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Do local governments use municipal companies for off-balance-sheet financing?

Abstract
This paper investigates whether municipalities in Poland use their municipal companies to increase debt capacity beyond the limitations imposed by the fiscal debt rules. The article presents corporate governance and agency problems on the example of relations between local government units and affiliated companies. We review and link literature on corporate finance, in particular capital structure, and public finance - debt liabilities of municipalities. We analyse a sample of 2,019 observations of municipalities and their municipal companies using the Ordinary Least Squares (OLS) method, where explanatory variables were taken from the public and corporate finance (leverage and its determinants). Results show that long-term debt of municipalities is positively associated with the leverage and size of municipal companies, but it is negatively related to their profitability.

Keywords
debt | municipal companies | municipalities | corporate governance | off-balance-sheet financing

JEL Codes
G30, G32, C51

1 Introduction

This paper aims to investigate whether municipalities in Poland use their municipal companies to increase debt capacity beyond the limitations imposed by the fiscal debt rules. The relationship between the debt of municipalities and the leverage of their subsidiaries is analysed from the perspective of corporate governance and agency theory. Municipalities are a particular example of stakeholders playing a dual role: principals (ultimate or controlling shareholders of municipal companies) and agents carrying out tasks imposed by the state (as defined in the Constitution) related to the provision of public (municipal) services to the residents under conditions of the public finance discipline. The agents of municipalities, in turn, are municipal companies whose owners or majority shareholders are municipalities, which can thus use the companies to achieve their objectives (public service delivery, off-balance-sheet financing). The implementation of the tasks of municipalities performed by municipal companies takes place based on management contracts, which have been in force in Poland since 2017, as well as in-house orders, commissioned to companies whose owner is a local government unit. To reflect the impact of this complex agency relationship, and off-balance-sheet financing on the debt of municipalities, explanatory variables from two sectors were taken into account: public and corporate finance.

Our study on the determinants of short- and long-term debt of municipalities in Poland was carried out using the Ordinary Least Squares (OLS) method. We use financial data of municipalities and municipal companies and structural and ownership data for 2018. Our research stands out from other studies because it combines public finance with private finance.

The structure of this article is adapted to realise its objectives. After the introduction, the second part of the paper reviews the literature on the principal–

agency relationship between municipalities and their municipal companies, and debt from the perspective of public finance and corporate finance (capital structure). The third section presents the research design, the fourth part delivers results and the final section concludes.

2 Municipalities in Poland and their relations with municipal companies

The local government sector includes 2,477 municipalities (CSO, 2020). Municipalities, as local government units, belong to the public sector and are subject to the regulations of the Public Finance Act. The main task of municipalities is to provide public services for all residents to satisfy their needs. Fulfilling the tasks set for municipalities requires the decentralisation of public income and assets (Świrska, 2008, p. 167–180). The basis for financing local government units is their revenues and external sources of financing. Own revenues include taxes, which includes a share in personal income tax (PIT) and corporate income tax (CIT), local fees, income from municipal property, fees, interest on borrowings granted by municipalities, and other (Act of 11 September 2019 amending the Act on the income of local government units, Journal of Laws of 2019, item 1951).

Revenues from fees include stamp duty, trade fair fees, local, administrative, and other fees. Tax receipts include property taxes, share in PIT and CIT, agricultural, forestry, transportation, inheritance, donation, dog ownership, and civil law activities (Świrska, 2008, pp. 167–180). Apart from their income, the municipalities also obtain external sources of non-refundable financing, including subsidies and grants, mainly financed from the state budget, the EU, and loans and borrowings.

Due to the multitude of public tasks that have to be done by municipalities, financial resources for individual purposes, including investments in municipal infrastructure, often seem to be insufficient. This is the reason why municipalities benefit from the possibility of debt. The phenomenon of indebtedness among local governments is common (zadluzenia.com), which translates into growing public debt. At the end of 2017, the total debt of Polish municipalities reached 57.205 billion PLN (Gazeta Krakowska, 7.09.2018). The largest Polish cities with the enormous budgets are nominally indebted: Warsaw (over 5 billion PLN), Wrocław and Łódź Ostrowice had the record debt per capita in 2017 (18.644 PLN), and as a result, Ostrowice was liquidated in 2019 (Serwis Samorządowy (Local Government Service) PAP), which is then followed by Rewal (14.924 PLN), Byczyna (12.060 PLN), Dziwnów (5.321 PLN), Wałbrzych (5.015 PLN), Sulmierzyce (4.904 PLN), Daszyna (4.651 PLN), Wrocław (4.410 PLN), Bielice (4.302 PLN) and Lublin (4.245 PLN). Seven municipalities have most significant debt problems: Ostrowice, Rewal, Białogard, Manowo, Bielice, Przybiernów and Brojce in West-Pomeranian province (Zadłużenie polskich gmin, 2017). In 2017, seventy-nine municipalities in Poland were not in debt at all, including Świdnik (https://www.portalsamorzadowy.pl/). However, the opportunities for local governments to incur liabilities are not arbitrary in the context of the choice of the purposes of going in debts but are constrained in terms of the volume of debt concerning the capacity to repay them. There are four legal limits to the amount of deficit and debt of territorial self-governments specified in the Public Finance Act (Act of 27 August 2009 on public finance).

