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Contents

| | |
|--|----|
| Introduction | 7 |
| Jacek Soltys: Sub-regional service centres in reality and regional planning in Poland / Podregionalne ośrodki obsługi w sferze realnej i planowaniu regionalnym w Polsce..... | 9 |
| Andrzej Raszkowski: PEST analysis of Piechowice Municipality – power and future impact direction of environmental factors / Analiza PEST gminy miejskiej Piechowice – siła i przyszły kierunek oddziaływania czynników otoczenia | 18 |
| Andrzej Sztando: Barriers in strategic governance of local development in Poland at the beginning of the 21 st century / Bariery zarządzania strategicznego rozwojem lokalnym w Polsce na początku XXI wieku..... | 27 |
| Jacek Welc: Reversion toward the mean of regional economic growth – a Polish experience / Rewersja do średniej regionalnego wzrostu gospodarczego – doświadczenia polskie..... | 49 |
| Marek Goleń: Cross subsidization in Polish municipal waste management fees / Subsydiowanie skrośne w ramach opłat stosowanych w Polsce za zagospodarowanie odpadów komunalnych | 57 |
| Grzegorz Maśloch: The importance of renewable energy sources for sustainable development of Polish regions / Znaczenie odnawialnych źródeł energii dla zrównoważonego rozwoju regionów Polski | 65 |
| Andrzej Raszkowski: The assessment of Dzierżoniów City selected functional areas in the eyes of entrepreneurs – a research report / Ocena wybranych obszarów funkcjonalnych miasta Dzierżoniów w oczach przedsiębiorców – raport z badań | 75 |
| Marcelina Zapotoczna, Joanna Cymerman: Effect of property tax on voivodeship capital residents’ housing market decisions / Wpływ polityki podatkowej miast wojewódzkich w zakresie podatku od nieruchomości na decyzje zakupowe na rynku nieruchomości mieszkaniowych | 84 |
| Magdalena Wiśniewska: The suitability of Living Lab concept in the implementation of municipal projects / Przydatność koncepcji Living Lab w realizacji projektów komunalnych..... | 98 |

Introduction

The Department of Regional Economy at the Faculty of Economics, Management and Tourism of Wrocław University of Economics organized yet another scientific conference entitled: “Local and regional economy in theory and practice”. It was already the 23rd conference held on 23-25th September 2015 in “Chata za wsią” hotel in Mysłakowice near Jelenia Góra.

The conference was attended by the representatives of national and international scientific circles, regional and local government structures, and also other entities representing business practice and interested in the problems of local and regional economy, as well as PhD students. Over 80 participants of the conference arrived from over 30 national and foreign scientific centres and institutions to present papers and posters.

The subject matter of the conference covered the following areas: local and regional development, local and regional governance, application of quantitative methods in regional studies, partnership in local and regional development, directions of research in local and regional development, cooperation between academic centres and local government units.

The conference contributed to establishing more extensive and stronger relationships, created within the framework of the constructed platform for the exchange of scientific and practical experiences (the conference has been held cyclically since 1992) at the local, regional, national and international forum. The discussions were focused on the dissemination of research results, the exchange of experiences and the establishment of a discussion forum covering both theoretical and practical aspects of local and regional development. They also resulted in more extensive cooperation between academic centres, local government units as well as research and development centres, including the cross-border ones.

The conference is cyclically attended by the representatives of science from Poland and abroad. So far we have hosted e.g. the research workers representing academic centres from Ukraine, the Czech Republic, Italy, Sweden, Germany, Austria, Denmark, Slovakia and also the representatives of business practice, e.g. city presidents and mayors, village heads, county governors, presidents of regional development agencies or of local enterprises, etc.

As a result of the organized conference, the hereby publication presents the collection of thematically selected articles in English covering the broadly understood problems of local and regional economy. Its authors represent the following scientific centres: Warsaw School of Economics, University of Łódź, Gdańsk University of Technology, Koszalin University of Technology, University of Warmia and Mazury in Olsztyn and Wrocław University of Economics.

We are most grateful to the conference participants for the joint meeting and we do hope for further cooperation.

