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## Article

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e-Finanse: Financial Internet Quarterly

## Provided in Cooperation with:

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*Suggested Citation:* Łukomska, Julita; Neneman, Jarosław (2018) : Local taxes and fees as a source of revenue for polish municipalities: Substitutes or complements?, e-Finanse: Financial Internet Quarterly, ISSN 1734-039X, Sciendo, Warsaw, Vol. 14, Iss. 3, pp. 49-59, <https://doi.org/10.2478/fiqf-2018-0019>

This Version is available at:

<https://hdl.handle.net/10419/197418>

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# LOCAL TAXES AND FEES AS A SOURCE OF REVENUE FOR POLISH MUNICIPALITIES: SUBSTITUTES OR COMPLEMENTS?

JULITA ŁUKOMSKA<sup>1</sup>, JAROSŁAW NENEMAN<sup>2</sup>

## <sup>2</sup>Abstract

The main purpose of this article is analysis of the relationship between local tax and fee policies in Poland. We argue that local authorities have similar and significant discretion over tax and fee policy and, therefore, they can be analysed in a similar way. Links between these policies are analysed to find out whether they are of complementary or substitutive nature. Panel data on 578 Polish municipalities from 2012 to 2016 includes information on property tax rates and tariffs for water provision and sewage disposal for households and companies and is used to run panel regression analysis and to perform a quasi-experiment. The results indicate that there is a relationship between tax and fee policies as well as that taxes and fees are complements for local authorities. Only when a property tax rate has reached a “ceiling”, the municipalities increase fees at a faster rate than comparable municipalities below the ceiling – in this case a fee can be regarded as a substitute for a tax.

The paper is based on results of the “Fees for local public services - financial and political importance” research project. The project is funded by Narodowe Centrum Nauki (National Science Centre) grant number UMO-2015/19/B/HS4/02898

**JEL classification:** H71, H76, H79

**Keywords:** local government, public finance, tax policy, political economy of taxes and fees, charges for local services, Poland

Received: 12.03.2018

Accepted: 19.10.2018

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## INTRODUCTION

On the face of it, given substantial legal differences between taxes and fees<sup>1</sup>, there appears to be no reason for searching for a relation between their level and dynamics. We think, however, that on a municipality level tax and fee policy is similar in many aspects, and it makes a lot of sense to investigate whether taxes and fees are substitutes or complements. By substitutes we mean that an increase in local taxes is accompanied by a drop (or keeping at the same level) of fees for local public goods and vice versa. If they are complements however, then we should observe the same direction of changes – strong local power (that can be defined by a margin of victory or a contested election, which are measures commonly used in electoral studies) tends to increase both taxes and fees, whereas a weaker power will keep them unchanged. In this case the correlation will be positive. In our main research question, we ask about the relationship between local taxes and fees in Polish municipalities. In the foreign literature we have found only a few cases of studies in which such relationships were confirmed (Mouritzen, 1989; Wolman & Davies, 1980; Borge, 2000; McCubbins & Moule, 2010; Dafflon, 2015). The second research question is about the type of possible relationship which can appear between these policies: substitutive or complementary? Thirdly, we ask whether these Polish municipalities which have no possibility of further raising property tax rates are more likely to increase water and sewage fees compared to the municipalities that can raise property tax rates. We do not know of any previous Polish studies dealing with the subject matter described. We want to contribute to filling the gap in our knowledge on the relationship between local tax and fees policies in Poland. Tax and fee policy should be integrated and therefore our research might be of interest to local authorities as well as policy-makers. Our conclusions may go beyond Polish borders, as tax and fee policies in other countries (especially Central and Eastern Europe) face similar challenges.

## TAXES AND FEES

A tax is a compulsory levy made by public authority for which nothing is received directly in return. On the other hand, a fee is just a payment for service or goods. It does not have to go to authorities and it is not compulsory

1 We treat user fee – simply ‘fee’ as a synonym of (user) ‘charge’ and ‘price’.

- it is paid only by the users. From the perspective of payers, taxes are generally used to finance public goods, whereas fees - to finance private goods or impure public goods i.e. goods that are non-rival in consumption, but it is relatively easy to exclude those who do not pay (Rosen & Gayer, 2010).

