

Chapter 1

Introduction

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1.1 Introduction

In 2004 Elbert Dijkgraaf finished a PhD-thesis ‘Regulating the Dutch waste market’ at the Erasmus University Rotterdam. It was interesting that not much is published about the waste market, although it is a very important sector from an economic and environmental viewpoint. In 2006 we were participants at a very interesting conference on Local Government Reform: privatization and public-private collaboration in Barcelona organized by Germà Bel. It was interesting to notice that researchers from Spain, Scandinavian countries, the UK and the USA were studying this issue as well. From this we brought forward the idea to publish a book about the waste market. Because of its legal framework we want to focus on Europe.

In this chapter we give an introduction to this book. In the next paragraph we present a short overview of the waste collection market. Since 1960 the importance of the waste sector has increased substantially both in the waste streams and the costs of waste collection and treatment. Furthermore, we discuss policy measures to deal with these increases and give an overview of the different measures in EU-countries. In the last paragraph we present different chapters of our book.

1.2 Empirical Update of the Waste Collection Market

The Dutch case provides a nice example why studying the waste market is interesting from an economic point of view. The quantity of waste in kilograms per Dutch inhabitants has more than doubled in the last 90 years (see Fig. 1.1). After

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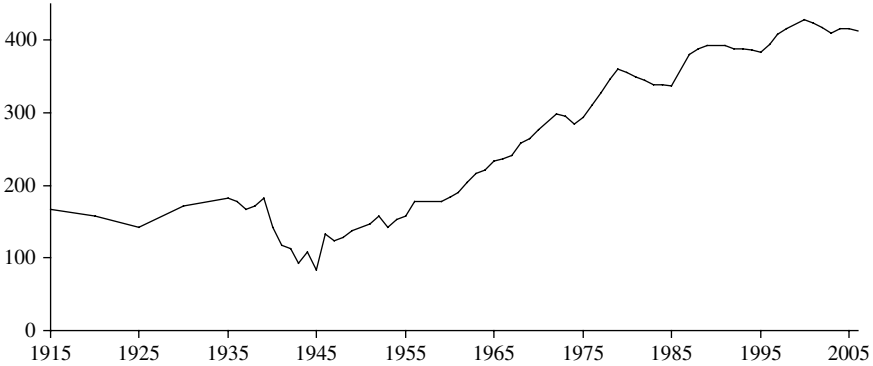


Fig. 1.1 Quantity of waste in kg per inhabitant, The Netherlands

2000 the level has stayed more or less stable on a level between 410 and 430 kg per inhabitant.¹ As will be shown in this book (Chapter 8) the use of unit-based systems in some parts of the Netherlands in the last years is an explanation for this. Key question is than whether wider application of this system might result in much lower levels of waste and decreasing costs for citizens.

The increase in waste quantity and the changes in waste management policy resulted in a sharp acceleration of collection costs (see Fig. 1.2). In 1972 a Dutch

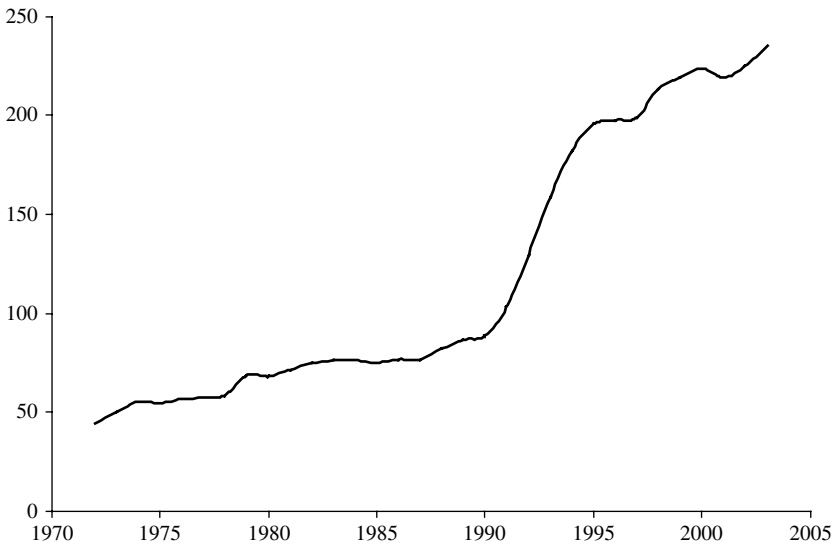


Fig. 1.2 Real costs waste in euro per household, The Netherlands

¹ Note that this includes the types of waste analyzed in this book. This is the sum of unsorted waste, recyclable waste (glass, paper, textiles) and compostable waste (vegetable, fruit and garden waste). We do not analyze demolition waste, chemical waste and other special types of waste.

household paid 44 euro per year on average for the collection and treatment of waste. In 1990 the real costs were already two times as high, while in 2003 a household paid more than five times as much.