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CROSS SUBSIDIZATION IN POLISH MUNICIPAL WASTE MANAGEMENT FEES

SUBSYDIOWANIE SKROŚNE W RAMACH STOSOWANYCH W POLSCE OPŁAT ZA ZAGOSPODAROWANIE ODPADÓW KOMUNALNYCH

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Summary: The article presents the results of surveys conducted in municipalities which relate to cross subsidization of municipal waste management costs under the new system of municipal waste management operating in Poland from July 1, 2013 to June 30, 2014. It was found that the introduced fees were not common and that at least 20% of system costs were financed by entities that did not generate these costs. The article also identifies, without identifying the scale of the issue, the areas of potential cross subsidization within the charging system disparities with respect to the cost shaping factors, as well as within tariff groups that can be created by municipalities under the regulations in force. The conclusions present recommendations designed to reduce the scale of the problem.

Keywords: municipal waste, fees, cross subsidization.

Streszczenie: Artykuł przedstawia wyniki badań ankietowych gmin, które dotyczyły subsydiowania skrośnego kosztów gospodarowania odpadami komunalnymi w warunkach nowego systemu finansowania gospodarki odpadami komunalnymi w Polsce działającego od 1 lipca 2013 r. do 30 czerwca 2014 r. W wyniku analiz stwierdzono, że wprowadzone opłaty nie mają powszechnego charakteru i przynajmniej 20% kosztów systemu finansowanych jest przez podmioty, które kosztów tych nie generują. W artykule zidentyfikowano ponadto, bez określenia skali zjawiska, obszary potencjalnego subsydiowania skrośnego w obrębie dysproporcji systemu naliczania opłat względem czynników kształtowania kosztów, a także w obrębie grup taryfowych, które gminy mogą tworzyć w ramach obowiązujących przepisów. W tekście przedstawiono rekomendacje zmierzające do zmniejszenia skali problemu.

Słowa kluczowe: odpady komunalne, opłaty, subsydiowanie skrośne.

1. Introduction

Cross subsidization of the municipal waste management costs in the Polish legal environment takes place at three (and in some municipalities – at four) independent levels with different intensity of the issue in each of these levels that overlap each other, at times causing serious injustices related to charging the costs to various social groups. Despite the expected universality of the fee, there is a serious problem, namely: part of property owners hide the basis for calculation of the fee partially or, less frequently, in whole. The first level of cross subsidization is the scope of the basis of all fees which, in general, is not declared by property owners and, in addition, gets out of control of authorities entitled to collect the fees. For reasons of simplification this level will be referred to as *non-declared fees*. Its presence causes two effects in the area of cross subsidization. If the fees recovered from paying entities are sufficient for a municipality to cover all costs related to the system, then these paying entities cover the costs generated by non-paying entities. If there is a shortfall of the fees in a municipality, we are faced with the need to subsidize part of the system costs from other sources such as unspecified taxes, which at the same time does not rule out the effects of the first kind that are usually present in the described situation.

The second area of cross subsidization with exactly the same effects as the first one is called *fees not collected*, i.e. declared by property owners, but not paid to the municipal budget for various reasons. While municipalities have the legal instruments to enforce these fees, they are not always applied. First of all, sometimes it is just not possible to collect the fees due to the difficult financial situation of certain social groups, and secondly, sometimes local authorities do not collect the fees because of the fear of losing support in the elections.

The public discussion on cross subsidization is dominated by the problem of the third level of cross subsidization, namely: breaking the balance between the amount of the fees and the costs generated in the system by various entities that produce waste (*imbalance between the fees and generated costs*). The new financing rules concerning municipal waste management result in introducing cross subsidization to the system, because not only the amount of waste produced by the population but also the overall costs generated by individual properties are not proportionate to any of the charging practices for residential properties listed in the Act [Ustawa z dnia 1 lipca 2011].

The fourth area of cross subsidization applies to some municipalities that voluntarily decided to extend the municipal waste management system not only to waste generated in residential properties but also to waste from nonresidential properties. These municipalities are required by law to make two *tariff groups* of recipients of services related to municipal waste management (residential and nonresidential properties), each of which must have separate charging rules.

