DOI:10.17951/h.2022.56.4.107-133

ANNALES
UNIVERSITATIS MARIAE CURIE-SKŁODOWSKA
LUBLIN – POLONIA
VOL. LVI, 4 SECTIO H 2022

KATARZYNA OWSIAK

owsiakk@uek.krakow.pl
Cracow University of Economics. Institute of Finance. Department of Public Finance
27 Rakowicka St., 31-510 Cracow, Poland
ORCID ID: https://orcid.org/0000-0003-3316-7942

Local Debt and the Development of Municipal Infrastructure. The Case of Małopolska

Keywords: local debt; fiscal rules; local development; local government; local infrastructure

JEL: H71; H72; H74

How to quote this paper: Owsiak, K. (2022). Local Debt and the Development of Municipal Infrastructure. The Case of Małopolska. *Annales Universitatis Mariae Curie-Skłodowska, sectio H – Oeconomia*, Vol. 56, No. 4.

Abstract

Theoretical background: The contemporary approach to public debt is multi-faceted. Debt incurred to finance current expenses is assessed differently than debt financing capital expenditure. This distinction is also important from the point of view of local authorities as part of their budgetary policy. Each decision related to incurring a debt has not only financial consequences, but is also made in the political and image context. It is worth noting that the current research on debt insufficiently emphasizes its direct impact on the socio-economic development of a given local government unit, devoting much more attention to the impact of debt on the condition of public finances. In the case of the first stream of research, significant discrepancies should be noted with regard to the selection of optimal indicators for measuring the impact of debt on local development. Therefore, one should agree that local development is conditioned by a whole group of factors dependent and independent of local authorities. The article attempts to verify several indicators of the development of infrastructure partially financed with debt.

Purpose of the article: Against this background, the subject of this study is to identify the policy of incurring debt by local government units in Poland in the longer term, to determine the degree of diversification of this policy, as well as, and perhaps above all, to link this policy with development processes. In order to avoid a superficial approach to such outlined issues, the scope of observation was limited to the communes

of the Małopolska Voivodeship. Such an approach also made it possible to take into account a longer period of observation of the surveyed communes (2010–2020).
Research methods: Out of the total number of 179 communes existing in Małopolska, 11 urban communes (the whole group due to their limited number), 20 rural communes and 20 urban-rural communes were randomly selected for the study. The basic criterion for assessing the policy of municipalities in relation to local debt was the ratio of total debt per capita to total revenue per capita. This indicator allows to determine the level of debt burden on communes' revenue. Next, the total impact of variables characterizing the budgetary policy of the commune was examined, such as: a) own revenue per capita, b) investment expenditure per capita, c) non-recoverable property expenditure per capita (mainly from the European Union), d) debt per capita, on selected indicators of the development of municipal infrastructure of the commune, affecting the quality of life of the commune's inhabitants. Progress in the development of infrastructure improves the conditions for conducting business activity of private enterprises, including the location of new entities, which may result in an increase in the commune's own revenue. The study used a multiple correlation coefficient, the value of which was calculated in each distinguished cluster of communes. The obtained results allowed to assess how the level of indebtedness of communes influenced the socio-economic development of these units.
Main findings: The conducted analysis made it possible to determine the degree of restrictiveness carried out by the authorities of the analyzed municipalities of Małopolska. The level of the multiple correlation coefficient calculated for municipalities between the explanatory variables characterizing the budgetary policy of municipalities (investment expenditure per capita, debt per capita, non-refundable property expenditure per capita and the dependent variable own revenue per capita) proves a fairly strong relationship between the analyzed variables. On the other hand, in rural communes with a low-restrictive budget policy (with a high debt ratio), the total impact of the indicated variables on the level of infrastructure development is generally stronger than in communes with a more disciplined budget policy (with a lower debt level). In the case of urban-rural communes with a low-restrictive budget policy (high debt ratio), the total impact of the analyzed variables on the level of infrastructure development in a commune is generally stronger than in communes with a more disciplined budget policy (with a lower level of debt).

Introduction

Local (self-government) authorities are part of the system of public authorities. Their structure varies depending on the preferred model of state management, which defines the level of decentralization of competences and tasks at individual levels. The division of competences and assigned tasks is important for building a systemic (statutory) structure of financing sources of public authorities from the point of view of their specific type. However, regardless of the preferred model of state management, it is important to note that in any system (model) the amount of financial resources at the disposal of public authorities is always limited. These restrictions mainly apply to central authorities, but they also apply to local authorities. It is worth noting, however, that the possibilities of shaping the amount of financial resources of local authorities are much smaller than that of central authorities. We are not developing this issue. On the other hand, it is important to state that, for various reasons, public revenues, including local government revenues, are generally not sufficient to finance tasks, i.e. incur expenses. In such a situation, central authorities may, guided by the choice of a specific strategy (doctrine), decide to incur public debt, an element of which may be (is) the debt of local government units. It is worth noting that public revenue, and consequently also expenses, find their source in the national income (domestic prod-

uct). In the market economy there are fluctuations (considerable in some years) in the amount of generated national income (business cycle), which affects the revenue of central authorities (state budget), as well as the revenue of local authorities. Due to the fact that the basic public goods provided (financed) by the authorities are rigid or quasi-rigid, incurring debt sometimes becomes a necessity, especially in times of economic crisis, in the event of natural disasters, pandemics, etc. The source and method of financing expenses, as such activities may lead to destabilization (crisis) of public finances. Empiricism in many countries in many periods also confirms such situations. Hence, state authorities or supranational organizations (e.g. the EU) introduce self-restrictions for this type of activity by establishing the so-called fiscal rules. Such rules can also be imposed on local authorities. In view of the above-mentioned revenue limitations, local authorities, striving to meet the expectations of the local community, may decide to incur debt, which should primarily involve financing investment and development tasks. In some countries, for example, in Poland, there is a statutory ban on financing current expenses with loans, except for short-term loans in order to maintain financial liquidity. Thus, seeing the opportunity to use debt to finance development tasks, it is impossible not to notice the possible negative effects of this activity. It is especially about the risk of a debt trap, the need to bear the costs of borrowings. Hence, the aforementioned regulations of the central authorities, which are aimed at protecting local communities against excessively risky actions of these authorities. Notwithstanding this paternalistic approach by the central government to the issue of borrowing, local authorities can make autonomous, but limited decisions, whether to incur or not to incur a debt. Some local authorities even avoid incurring debt, while other local government units abuse this instrument. Both the first, conservative approach to debt and the second too risky approach are not rare.

The above-mentioned issues related to incurring debt prompted a closer examination of the policy of incurring debt by local government units in our country in the longer term, determining the degree of diversification of this policy, as well as, and perhaps most of all, linking this policy with development processes. In order to avoid a superficial approach to such outlined issues, the scope of observation was limited to the communes of the Małopolska Voivodeship. Such an approach also made it possible to take into account a longer period of observation of the surveyed communes (2010–2020).

Literature review

Assessment of the impact of local debt on development

In addition to the budget deficit, the reasons for the emergence of debt lie in the insufficient level of revenue resulting, *inter alia*, from unfinished decentralization, as well as growing collective needs resulting from civilization development and techno-

logical progress. At the same time, local government authorities may be under social, political and economic pressure to provide various public services (Jastrzębska, 2009, pp. 29–30). Consequently, it can be assumed that there are two groups of reasons for the increase in debt: 1) economic (budget imbalance, increased investment activity, overinvestment); 2) other (mismanagement, no analysis, no strategic planning). Jastrzębska and Poniatowicz distinguish the following determinants of local debt: legal-financial, political, economic-social and organizational-managerial (Jastrzębska & Poniatowicz, 2021, pp. 156–167). These aspects are addressed in various studies (Cropf & Wendel, 1998, pp. 211–224; Balaguer-Coll et al., 2016, pp. 513–542). Nevertheless, the recognition that the debt was created for the purpose of carrying out investments contributing to local development is the basis for a positive assessment of local debt. The debt that has been incurred to finance the investment is assessed well. This type of debt contributes to economic development. On the other hand, bad debt is the one that serves to finance current expenditure, and thus consumption (Poniatowicz, 2011, p. 490). Incurring debt to finance current operations needs (current expenditure) may in extreme cases lead to the accumulation of the "debt loop" and solvency problems (Dafflon, 2002, pp. 15–44). Such an approach to debt allows it to be classified as administrative and financial debt, or profitable and unprofitable.