In some cases, it is not so easy to state if a levy is a tax or a fee. A dog fee was for many years a dog tax. The legal construction has been changed, but due to the lack of equivalence, from the economic perspective this is still more a fee than a tax. Similarly, health insurance contribution or the public media fee are somewhere between taxes and fees, as one they can be financed via taxes rather than fees.

In many cases there are no clear linkages between the size of the fee and the cost of provision. In the case of water supply and sewage collection, this issue seems to be straightforward – a fee is to cover the cost of provision of water and sewage disposal. But what cost? Total? Marginal? And what about the incremental cost and the cost of development and connection to the network (Bahl & Linn, 2010)? This issue is further complicated by the fact that supply of water and sewage collection can be considered a natural monopoly. Thus, pricing at marginal cost, which is optimal from the public point of view, will yield revenues below total cost. This would call for a subsidy even though water supply can be regarded as a private good. The other extreme case is a parking fee, where there is not and should not be any relationship between a fee and cost. In this case the economic function of a fee is quite different than in the case of water. The price for parking is to decrease demand for parking space and internalize negative externality of car usage in city centres. As such, parking fees act as a Pigou tax.

## CHARACTERISTICS OF LOCAL TAX AND FEES POLICIES

Despite the differences between taxes and fees, tax and fee policy can and should be analysed in a similar, integrated manner. Before proving this assumption, we analyse the objectives of tax and fee policy.

Taxes are the main source of financing of public expenditures<sup>2</sup>. In an ideal world, taxes are closely linked

2 This does not have to be the case in relation to some fees – e.g. public transport fares. However, at the end of the day, the deficit of a public transport companies is covered by taxes.

with public expenditures so that total tax burden is set at a level where marginal social cost of tax revenues is equal to the marginal social utility of the expenditures. In an ideal world, the tax mix would depend on minimisation of the excess burden on one hand, and on the other, on maximization of the social welfare function. In the real world, tax (and fee) policy serves two aims: to increase financial and political capital for policymakers. Simply speaking, taxes (and fees) should bring money and popularity. Hence, the policymaker has to optimize the level and mix of taxes and fees against the level and mix of public expenditures. If the political cost of getting one additional zloty (PLN) from taxes is lower than from fees, then a tax will be raised, otherwise the fee would go up.

Only a few studies refer to the relationship between local fees and taxes. Mouritzen (1989), who uses 1978-1986 data for six European countries (Denmark, Norway, Sweden, Finland, France and Italy) tries to identify political business cycles in relation to expenditures and revenues of local budgets. He assumes that local political leaders use local fees and charges as one means to survive during the period where expenditures increase faster than tax revenues (he found that fees for services were growing prior to the local elections). An increase of local fees makes a balanced budget possible while the local tax rates are lowered before the election. In this way, Mouritzen identifies a negative relationship between tax rates and local fees which may also mean that there is substitution between them. Wolman and Davies (1980) in their analyses of typical local government reactions to fiscal stress claim that an increase in fees and charges for local services is politically easier than a change in local taxes. This observation has been empirically confirmed by some European studies (for example: Borge 2000 in Norway, Dafflon 2015 in Switzerland). Dafflon (2015) found out that there is a substitutability between local taxes and fees in Switzerland; he noted that tax competition has been leading to local tax rate reduction (a phenomenon known as a race to the bottom). In such a situation, the increase of tariffs for local services may compensate the loss of tax yields. McCubbins and Moule (2010) noticed a similar situation in the US. They claim that increases of the fees are a direct effect of the restrictions on freedom of local authorities to increase the local taxes rates. They found that the adoption of a property tax limit is associated with approximately an 0.82 percentage point increase of charges and fees relative to general own-source revenues. They write about perfect substitution

between declines in property taxes and increases in charges and fees. We guess that this phenomenon is not likely in Europe (except for Switzerland; Dafflon 2015). Our expectation is due to the high rates of property taxes in the US and their significance to local budgets. We found only one similar study of a European country (namely Denmark) in which authors claim that the same effect (tax and fees' substitution) was not confirmed (Blom-Hansen et al., 2014).

The relation between tax and fee policy, including substitutability, depends on the discretion of local authorities with respect to the setting of fee and tax rates. If one of these policies is exogenous, i.e. independent of local authorities, then the other may, at best, react to these exogenous changes. In our opinion, despite some legal constraints, local authorities in Poland may conduct an active tax and fee policy.