The purpose of this article is to theoretically organize the issue of “fairness” of the fees under the current legal conditions in Poland for financing the costs of municipal waste management, but also to contribute to the discussion on the possibilities of reducing cross subsidization of costs related to municipal waste management in Poland. This article also aims at presenting the results of surveys related to fee collection (which is one aspect of the cross subsidization issue) that were conducted in municipalities on the occasion of tests carried out for the Polish Ministry of Environment aimed at establishing maximum possible statutory fees required by the Polish Constitution.

2. Non-declared fees

The survey addressed to all 2479 municipalities in Poland included a question about the number of municipality residents according to declarations on the amount of the fee. 1999 municipalities answered the question (80.6%). These data were compared with official data of *GUS* (Central Statistical Office) related to the number of people living in municipalities as of December 31, 2013. According to the data of *GUS*, the municipalities that answered to the above-mentioned question had 31,8 million inhabitants, while property owners reported only 26,9 million people in declarations on the amount of the fees. On the basis of the answers and after summing up the data it can be said that approximately 15.4% of the population is missing in the system of payment for municipal waste management, and there is a minor group of municipalities that report there are more people who declare payments than in the official data of *GUS* related to the number of inhabitants. After rejecting extremely unreliable survey results¹, most likely resulting from errors made by the respondents while filling out the questionnaires, the percentage of “missing people” is reduced to approximately 14%.

The results of the analyses show, only on the basis of the research on the first cross financing area, that the new payment system is not common and that the scale of cross subsidization is significant. However, only on the basis of the questionnaires it is difficult to determine the scale of the waste management cross financing costs due to the diverse nature of the fees (different charging methods and different fee levels). To illustrate the scale of the problem let us assume that the fees are uniform in all municipalities throughout the country (fixed fee calculated according to the number of inhabitants) and that the system balances to zero in the case of declared (and collected in 100%) fees. An additional 14% of the population generating costs proportional to its level results in the necessity to use 14% higher fees than in the case of universal fees. When calculating in the opposite direction, the introduction of universal fees could reduce current rates by approximately 12.9%.

¹ Over 30% more payers in relation to residents (6 municipalities) and over 80% less payers in relation to residents (17 municipalities).

The problem of people missing in the system of payment for waste management in particular affects municipalities whose population is subject to considerable fluctuations. Frequent changes in population size in individual municipalities are associated with tourism (gainful, religious, leisure, recreational, medical, etc.). Whatever the reason for local seasonal changes in population size is, the system is designed only partially and rather theoretically to limit the scale of cross subsidization of the costs generated by the population remaining temporarily on the municipality territory, because these changes are not registered at all and should be registered while taking into consideration individual properties. A large but unspecified portion of the waste stream from tourists moves in the system by means of residential properties (mainly private) and street bins, thereby increasing the scale of the problem. An attempt was made to measure the phenomenon as part of the survey, but due to a very small sample the analyses are not suitable for scientific presentation.

3. Fees not collected

The examination of fees collection in total (i.e. regardless of whether a municipality took over the responsibilities of nonresidential property owners in terms of municipal waste management) was based on 3 questions. 2 of them were related to the total annual amount of fees declared by property owners: the first as of July 1, 2013 (the new payment system enters into force), the second as of June 30, 2014 (after the year of tightening the system). The third question concerned the fees that were received by municipalities between the above mentioned dates. Numerous errors involving an order of magnitude (confusing units with thousands) significantly hinder the full analysis of the problem based on absolute values, but it is possible to create relative meters. For each of the 1854 municipalities that gave non-zero answers to all 3 questions the following meters were calculated: the relation between the fees declared after one year of the system operation and the fees declared upon entry of the new rules (1); relation between the fees collected in the first year of system operation and the fees declared as of July 1, 2013 (2); and relation between the fees collected in the year of system operation and the fees declared as of June, 2014 (3). Table 1 presents the results of the calculations.