The above considerations lead to the conclusion that good debt is debt created in order to finance investments bringing various positive effects. The benefits of the investments undertaken can be divided into financial and social. Those relating to the financial sphere result from the possibility of generating revenue in the perspective, e.g. from taxes and local fees. The opposite will be such investments that do not generate revenue, but only contribute to an increase in expenses resulting from the maintenance of the infrastructure (Jurewicz, 2016, p. 233). On the other hand, in the social dimension, it is about the satisfaction of residents with the investments carried out that increase the standard of living (increased level of public services) in a given unit. The satisfaction of the inhabitants may translate, among others, into the results of local elections. This is where the political context of debt emerges. From the point of view of local development, local debt can be divided into constructive and destructive. The first is debt contributing to the development of a given entity, and the second is debt that reduces development opportunities and even leads to insolvency. It should be noted, however, that local authorities can pursue a budgetary policy characterized by a stable level of debt, which in turn means limiting investments in local infrastructure (Bröthaler et al., 2015, pp. 521–546).

The view about the impact of debt on the development of a given local government unit has supporters and opponents. On the one hand, in the literature on the subject, there is a position that can be reduced to the slogan: "everything for development, even debt". Without denying such an approach, one cannot lose sight of the fact that the consequence of excessive debt is excessive burdening of current revenue with debt servicing costs, i.e. limiting the expenditure capacity of the commune, or emerging problems with milling. In such situations, barriers to the development of

a given individual may appear (Gonet, 2018, pp. 135–139). It is also worth noting that excessive indebtedness is often identified with the requirement to have own contribution to obtain EU funds, with which local government units often have a problem (Otczyk & Felis, 2021, p. 177). Looking at debt in a broader perspective, its destabilizing effect on the financial situation of a local government unit can be noticed. It is visible in periods of crises, with any changes affecting the level of revenue resulting from demographic trends and system modifications, lack of restructuring of public tasks, financial risk (Filipiak, 2017, p. 260). Table 1 presents debt as an element/parameter having a positive and negative impact on local development.

Table 1. Importance of debt for local development

Positive	Negative
It creates local development, which leads to an improvement in the standard of living of the inhabitants and an increase in the self-government's competitiveness.	Part of the funds from liabilities is allocated to increasing the competitiveness of the local government, and not to its development.
Increases investment activity.	It reduces investment activity when incurring another debt to repay the existing debt.
It translates into an increase in revenue if the liabilities were allocated to investments that bring profits in the future in the form of revenue, which means that an analysis/evaluation of the profitability of the investment was carried out.	It causes an increase in current expenses, if the investments were not preceded by a reliable assessment of effectiveness and risk.

Source: Author's own study based on (Dolewka, 2018, pp. 171–172; Kozera, 2017, pp. 206–207; Otczyk & Felis, 2021, pp. 174–179).

When assessing local debt and its impact on local development, the issue of debt servicing costs is of particular importance on the one hand, as well as the level of this debt in relation to the revenue made and on the other. In the first case, it is related to the adopted debt management strategy, whereas the level of debt measured in relation to revenue is an indicator (parameter) used to assess the financial management of a local government unit, however, as noted by Piotrowska-Marczak, the level of the indicator is not significant, but the reasons for which this level results (Piotrowska-Marczak, 2013, pp. 21–23). Undeniably, in looking for an answer to the question about the impact of debt on local development, one should also address the following issues: the direction (manner) of spending the funds obtained from external sources and the analysis of the creditworthiness of a given entity.

Security of local government finances – limiting local debt

Local debt is part of the public debt, it arises in the long term as a result of the transformation of the permanent budget deficit (Sołtyk, 2020, p. 138). In the literature on the subject, local debt is most often defined as the sum of various financial liabil-

ities incurred by a given local government unit in connection with the expenditure incurred by this unit in excess of the obtainable revenue (Surówka, 2013, p. 56). Incurring debt by local government units is limited for several reasons. From the point of view of the State Treasury, the regulation of local debt should be treated as a tool preventing the insolvency of a given entity. If this were to happen, the liabilities of this unit are transferred to the debt of the State Treasury (Banaszewska et al., 2020, p. 132). Moreover, debt regulation prevents an increase in expenditure and budget deficit in pre-election periods or through the efforts of various interest groups, and reduces the moral hazard of spending public funds. Therefore, debt limits should be included among the instruments ensuring the safety of the finances of local government units. Moreover, in the situation of loss of this security, understood as the ability to finance public (local) tasks and settling liabilities, problems may arise with maintaining liquidity, entering (returning) an entity to the loan market, absorption of EU funds, implementation of development tasks, etc.

Instruments enhancing the security of local government finances (Owsiak, 2017, pp. 263–270) were included in the Public Finance Act (Ustawa z dnia 27 sierpnia 2009 r., Art. 91, 91a, 92, 93, 212, 227, 224, 228, 240, 242, 243, 244). It is worth emphasizing that they have changed over time, especially those relating to debt limitation. In the years 2010–2013, the following were in force: quantitative (rigid) limits related to debt. The first limit – the rule of debt servicing costs, which could not exceed 15% of the revenues of a local government unit planned for a given financial year. And also the second limit – the debt rule, according to which the debt could not exceed 60% of the total revenue of this entity in a given budgetary year. During the financial year, the total amount of debt of the local government unit at the end of the quarter could not exceed 60% of the revenue planned in a given financial year (Ustawa z dnia 30 czerwca 2005 r., Art. 169, 170). In 2011, the rule of balanced budget in the current part was introduced. An individual debt repayment ratio applies in 2014. It should be noted that these rules were changed successively by the amendment to the Public Finance Act of 2018, and then by the solutions introduced in connection with the COVID-19 pandemic (*The Public Finance Sector Debt Management Strategy in the Years 2021–2024*, 2020, pp. 34–35) .

According to the first rule – balancing the budget in the current part – the planned and performed current expenses cannot be higher than the planned and realized current revenues increased by revenues resulting from: 1) repayment of loans granted in previous years; 2) the surplus of the budget of the local government unit from previous years, less funds from unused funds on the current account of the budget, resulting from the settlement of revenue and expenditure financed with them, related to the specific principles of budget implementation set out in separate acts and resulting from the settlement of funds from the EU budget and non-returnable funds from aid granted by EFTA Member States and subsidies for the implementation of a program, project or task financed with the participation of these funds. For the years 2020–2021, the possibility of not keeping the above rule has been accepted.

When planning and implementing the budget in 2020, a local government unit could exceed the ratio of balancing current revenue and expenses by the amount of the loss in the revenue of a given unit resulting from the COVID-19 epidemic. Thus, current expenses could be higher than current revenue by the amount of the loss in revenue of a given unit resulting from the COVID-19 epidemic. In addition, for 2020, a change was introduced that made it possible to exceed the relationship regarding the balance of current revenue and expenses by expenses incurred in order to implement tasks related to counteracting COVID-19 (*The Public Finance Sector Debt Management Strategy in the Years 2022–2025*, 2021, pp. 32–33). As a result of the systemic change in 2018, the balanced budget rule in the current part from 2022 adopted the following: the current expenditure made may be higher than the current revenue made plus the budget surplus from previous years only by the amount related to the implementation of current expenditure with the share of funds from the budget, EU funds and non-reimbursable aid granted by EFTA Member States in the event that these funds were not transferred in a given financial year. It should be emphasized that the operating surplus is the basic indicator of the financial security of local governments. The higher the surplus, the lower the risk of losing financial liquidity, the greater the possibility of paying off liabilities. Low surplus means less investment and cutting back on public services (*Nadwyżka operacyjna*, n.d.).

With regard to the second rule – the individual debt repayment ratio – according to the provisions in a given financial year, the value of repayment of liabilities together with the costs of servicing them to the total revenue of the budget may not exceed the arithmetic average of the current revenue ratio calculated for the last three years, increased by revenue from sale of property and reduced by current expenses to total revenue of the budget. During the pandemic, liabilities for loans, borrowings and bond issues that were incurred by a given entity due to the loss of revenue resulting from the COVID-19 epidemic were excluded from the individual debt ratio (only up to the level of losses). The solution is of a long-term nature, i.e. in 2021 and in the following years, the service of liabilities will be beyond the limit for the entire repayment period. The same solution applies to establishing a debt repayment relationship, it will be possible to reduce current expenses by current expenses incurred in 2020 and 2021 in order to perform tasks related to counteracting COVID-19. As a result of system changes, from 2026, the period from which the debt repayment limit is calculated was extended to 7 years and the revenue from the sale of property was eliminated when calculating the individual debt repayment ratio.