This sharp rise in costs is not only a consequence of the increase of waste quantity, but also of the increased use of more expensive treatment options. Especially, the introduction of a landfill tax in 1996 and the introduction of more expensive incineration methods were important in this respect.² Due to this sharp increase several policy measures such as increasing private involvement of waste collection and unit-based pricing has been introduced with the goal to minimize waste collection costs. Main objective for this book is to learn from these experiences to get hold on possibilities to compensate the sharp rise in costs. This asks for an evaluation of the relation between costs and different policy measures such as privatization and variable charging as will be done in this book.

In 2002 a EU-study was published giving an overview of the extent of private involvement of refuse collection and variable charging (see Hogg, 2002). In Table 1.1 the differences between the EU-countries and Norway are summarized.

Table 1.1 Private sector involvement and variable charging in EU-countries

Country	Private sector involvement collection	Variable charging
Austria	50%	Widespread, usually on basis of volume
Belgium	Frequently	Widespread and increasing
Denmark	80%	10% of authorities, usually weight-based; some charge for additional bags
Finland	Municipalities dominant	Volume-based charging on residual waste
France	50%	14% of population, mostly volume based, some weight-based
Germany	Limited role	Widespread, by volume, amount of waste and sometimes frequency
Greece	Limited role	No variable charging
Ireland	40%	Being piloted, tagged bags, volume and weight based
Italy	46%	Will be compulsory, tags and average weight
Luxemburg	Some	Compulsory, mostly volume-based, some weight-based
Netherlands	38%	21% of municipalities, volume and volume/frequency are most common
Norway	10-15%	56% voluntary and 18% mandatory
Portugal	Limited role	No variable charging
Spain	56%	No variable charging
Sweden	60%	About 5% of municipalities, mainly based on size, some on weight
United Kingdom	50%	No variable charging permitted by law

Source: Hogg (2002, Table 1), Kipperberg (2007) and authors.

² This book only studies waste collection. See Dijkgraaf (2004) for an overview of the waste treatment market (landfilling and incineration) and options to reduce costs also in this market.

From Table 1.1 it is quite clear that private sector involvement differs across countries. In some countries, especially some Scandinavian countries such as Denmark and Sweden, the level of private sector involvement is large. In other countries such as Austria, the Netherlands and the UK, the level is less than fifty percent. In a third group, with countries such as Greece and Germany, there is a limited role for the private sector in waste collection. Although the results from this EU-study should be interpreted with caution as other studies give a slightly different picture and data can be outdated, it indicates that there is no firm one way trend in all EU-countries. Therefore, it is interesting to study the effects and reasons for privatization. Furthermore, variable charging or unit-based pricing also varies in its extent across EU-countries. Especially in the southern parts of Europe, except Italy, variable charging has not been implemented. In other countries such as the Benelux and the Scandinavian countries different forms of variable charging based on weight, volume and frequency are becoming more widespread and therefore are studied in several chapters in this book.

1.3 Description and Purpose of the Book

In this book we analyze the waste collection market in different EU-countries. In the previous paragraph we gave an empirical update of the waste market, which has changed considerable in the last thirty years. Especially in high densely populated countries or regions as the Netherlands, Belgium, Catalonia and the Stockholm area, waste management policies have resulted in an acceleration of waste collection and treatment costs.

In the following chapters several policy measures are discussed with the goal to generate more insight in the available policy options to reduce these costs. First, the cost advantage of contracting out refuse collection is analyzed. Second, evidence is presented for the incidence of contracting out related to this cost advantage. Key question is why private provision is not accepted as a best-practice and how this relates to issues like assuring enough control for municipalities, ideology, pressure groups and the dynamics of the market structure. This is done for the Netherlands (Chapters 1, 2, 3 and 7), Sweden (Chapter 4), Norway (Chapter 5) and Spain (Chapter 6). Third, the effects of unit-based pricing and other policy measures to decrease waste generation are studied based on experience in the Netherlands (Chapter 8) and Belgium (Chapter 9). Finally, Chapter 10 discusses items for future research.