Formally, the rates of local taxes were set by the Parliament in the tax codes. This is due to the Polish constitution, that grants tax rate determination exclusively to the Parliament. However, in the case of local taxes, only the maximum rates, indexed by the CPI, are set by the Parliament. Local authorities can conduct their own tax rate policy, subject to the rate being below the ceiling set in the tax code. Does the tax "ceiling" limit the local authority discretion with respect to tax policy? There is no simple and unique answer to this question. If we use a number of municipalities that reached the "ceiling" as a measure of this limitation, then in 2016 there were only 74 municipalities. In relative terms this is ca. 3% of all municipalities. We will not even try to investigate how many municipalities would have used higher rates than the actual ceiling rate, if that had been possible. We just assume that, except for a few dozens of municipalities, they are free to conduct a discretionary policy with respect to local taxes rates.

In tax policy of local authorities, the ceiling rate and its yearly indexation may play the role of the focal point. This means that, on one hand, changes in the local tax rates can be presented to local voters as exogenous – it is the government in Warsaw that changes them, on the other hand, the level of a "ceiling" rate may act as a reference point in local debate over tax rates. Yardstick competition plays an important role in local tax policy – tax rates in a given municipality are influenced by tax rates in neighbouring municipalities or municipalities that are treated as a reference point for local voters (Łukomska &



Swianiewicz, 2015).

In the case of fees, things are more complicated. In some cases, the level of a fee should be derived from an algorithm (water and sewage<sup>3</sup>, rubbish disposal). In other cases, there is either a ceiling – e. g. for parking fees, or there are no restrictions at all – like for public transportation fares. Moreover, a name ‘fee’ suggests payment for something. This, in turn, should imply that if a cost of provision goes up, the fee should follow. Despite that, we believe that local authorities can run a discretionary fee policy in a manner analogous to tax policy. A fee, despite its name, can be completely separated from the cost of provision. A parking fee is the best example. To some extent we can observe this separation also in the case of other public goods provided by local authorities that were the subject of our research i.e. rents for municipality apartments, fees for public transportation and water and sewage. This separation implies that a fee may, but does not have to, cover the costs of provision. In the case of a parking fee, it should yield a profit. Among the goods and services analysed by us, the price for water and sewage seemed to be the most linked to the cost. This was a result of an algorithm from the Ordinance of the Minister of Construction of June 26th, 2006 (2006). But even in this case the room to manoeuvre for local authorities was significant, as long as the water and sewage company was somehow linked to the municipality. In the case of the budgetary enterprise<sup>4</sup> the situation is easy – the linkages can be traced in the municipality budget. In the case of a limited company owned by the municipality, when costs are higher than revenue, local authorities may increase its equity. The investment outlays may also be financed directly by the municipality and then the infrastructure may be transferred to the company. This company may also set a different depreciation rate for the calculation of a tariff and different for property tax. Local authorities

3 This was the case before the government created the public enterprise Polish Water, which changed the fee policy in that respect. On January 1st 2018, a Law on Water from July 20th 2017, came into force. The main purpose of this law was to implement into the Polish legal system the provisions of directive establishing a framework for Community action in the field of water policy. The new law changes the rules of setting the fees for water supply and sewage collection. The head of the public company Polish Waters plays the role of a regulator. The details of the new rules of establishing tariffs for water and sewage are given in the amended Law on Collective Water Supply and Sewage Disposal from October 27th 2017. The municipality council has lost the right of tariff setting. It has in turn to prepare the rules for water supply and sewage disposal and send to the regulator for an approval. The tariffs proposed by the water and sewage companies are sent directly to the regulator. It will check from the legal and economic perspective and approve in the form of an administrative decision. Once approved, these tariffs will be in force for 3 years.

4 It is not a separate legal entity, it is partially financed from own revenues, but usually receives also a subsidy from the local government budget (up to 50% of operating costs).

may also write off the company property tax arrears.

The results of a tax policy can be easily seen in the budget of a municipality. The consequences of a fee policy are a little bit shaded and can be seen in an indirect way. But at the end of the day, the economic consequences are exactly the same as in the case of taxes. The drop in, or a freeze of, a fee, when costs are rising, implies the need for a higher subsidy, a drop of a profit or a loss of a company owned by the community, the necessity of a tax debt write-off and the like.