These limitations specify the acceptable sources of liability coverage; the requirement to obtain an opinion of the Regional Chamber of Auditors on the possibility of financing the deficit, the limitation of the amount of the planned budgetary revenues of the units, and the limitation of the total amount of the local government debt, which by 2013 could not exceed 60% of the local government revenues established at the end of each quarter according to the values planned and at the end of the financial year according to the values executed (Satoła, 2012, pp. 77–91) and the level of debt service, which could not be higher than 15% of the local government revenues (Kopańska & Kopyt, 2018). The increase in municipalities' debt led to the introduction in the Public Finance Act of 2009 of a ban on the current budget deficit and a new so-called individual debt ratio (*IWZ*) in the following form:

$$IWZ_t = \left(\frac{Db_{t-3} + Sm_{t-3} - Wb_{t-3}}{D_{t-3}} + \frac{Db_{t-2} + Sm_{t-2} - Wb_{t-2}}{D_{t-2}} + \right.$$
$$\left. + \frac{Db_{t-1} + Sm_{t-1} - Wb_{t-1}}{D_{t-1}} \right) / 3$$

where *Db* – current revenues, *Sm* – income from the sale of assets, *Wb* – operating expenditures, *D* – total

revenues in line with the municipality's budget, *t* – fiscal year.

The total debt repayment planned for the financial year, including interest, discount, and amounts resulting from the sureties and guarantees granted to total income in the financial year *t* may not exceed the individual debt ratio (IWZ). As the IWZ is more restrictive for a significant number of municipalities (Kopańska & Kopyt, 2018), an adjustment period was introduced, and the IWZ became effective from 2014.

In Poland, the municipal economy implemented by the local governments may take place within the framework of budget units, local government budgetary institutions and commercial law companies (i.e. limited liability companies). The most common form is municipal companies in which municipalities have various shares in equity, often even the majority ones (Żabski, 2014, pp. 409–423). Municipal services are infrastructural utilities necessary to ensure the basic needs of urban and rural residents. Such services include municipal transport, water and sewage systems, heating (combined heat and power plants), health care, and management of municipal administrative property, residential estate, and other facilities (Barwacz, 2009, pp. 169–179). Since these are public services, for the benefit of the local community, municipal enterprises are subject to control local authorities, i.e. municipalities. This form of ownership of municipalities leads to the existence of corporate governance, and in the case of almost 100% of the municipality's share in the equity of the municipal company, corporate supervision over the internal entity to which *in-hous*e contracts, regulated under the Public Procurement Act, apply.

2.1 Corporate governance in municipal companies

Corporate governance is interpreted in many ways and has no uniform definition. Corporate governance must be related to the structure of links between owners, management bodies, shareholders, and other entities associated with the company (Żabski, 2014, pp. 409–423). Jeżak described corporate governance as an arrangement in a company aiming to achieve the goals and objectives of the owner (Żabski, 2014, pp. 409–423).

According to the OECD, "*corporate governance is influenced by the relationship between the participants in the governance system. Controlling shareholders – individuals, families of shareholders, alliances, or other companies acting through the parent company or cross-shareholding – can have a significant influence on the behavior of a company*" (OECD, 2004). This is a form of control exercised over the activities of a company, which in consequence, may contribute to the improvement of its efficiency and operating. The system of relations between municipal companies and local governments is visible not only in corporate governance but can also be seen in the light of the agency theory. The agency theory describes relations between two or more parties of a contract, most often a principal and an agent, i.e. the principal's contractor. The key concept for this theory is the 'agency relationship', which is described as a contract in which one party uses the services of another party to meet its goals and additional benefits (Przegrocki & Jabłecka, 2013, pp. 117–143).

In the agency theory, the municipality, i.e. the principal exercises power over the municipal companies, i.e. the agents. The relationship between the principal and the agent is often attributed to agency problems. One of the issues is the divergence of objectives and intentions of the principal and the agent. In such a situation, there is a conflict between the parties, which may be a result of poor targeting by the principal or insufficient motivation of the agent. However, their goals do not always have to remain in such a conflict. For an agent to act in the interest of the principal, motivational factors are often used, which may include rewards for performance. Other problems of the agency are the difficulties in controlling the agents and the risks. The two parties of a contract may have different attitudes to risk, which may result in a readiness to take divergent actions.

The formal and informal contracts between principals and agents include – apart from the agency conflicts – management contracts. They outline the rules of providing services by managers. Management contracts are to meet two key assumptions: to reduce the occurrence of information asymmetry and to reduce moral hazard as much as possible

We talk about *moral hazard* when one party of a contract during its term has more information than the other and thus takes steps contrary to an agreement to achieve their benefits (Ciżkowicz, 2008). For shareholders, the management contract is to contribute to the increase in the company's performance, i.e. to increase the value and reduce transaction costs. An additional goal is to encourage the manager, i.e. the agent, to perform the tasks set by the owner (principal) (Chrabąszcz-Sarad &

Kozioł, 2017, pp. 13–25). In 2017, the managers of municipal companies changed their existing contracts into managerial contracts (Chrabąszcz-Sarad & Kozioł, 2017, pp. 13–25). In the concept of corporate governance and control of local governments over municipal companies, *in-house* orders play a crucial role because they are select contracts awarded to companies wholly owned by municipalities. This form of supervision aroused considerable controversy caused by strengthening the position of such business entities, even though such activity is not illegal (Barwacz & Chrabąszcz-Sarad, 2019, pp. 55–65). Regulations of *in-house* contracts are included in Art. 67 Sec. 1 point 12 of the Public Procurement Law and outline the conditions for the contracting authority that has control over the contractor analogous to control over its units (e.g. through dominant influence on strategy and essential management decisions); performance by the contractor of the tasks entrusted to it by the contracting authority in the scope of at least 90% of its activity; and no direct participation of private capital in the contractor's equity except, among others, public-private partnership (PPP).