In connection with the pandemic, in the years 2020 and 2021, there was a mechanism securing the finances of local government units – the debt of a given unit could not exceed 80% of the revenues made, and during this financial year, the debt at the end of the quarter could not exceed 80% of the planned revenues of this unit. If the entity met the debt repayment limit, not excluding the repayment of liabilities incurred in connection with shortages in revenue, it might not meet the limit of 80% of revenue. In 2020, the legislator also excluded expenditure on debt servicing

from the current expenditure of a local government unit when determining the ratio limiting the amount of debt repayment of a given unit.

When assessing the legal solutions implemented during the pandemic, it should be stated that the security of local government finances has been weakened by allowing the operating deficit (in the current part of the budget) and increasing the possibility of borrowing.

Measures of local development

The concept of local development is multifaceted, it concerns, e.g. economic, social, cultural, technical, spatial, environmental areas (Kosiedowski, 2008, p. 232; Sekuła, 2002, pp. 59–64). Generally speaking, it can be assumed that this is a goal "in itself", pursued by every local government unit. In this approach, development should be treated as a long-term process. In other words, quantitative and qualitative changes take place in the development processes, leading to an increase in the living standards of the inhabitants of the local government community, and consequently, contributing to the economic development of this unit (Markowski, 2008, p. 9). With such a broadly understood development, it is difficult to measure it, as there is no set of universal indicators. In addition, the concept of development today is associated with sustainable development understood as meeting contemporary needs without compromising the ability of future generations to meet their own needs (*Report of the World…*, 1987). Researchers, noticing various aspects of development, decide on the choice of indicators themselves (e.g. Kiczek & Pompa-Roborzyński, 2013, pp. 65–76). Therefore, we can distinguish synthetic indicators, structural indicators and indicators for local communities (Śleszyński, 2017, p. 40). With regard to sustainable development, there is a group of indicators that should be treated as information and diagnostic tools and classified according to groups – environmental, social, institutional, economic (Smarzewska & Bodzak, 2015, pp. 56–59). Without going into detail in the issues of measuring development, it should be emphasized that local development is determined by a whole group of factors dependent and independent on local authorities.

In analyzing the impact of debt on local development, the first step should be to determine the financial condition of a given entity. Investments are certainly one of the factors influencing the level of development. Therefore, the basic indicator of its assessment is the amount/increase of capital expenditure. The impact of debt on development is related to the investments undertaken (sewage system; waterworks; sewage treatment plant; roads; cultural institutions – libraries, theaters, museums, cultural centers, community centers, music institutions, clubs, cinemas; swimming pools; sports halls; sports fields; bicycle paths; revitalization of the old town; parks, including outdoor gyms).

Research methods

When starting the analysis of the policy of communes towards debt in general, it is necessary to make a clear statement at the outset that in these studies it is absolutely necessary to distinguish units with similar characteristics from the total number of observed communes. Comparing small rural communes with large urban communes has a limited cognitive value. Therefore, the studies distinguished the classical division of communes into: a) urban communes, b) rural communes, c) urban-rural communes. In the analyzed period 2010–2020, 182 communes operated in Małopolska, including 3 cities with *powiat* rights (Kraków, Nowy Sącz, Tarnów). Cities with *powiat* rights were excluded from further analyzes due to the incomparably greater economic, financial and population potential, also due to a different system of financial support. These units require separate studies due to their low comparability with small or medium-sized communes.

Out of the total number of communes (179 communes, excluding cities with *powiat* status) in the analyzed period in Małopolska, there were the following numbers of communes:

– urban (11),
– rural (121),
– urban-rural (47).

Due to the still large number of communes and the eleven-year period of observation to more accurately capture the features of the debt policy, their number was limited by drawing lots.

In the groups of rural and urban-rural communes, 20 units were randomly selected. Urban communes were included in the study in full due to their small number (11).

The basic criterion for assessing the policy of municipalities in relation to local debt was the ratio of total debt to total revenue. This indicator allows to determine the level of debt burden on the commune's revenue. Next, the total impact of variables characterizing the municipal budget policy was examined, i.e. own revenue per capita, investment expenditure per capita, non-refundable property expenditure per capita, debt per capita on selected indicators of the effects of municipal investment policy shaping the development of the municipality/quality of life of the residents of the municipality, i.e. sewage system (length of the network in km and users of the installation in % of the total population of a given local government unit); water supply (length of the network in km and users of the installation in % of the total population of a given local government unit). For this purpose, a multiple correlation coefficient was used, the value of which was calculated in each distinguished cluster of communes. The obtained results allowed to assess how the level of indebtedness of communes influenced the socio-economic development of these units.

First, however, a linear order was made according to the average values of the debt ratio over the period. The values of the standard deviation and the coefficient of variation were also calculated. An interesting relationship was noticed: the lower the

average level of the debt ratio, the greater its volatility over time. To confirm this, the linear correlation coefficient was calculated and its significance was tested in each group of communes – urban, rural, urban-rural (Student's *t*-test for the correlation coefficient). Then, communes were grouped separately in each group (urban, rural, urban-rural) using the *k*-means method, distinguishing 4 commune clusters (see Tables 3, 10, 17). Each cluster contained communes that were as similar as possible in terms of debt levels in individual years. The obtained clusters were described in terms of debt and debt volatility over time.

As noted above, in the first stage, the *k*-means method was used. It is a method of dividing the entire set into disjoint sets, so that within each set the objects are as similar as possible (in terms of the considered features), and the diversity between the created sets is as large as possible. In other words, it is a method belonging to the cluster analysis split methods (Sokołowski & Czaja, 2014, pp. 23–29).

Results

Urban communes

Table 2. Selected urban communes in Małopolska and numerical characteristics of their debt ratio

Commune	Numerical characteristics of the debt ratio		
	average	standard deviation	coefficient of variation
Limanowa	42.991	10.638	24.74%
Zakopane	41.718	8.235	19.74%
Bochnia	34.255	7.712	22.51%
Gorlice	33.370	6.027	18.06%
Nowy Targ	32.291	13.275	41.11%
Bukowno	32.191	9.943	30.89%
Grybów	28.936	8.025	27.73%
Oświęcim	26.982	8.893	32.96%
Mszana Dolna	19.173	6.958	36.29%
Sucha Beskidzka	14.173	7.553	53.29%
Jordanów	12.973	9.652	74.41%

Source: Author's own study.

The most indebted communes in the analyzed period were Limanowa, Zakopane, Bochnia, and the least indebted ones: Jordanów, Sucha Beskidzka and Mszana Dolna (Table 2). The correlation coefficient between the average debt level and the coefficient of variation is 0.259 and is not statistically significant (p-value = 0.425). A commune that owes more debt usually has a more "labile" level of this debt than a commune that is indebted to a lesser extent, but this relationship is not statistically significant.

Table 3. Composition of clusters formed as a result of grouping urban communes using the *k*-means method

Group 1	Group 2	Group 3	Group 4
Grybów	Bochnia	Limanowa	Jordanów
Oświęcim	Bukowno	Zakopane	Mszana Dolna
	Gorlice		Sucha Beskidzka
	Nowy Targ		

Source: Author's own study.

Below there are the numerical characteristics of the debt level (average, standard deviation, coefficient of variation) in each group (see Tables 4–7).

Table 4. Group 1 urban communes – numerical characteristics of the debt ratio

Year	Average	Standard deviation	Coefficient of variation
2010	17.050	6.435	37.74%
2011	18.100	8.344	46.10%
2012	20.650	7.566	36.64%
2013	37.200	15.556	41.82%
2014	34.250	5.445	15.90%
2015	35.100	1.838	5.24%
2016	27.500	0.849	3.09%
2017	26.550	7.707	29.03%
2018	30.700	9.051	29.48%
2019	31.450	5.728	18.21%
2020	29.000	6.647	22.92%

Source: Author's own study.

Cluster 1 has lower debt ratio values than cluster 3 and higher values than cluster 4 (starting from 2012). The volatility of this indicator is generally higher than in cluster 2 and 3 and lower than in cluster 4 (Table 4).