But the best proof is a fee competition which was observed in Polish municipalities (Swianiewicz & Kurniewicz, 2018). This fee competition is even stronger than the tax competition. Łukomska and Swianiewicz (2018) also noted the tariff for water mimicking in Poland. And again, the effect of tariff mimicking is stronger than local tax mimicking.

The discretion over water and sewage tariffs seemed to be lower among other local fees. Until the end of 2017, the water and sewage company sent the proposal for the new tariff to the municipality council for the approval. The council may have approved it in a way of a resolution or abstained from voting. If the latter happened, then the new tariff came into force after 70 days. At first glance, it looked as if the local authorities had no discretionary power on the water and sewage tariff. But the previous research on political cycles and mimicking proved that there was a strong influence of local authorities on the tariffs (Swianiewicz & Kurniewicz, 2018; Swianiewicz & Łukomska, 2018). It sometimes happened that a municipal water and sewage company employed an external consultant for the preparation of the tariff proposal. In our opinion this solution was very convenient for the local authorities – the decision about the increases (and in fact they were higher than inflation) was in a sense external. In the explanatory statement to the amendment of the Law on Collective Water Supply and Sewage Disposal (Uzasadnienie projektu ustawy..., 2017) we can read that the purpose of that amendment that takes away the right of the municipal council to approve the tariffs, is to protect the inhabitants from unjustified increases in prices. The government assumed that local authorities could not protect the interest of inhabitants (and voters at the same time) and deliberately or not, allowed too high tariffs. We think this explanation was wrong. The municipality budget and the company budget are closely linked. From the perspective of an average inhabitant it

does not make any bigger difference if the additional zloty in the local budget comes from an increase in a local tax or a local fee. The report of the Supreme Audit Office (2016) on water provision notes that:

“The interest of consumers may be threatened by the local government usage of water and sewage municipal companies as a source of revenue to the municipal budgets and possibility of spending these monied on aims not linked to the collective water supply and sewage disposal, but e.g. on dividend payments or supporting sport foundations”.

This is a nice and independent confirmation, of the statement that each decision about a local tax or a local fee can be seen in the local budget.

The multi-year investment plans approved by local authorities are the additional channel of influence over the prices of water and sewage. A delay in investment may reduce costs in the short to medium run and, therefore, allows them to keep the tariff unchanged.

## DATA AND METHODS

We focus on property tax and fees for water and sewage while searching for the linkages between policies. The choice of a property tax seems obvious – this is the most important tax with the discretionary power of local authorities. Other local taxes are far less important or have significance only in some municipalities (e.g. an agriculture tax). Moreover, the significance of property tax increases along with the size of a municipality, similarly to the scope of locally provided public goods and fees. Additionally, one can hardly find tax competition in property tax, but mimicking seems to have some importance (Łukomska & Swianiewicz, 2015). In the article we analyse the rates of local property tax expressed as a proportion of maximum available rates. We use data from reports on budget execution of local governments. Hence, we divide the rates of property tax into tax rates from legal entities (i.e. business (commercial) properties) and from physical persons, which, in practice, means housing properties of local inhabitants.

The choice of a fee we use in our analysis is also obvious. Water is supplied in each municipality. In most of them, a local water and sewage company is

responsible for the supply. This company is usually controlled by the local authorities either via ownership or directly in the case of a budgetary enterprise. There are a few municipalities where water supply is provided by commercial companies independent of local authorities. It also happens that water is supplied by big industrial enterprises which have their own facilities to produce water and deal with sewage. Other fees either do not exist in all municipalities (parking and public transportation) or – in the case of rents for communal and social housing - there are many other factors influencing the level of a fee (the stock of apartments, demand, uncontrolled rents and the like). Moreover, despite the obvious fact that the costs of water supply and sewage disposal are different, generally the variability of the cost is relatively low and does not depend that much on the size or the wealth of the community. Last but not least, we have a reliable database for 578 municipalities for the years 2012-2016 acquired from the now defunct version of the portal: [www.cena-wody.pl](http://www.cena-wody.pl)<sup>5</sup>. We analyse the prices of water supply and sewage collection separately for households and industrial customers.