2.2 Determinants of debt of municipalities

Studies of Kopańska and Kopyt (2018) and Köppl-Turyna, Kula, Balmas, and Wacławska (2016) indicate the increase in debt of the municipalities in the election year. Most often, in the period close to the deadline of local government's elections, the current authorities increase expenses noticeable to potential voters, i.e., residents. Such actions result in an increase in debt, which in turn may prevent future successors from acting freely if the elections of the current government fail. Therefore, it is crucial to have a broad political competition. Kopańska and Kopyt (2018) confirm that municipalities' debt is negatively related to competition between candidates in the local election. The political competition adds to "forced" transparency of local governments' actions.

Results of the study conducted by Kopańska and Kopyt (2018) show that municipalities' debt is positively related to capital expenditures, subsidies (grants), current income, and unemployment. The effect of the 'golden rule of debt' is the relationship between debt levels and investment projects. Along with the increase in capital expenditure, the debt also increases. The capital expenditures are related to subsidies granted to local governments to finance investments. Therefore, grants also contribute to an increase in debt when the conditions for using the grants require their contribution. Besides, Siwińska-Gorzelak, Bukowska, and Wójcik (2019) showed that capital expenditures are negatively correlated with local potential tax autonomy, subsidies, political fragmentation, population density, and the share of older residents in the population. Political competition is positively correlated.

Kopańska and Kopyt (2018) indicate that the spatial dependence of debt results from spending and tax competition between local governments. Neighbouring municipalities and cities compete for companies, residents, and available resources, resulting from which the neighbouring local governments are similarly indebted.

Shon and Kim (2019) examined the determinants of the short- and long-term debt of municipalities, taking into account their revenue diversification. They use panel data between 1977 and 2012 for 149 of the largest cities in the United States (excluding Washington) with a fiscal standard (FiSC) set by the Lincoln Institute of Land Policy. Shon and Kim (2019) emphasise the importance of distinguishing between short-term and long-term debts. Municipalities usually use the former to deal with the current deficit, i.e. the current lack of operational resources. In contrast, long-term debt is used to invest in capital projects. One of the consequences of revenue diversification may be a fiscal illusion.

Puvianie defined the fiscal illusion "*as a process whereby governments conceal real tax costs of public expenditure. Fiscal illusions are a consequence of the use of indirect taxes, more "invisible" to the taxpayer, as well as the use of inflationary phenomena to lower the real value of tax allowances and exemptions, freeze tax thresholds, etc.*" (Bartkowski, 2019, pp. 173–193). Fiscal illusions may prompt officials to increase expenditures and revenues, but their higher levels may be independent of debt levels, especially long-term debt.

Another implication is fiscal stabilisation. The diversified income leads to an improvement in the budgetary and economic stability of the municipality. This allows for better transparency in planning budget expenditures in the future. This should show a local government with a more significant revenue diversification to reduce its short-term debt due to control expenditure in the current year. The last hypothesis is that a local government with more

diversified revenues is more likely to increase its long-term debt level. This hypothesis is supported by the consequences of the greater stability of income, i.e. perceiving such a local government as a more cautious and reducing financial risk. This, in turn, lowers the cost of debt and increases the creditworthiness and, consequently, allows to increase the long-term debt.

The results confirm the negative relation between income diversification (including non-tax diversification) and short-term debt. Capital expenditure, unemployment rate, and population positively correlate with short-term debt. In the case of long-term debt, the relation is reversed, i.e. with a higher level of income diversification of the local government, its long-term debt increases. The long-term debt is positively influenced by cash and securities, property tax revenues and tax transparency, and negatively – by received subsidies (grants). Income diversification helps the local government to improve the fiscal situation by reducing its short-term debt. On the other hand, the increase in revenue diversification increases the level of long-term debt. Shon and Kim (2019) also stated that non-tax revenue diversification is more critical for short- and long-term debts than tax revenue diversification.

In the study of the Polish municipalities, Bukowska and Siwińska-Gorzelak (2018) measure *de jure* fiscal decentralisation, which results from the share of own taxes in total income. Local authorities are entitled to collect some of their taxes even before implementing local tax policies. According to the authors, it is worthwhile to control local spending policies or ways of managing expenditures, dividing them into '*de jure*' and '*potential*' tax autonomy revenues to assess their impact on budgetary balance. The study uses the legal restriction imposed on the tax autonomy of Polish municipalities, which measures the maximum level of own taxes to which local authorities are entitled just before the implementation of tax policy. On average, ca. 30% of total public sector expenditures are local public expenditures. The municipality, as the lowest level of local government, has greater fiscal autonomy than counties or provinces. The primary sources of income for municipalities are taxes, fees (and charges) to which the municipality has some degree of autonomy.