Table 5. Group 2 urban communes – numerical characteristics of the debt ratio

Year	Average	Standard deviation	Coefficient of variation
2010	27.425	10.906	39.77%
2011	40.500	6.411	15.83%
2012	44.175	3.950	8.94%
2013	40.175	0.885	2.20%
2014	41.825	5.232	12.51%
2015	40.825	4.635	11.35%
2016	31.975	2.609	8.16%
2017	27.525	4.346	15.79%
2018	23.100	6.238	27.00%
2019	22.450	5.684	25.32%
2020	23.025	6.790	29.49%

Source: Author's own study.

As Table 5 shows cluster 2 is characterized by higher debt ratio values than cluster 3 and cluster 1 (in 2010–2017). The volatility of this indicator is usually lower than in clusters 1 and 4.

Table 6. Group 3 urban communes – numerical characteristics of the debt ratio

Year	Average	Standard deviation	Coefficient of variation
2010	27.800	0.141	0.51%
2011	29.850	1.202	4.03%
2012	34.000	8.485	24.96%
2013	37.500	4.808	12.82%
2014	45.450	0.919	2.02%
2015	49.000	7.354	15.01%
2016	44.400	5.798	13.06%
2017	49.050	11.950	24.36%
2018	50.350	11.384	22.61%
2019	52.800	3.111	5.89%
2020	45.700	5.940	13.00%

Source: Author's own study.

Cluster 3 is characterized by higher values of the debt ratio than clusters 1 and 4 (see Table 6). The volatility of this ratio is the lowest compared to the other clusters.

Table 7. Group 4 urban communes – numerical characteristics of the debt ratio

Year	Average	Standard deviation	Coefficient of variation
2010	30.533	2.836	9.29%
2011	24.100	3.637	15.09%
2012	20.100	5.667	28.19%
2013	18.333	4.499	24..54%
2014	16.867	7.586	44.97%
2015	11.900	6.409	53.85%
2016	10.600	7.038	66.39%
2017	7.500	4.288	57.18%
2018	6.400	5.645	88.21%
2019	8.133	6.369	78.31%
2020	15.367	6.724	43.76%

Source: Author's own study.

Cluster 4 is characterized by the lowest values of the debt ratio among all groups (see Table 7), and the volatility of this ratio is the highest among all the clusters.

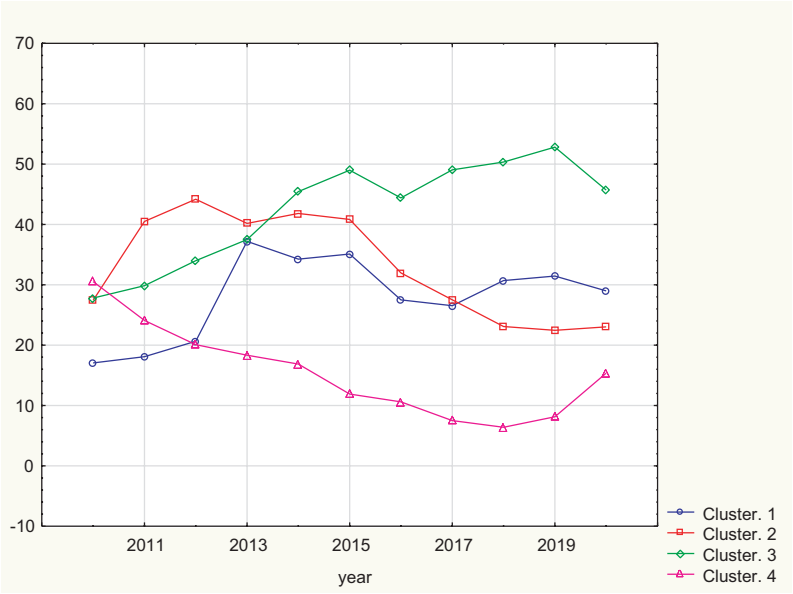

Figure 1. The average values of the debt ratio over time for four clusters of urban communes in Małopolska

Source: Author's own study.

Table 8 contains the multiple correlation coefficients of Małopolska urban communes calculated for the explanatory variables characterizing the budgetary policy of the commune: own revenue per capita, investment expenditure per capita, non-returnable property expenditure per capita, debt per capita, and selected explanatory variables representing the quality of life of residents / investment effects in communes.[1]

Table 8. Correlation coefficients for the urban communes group

Explanatory Variable	All group
Sewerage (length, km)	0.831
Waterworks (length, km)	0.886
Sewerage (population, %)	0.701
Waterworks (population, %)	0.880

Source: Author's own study.

[1] It was not possible to calculate multiple correlation coefficients in any group of Małopolska urban communes due to the insufficient amount of data, therefore, it was necessary to combine all groups into one (there are only 11 communes in Małopolska).

Rural communes

Table 9. Selected rural communes in Małopolska and numerical characteristics of their debt ratio

Commune	Numerical characteristics of the debt ratio		
	average	standard deviation	coefficient of variation
Czernichów	53.482	8.709	16.28%
Radziemice	39.118	9.913	25.34%
Kłaj	36.145	12.183	33.71%
Żegocina	32.382	6.521	20.14%
Osiek	30.082	8.463	28.13%
Tomice	28.273	9.374	33.16%
Pleśna	27.264	4.396	16.12%
Tymbark	26.755	5.629	21.04%
Gdów	25.918	8.874	34.24%
Czorsztyn	24.718	15.204	61.51%
Brzeźnica	22.791	8.104	35.56%
Wielka Wieś	18.918	9.685	51.20%
Biały Dunajec	18.736	6.006	32.05%
Tokarnia	18.173	9.949	54.75%
Gręboszów	16.955	11.078	65.34%
Łabowa	16.282	9.255	56.84%
Koszyce	15.727	3.824	24.32%
Kamionka Wielka	14.745	2.468	16.74%
Słopnice	11.227	4.690	41.7%
Zembrzyce	5.309	7.600	143.15%

Source: Author's own study.

The most indebted communes in the analyzed period were Czernichów, Radziemice and Kłaj, and the least indebted ones: Kamionka Wielka, Słopnice, Zembrzyce (see Table 9). The correlation coefficient between the average debt level and the coefficient of variation is -0.573 (p-value = 0.0019), which means that municipalities with higher debt generally have lower volatility of the debt ratio in subsequent years. Thus, a commune that is heavily indebted has a more "stable" level of debt than a commune that is less indebted.

Table 10. Composition of clusters formed as a result of grouping rural communes using the *k*-means method

Group 1	Group 2	Group 3	Group 4
Gdów	Łabowa	Słopnice	Czernichów
Pleśna	Kamionka Wielka	Zembrzyce	Radziemice
Tymbark	Tokarnia		
Żegocina	Gręboszów		
Tomice	Wielka Wieś		
Czorsztyn	Koszyce		
Brzeźnica	Biały Dunajec		
Kłaj			
Osiek			

Source: Author's own study.

Below there are the numerical characteristics of the debt level (mean, standard deviation, coefficient of variation) in each group (see Tables 11–14).

Table 11. Group 1 rural communes – numerical characteristics of the debt ratio

Year	Average	Standard deviation	Coefficient of variation
2010	36.467	7.976	21.87%
2011	35.722	6.745	18.88%
2012	39.711	10.971	27.63%
2013	36.033	6.424	17.83%
2014	32.133	7.581	23.59%
2015	26.778	5.011	18.71%
2016	20.200	4.953	24.52%
2017	19.311	6.755	34.98%
2018	22.300	8.476	38.01%
2019	22.656	5.935	26.20%
2020	19.533	4.928	25.23%

Source: Author's own study.

Cluster 1 is characterized by higher debt ratio values than clusters 2 and 3 and lower than cluster 4 (Table 11). The volatility of this ratio is generally lower than in clusters 2 and 3.

Table 12. Group 2 rural communes – numerical characteristics of the debt ratio

Year	Average	Standard deviation	Coefficient of variation
2010	14.886	7.584	50.95%
2011	16.886	9.701	57.45%
2012	23.014	8.404	36.52%
2013	24.314	7.802	32.09%
2014	24.000	7.677	31.99%
2015	21.900	7.563	34.53%
2016	15.586	6.876	44.12%
2017	12.914	5.090	39.41%
2018	11.414	4.649	40.73%
2019	11.271	5.160	45.78%
2020	11.657	4.696	40.29%

Source: Author's own study.