In data analysis we have taken into account these two main groups of taxpayers/users of local services. It is related to a slightly different meaning of these groups for budget revenues (80% of property tax revenues come from legal entities and only 20% from physical persons) as well as for political reasons (definitely there are more potential voters in the group of physical persons/households than in the group of legal entities/industrial customers). Almost 50% of the analysed municipalities differentiate the prices of water and sewage for individual and industrial consumers. The maximum property tax rates differ significantly depending on type of taxpayer (private individuals or legal entities; in the latter case the rate can be 30 times higher).

The time scope of the analysis is 2012-2016. The choice of this period was determined by the availability of data on water and sewage prices for a sufficiently large sample of municipalities. In our case, a data panel for 578 municipalities is analysed. The sample structure shows over-representation of large and medium-sized cities and underrepresentation of rural local governments (Table 1). We have analysed the data in a static approach: water

<sup>5</sup> The portal with data on prices of water and sewage existed until June 2017. Currently, it operates in a changed version, without detailed databases. The data was collected by a student at the Faculty of Geography and Regional Studies at the University of Warsaw – Julia Dobosz, to whom we would like to give many special thanks here.

**Table 1: Structure of the research sample**

	Number of units	% of the population (all municipalities of a certain type)
Cities of county status	66	100
Urban municipalities	172	73
Rural local governments	88	6
Rural-urban local governments	252	41
Total	578	23

Source: Own calculation

prices, wastewater prices and property tax rates as well as data in dynamic terms: single-base dynamics indexes and chain indexes for water prices, wastewater prices and property tax rates.

To answer the first two research questions presented in the Introduction, we used methods of panel data analysis, including pooled OLS regression, Fixed Effects regression (FE) and Random Effects regression (RE). The results of the F tests and the Hausman test assisted in the selection of a particular method for individual models in accordance with the model selection guide in the panel data analysis presented by Park (2011). Modelling was performed both for data in a static approach (water and wastewater prices, tax rates) as well as in dynamic terms (dynamic chain indexes). When testing the relationship between water and wastewater prices and tax rates, mostly FE regression models were used. When analysing data included in the form of dynamic chain indexes in all performed cases pooled OLS models were used (there were no bases for rejecting the null hypothesis of the F tests). In the conducted tests, control variables such as population, affluence or population density were added to the models. However, the implementation of this procedure did not improve the quality of the models (goodness-of-fit measures) nor did it affect the relationship between the independent and dependent variable. In the next section of this article, we present the results of models without taking into account the control variables.

For the third research question, which is referring to the comparison of the tax policy of municipalities that have reached the maximum rates in property tax with the local policy of those using lower property tax rates, we initially tried to answer using the independent-samples t-test which compares the means between two unrelated groups. However, due to the clear difference in the number of analysed groups, we decided to look

for a different, more precise method. To check whether the dynamics of water and sewage fees in municipalities that have come to the “ceiling” with taxes differs from the dynamics in municipalities with lower property tax rates, we decided to use a quasi-experiment. The method involves the selection of a control group of municipalities to the treatment group. The group of municipalities that no longer have the opportunity to raise local property tax rates (because they have already been at the maximum tax rates for several years) is for us the treatment group. Municipalities as similar as possible to the municipalities of the treatment group belong to the control group. The next stage was the analysis of the average values of four dependent variables (the dynamics of water prices for households and industrial customers, the dynamics of wastewater prices for households and industrial consumers) for the treatment and control groups on the graphs.

The treatment group consisted of 11 municipalities where the rate of property tax (both for legal entities and physical persons) exceeded 99% of the maximum rate in 2012 and this state was maintained until 2016. The following cities and municipalities belonged to this group: Poznań, Gdańsk, Gdynia, Lubin, Żory, Polkowice, Bogatynia, Lubań, Ustrzyki Dolne, Sulików, Podkowa Leśna. The control group included 30 municipalities, the most similar to the municipalities from the treatment group. Three most-similar control units were selected for each “treated” unit in terms of seven features (selection criteria). The size of the control group should therefore be 33, but 3 cases of repeating municipalities have been removed. The selection criteria were the following variables:

- 1) population (2012),
- 2) affluence of the municipal budget (measured by budget revenues reduced by conditional grants per capita) (2012),



**Table 2: Comparison of characteristics (selection criteria) for the treatment and control group**

	Average values	
	“Treated”	Control
Population	136216	106115
Affluence of municipal budget	4000	3382
Population density	972	896
Denivelations	248	243
Price of water	4.22	4.05
Price of wastewater	5.96	5.80
Importance of income from water fees in municipal budget	0.030	0.030
N	11	30

Source: Own calculations based on data from budget execution reports and Dobosz (2017)

- 3) population density (2012),
- 4) denivelations (difference between the maximum and minimum height),
- 5) water price (2012),
- 6) wastewater price (2012),
- 7) the importance of income from water fees in the municipal budget (2012).