Results show that a higher level of *de jure* tax autonomy is associated with higher budget balances. As unemployment increases, budget balances decrease. Based on the results of the study by Bukowska and Siwińska-Gorzelak (2018), the authors conclude that increasing autonomy may lead to increased responsibility and flexibility of local government, which may result in improvement of fiscal discipline and applied budgetary policies. Municipalities, which have more tax freedom, are characterised by greater fiscal balance. Based on the presented literature and taking into account the much lower fiscal autonomy of Polish municipalities in terms of shaping their income than in the USA, the following research hypotheses relating to public finances were formulated:

> **H1a:** *The higher the revenue diversification, the higher will be the long-term debt of municipalities.*
>
> **H1b:** *The higher the revenue diversification, the higher will be the long-term debt of municipalities.*

Kopańska and Kopyt (2018) show a negative correlation of the debt with the fiscal imbalance index and the Individual Debt Index (IWZ) defining the debt limit of each municipality. Fiscal inequalities include expenditures of local governments that are not financed from local taxes but state budget transfers. The local governments can decide on their debt in the hope that they will receive support from the state budget if necessary.

The Individual Debt Index (IWZ) is a limitation of local governments' debt capacity. According to legal regulations, in a given fiscal year, 'the value of repayment of liabilities together with the costs of their servicing to the total income of a local government unit's budget cannot exceed the arithmetic mean of the last three years of the ratio of its current income, increased by sale of assets and decreased by current expenditure to the total budgetary income' (Act of 27 August 2009 on Public Finance, Art. 243).

Besides, local governments may wish to conceal actual debt, which can be done by using off-balance-sheet financing through their own municipal companies. Hence, we formulate a second research hypothesis that links public and private finances. Based on this hypothesis, it is possible to examine whether there is a correlation between the level of debt of a local government unit and the leverage of its subsidiaries – municipal companies.

> **H2:** *Municipalities use off-balance-sheet financing via leverage of municipal companies.* **In other words,** *the leverage of municipal companies is positively related to the debt level of municipalities.*

2.3 Capital structure

In the literature, capital structure is most often defined as total debt to a market value of asset ratio, total debt to book value of asset ratio, long-term debt to a market value of asset ratio, and long-term debt to book value of asset ratio (Frank & Goyal, 2009). We use the latter measure in our study in this article. An extensive literature review and meta-analysis of the capital structure and financing sources of companies has been conducted by Białek-Jaworska and Nehrebecka (2015) and Nehrebecka, Białek-Jaworska, and Dzik-Walczak (2016).

Öztekin (2015) shows that the factors determining the capital structure are profitability, firm size, tangibility, industry leverage, and inflation. Larger firms use more debt as they potentially have lower financial costs or lower agency costs. A factor reflecting transaction or information asymmetry costs is profitability: the higher the profits, the lower will be leverage.

Frank and Goyal (2009) identify the key factors determining leverage: the median leverage of the industry, tangibility, profitability, firm size, and inflation. Companies with a higher percentage of tangible assets typically have greater leverage as they play the role of collateral. Companies with higher profits tend to have less leverage, and firm size and expected inflation are positively related to leverage. In light of the agency theory, a positive relationship between profitability and leverage can be expected, but from a trade-off theory perspective, a negative relationship is possible. The pecking order theory shows that more profitable companies usually have less leverage (Białek-Jaworska & Nehrebecka, 2015).

Tax benefits can also influence the choice of financing. Some firms deliberately choose debt financing due to the interest tax shield, which allows for the reduction of the income tax burden (Degryse, de Goeij, & Kappert, 2012). Frank and Goyal (2009) observed no correlation of leverage with market factors, firm size and expected inflation. On the other hand, variables such as tangibility and median leverage of the industry positively influence leverage.

Deloof, Ooghe, and Heyman (2008) studied the capital structure of small private firms operating in a creditor-oriented system in Belgium. Banks better monitor debt and often alleviate agency problems. Leverage was measured as total debt to total assets ratio. They show that the debt ratio is influenced by tangibility, growth, profitability and firm size. Higher tangibility increases, on average, a debt ratio, and growth and profitability are negatively related to leverage. Larger companies have, on average, a higher debt ratio. Most small firms usually take out loans in local bank branches, which often results in close monitoring by the bank.

Daskalakis et al. (2014) study factors determining the capital structure of micro, small and medium-sized enterprises, including profitability, tangibility, firm size and growth. The negative correlation between profitability and debt is supported by the theory of information asymmetry, according to which managers have more relevant information about the company from investors, and in case of necessity to obtain additional funds, debt is preferred, which is considered a positive signal by investors (on the stock exchange). A positive correlation between profitability and debt can be supported by the trade-off theory and the interest shield benefits of debt financing. Profitability and tangibility are negatively related to debt, which shows that companies relying more on fixed assets on average have less debt as opposed to entities with a relatively smaller share of fixed assets. The larger companies use more debt. The positive correlation between debt and growth was confirmed. The capital structure is strongly differentiated depending on the firm size; however, firms belonging to different groups in terms of size maintain a similar relation between debt and the variable approximating the enterprise size.

The factors determining the capital structure of small unlisted companies were also studied by Degryse et al. (2012). The results confirm that larger firms have a higher debt ratio. The tangibility and taxation (interest tax shield) are positively correlated with overall and long-term debt, while it correlates negatively with short-term debt. As profitability increases, the debt decreases. The growth is positively related to total and long-term debt. The results also show that industry-specific factors play an essential role in the choice of capital structure.