The analysis of the (3) indicator provides the most important conclusions related to the area of cross subsidization. On one hand we can see 20% of municipalities that report more collected fees than declared fees, but on the other hand we have 30% of municipalities that collect less than 90% of declared fees. On the basis of the median and internal average it should be noted that the collection rates in the year after the year of the new system operation were at least a few percent lower than the perfect rate. Let us assume that recoverability is 95% (i.e. 5% of fees will never be collected), thereby changing the assumptions of the part 3 of the article – in such case we have fees higher not by 14% but by about 20% in relation to the ideal

Table 1. Selected rates of empirical distribution of waste management fees recoverability during the period from July 1, 2013 to June 30, 2014 in 1854 municipalities in Poland

| | Quantiles of the k order | | | | | | | | | Internal average* |
|-----|--------------------------|---------|---------|---------|------------------|---------|---------|---------|---------|-------------------|
| | k = 0.1 | k = 0.2 | k = 0.3 | k = 0.4 | k = 0.5 (median) | k = 0.6 | k = 0.7 | k = 0.8 | k = 0.9 | |
| (1) | 0.97 | 1.00 | 1.01 | 1.06 | 1.26 | 1.92 | 2.00 | 2.10 | 2.61 | 1.50 |
| (2) | 0.85 | 0.91 | 0.96 | 1.01 | 1.32 | 1.76 | 1.88 | 2.00 | 2.50 | 1.43 |
| (3) | 0.77 | 0.85 | 0.89 | 0.91 | 0.93 | 0.95 | 0.98 | 1.00 | 1.10 | 0.93 |

* Internal average calculated on the basis of 80% of cases after rejecting 20% of extreme values.

Source: own development based on surveys.

financial integrity of the system. Counting in the opposite direction, tightening the system could bring a decline of applicable fees by even 16.5%.

4. Imbalance between the fees and generated costs

The costs of waste management depend on many different variables. In particular we have to include: the amount of waste (in terms of both weight and volume), the frequency of waste collection, disposal methods, the degree of residential buildings dispersion. In addition, there are numerous side factors shaping the total costs of the system, but discussing and calculating them is not the purpose of this article. What is important here is the fact that these costs do not depend directly on any charging factors listed in Polish law (population number, number of households, surface area of apartments, the amount of water consumed) and it is not changed even by the legal possibility of applying hybrid methods, i.e. those that include several of the above mentioned factors at the same time and in various combinations, which constitute premises for determining the costs.

The most common charging method used in Poland is the method based on the number of inhabitants used by 1469 municipalities, which is approximately 70% of all municipalities participating in the survey of the Ministry of Environment carried out at the beginning of 2013. The second most common method is the method based on the number of households that formally occur 422 times in the database (i.e. approximately 20% of all cases). However, it should be noted that most of the municipalities in this group use diversification of the fees depending on the number of people in each household, and only 73 municipalities in that group charge the fees according to a uniform method based on the number of households. The remaining 349 municipalities use their informal hybrid methods, i.e. they determine the size class of households and charge the fees on the basis of not only the number of households but also on the basis of the number of residents living in individual

households. Combined methods (a hybrid of at least two of the four methods allowed under the law) were declared formally by 200 municipalities (approx. 9.5%), which, along with municipalities declaring the method based on the number of households but in their class size, gives 549 municipalities (approx. 26% of all municipalities participating in the survey). The other two methods, i.e. the method based on the amount of water consumed (19 municipalities) and on the surface area of apartments (only 4 municipalities) are used rarely and therefore they will be omitted in further analysis.

As demonstrated by scientific studies conducted both in Poland and in other Member States of the European Union, the amount of waste produced in a household is not fixed relative to the number of persons in this household as the logic of the fees charged on the basis of the number of households regardless of their size would require. It is also not directly proportional to the number of persons in a household, which should be expected in the system of headage payments. Therefore the two above mentioned charging methods do not fulfil the conditions of fairness from the point of view of waste processing costs (the “polluter pays principle”), and they completely disregard logistical costs by entering the next cross subsidization area into the system.

Of particular interest in terms of fairness are the results of Austrian researchers [Lebersorger, Beigl 2011], who, after 12 years of examining 500 municipalities in Styria, Austria, developed a general formula describing the amount of municipal waste produced. This formula is not useful in Poland and therefore will not be quoted. Slightly more useful can be Lebersorger’s and Beigl’s results related to specific quantities of municipal waste according to the size of households, which are shown in Table 2.