Cluster 2 is characterized by lower values of the debt ratio than clusters 4 and 1 (Table 12). The volatility of this ratio is usually higher than in clusters 1 and 4 and lower than in cluster 3.

Table 13. Group 3 rural communes – numerical characteristics of the debt ratio

Year	Average	Standard deviation	Coefficient of variation
2010	8.950	6.718	75.06%
2011	10.900	14.425	132.34%
2012	6.250	8.839	141.42%

Year	Average	Standard deviation	Coefficient of variation
2013	3.500	4.808	137.38%
2014	2.800	3.253	116.17%
2015	2.550	3.182	124.78%
2016	5.250	7.142	136.03%
2017	3.850	5.445	141.42%
2018	13.800	1.414	10.25%
2019	17.650	2.616	14.82%
2020	15.450	3.748	24.26%

Source: Author's own study.

Cluster 3 is characterized by the lowest values of the debt ratio in 2010–2017 (Table 13). The volatility of this indicator is the highest compared to the other clusters.

Table 14. Group 4 rural communes – numerical characteristics of the debt ratio

Year	Average	Standard deviation	Coefficient of variation
2010	57.100	21.355	37.40%
2011	63.150	5.020	7.95%
2012	48.150	15.627	32.45%
2013	48.250	15.627	32.39%
2014	49.900	7.637	15.30%
2015	46.600	5.798	12.44%
2016	36.550	6.576	17.99%
2017	37.450	4.455	11.90%
2018	40.000	12.587	31.47%
2019	43.450	14.071	32.39%
2020	38.700	13.011	33.62%

Source: Author's own study.

Cluster 4 is characterized by the highest values of the debt ratio among all groups (Table 14) and the volatility of this ratio is lower than in clusters 2 and 3.

Table 15 contains multiple correlation coefficients according to the created groups of rural municipalities in Małopolska, calculated for the explanatory variables representing the budget policy of the commune: own revenue per capita, investment expenditure per capita, non-returnable property expenditure per capita, debt per capita and selected explanatory variables representing the quality of life of residents / the effects of investments in communes.[2]

[2] It was not possible to calculate multiple correlation coefficients in the 3rd and 4th groups of Małopolska rural communes due to insufficient data, hence it was necessary to add additional rural communes. Finally, Group 4 was supplemented with 5 communes for which the debt ratio values in the analyzed period exceeded the respective values of the ratios in the remaining groups, and Group 3 was supplemented with 5 communes for which the debt ratios were lower than in the remaining groups.

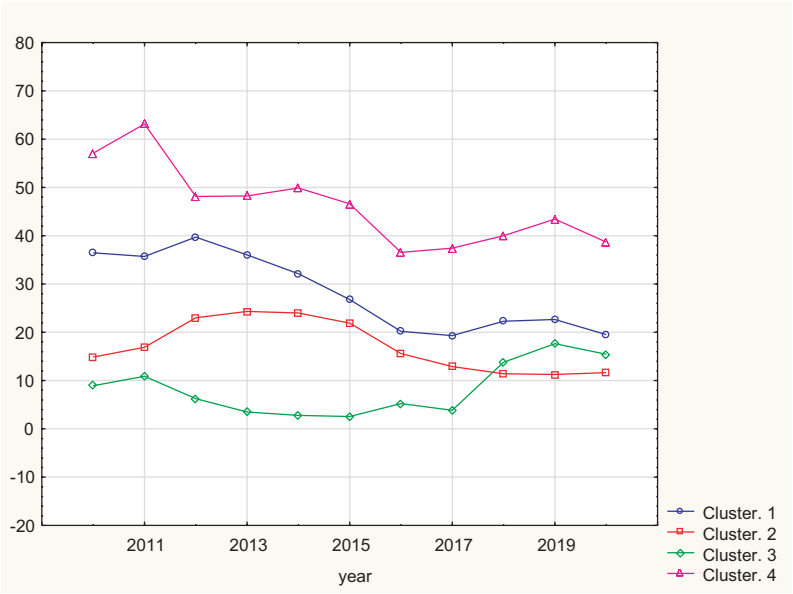

Figure 2. The average values of the debt ratio over time for four clusters of rural communes in Małopolska

Source: Author's own study.

Table 15. Correlation coefficients for the rural communes group

Explanatory variable	Group 1	Group 2	Group 3	Group 4
Sewerage (length, km)	0.948	0.911	0.488	0.955
Waterworks (length, km)	0.608	0.880	0.543	0.971
Sewerage (population, %)	0.933	0.865	0.590	0.958
Waterworks (population, %)	0.832	0.831	0.845	0765

Source: Author's own study.

Urban-rural communes

Table 16. Selected urban-rural communes in Małopolska and numerical characteristics of their debt ratio

Commune	Numerical characteristics of the debt ratio		
	average	standard deviation	coefficient of variation
Piwniczna Zdrój	49.873	13.956	27.98%
Brzesko	47.964	8.358	17.43%
Miechów	43.918	4.549	10.36%
Ryglice	41.200	6.178	14.99%
Libiąż	39.936	6.303	15.78%
Żabno	35.082	10.467	29.84%
Tuchów	32.882	6.764	20.57%
Słomniki	32.809	5.719	17.43%
Radłów	32.236	4.836	15.00%

Commune	Numerical characteristics of the debt ratio		
	average	standard deviation	coefficient of variation
Brzeszcze	30.873	8.660	28.05%
Chrzanów	28.373	13.343	47.03%
Ciężkowice	28.182	7.359	26.11%
Alwernia	24.473	11.531	47.12%
Świątniki Górne	23.918	5.642	23.59%
Andrychów	21.955	5.491	25.01%
Chełmek	21.636	9.343	43.18%
Dąbrowa Tarnowska	17.727	6.883	38.83%
Szczucin	15.927	4.582	28.77%
Wolbrom	14.427	6.235	43.21%
Maków Podhalański	12.864	3.727	28.97%

Source: Author's own study.

The most indebted communes are Piwniczna Zdrój, Brzesko and Miechów, and the least indebted ones are Szczucin, Wolbrom, Maków Podhalański (Table 16). The correlation coefficient between the average level of debt and the coefficient of variation is -0.589 (p-value = 0.0012), which means that municipalities with higher debt generally have lower volatility of the debt ratio in subsequent years. Thus, a municipality that is heavily indebted has a more "stable" level of debt than a municipality that is less indebted.

Table 17. Composition of clusters formed as a result of grouping urban-rural communes using the *k*-means method

Group 1	Group 2	Group 3	Group 4
Słomniki	Alwernia	Andrychów	Piwniczna Zdrój
Libiąż	Chełmek	Maków Podhalański	Miechów
Ciężkowice	Chrzanów	Szczucin	Brzesko
Radłów	Świątniki Górne	Dąbrowa Tarnowska	Ryglice
Brzeszcze		Wolbrom	
Tuchów			
Żabno			

Source: Author's own study.

Table 18. Group 1 urban-rural – numerical characteristics of the debt ratio

Year	Average	Standard deviation	Coefficient of variation
2010	33.771	12.387	36.68%
2011	33.400	7.360	22.03%
2012	34.529	5.933	17.18%
2013	38.500	6.906	17.94%
2014	40.486	7.775	19.20%
2015	36.729	8.783	23.91%
2016	28.600	7.954	27.81%
2017	29.043	7.081	24.38%
2018	29.957	5.006	16.71%

Year	Average	Standard deviation	Coefficient of variation
2019	30.257	6.223	20.57%
2020	29.300	6.572	22.43%

Source: Author's own study.

Cluster 1 has higher debt ratio values than cluster 3 and lower than cluster 4 (Table 18). The volatility of this ratio is generally lower than in clusters 2 and 3 and higher than in cluster 4.

Table 19. Group 2 urban-rural – numerical characteristics of the debt ratio

Year	Average	Standard deviation	Coefficient of variation
2010	31.050	12.959	41.74%
2011	37.050	9.335	25.19%
2012	36.550	6.587	18.02%
2013	31.375	4.148	13.22%
2014	30.375	5.096	16.78%
2015	24.000	7.788	32.45%
2016	18.425	7.330	39.78%
2017	14.250	5.717	40.12%
2018	17.000	4.237	24.92%
2019	13.825	5.894	42.63%
2020	16.700	7.376	44.17%

Source: Author's own study.