In terms of the above features municipalities in the control group were quite well selected for the “treated” municipalities (Table 2).

## RESULTS

Analysing data on water and sewage prices in the selected municipalities in the period 2012-2016, we can

observe a systematic increase of these prices both in relation to households and industrial customers. A similar trend cannot be seen in the case of property tax rates. On average, municipalities set slightly higher prices of water and sewage for industrial consumers than for households. A similar policy is observed in the case of property tax (Table 3).

The results of the conducted analyses show that the higher rates of local property tax on individuals were applied by Polish municipalities in the period 2012-2016, the higher the water and sewage prices charged on households were in force. This complementary relationship between fee and tax policies addressed to the local community was also confirmed in the case of data analysis in dynamic terms, but only in relation to

**Table 3: Descriptive Statistics**

	Mean	SE	Min	Max
Price of water (households)	3.78	1.29	1.60	15.47
Price of wastewater (households)	6.09	2.43	2.05	32.85
Price of water (industrial customers)	4.03	1.50	1.60	19.17
Price of wastewater (industrial customers)	6.96	2.97	1.07	34.27
Property tax rates for legal entities (% of max rate)	88.58	9.99	5.87	100.00
Property tax rates for physical persons (% of max rate)	79.51	13.21	21.85	100.00
Dynamics of water price (households)	103.01	8.97	38.14	262.20
Dynamics of wastewater price (households)	105.12	15.77	32.72	371.61
Dynamics of water (industrial customers)	102.79	9.36	38.14	262.20
Dynamics of wastewater price (industrial customers)	104.54	13.00	35.74	363.51
Dynamics of property tax rates for legal entities	100.92	9.23	44.47	336.34
Dynamics of property tax rates for physical persons	100.95	5.57	47.94	185.71

Source: Own calculations based on data from budget execution reports and database on prices of water and wastewater downloaded from the website [www.cena-wody.pl](http://www.cena-wody.pl)



**Table 4: Results of regression analyses of water and sewage prices from property tax rates (2012-2016)**

	Dependent variable	Explanatory variable	Type of regression model	Regression coefficient (SE)	Significance of regression coefficient	Type of relationship between local policies
Policy towards people	Price of water -households	Property tax rates for physical persons	RE	0.017 (0.002)	Significant at the 0.01 level	<b>Complementary relationship</b>
	Property tax rates for physical persons		FE	0.055 (0.006)	Significant at the 0.01 level	<b>Complementary relationship</b>
Policy towards companies	Price of water - industrial customers	Property tax rates for legal entities	FE	0.003 (0.002)	Insignificant	No relationship
	Price of wastewater - industrial customers		FE	0.006 (0.004)	Insignificant	No relationship
Mixed policies	Price of water - industrial customers	Property tax rates for physical persons	FE	0.005 (0.002)	Significant at the 0.05 level	<b>Complementary relationship</b>
	Price of wastewater - industrial customers		RE	0.036 (0.005)	Significant at the 0.01 level	<b>Complementary relationship</b>
	Price of water -households	Property tax rates for legal entities	FE	0.004 (0.002)	Significant at the 0.05 level	<b>Complementary relationship</b>
	Price of wastewater - households		FE	0.007 (0.004)	Insignificant	No relationship

Source: Own calculations

the dynamics of changes in non-industrial waste water prices (cf. Table 4 and 5). However, no relation was identified between the policy of water and sewage fees and the property tax policy with regard strictly to entities

conducting economic activity. All observed dependencies have the character of complementary relations (the increase in the prices of services goes up with the increase of tax rates, and the drop in tax rates is accompanied by a

**Table 5: Results of regression analyses of changes in water and sewage prices from changes in property tax rates (2012-2016; dynamic chain indexes)**