Chapter 2 discusses the possible cost savings of contracting out refuse collection in the Netherlands. The findings indicate that similar to foreign econometric studies cost savings of approximately 15–20% apply to the Netherlands (for an overview see Domberger and Jensen, 1997). However, it should be noticed that contracting out is more important than the ownership issue because the difference in cost advantage between private and public firms is very small. In addition, compared with the existing literature it is shown that different production technologies apply to internal municipal waste collection units and external refuse collection firms. Different cost

functions have to be estimated for the sub-samples. Using different production techniques it is shown that out-side firms such as private or public firms can make more use of scale economies than municipal service or cooperation.

There are some reasons to doubt the cost-advantage result of private contracting out in a dynamic perspective (see also Bel and Warner 2006). Contracting out refuse collection is a dynamic process typically converging from a competitive market structure to a monopolistic one. Even though the bidding process may have been competitive, the market becomes a bilateral monopoly just after awarding the contract. Contracted firms will try to keep control over the contract by means of anticompetitive behavior against rivals. This might explain why the use of private collectors seems relatively low, despite the estimated cost advantages at short term. In 2006 in the Netherlands, 38% percent of the municipalities used private firms. So, more than 60% of the municipalities has public provision (public firms, municipal cooperation or municipal collection service). For the United Kingdom and Sweden similar pictures can be drawn (see Chapter 4 for Sweden and Szymanski (1996) for the United Kingdom).

It is, therefore, important to study political economy factors that induce or deter privatization. In Chapter 3 an explanation is sought for the reservations of Dutch local authorities toward privatization. Based on theoretical insights the choice is modeled between private and public provision of refuse collection on the one hand and the choice between in-house and out-house provision on the other. Data are available for nearly all Dutch municipalities in 1998. Evidence is found that the higher the number of inhabitants the less likely it is that municipalities will privatize. In addition, large transfers by the central government and strong interest by public unions discourage privatization. Interestingly, the results with respect to the political variables are much weaker. For out-house provision the over-all results are in line with privatization. Compared to earlier studies also more general models are estimated. Although the same qualitative results are found for parametric and semi-parametric models, strong statistical evidence is found that a parametric specification is too inflexible. In addition, semi-parametric models are more capable to investigate spatial models.

In Chapter 4 it is shown that municipalities did not choose the least-cost alternative using Swedish 1989-data. In other words, cost differences did not affect producer choice in Sweden. Interestingly, other variables as ideology, the influence of pressure groups and legal constraints did not fit the data as well. In addition, the dummy-variable approach which captures the difference between public and private production is rejected and therefore a pooling model is used, which also corrects for selection bias. In that case it is shown that public production is 6% cheaper than private production. This is interesting because the cost advantage of public versus private production is the reverse, although the difference is rather small.

A more general finding in the political-economy literature is that there do not seem to be many ideological biases influencing politician's decision. The decision of the municipality is often pragmatic and not ideological. It seems that some politicians are reluctant to privatization simply because they do not foresee relevant cost savings in the longer term. A possible explanation is that initial savings given by

privatization are diminished over time and the previous chapters seriously doubt the positive link between privatization and cost savings. Also in a recent meta-analysis of all published empirical refuse collection studies Bel and Warner (2006) show that there is little evidence for such a link.

In Chapter 5 the refuse collection process in Norway and the possible cost savings are discussed. Interestingly, in Norway only 10–15% of the municipalities use a private collector. It seems that privatization faces political opposition of the affected constituencies, which seems to imply that Norway is the less market oriented of the Nordic countries. However, to take advantage of economies of scale Norwegian municipalities are more willing to cooperate with other municipalities, which is the case for more or less half of the municipalities. In this chapter the internal governance structure is analyzed into more detail. It is shown that dispersed public ownership impairs inefficiency. Local governments that cooperate with neighbors to provide refuse services have costs that are 10% higher than those municipalities that supply the service single-handedly. In addition, if ownership is measured by the Herfindahl index of ownership concentration, estimates suggest that an increase in ownership concentration from 0 to 1 will reduce costs by 6% and an increase in the number of owners from 1 to 6 will increase costs by about 5%.

Chapters 6 and 7 describe the structure of the refuse collection market in more detail. Chapter 6 starts with analyzing the Spanish refuse collection market. Based on a 2003-sample for Spain, it is shown that the level of private provision (63%)³ is higher than in some other European countries. Therefore, the Spanish system of municipal cooperation is described as it combines local grip with private provision. This system and the relatively low municipality size might explain the relatively high figure of private provision. With respect to the refuse collection market a dual market is faced. One single Spanish company concentrates more than 50% of the population served by private enterprises. Measured in the so-called Herfindahl index for Spain it is 0.33, which is a very high level. However, for the sub-sample of small municipalities this Herfindahl index and thereby the concentration is much lower. Nevertheless, Spanish private companies have significant market power in 2002 and it is, therefore, possible that the cost reductions of contracting out can not be sustained over time.