3 Research design

The database used for the study was constructed from several data sources. Data on income and expenditure of Polish municipalities come from the Ministry of Finance. Data related to the local demographic structure come from the Local Data Bank of the Central Statistical Office, while financial and ownership data come from the ORBIS database.

Tab. 1. Definition of variables describing municipalities

Variable	Definition	Data sources
Dependent variables		
Short_debt	Short-term debt outstanding/population	Ministry of Finance, Local Data Bank
Long_debt	Long-term debt outstanding/population	Ministry of Finance, Local Data Bank
Independent variables		
Revenue_diversification	Hirschman–Herfindahl Index $\frac{1-\sum_{i=1}^{n} R_i^2}{1-\left(\frac{1}{n}\right)}$ where R – a share of revenues generated from each source in total revenues, n – number of revenue sources (n = 5 incl. real estate tax, share in income (PIT and CIT) tax, other tax, general charges, miscellaneous general revenue)	Ministry of Finance
Grant_revenue	The logarithm of grant revenue scaled by population	Ministry of Finance, Local Data Bank
Unemployment_rate	Unemployment/population in the productive age	Local Data Bank
Income_pc	The logarithm of total revenues scaled by population	Ministry of Finance, Local Data Bank
Population_density	Number of inhabitants per square miles	Local Data Bank
Tax_burden	Local taxes as a share in total revenues	Ministry of Finance

Source: Own elaboration based on Shon and Kim (2019). The impact of revenue diversification on municipal debts: comparing short-term and long-term debt levels. *Local Government Studies, 45*(2), 241–261.

These are the data of municipalities and municipal companies located in Poland for 2018. The database consists of 2019 observations. We remove few observations due to the lack of data concerning total assets, profit before tax for 2018, and total assets for 2017 of municipal companies.

The dependent variables explained in the model are the municipalities' short- and long-term debt. The explanatory variables, on the other hand, concern two sectors: public and private. Table 1 presents definitions of variables and data sources for municipalities, while Table 2 shows those for municipal companies. The leverage variable used in the first presented set of models is the long-term debt to total assets ratio of a municipal company. The remaining of the listed explanatory variables concerning municipal companies are the determinants of leverage well-recognised in the corporate finance literature. They were used in subsequent models. This allows for a more in-depth study of the role of characteristics of a municipal company determining its leverage in shaping a local debt of the municipality.

The study was carried out for all municipal companies' industries in total and separately for six of the eight sectors in the database. The research carried out for each sector separately is motivated by the variety of characteristics (creditworthiness, debt capacity) between them and the different ways of managing companies' finances. Two industries: administrative and support activities and agriculture, forestry, and fisheries, were omitted because the number of observations is too small. Table 3 contains a list of industries (according to top-level NACE sectors (sections)) with abbreviations and figures. Next, Table 4 presents municipal companies by number of shareholders, whereas Table 5 compiles descriptive statistics of the dependent variables – short-term and long-term debt of municipalities in Poland (logarithm). Table 6 presents descriptive statistics of independent variables used in the model, whose definitions (and the resulting units of measurement) are described in Tables 1 and 2.

Tab. 2. Definition of variables describing municipal companies

Variable	Definition	Data source
Lever	Long-term debt to total assets ratio	ORBIS
Tangibility	Tangible assets to total assets ratio	ORBIS
Size	The logarithm of total assets	ORBIS
ROA	EBIT (earnings before interests and tax) to total assets ratio if EBIT is positive, and 0 otherwise	ORBIS
Tax_rate	Income tax to gross profit	ORBIS
Growth	The growth rate of total assets between 2017 and 2018	ORBIS

Tab. 3. Municipal companies by NACE sections

Top-level NACE Sectors (Sections)	Number of firms	Share(%)	Cumulative percentage
"A" Agriculture, forestry, fishing	1	0.06	0.06
"E" Water supply, sewage, waste management	917	50.80	50.86
"L" Rental and management of a real estate	286	15.84	66.70
"H" Passenger, urban and suburban land transport	157	8.70	75.40
"F" Construction	103	5.71	81.11
"R" Activity of sports facilities	96	5.32	86.43
"D" Electricity, gas, steam and air conditioning supply	232	12.85	99.28
"N" Administrative and support activities	13	0.72	100.00
Total	**1,805**	**100.00**	

Tab. 4. Municipal companies by number of shareholders (municipalities)

Number of shareholders	Number of firms	Number of shareholders (municipalities)	Number of observations (municipality × firm)
1	1,701	1	1,701
2	57	2	114
3	25	3	75
4	9	4	36
5	5	5	25
6	1	6	6
7	2	7	14
8	1	8	8
9	2	9	18
10	1	10	10
12	1	12	12
Total	**1,805**		**2,019**

Tab. 5. Descriptive statistics of short- and long-term debt of municipalities in Poland

Variable	*N**	Mean	Median	Q1	Q3	SD	Min	Max
Short_debt	2,019	6.32	7.09	6.39	7.76	2.46	0	9.72
Long_debt	2,019	8.79	9.03	8.49	9.55	1.48	0	11.30

*Number of observations (municipality × firm).