Cluster 2 is characterized by higher debt ratio values than cluster 3 and lower than cluster 4 and generally lower than cluster 1 (Table 19). The volatility of this ratio is usually higher than in clusters 1 and 4.

Table 20. Group 3 urban-rural – numerical characteristics of the debt ratio

Year	Average	Standard deviation	Coefficient of variation
2010	17.000	3.088	18.16%
2011	21.100	6.004	28.46%
2012	20.600	7.055	34.25%
2013	16.540	7.022	42.45%
2014	15.800	7.809	49.43%
2015	14.700	5.312	36.13%
2016	14.440	3.272	22.66%
2017	13.500	3.281	24.30%
2018	16.780	6.463	38.51%
2019	15.440	6.585	42.65%
2020	16.480	11.838	71.83%

Source: Author's own study.

Cluster 3 is characterized by the lowest values of the debt ratio (Table 20). The volatility of this indicator is usually higher than in clusters 1 and 4.

Table 21. Group 4 urban-rural – numerical characteristics of the debt ratio

Year	Average	Standard deviation	Coefficient of variation
2010	38.275	8.928	23.33%
2011	42.775	11.815	27.62%
2012	49.725	8.670	17.44%
2013	51.000	3.233	6.34%
2014	58.575	11.196	19.11%
2015	54.025	11.956	22.13%
2016	44.175	7.008	15.86%
2017	42.850	9.775	22.81%
2018	42.025	5.326	12.67%
2019	40.750	3.813	9.36%
2020	38.950	3.336	8.57%

Source: Author's own study.

Cluster 4 is characterized by the highest values of the debt ratio among all groups (see Table 21) and the volatility of this ratio is the lowest among all clusters.

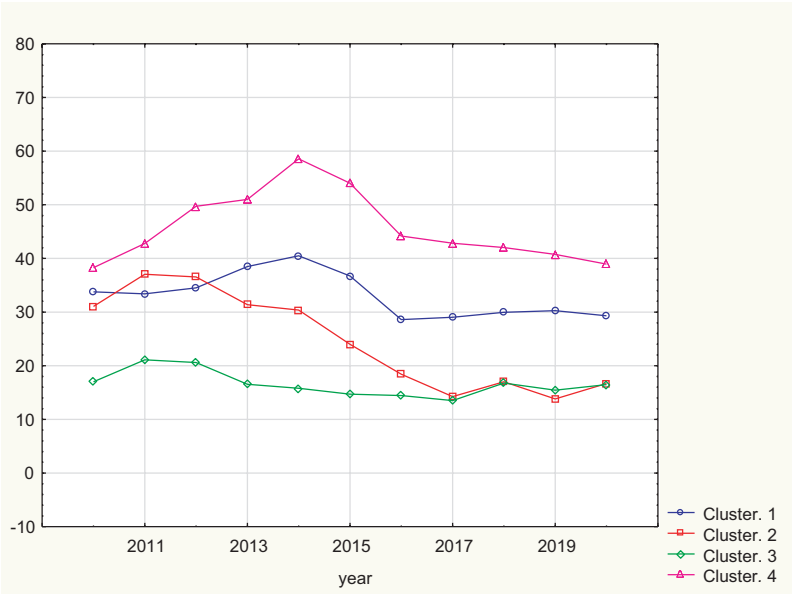

Figure 3. The average values of the debt ratio over time for four clusters of urban-rural communes in Małopolska

Source: Author's own study.

Table 22 contains multiple correlation coefficients according to the created groups of urban-rural communes in Małopolska, calculated for the explanatory variables representing the budgetary policy of the commune: own revenue per capita, investment expenditure per capita, non-returnable property expenditure per capita, debt per

capita and selected explanatory variables representing the quality of life inhabitants / investment effects in communes.[3]

Table 22. Correlation coefficients for the urban-rural communes group

Explanatory variable	Group 1	Group 2	Group 3	Group 4
Sewerage (length, km)	0.674	0.854	0.611	0.931
Waterworks (length, km)	0.783	0.993	0.516	0.983
Sewerage (population, %)	0.880	0.652	0.647	0.958
Waterworks (population, %)	0.734	0.990	0.662	0.993

Source: Author's own study.

Discussions

In Małopolska communes, the total impact of variables: own revenue per capita, investment expenditure per capita, non-recoverable property expenditure per capita, debt per capita on the variables representing the level of development of the municipal infrastructure is quite clear (multiple correlation coefficients are not lower than 0.7). Nevertheless, there is some variation in the strength of the impact on individual dependent variables. The strongest impact of this type is observed in the case of the Waterworks km variable, and the weakest in the case of the Sewage system, population % variable. Due to the necessity to combine all groups of Małopolska municipalities into one group, it is difficult to determine the impact of the debt size of individual municipalities on the strength of the relationship between the variables in question.

In the fourth group of rural communes (with the highest average level of the indicator in 2010–2014 in comparison with other groups), the total impact of variables: own revenue per capita, investment expenditure per capita, non-returnable property expenditure per capita, debt per capita on the variables representing the level of development infrastructure of the commune is stronger compared to other clusters of communes.

The weakest total impact of the explanatory variables on the variables Sewage km, Waterworks km, Sewerage population % describing the level of development of municipal infrastructure is visible in cluster 3 (with lower values of the debt ratio than in Groups 1 and 4 throughout the period and lower values of this indicator in compared to Group 2 in 2010–2017).

In Groups 1 and 2 (with lower debt ratios than in Group 4 and generally higher ratios than in Group 3) total impact of variable own revenue per capita, investment

[3] Calculating the multiple correlation coefficients in the 3rd and 4th groups of Małopolska urban-rural communes was not possible due to insufficient data, hence it was necessary to add additional urban-rural communes. Finally, Group 4 was supplemented with 5 communes for which the debt ratio values in the analyzed period exceeded the respective values of the ratios in the remaining groups, and Group 3 was supplemented with 5 communes for which the debt ratios were lower than in the remaining groups.

expenditure per capita, non-recoverable property expenditure per capita, debt per capita on variable Sewerage km and Waterworks km is usually weaker than in cluster 4, but stronger than in Group 3 (except for the variable Waterworks population %), while in the case of the variables Sewage km, Waterworks km and Waterworks population % the strength of this impact in Group 1 is greater than in Group 2.

In conclusion, in Małopolska rural municipalities with a low-restrictive budget policy (with a high debt ratio), the total impact of variable own revenue per capita, investment expenditure per capita, non-returnable property expenditure per capita, debt per capita on the level of infrastructure development in the commune is generally stronger than in municipalities with a more disciplined budget policy (with a lower level of debt).

In the fourth group of urban-rural communes (with the highest average level of the indicator in 2010–2014 in comparison with other groups), the total impact of variables: own revenue per capita, investment expenditure per capita, non-returnable property expenditure per capita, debt per capita on variables representing the level of development of the commune's infrastructure is stronger than in other clusters of communes. The weakest total impact of the explanatory variables on each of the explanatory variables describing the level of development of municipal infrastructure is visible in cluster 3 (with the lowest values of the debt ratio among all groups). In Group 2 (with lower debt ratios than in Groups 4 and 1 and generally higher ratios than in Group 3) total impact of variable own revenue per capita, investment expenditure per capita, non-recoverable property expenditure per capita, debt per capita on variable presenting the level of development of the commune's infrastructure is usually weaker than in Cluster 4, but stronger than in Group 3 and with one exception (Sewerage, population %), stronger than in Group 1. In Group 1 (with lower debt ratio values than in Group 4 and generally higher indicators than in Group 3 and 4) the total impact of variable own revenue per capita, investment expenditure per capita, non-returnable property expenditure per capita, debt per capita on the variables representing the level of development of the commune's infrastructure is usually stronger than in cluster 3 and at the same time generally weaker than in Groups 4 and 2.

To sum up, in Małopolska urban-rural municipalities with a low-restrictive budget policy (high debt ratio), the total impact of variable own revenue per capita, investment expenditure per capita, non-returnable property expenditure per capita, debt per capita on the level of infrastructure development in the commune is in general stronger than in communes with a more disciplined budget policy (with a lower level of debt).

The conducted research confirms that the type of budgetary policy in relation to the debt incurred (restrictive or expansive) translates into the level of infrastructure development in the commune. However, these dependencies are not permanent. High debt does not always affect the level of development. This may result from various reasons, e.g. depending on the type of commune, degree of affluence (level of own revenue), lack of investments in the studied areas (water supply, sewage system).