In Chapter 7 it is shown that the Dutch market for private refuse collection is highly concentrated as well. Moreover, it is shown that in highly concentrated provinces competition is weak, which results in barriers for local governments to effectively obtain benefits from contracting-out. However, according to our estimates this is only the case for private firms. It seems that the price behavior of public firms is not influenced by market concentration and in low concentrated provinces, where public firms are active, competition is strengthened. The importance of public firms is also put forward, if the increase of prices is related to the institutional form chosen. For the public firm dummy a significant negative effect is found meaning that prices go down if a public firm is chosen. However, the level of concentration does not

³ This figure also includes so-called mixed-firms (see Table 6.1 of Chapter 6).

influence the cost saving effect of public firms, but the change in concentration does. Nevertheless, it seems an effective way to organize day-to-day operations under private commercial law rules, whereas the government retains control over strategic decisions. An important policy implication of this chapter is that local governments should be cautious with privatization of public firms.

In this book we analyze also unit-based pricing (UBP) as an instrument to lower refuse collection costs. With a UBP system the waste collection tariff depends on the amount of waste citizens produce. The idea is that this introduces an incentive for citizens to reduce the amount of waste compared with the generally used flat rate system. It is shown that unit-based pricing is much more effective in cost reductions of the costs of refuse collection than contracting out. From an environmental point of view this is important as well, because unit-based pricing systems are effective in reducing unsorted, the most environmentally unfriendly waste stream, and in stimulating recyclable waste.

In Chapter 8 the effects are estimated of four unit-based pricing systems (weight-, bag-, volume- and frequency-based) on waste collected using a panel data set for all Dutch municipalities. More than 20% of the Dutch municipalities had implemented such a system in 2000, while in 2005 this was already more than 30% (Dijkgraaf & Gradus, 2008). Unit-based pricing is shown to be very effective in reducing solid waste, composted waste and in increasing recyclable waste such as paper, glass and textile. If the estimations are corrected for differences in environmental activism between municipalities the effects are still large but significantly lower. The performance of bag- and weight-based systems is equal and compared with the frequency- and volume-based systems these two performs much better with a reduction of total waste of one third. This is interesting, as administrative costs are substantially lower for the bag-based system. Furthermore, unit-based pricing systems have no effect on the amounts of waste collected in surrounding municipalities.

Finally, the issue of illegal dumping, one of the adverse effects of the introduction of unit-based pricing systems is discussed as well. However, studying the effects of introducing a weight-based system in the Dutch municipality of Oostzaan Linderhof, Kooreman, Allers, and Wiersma, (2001) state that illegal dumping is virtually non-existent. According to them, the monitoring system in Oostzaan, with fines for illegal dumping, appears to be very effective in terms of deterrence. Moreover, another explanation for the absence of illegal dumping is that a small municipality such as Oostzaan has a large degree of social control. In general, the high population density of the Netherlands would suggest a low level of illegal dumping. This is confirmed by the lack of clear anecdotal evidence despite the large number of municipalities with unit-based pricing. Nevertheless, it shows that there is an important relation of unit-based pricing in relation to other policy variables as well.

Therefore, it is interesting to study the Flemish region of Belgium, where the authorities in the 'implementation plan household waste 2003–2007' assessed a broad policy mix (Chapter 9). It is shown that besides pecuniary incentives service level and measurements stimulating prevention and waste reduction are effective in reducing household solid waste. Instruments to reduce waste can be divided in three groups: pecuniary incentives; service level and measurements stimulating

prevention and waste reduction. Also specific characteristics of the community determine the amount of waste generated. The chapter analyses whether findings in the literature on effectiveness of policy measures are valid for Belgium, specifically for the Flemish region. Multiple regression analysis identifies those measurements having the greatest impact on household solid waste. An income elasticity is found of 0.33. Also the provided service level has a significant impact. Pecuniary incentives are effective instruments in reducing waste, with a price elasticity of -0.14 . Furthermore, a higher percentage of direct costs, directly attributable to waste services, borne by households, reduces waste. A consequent implementation of the ‘polluter pays’ principle proves to be effective.

Finally, Chapter 10 provides issues for future research.

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