Tab. 6. Descriptive statistics

Variable	*N*	Mean	SD	Min	Max
Municipality-level					
Revenue_diversification	2,019	0.773	0.120	0.312	1.067
Grant_revenue (ln)	2,019	9.018	0.224	8.301	10.144
Unemployment_rate	2,019	0.089	0.045	0.018	0.265
Income_pc (ln)	2,019	10.243	0.245	9.775	12.032
Population_density	2,019	750.805	829.326	11	3,993
Tax_burden	2,019	0.527	1.018	0.030	12.255
Firm level					
Lever	2,019	0.155	0.165	0	1
Tangibility	2,019	0.718	0.252	0	1
Size	2,019	16.766	1.853	8.517	22.845
ROA	2,019	0.023	0.054	0	0.980
Tax_rate	2,019	0.173	0.212	0	1
Growth	2,019	0.105	0.391	-0.883	3

The study was conducted using the Ordinary Least Square method. This method allows us to examine the correlation of debt with all independent variables. The creation of the following study was a several-stage process that aims to select the functional form of the model. The desired functional form is one that reflects as much as possible the theoretical basis for creating an econometric model. The final model is as follows:

$$Short\_debt_{i,j} = \alpha + \beta_1 Revenue\_diversification_i + \beta_2 Grant\_revenue_i + \beta_3 Unemployment\_rate_i + \beta_4 Income\_pc_i + \beta_5 Population\_density_i + \beta_6 Tax\_burden_i + \beta_7 Tangibility_{i,j} + \beta_8 Size_{i,j} + \beta_9 ROA_{i,j} + \beta_{10} Tax\_rate_{i,j} + \beta_{11} Growth_{i,j} + e_{i,j}$$

$$Long\_debt_{i,j} = \alpha + \beta_1 Revenue\_diversification_i + \beta_2 Grant\_revenue_i + \beta_3 Unemployment\_rate_i + \beta_4 Income\_pc_i + \beta_5 Population\_density_i + \beta_6 Tax\_burden_i + \beta_7 Tangibility_{i,j} + \beta_8 Size_{i,j} + \beta_9 ROA_{i,j} + \beta_{10} Tax\_rate_{i,j} + \beta_{11} Growth_{i,j} + e_{i,j}$$

4 Results

Table 7 presents the results of the regression of dependent variables: short-term and long-term debt using the characteristics of municipalities and debt (the *lever* variable) of municipal companies in the model (1) and (3) or determinants of the capital structure of companies (discussed in part 2.3, i.e., *tangibility, firm size, return on assets (ROA), tax rate, growth*) in the model (2) and (4). Due to the specificity of the sectors and the differentiation of debt of municipal companies among the sectors, the models were estimated separately for the sectors. The presented results enable verification of the **H2** hypothesis. A positive correlation of financial leverage (*lever*) with dependent variables was expected. In the case of short-term debt, the hypothesis **H2** was rejected. However, there are no grounds to

reject the **H2** hypothesis in the case of long-term debt. An increase in the leverage by one unit increases the long-term debt of the municipality per capita by 0.838 units, with the remaining variables in the model unchanged. Such conclusions lead to the extension of the study to include leverage determinants for both short- and long-term debt.

Table 8 presents regression results for short-term debt for particular sectors of municipal companies, while Table 9 for long-term debt. The differences between the significance of determinants and the direction of relations result from differences between sectors and their specificity. In the case of short-term debt, the *income_pc* variable relates positively to the dependent variable for four of the six branches: E, H, F, R. This means that more affluent municipalities with municipal companies operating in the water and sewage and waste management (E), passenger transport (H), construction (F) and sports facilities (R) sectors have higher short-term debt. Higher income per capita enables municipalities to service their debt. The results for these sectors are consistent with those for the total sample (2,019 observations). Short-term debt also positively correlates with the *grant_revenue* variable in the model for sectors L and D, which means that municipalities with higher revenues from subsidies, managing the real estate through municipal companies (L), and providing energy through combined heat and power plants operating as municipal companies (D), show higher short-term debt. Likewise, municipalities with a higher population density are more indebted in the short term, using municipal companies to provide water and sewage services and waste management (E), passenger transport (H), and property management (L). In contrast, the negative correlation of short-term debt with the *tax_burden* variable for sectors L and R indicates that municipalities with higher local fees revenue using municipal companies for property management (L) and sports facilities (R) and those with lower taxes paid by municipal companies providing property management services (L) or electricity, gas, steam, and air conditioning supply (D) (negative coefficient with *tax_rate* for sectors L and D) have less short-term debt. Larger (*size*) and with higher *growth* municipal companies providing passenger transport services (H) operate in municipalities with lower short-term debt, but municipal transport companies with higher tangible assets (to guarantee the debt) are found in municipalities with higher short-term debt. Larger municipal companies managing sports facilities or providing energy and heating to residents operate in municipalities with higher short-term debts. In the case of long-term debt, a positive correlation is with the *revenue diversification* and *grant_revenue* variables for sectors E and H, which means that a higher revenue diversification and grant receipts allow increasing the long-term debt of municipalities with municipal companies providing water, sewage, and waste management services (E) and transport (H). The higher grant receipts, in turn, reach the more indebted municipalities with municipal companies responsible for sports facilities (R). Municipalities with higher unemployment with municipal companies operating in the electricity, gas, steam, and air conditioning supply (D) sector are more indebted for the long term. In contrast, those with municipal transport companies (section H) have lower long-term debt. More affluent municipalities with shares in municipal companies managing real estate (L), providing construction services (F) or supplying energy and heat (D) have higher long-term debt (positive coefficient with the *income_pc* variable for the L, F, and D industries), probably due to higher capital intensity of the investment projects underway. Higher income enables them to service their debt. Municipalities with a higher population density and with water and sewage municipal companies, providing property management services, passenger transport, sports facilities management, and supplying electricity, gas, steam, and air conditioning are more indebted in the long term (positive coefficient at the *population_density* variable for E, L, H, R and D sectors). Capital expenditures (which cause the *growth* of assets) for the water and sewage and waste management industry (E), especially in the case of larger companies supplying electricity, gas, and steam (D) require higher long-term debt financing, while lower financing for construction companies (negative correlation with the *growth* variable for sector F).

