecting charges applied in Europe. This paper contributes to filling the gap, delivering the findings on the existing funding system in use in the Spanish Provincial Capitals and some additional evidence on waste related variables in the Capital city of Madrid.

Echoing Bilitewski (2008), Muñoz et al. (2011) and Spanish Law on waste and polluted soil (2011), it is to be acknowledged that a more than merely adequate costing system is necessary for the optimal implementation of a charging system. Determining the funding of local public services with the lack of a reliable measure of the cost does not inject transparency into the system. Therefore, the possibility of establishing a variable waste charge must be accompanied by the operation of a proper waste management accounting system that provides transparency in the complex world of MSW management and its related costing. Bilitewski (2008) acknowledges the fact that overall, across Germany, 70% of the costs of MSW disposal services are fixed – and so are not dependent on the waste generated by citizens or dwellers.

The objectives of this research are to introduce the European and OECD framework on waste charges and then to disclose what

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is happening with waste charges in Spain, later to reveal if Madrid waste charges are in any way dependent on the waste generated, to do so will require proof of the existence of a statistical relationship between the value of properties and waste generation and finally to confirm the dependence of waste generation on the number of properties (Household waste generator). In accordance with the objectives later some hypothesis will be formulated.

The paper is structured into five main sections. The first section introduces the research issue; the second places it in better focus and context with some key relevant literature that enables the theoretical approach. The third section is devoted to matters relating to the empirical methods–methodology, while the fourth presents findings–results with discussion of the main findings and results, while being supported by an overall summary of key aspects of the paper. The last part includes conclusions and policy implications.

2. Research literature review and hypotheses

2.1. Funding-charging systems

Early literature refers to the ancient Roman Empire, to describe a so called “*Cloacarium*” tax that could well be the oldest referenced waste charge, raised to pay for the maintenance of slaves/criminal convicts doing this labour (Mac Chombaich De Colquhoun, 1851; Barles, 2014).

A review of literature on waste funding-charging (Hong and Adams, 1999; Gordon Mackie Associates Ltd., 2007; Bilitewski, 2008; Puig-Ventosa, 2008; Skumatz, 2008; Chamizo González, 2010; Dahlén and Lagerkvist, 2010; Brown and Johnstone, 2014) reveals the application of four main systems of funding waste services.

2.1.1. Undesignated funds system

This system is based on funding the service from general city funds with no attempt to relate the cost of the service (either through actual service provided as expressed in either weight or cubic volume of MSW removed). In this system funds when collected (by means of other relevant taxes such as council tax) are not specifically attributed to or connected with MSW. They are placed within the overall general funds and remain undesignated, meaning that all residents are paying for the provision of all local services including MSW services.

Evidence of this form of MSW funding was witnessed in virtually all (if not all) the countries considered, Germany (Bilitewski, 2008), France (Le Bozec, 2008), and Canada. The Netherlands, Sweden and Switzerland (Brown and Johnstone, 2014). This system of funding provides no incentive to the citizen to behave accordingly to environmental concerns originated.

Within Spain it is apparent in Table 2 below that this system of charging is not prevalent in Spanish provincial capitals with an average of 5.33 out of 52 (10.3%) applying this undesignated funds system. Despite that (essentially) this system of charging prevailed in Madrid until 2008 (Chamizo González, 2010; Muñoz et al., 2011).

2.1.2. Flat fee system

The second funding system is the levy of a flat fee for the service again, with no formal attempt to relate to the cost of the service. Such systems do not seek to relate the charges for MSW to the actual waste generated. The flat fee may be a relatively fixed and constant one. This funding system categorises householders and everyone who is included in a given category will be charged with the same amount of money. Councils applying this funding system may settle on a single category or up to seventeen (the case of Madrid). This system is often considered the most easily applicable, as simple as calculating/estimating the global cost of the service of X €, to split up into N taxpayers, so a minimum charge of X/N € per capita).

This form of MSW disposal funding was also seen in virtually all the countries considered. Bilitewski (2008) refers to its existence within Germany, Le Bozec (2008) provides evidence indicating that in 2005 around 10% of the French population paid for their MSW disposal on that basis (including Paris with a population of more than two million inhabitants and Rouen with more than four hundred thousand), and OECD (2013) refers to its presence in Australia, Canada, Chile, France, Israel, Japan, Korea, Netherlands, Spain, Sweden and Switzerland. Kawai and Osako (2013) refer to its presence in Vietnam pointing out that fixed fees do not encourage householders to reduce the waste generated.

2.1.3. Variable (on waste generated) fee system

The third funding system is the levy of a fee that is overtly tied into quantifiable aspects of MSW generation (per relevant unit e.g. household). This charging system is also known as a Pay As You Throw (PAYT) system or pay per waste generation. That variability criterion could be the weight of the MSW or its cubic volume or, in some cases, the number of bags/bins. Djemacim (2009) describes the case of three French municipalities (Paris, Rouen, and Besançon) the last one being the only one applying what this author refers to as “incentive fee” based on the number of weekly collected bins. Djemacim discloses that small entities opt for incentive fees whereas the large cities tend to choose a flat tax (flat fee).

In terms of the MSW service, in particular, the application of a specific waste charge/fee is a way for certain municipalities to recover the cost of a sustainable provision of the service – shifting the financial burden from the local authority to the consuming citizen–dweller. In countries like USA and Canada, the PAYT system (or a variant of it) has been applied for many years and there is evidence indicating that in 2006, it was in application in over 7100 US communities (United States EPA, 1997; Skumatz, 2008,). Still, there is some evidence to show that such charges frequently fail to cover the full cost of the service – due to the lack of an overt causal relationship between the fee and the cost of the service (OECD, 2013; Brown and Johnstone, 2014). Evidence of this form of MSW service funding (or a variation of it) was witnessed in virtually all countries considered with its most classic expression being seen in PAYT systems.

Exceptionally, within the Spanish context, Puig-Ventosa (2008) notes the application of PAYT in a region of Catalonia and the Environment Ministry refers to another experience in the Balearic Islands (MAGRAMA, 2014). In Germany, Bilitewski (2008) identifies its application with the basis of charging being each disposal bag or bin used. Dahlen and Lagerkvist (2010) reveal application in Sweden. Supporting evidence is also seen in the United Kingdom (Dresner and Ekins, 2010). With regard to the United Kingdom it must be said that the practice of charging for the waste services was forbidden (as of 2010) and the referenced cases were pilot experiences.

In Sweden as in Spain, MSW management is a local authority duty. Swedish local governments can charge fees for the service but never above cost. While there are several ways to implement these rates within the law, in Sweden the most common form is a PAYT system (based on volume or less commonly weight). Over the decade from 1995 till 2005, only 26 (8.9%) of Sweden’s 290 municipalities had implemented that system or a form of it. Table 1 gives a visual insight as to how intensively variable waste charging prevailed in Europe in 2005.

As described by most of the authors referred to, a variable fee system is also a unit price system and hence there must be an individualised per household collection system (e.g. door to door collection) as there is no point in attempting to make an individual charge per household when there is no individual measurement of

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