The research period assumed in the work covers 2020, i.e. the first year of the COVID-19 pandemic. This situation affected the financial condition of communes in Poland (Malinowska-Misiąg, 2022, pp. 48–63; Kostyk-Siekierska, 2021, pp. 29–45), which could have had an impact on the results obtained in the study. In the case of communes, revenues were realized in the amount of over PLN 149 million, which accounted for 100.2% of the plan; expenditures PLN 144 million, which accounted for 91.4% of the plan. Capital expenditure of communes was lower by 7.2% (10.6% in real terms). On the other hand, expenditure on investment tasks was lower by 7.7% compared to 2019. The amount of expenditure on investments implemented by communes as part of projects co-financed from foreign funds also decreased by 16.9% (KRRIO, 2021, p. 198). Most communes closed the budget with a surplus – 79.7% of communes (p. 202), and the amount of debt increased by 5.6% compared to 2019 (p. 205). Despite the fact that the budgetary policy was carefully implemented in the conditions of the pandemic and there was no direct threat to financial liquidity, this summary list does not exclude an individual approach in assessing the financial situation of municipalities in Poland. It should be added that the high level of revenue results from the transfer of funds from the Government Local Investment Fund classified as own revenues and the receipt of targeted subsidies for the implementation of benefits under the "500+" program (since 2016).

In the area presented in the article, research and empirical analyzes were conducted. The literature presents the results of other researchers, but it is difficult to compare them with the results obtained in this work for two reasons. Firstly, the analyzes covered a different research period or types of communes, and the research assumptions were different. Secondly, some studies concerned Małopolska, but they adopted different criteria and research methods (Woźniak & Zemanek, 2006, pp. 193–205; Ziemiańczyk, 2010, pp. 31–40; Paluch, 2013, pp. 527–539). Ziemiańczyk's research, which concerned rural and urban-rural communes in Małopolska, draw attention. To assess the socio-economic level of these communes, the author chose 10 indicators (5 in the field of economic development and 5 in social). The results of the study confirmed the common opinion about the division of the voivodeship into the western part characterized by a higher economic development and the eastern part with a lower level of this development, as evidenced by the variability index of the received assessments of economic development at the level of 35.7%. In the case of human development, despite the low variability index of 16%, the results confirmed its greater territorial differentiation. On the other hand, the synthetic indicator combining the features of economic and social development was the best in towns and urban-rural communes, which form specific local and regional centres. The obtained research results are in line with the problem of spatial polarization perceived in the literature on the subject, e.g. spatial polarization of own revenue (Kossowski & Motek, 2021, pp. 1–23), as well as the aspect emphasized in the article that local development is determined by a whole group of dependent factors and independent of local authorities. Research on communal investments also addresses the aspect of

revenue potential (Zawora, 2018, pp. 224–235) and the impact of EU funds on the investment activity of communes (Sierak, 2018, pp. 195–208).

A certain perspective on the development of communes in Poland is also provided by the sustainable development ranking, which is created on the basis of criteria (indicators) from three areas of development: economic, social and environmental protection (*Najlepsze gminy w Polsce…*, 2022). In the 2022 edition of the ranking, the ten best communes of each type (urban, rural and urban-rural) included (respectively 2, 1 and 1) communes from the Małopolskie Voivodeship.

Conclusions

The increase in indebtedness of municipalities is to the greatest extent related to covering investment expenditure. This state of affairs can be considered favorable, as these expenses form the basis of socio-economic development. The fact that debt is also incurred to finance statutory day-to-day tasks proves a structural maladjustment of the financial supply system for local authorities. This may result from the emerging development disproportions in the periods of accelerated economic growth, characteristic of countries undergoing economic transformation. In view of the tensions in public finances at the government level (imbalance in the state budget, increase in public debt), the systemic under-financing of local governments forces them to incur debt. It cannot be ruled out the systemic solutions, the symptom of which are imbalances in the budgets of local authorities, resulting from the implemented doctrine of centralization of authorities and public finances. The change of this state depends on political factors (will). The research has highlighted the relationship between the type of debt policy pursued by local authorities and the development of infrastructure. They fit into the direction of research on local debt focused on the analysis of the relationship between the incurred debt and tangible (useful) results, such as, for example, the length of local roads, the percentage of residents using the water supply system and sewage treatment plants, residents' access to cultural goods, the impact of investments on improvement environment, etc. Such an analysis is fully rational, as it directly links incurring debt with socially and economically useful goods and services.

In other words, the article is an attempt to examine how the budgetary policy in relation to debt affects the investment activity of the commune, and, thus, local development. Budgetary policy was expressed through basic financial figures such as: own revenue per capita, investment expenditure per capita and debt per capita. The effects of investment activity were selected indicators shaping the quality of life of the inhabitants (length of water supply and sewage systems, percentage of people using these networks in the total number of inhabitants of a given commune). Utility indicators prove the development of the commune and, at the same time, the level of implementation of the commune's tasks. An innovative approach to the analyzed

dependencies consists in strongly emphasizing the relationship between the debt incurred and the development of communes. This issue is all the more topical because in the 21st century local governments face new civilizational challenges, and there are units where there are problems with water supply and sewage systems. This problem concerns especially small communes. Therefore, the issues raised in the study are not exhaustive, which means that further research is required in various cross-sections, also taking into account the processes of aging population, migration and suburbanization.

References

Balaguer-Coll, M.T., Prior, D., & Tortosa-Ausina, E. (2016). On the determinants of local government debt: Does one size fit all? *International Public Management Journal*, *19*(4), 513–542. **doi:10.1080/10967494.2015.1104403**

Banaszewska, M., Kańduła, S., & Przybylska, J. (2020). *Finanse samorządu terytorialnego. Ujęcie praktyczne*. Warszawa: CeDeWu.

Bröthaler, J., Getzner, M., & Haber, G. (2015). Sustainability of local government debt: A case study of Austrian municipalities. *Empirica*, *42*, 521–546. **doi:10.1007/s10663-014-9261-3**

Cropf, R.A., & Wendel, G.D. (1998). The determinants of municipal debt policy: A pooled time-series analysis. *Environment and Planning C: Government and Policy*, *16*(2), 211–224. **doi:10.1068/c160211**

Dafflon, B. (2002). The theory of subnational balanced budget and debt control. In B. Dafflon (Ed.), *Local Public Finance in Europe: Balancing the Budget and Controlling Debt* (pp. 15–44). Studies in Fiscal Federalism and State – Local Finances Series. Cheltenham – Northampton: Edward Elgar.

Dolewka, Z. (2018). Zadłużenie miast wojewódzkich a ich rozwój. *Nierówności Społeczne a Wzrost Gospodarczy*, *56*(4), 158–174. **doi:10.15584/nsawg.2018.4.13**

Filipiak, B. (2017). Dług jako determinanta stabilności systemu finansów samorządowych. *Kwartalnik Kolegium Ekonomiczno-Społecznego. Studia i Prace, Szkoła Główna Handlowa*, *1*, 15–30. **doi:10.33119/KKESSiP.2017.1.1**

Gonet, W. (2018). Granice zadłużania się jednostek samorządu terytorialnego na realizację zadań inwestycyjnych. *Nierówności Społeczne a Wzrost Gospodarczy*, *55*(4), 133–147. **doi:10.15584/nsawg.2018.4.11**

Jastrzębska, M. (2009). *Zarządzanie długiem jednostek samorządu terytorialnego*. Warszawa: Wolters Kluwer.

Jastrzębska, M., & Poniatowicz, M. (2021). Zadłużenie jednostek samorządu terytorialnego i jego determinanty. In P. Felis & M. Korolewska (Eds.), *Zewnętrzne źródła finansowania jednostek samorządu terytorialnego w Polsce* (pp. 147–170). *Studia BAS, Biuro Analiz Sejmowych*, *4*(68).

Jurewicz, D. (2016). Dług samorządu – bodziec czy bariera absorpcji środków europejskich? *Ruch Prawniczy, Ekonomiczny i Socjologiczny*, *LXXVIII*(2), 231–229. **doi:10.14746/rpeis.2016.78.2.19**

Kiczek, M., & Pompa-Roborzyński, M. (2013). Ocena rozwoju gmin powiatu rzeszowskiego (z wykorzystaniem metody Hellwiga). *Humanities and Social Sciences*, *XVIII*(20/2), 65–76. **doi:10.7862/rz.2013.hss.15**

Kosiedowski, W. (2008). Zarządzanie rozwojem regionalnym i lokalnym. In Z. Strzelecki (Ed.), *Gospodarka regionalna i lokalna* (p. 232).Warszawa: Wyd. Naukowe PWN.