	Dependent variable	Explanatory variable	Type of regression model	Regression coefficient (SE)	Significance of regression coefficient	Type of relationship between local policies
Policy towards people	Dynamics of water price -households	Dynamics of property tax rates for physical persons	OLS	0.01 (0.03)	Insignificant	No relationship
	Dynamics of wastewater price - households		OLS	0.33 (0.06)	Significant at the 0.01 level	<b>Complementary relationship</b>
Policy towards companies	Dynamics of water price - industrial customers	Dynamics of property tax rates for legal entities	OLS	-0.01 (0.02)	Insignificant	No relationship
	Dynamics of wastewater price - industrial customers		OLS	-0.04 (0.03)	Insignificant	No relationship
Mixed policies	Dynamics of water price - industrial customers	Dynamics of property tax rates for physical persons	OLS	-0.06 (0.03)	Insignificant	No relationship
	Dynamics of wastewater price - industrial customers		OLS	0.20 (0.05)	Significant at the 0.01 level	<b>Complementary relationship</b>
	Dynamics of water price -households	Dynamics of property tax rates for legal entities	OLS	-0.01 (0.02)	Insignificant	No relationship
	Dynamics of wastewater price - households		OLS	-0.06 (0.03)	Insignificant	No relationship

Source: Own calculations

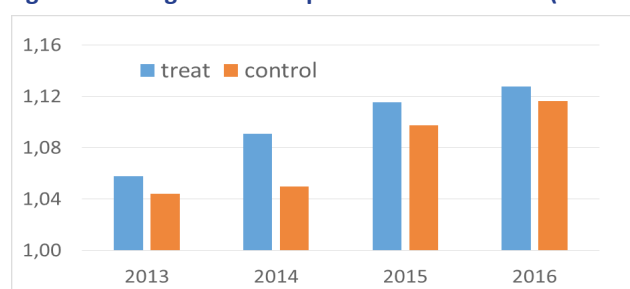
drop in the prices of water and sewage).

If Polish municipalities, taking care of the budget, complementarily use tax revenues and income from fees, one can ask what happens in a situation when the possibilities of increasing income by raising rates from one of these sources will be exhausted. Will the municipalities be more efficient in exploiting the second of the analysed sources of income, e.g. revenue from fees? The results of the quasi-experiment show that in municipalities that in 2012 adopted maximum property tax rates and

maintained them until 2016 (the treatment group), the dynamics of changes in water and wastewater prices in this period was higher than in the case of control group<sup>6</sup> (municipalities very similar in terms of socio-economic and location characteristics as well as baseline water and wastewater prices, but clearly differing in the possibility of raising tax rates). This relationship is slightly more visible in the case of prices adopted for households than prices for industrial customers (Figures 1-4).

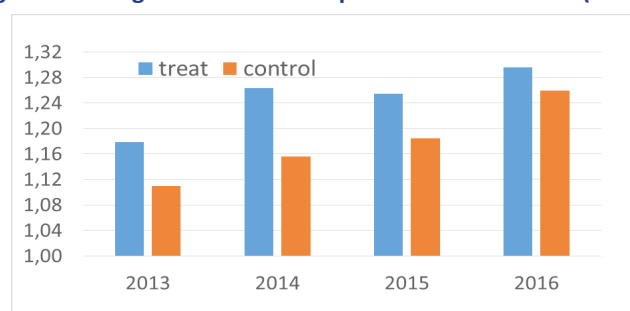
6 Results of t-tests indicate that the differences in changes in prices are in most cases statistically significant between years but usually insignificant between treatment and control groups.