Municipalities with higher income from local charges with their water and waste management companies (E), paying higher taxes (*tax_rate* for the E sector), i.e., more profitable have less long-term debts. From this, it can be concluded that in the water and sewerage and waste management industry, the burden of long-term financing is borne by municipal companies (via off-balance-sheet debt). Likewise, municipalities with more profitable (higher ROA) transport companies (H sector) benefit to a lesser extent from long-term debt financing thanks to shares in the revenues of municipal companies from these public services.

Tab. 7. Determinants of local public short-term and long-term debt

	(1)	(2)	(3)	(4)
Variable	**short-term debt**	**short-term debt**	**long-term debt**	**long-term debt**
Revenue diversification	1.399** (0.680)	1.356** (0.683)	2.120*** (0.394)	2.059*** (0.397)
Grant_revenue	-0.055 (0.361)	0.012 (0.363)	1.268*** (0.209)	1.343*** (0.211)
Unemployment_rate	-1.745 (1.355)	-1.522 (1.359)	0.448 (0.785)	0.680 (0.790)
Income_pc	1.340*** (0.307)	1.303*** (0.315)	0.459** (0.178)	0.435** (0.183)
Population_density	0.0004*** (0.0001)	0.0004*** (0.0001)	0.003*** (0.0001)	0.0003*** (0.0001)
Tax_burden	-0.126** (10.849)	-0.125** (0.054)	-0.072** (0.031)	-0.076** (0.031)
Lever	0.152 (0.321)		0.838*** (0.186)	
Tangibility		0.271 (0.270)		-0.018 (0.157)
Size		0.49 (0.039)		0.045* (0.023)
ROA		0.003 (1.030)		-1.599*** (0.599)
Tax_rate		-0.417 (0.254)		-0.170 (0.148)
Growth		-0.178 (0.136)		-0.021 (0.079)
Constant	-8.119*** (2.944)	-9.209*** (2.962)	-9.379*** (1.705)	-10.322*** (1.721)
F (*p*-value)	0.0000	0.0000	0.0000	0.0000
N (municipality × firm)	2,019	2,019	2,019	2,019
R^2	0.081	0.086	0.144	0.143

*$p < 0.1$ **$p < 0.05$ ***$p < 0.01$.

Standard errors are given in parentheses below the coefficients.

Statistical tests were carried out for all companies together on the final model form. For all p-value models, the statistic F is less than 0.05, i.e., the assumed level of significance, which means rejecting the null hypothesis about the total insignificance of variables in the model ().

The results of the regressions allow verifying the validity of the hypotheses. The first hypothesis (H1a and H1b) was confirmed for both long-term and short-term debt. Based on the obtained results, there are no grounds for rejecting H1a nor H1b. These hypotheses concern a positive relation of revenue diversification to debt levels. The value of the coefficient at the *revenue_diversification* variable indicates that as a result of an increase in overall revenue diversification by a unit, the short-term debt per capita increases by 1.356 units and by 2.059 units per capita in the case of long-term debt. This means that the revenue diversification of municipalities does not help them to reduce their debt.

On the contrary, too low fiscal autonomy in terms of determining income by municipalities may

Tab. 8. Determinants of local public short-term debt by industries of municipal companies – subsidiaries of municipalities

Variable	Sector E	Sector L	Sector H	Sector F	Sector R	Sector D
Revenue diversification	-0.091 (0.939)	1.689 (2.236)	2.313 (2.875)	-3.118 (3.049)	-4.498 (3.747)	7.071*** (2.183)
Grant_revenue	-0.726 (0.522)	1.939* (1.030)	-0.819 (1.010)	-1.197 (1.437)	-1.968 (1.307)	2.303* (1.328)
Unemployment_rate	-1.899 (1.890)	-6.724* (3.512)	6.450 (4.117)	-3.027 (5.766)	7.072 (6.518)	-0.149 (4.074)
Income_pc	1.599*** (0.477)	0.301 (0.889)	3.120*** (0.827)	2.160* (1.284)	2.138** (0.967)	0.024 (1.308)
Population_density	0.0004*** (0.0001)	0.0003** (0.0001)	0.0003* (0.0001)	0.0003 (0.0002)	0.0002 (0.0002)	0.0001 (0.0002)
Tax_burden	-0.035 (0.078)	-0.0217** (0.107)	-0.302 (0.233)	-0.385 (0.367)	-0.806*** (0.193)	0.154 (0.170)
Tangibility	0.135 (0.485)	-0.132 (0.479)	1.703** (0.839)	0.661 (0.749)	-0.750 (0.974)	0.337 (0.963)
Size	0.041 (0.067)	0.079 (0.088)	-0.243** (0.109)	-0.125 (0.158)	0.381** (0.174)	0.304** (0.119)
ROA	-0.091 (1.783)	-6.740 (4.087)	0.654 (3.725)	5.826 (7.646)	-0.972 (1.575)	-1.327 (5.978)
Tax_rate	0.172 (0.386)	-0.953* (0.563)	0.036 (0.556)	-0.807 (1.062)	2.428 (1.737)	-2.522*** (0.788)
Growth	0.021 (0.235)	0.038 (0.413)	-0.531* (0.269)	-0.383 (0.378)	-0.411 (0.326)	0.501 (0.508)
Constant	-4.453 (4.393)	-15.985** (7.538)	-17.822** (7.952)	-0.465 (11.324)	0.191 (10.786)	-25.301*** (8.932)
F (p-value)	0.0000	0.0000	0.0000	0.3115	0.0001	0.0000
N	1,051	311	189	113	99	242
R^2	0.059	0.125	0.228	0.114	0.340	0.176