Table 2. The amount of municipal waste according to the size of households

| The number of persons in a household | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|--|-----|-----|------|------|------|------|-----|-----|-----|-----|
| The amount of waste generated by a household (kg/year) | 557 | 887 | 1060 | 1125 | 1119 | 1069 | 993 | 904 | 810 | 716 |

Source: own elaboration on the basis of [Sobolak et al. 2013].

Similar results were reached also by other researchers, for example in Ireland [Dennison, Dodd, Whelan 1996], but also in the Polish conditions [Steinhoff-Wrzeńniewska, Strzelczyk 2012] and [Strzelczyk 2013]. So far, these are the best Polish sources related to the amount of waste according to the size of households, but due to the fact that a small number of households was covered by the research, the data are not sufficient to derive a mathematical model describing the size of the waste stream, not to mention describing the costs of municipal waste management. Nevertheless, they provide rationale to accept Austrian and Irish studies as a basis

to recommend the tariff system for the Polish municipalities that should recommend the establishment of fees based on the number of households in two size classes: single-person households and multi-person households (variability in the amount of waste generated in multi-person households is relatively small).

The use of such a tariff system merely reduces the scale of cross subsidization, because in the case of abandoning the fees charged according to the amount of people, multi-person households reduce the scale of single-person cross subsidization, and in the case of abandoning the fees charged to households without distinguishing their sizes, single-person households reduce cross subsidization of multi-person households. Eliminating cross subsidization is much more complicated, if at all possible. The scale of the phenomenon can be reduced by taking into account such factors differing the costs generated by individual properties as: the amount of waste collected, the frequency of waste collection, the degree of dispersal of residence. It is not fully possible under the law as it stands. Although [the Act of July 1, 2011] allow municipalities to vary the rates of the fees depending on *the density of population in the municipality and the distance from the place of municipal waste disposal, (...) collecting waste from rural or urban area, as well as the type of buildings*, the application of these rules in the Polish conditions is rather marginal, and the previous studies found isolated cases of this type. This is most likely due to the egalitarian social expectations and the lack of specific or customary legal regulations. The lack of legal opportunities to differentiate the fees depending on the amount of waste and frequency of waste collection results in cross subsidization of property owners who:

- produce above-average quantities of waste,
- are served with greater frequency,
- are more dispersed (especially in the case of low-rise buildings),
- by the owners of properties of the opposite characteristics. Determining the scale of the problem requires in-depth research and analyses.

5. Tariff groups

The provisions cited in part five [Ustawa z dnia 1 lipca 2011...] allow municipalities to establish tariff groups, however, due to the lack of research on the universality of applying these provisions, in this part of the article we will focus only on nonresidential properties. They constitute – for municipalities which take owners' responsibilities in terms of municipal waste management – a mandatory tariff group distinct from residential property owners. The fees for this tariff group are calculated according to separate rules on the basis of the volume of waste and the types of containers with which a nonresidential property is equipped.

This situation may cause local authorities to partially pass the costs of one tariff group to other depending on the needs and social possibilities, because the provisions governing the methods of determining the proportion of the fees focus on financing the fees wholly from the municipal system and not from individual tariff

groups. Allocation of the costs generated by individual tariff groups is not possible in most cases, because only a few municipalities in Poland introduced a precise system of registering the waste stream according to single loading actions of single containers assigned to specific properties, and even a smaller group of municipalities can take full advantage of these systems. That is why determining the scale of cross subsidization in this area also requires in-depth research and analyses in the future.

6. Conclusions

The analysis of the issue showed that the new system of financing municipal waste management in Poland is not widespread and that at least 20% of the current costs is financed from sources not related to the waste management system or by means of excessive charges imposed on the system users who pay their fees to the budgets of municipalities. The issue of investment costs was not analysed – under the law they were completely pushed out of the area of fees, increasing the scope of cross subsidization.

The situation can be improved by means of tightening fees execution, also through the establishment of legal instruments to verify the actual charging basis by municipalities, through the selection of a scientific and reasonable charging system by municipalities, by extending the legal possibilities of optional charging practices according to the cost shaping factors, and by taking into account the depreciation costs of waste management infrastructure fixed assets.

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