**Figure 1: Changes of water prices for households (2012=1)**



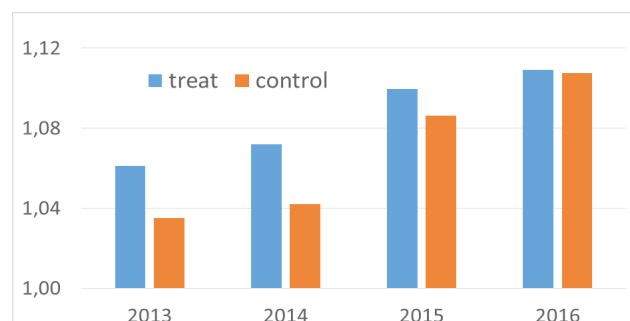
Source: Own calculation

**Figure 2: Changes of wastewater prices for households (2012=1)**



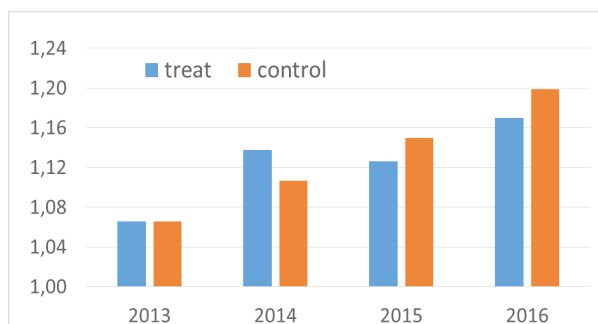
Source: Own calculation

**Figure 3: Changes of water prices for industrial customers (2012=1)**



Source: Own calculation

**Figure 4: Changes of wastewater prices for industrial customers (2012=1)**



Source: Own calculation

## CONCLUSIONS

We have analysed local tax and fee policy focusing on property tax and a tariff for water supply and sewage disposal. Both, on average, have similar relevance to municipalities' budgets. A property tax in Poland is not an ad valorem tax - the tax base is the area of the property, and the specific "ceiling" rate is set by the Tax Code. 97% of municipalities uses rates lower than the "ceiling" and therefore we assume they have discretion over the property tax policy. Among fees set by local authorities, discretion over tariff for water and sewage seemed to be the lowest. Until the end of 2017 there was an algorithm used for the calculation of a tariff. However, there are proofs for bigger yardstick competition in water and sewage tariffs than in property taxes (Swianiewicz & Łukomska, 2018). The report of the Supreme Audit Office accused some local authorities of benefitting from the surpluses of water companies. Local authorities have had significant influence over the tariffs. This, however, ended in 2018, when a national regulator was set up and local councils lost a formal right to approve the tariffs.

Knowing that municipalities can conduct fee and tax policy in a similar manner, we tried to investigate the relationship between these policies. Is this relationship significant and what is its nature: complementarity or substitutability? The last question we tried to answer was how these linkages change when a municipality reaches the "ceiling" in property tax.

An empirical analysis confirms that there exists a relationship between property tax and water and sewage tariff policy. This is however significant mainly with respect to tax and tariffs set for inhabitants, not for the enterprises. This makes sense, as a property tax rate for enterprises can be 30 times higher than for inhabitants and what seems to be more important in our opinion,

compared to residents, enterprises are less important for local authorities as a group of voters. The relationship, if it exists, is a complementary one, i.e. local authorities use both policies in a similar way to finance expenditures.

This conclusion shows that the results of European (Borge, 2000; Dafflon, 2015) and American studies (Mouritzen, 1989; Wolman & Davies, 1980; McCubbins & Moule, 2010), according to which the relationship between local tax rates and local fees usually takes the form of a substitution, have a limited scope. Results based on Polish data show that it is different in our country. This relationship with regard to the fees for water and sewage and property tax rates is rather complementary than substitutive in Poland.

This changes when a municipality reaches a "ceiling" in property tax. Our quasi-experimental analysis showed that tariff increases tend to substitute inability to increase revenues via a property tax. But the results in most cases are not statistically significant which is a confirmation of the outcome of the study based on Danish data (Blom-Hansen et al. 2014).

Our findings can be of great interest for Polish (and other Central and Eastern Europe countries as well) local authorities and policy-makers. Tax and fee policies should be treated in a similar way as sources of municipality revenue. This may require changing of the mentality (especially in small municipalities) and some provision of Polish law to allow for more discretion.

Our conclusions can be generalized to a certain degree. A similar pattern might be visible in other countries. The trade-off between taxes and fees may broaden the possible sources of financing local authorities' expenditures. This might also be relevant to some fees and taxes set at the national level.

The biggest limitation of our study is the time horizon – we analysed data only for 4 years. It would be interesting



to verify whether a similar pattern emerges for other time periods. For policy-makers it would be very interesting to analyse the distribution of the tax and fee burden on households with different socio-economic status. Local authorities have to some extent monopoly power over taxes and fees. Do we need tax/fee regulation? We believe not. In a typical case, a monopoly maximizes profit

and the only constraint is the elasticity of demand and therefore a regulator is needed. In the case of a monopoly owned or controlled by the local authorities, there is another constraint – the political cost of higher prices. Further research may attempt to answer the question of whether we need the regulator in this case.

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