*$p < 0.1$, **$p < 0.05$, ***$p < 0.01$.

Standard errors are given in parentheses below the coefficients.

contribute to an increase in debt to meet the needs of residents. The H2 hypothesis concerned the positive correlation between the leverage of companies and the level of indebtedness of municipalities was verified based on the results presented in Table 6. The results allow concluding that the subsidised municipalities show higher long-term debts, more affluent municipalities (with higher income per capita), and higher population density are more indebted, both short- and long-term. On the other hand, a higher share of local fees in the municipalities' income allows them to reduce their debts, both short- and long-term. Municipalities with larger municipal companies have higher long-term debt, and owners of more profitable companies are less in debt in the long run.

5 Conclusion

The aim of this paper has been realised via confirming that municipalities in Poland use their municipal companies to increase debt capacity beyond the limitations imposed by the fiscal debt rules. Based on the results of the study, the hypotheses were verified. A positive relation between debt levels

Tab. 9. Determinants of local public long-term debt by industries of municipal companies – subsidiaries of municipalities

Variable	Sector E	Sector L	Sector H	Sector F	Sector R	Sector D
Revenue diversification	2.053*** (0.581)	-0.143 (0.956)	5.135*** (1.693)	-0.860 (1.399)	-1.101 (3.108)	1.413 (0.964)
Grant_revenue	1.566*** (0.323)	0.143 (0.440)	1.349** (0.595)	0.508 (0.659)	2.876*** (1.084)	0.260 (0.587)
Unemployment_rate	1.412 (1.170)	2.011 (1.502)	-4.027* (2.424)	-2.060 (2.645)	-7.779 (5.405)	3.986** (1.799)
Income_pc	-0.060 (0.296)	1.927*** (0.380)	0.526 (0.487)	1.862*** (0.589)	-0.345 (0.802)	1.511*** (0.577)
Population_density	0.0003*** (0.0001)	0.0001** (0.0001)	0.0002*** (0.0001)	0.0001 (0.0001)	0.0006** (0.0002)	0.0002* (0.0001)
Tax_burden	-0.104** (0.048)	-0.023 (0.046)	-0.078 (0.137)	0.045 (0.168)	0.060 (0.160)	0.020 (0.075)
Tangibility	-0.323 (0.300)	0.284 (0.205)	-0.112 (0.494)	-0.084 (0.344)	0.775 (0.808)	0.324 (0.425)
Size	0.112*** (0.041)	0.008 (0.038)	-0.022 (0.634)	0.028 (0.073)	-0.027 (0.145)	0.036 (0.053)
ROA	-0.784 (1.103)	-0.240 (1.748)	-7.085*** (2.193)	-2.940 (3.508)	-1.222 (1.306)	2.178 (2.640)
Tax_rate	-0.415* (0.239)	0.054 (0.241)	0.186 (0.328)	0.078 (0.487)	-0.377 (1.440)	0.310 (0.348)
Growth	0.250* (0.145)	-0.138 (0.177)	0.026 (0.158)	-0.737*** (0.173)	-0.309 (0.270)	0.497** (0.224)
Constant	-8.329*** (2.719)	-12.520*** (3.224)	-12.240** (4.682)	-14.055*** (5.195)	-12.380 (8.944)	-11.589*** (3.944)
F (p-value)	0.0000	0.0000	0.0000	0.0000	0.0020	0.0000
N	1,051	311	189	113	99	242
R^2	0.091	0.255	0.338	0.358	0.275	0.201

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Standard errors are given in parentheses below the coefficients.

and revenue diversification of municipalities and a positive relationship between debt levels and leverage of municipal companies were shown. The results provide evidence of the off-balance-sheet financing using debt taken by municipal companies owned by local governments. As income per capita increases and population density increases, both debt levels of municipalities increase. On the other hand, as the share of local fees in the municipality's income (and fiscal autonomy in terms of income shaping) increases, the average debt per capita decreases. Additionally, the subsidies received and the sizes of the municipal company are positively correlated with the long-term debt level. In contrast, the profitability of the municipal company is negatively associated with the municipality's debt. Larger companies generally show higher transparency due to the better quality of financial reporting, which allows them to obtain financing from the bank. On the other hand, municipalities with shares in more profitable companies partially obtain financing from dividends (shares in profits generated by the municipal companies), which allows them to reduce their long-term debt. The results of our study show the opposite relationship than in the case of cities in the USA, but consistent with the limited fiscal autonomy of Polish municipalities indicated in the literature. However, they should be approached with caution.

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