Kosowski, T.M., & Motek, P. (2021). Zróżnicowanie i polaryzacja przestrzenna dochodów własnych gmin. *Wiadomości Statystyczne*. *The Polish Statistician*, *66*(8), 1–23.

Kostyk-Siekierska, K. (2021). Wpływ pandemii COVID-19 na sytuację finansową i funkcjonowanie jednostek samorządów terytorialnego. *Zeszyty Naukowe Małopolskiej Wyższej Szkoły Ekonomicznej w Tarnowie*, *51*(3), 29–45.

Kozera, A. (2017). Rosnące zadłużenie jednostek samorządu terytorialnego jako zagrożenie dla rozwoju lokalnego. *Nierówności Społeczne a Wzrost Gospodarczy*, *49*(1), 203–215. **doi:10.15584/nsawg.2017.1.16**

KRRIO. (2021). *Sprawozdanie z działalności Regionalnych Izb Obrachunkowych i wykonania budżetu przez jednostki samorządu terytorialnego w 2020 roku.* Warszawa: KRRIO.

Malinowska-Misiąg, E. (2022). Finanse jednostek samorządu terytorialnego w Polsce w pierwszym roku pandemii. *Optimum. Economic Studies*, *1*(107), 48–63.

Markowski, T. (2008). Teoretyczne podstawy rozwoju lokalnego i regionalnego. In Z. Strzelecki (Ed.), *Gospodarka regionalna i Lokalna* (p. 9). Warszawa: Wyd. Naukowe PWN.

Nadwyżka operacyjna. (n.d.). Śląski Związek Gmin i Powiatów. Retrieved from https://www.silesia.org.pl/nadwyzkaoperacyjna,483

Najlepsze gminy w Polsce – wyniki rankingu 2022. (2022). Retrieved from https://terazpolska.pl/pl/a/Najlepsze-gminy-w-Polsce-wyniki-rankingu-2022

Otczyk, G., & Felis, P. (2021). Problemy efektywnego zarządzania długiem samorządowym. In P. Felis & M. Korolewska (Eds.), *Zewnętrzne źródła finansowania jednostek samorządu terytorialnego w Polsce* (pp. 171–194). *Studia BAS, Biuro Analiz Sejmowych*, *4*(68).

Owsiak, K. (2017). Narzędzie ochrony finansów jednostek samorządu terytorialnego. *Annales Universitatis Mariae Curie-Skłodowska. Lublin-Polonia. Sectio H*, *51*(6), 263–270. **doi:10.17951/h.2017.51.6.263**

Paluch, Ł. (2013). Rola władz samorządowych w kreowaniu zrównoważonego rozwoju gmin wiejskich województwa małopolskiego. *Polityki Europejskie, Finanse i Marketing*, *10*(59), 527–539.

Piotrowska-Marczak, K. (2013). Umiejscowienie długu w systemie finansowym jednostek samorządu terytorialnego. In E. Denek & M. Dylewski (Eds.), *Szacowanie poziomu zadłużenia jednostek samorządu terytorialnego w warunkach zwiększonego ryzyka utraty płynności finansowej* (pp. 21–23). Warszawa: Difin.

Poniatowicz, M. (2011). Dobry dług versus zły dług, czyli o specyfice zadłużenia sektora samorządowego. In J. Szołno-Koguc & A. Pomorska (Eds.), *Ekonomiczne i prawne uwarunkowania i bariery redukcji deficytu i długu publicznego* (p. 490). Warszawa: Wolters Kluwer Business.

Report of the World Commission on Environment and Development "Our Common Future". (1987). *Chapter 2. Towards Sustainable Development*, United Nations, p. 54. Retrieved from https://digitallibrary.un.org/record/139811#record-files-collapse-header

Sekuła, A. (2002). Local development – the definition aspect in the 21sh century. In *Company at the Turn of the 21st Century* (pp. 59–64). Rzeszów: Politechnika Rzeszowska.

Sierak, J. (2018). Alokacja funduszy unijnych a wydatki inwestycyjne gmin. *Optimum. Economic Studies*, *3*(93), 195–208.

Smarzewska, A., & Bodzak, D. (2015). Pomiar zrównoważonego rozwoju gmin wiejskich powiatu bialskiego. *Economic i Regional Studies*, *8*(2), 54–66.

Sokołowski, A., & Czaja, M. (2014), Efektywność metody k-średnich w zależności od separowalności grup. *Prace Naukowe Uniwersytetu Ekonomicznego we Wrocławiu*, *327*, 23–29.

Sołtyk, P. (2020). *Finanse samorządowe. Teoria i praktyka*. Warszawa: Difin.

Surówka, K. (2013). *Samodzielność finansowa samorządu terytorialnego w Polsce. Teoria i praktyka*. Warszawa: PWE.

Śleszyński, J. (2017). Wskaźniki trwałego rozwoju na poziomie lokalnym. *Optimum. Studia Ekonomiczne*, *4*(880), 39–52. **doi:10.15290/ose.2017.04.88.04**

The Public Finance Sector Debt Management Strategy in the Years 2021–2024. (2020). Warsaw: Ministry of Finance.

The Public Finance Sector Debt Management Strategy in the Years 2022–2025. (2021). Warsaw: Ministry of Finance.

Ustawa z dnia 30 czerwca 2005 r. o finansach publicznych, tj. Dz.U. 2005, Nr 249 poz. 2104 z późn. zm. (Journal of Laws of 2005, No. 249, item 2140, as amended). Przepisy pozostawione w mocy do 31.12.2013 r., Dz.U. 2009, Nr 157, poz. 1241.

Ustawa z dnia 27 sierpnia 2009 r. o finansach publicznych, tj. Dz.U. 2009, Nr 157 poz. 1240 z późn. zm. (Journal of Laws of 2009, No. 157, item 1240, as amended).

Woźniak, A., & Zemanek, J. (2006). Analiza dochodów budżetowych w aspekcie poziomu rozwoju infrastruktury technicznej gmin. *Infrastruktura i Ekologia Terenów Wiejskich*, *3*(2), 193–205.

Zawora, J. (2018). Potencjał dochodowy a wydatki inwestycyjne gmin Polski Wschodniej. *Nierówności Społeczne a Wzrost Gospodarczy*, *56*(4), 224–235. **doi:10.15584/nsawg.2018.4.18**

Ziemiańczyk, U. (2010). Ocena poziomu rozwoju społeczno-gospodarczego gmin wiejskich i miejsko-wiejskich w województwie małopolskim. *Infrastruktura i Ekologia Terenów Wiejskich*, *14*, 31–40.

DOI:10.17951/h.2022.56.4.135-160

ANNALES
UNIVERSITATIS MARIAE CURIE-SKŁODOWSKA
LUBLIN – POLONIA
VOL. LVI, 4 SECTIO H 2022

DOROTA PODEDWORNA-TARNOWSKA

dpoded@sgh.waw.pl
SGH Warsaw School of Economics
162 Niepodległości Av., 02-554 Warsaw, Poland
ORCID ID: https://orcid.org/0000-0001-5945-403X

Costs of IPO in Poland

Keywords: direct costs; indirect costs; IPO; underpricing

JEL: G10; G20; G24; G32

How to quote this paper: Podedworna-Tarnowska, D. (2022). Costs of IPO in Poland. *Annales Universitatis Mariae Curie-Skłodowska, sectio H – Oeconomia*, Vol. 56, No. 4.

Abstract

Theoretical background: Entering the stock market is an important moment in the development of a company. However, whether the timing of the decision is determined by capital needs or driven by attractive market conditions is debated in literature studies. On the other hand, neither in financial theory nor in practice there is a single universal formula, the use of which would enable the determination of the most favourable capital structure for a given company, reconciling both the optimum profitability of its own capitals and a reasonable scale of risk. The decisions regarding the selection of sources of financing depend on several factors. There is no question the cost of capital is an important criterion used by companies when deciding on a financing decision. In the case of initial public offers (IPO), the total costs consist of directand indirect costs. This study fills a specific gap in the literature due to the lack of such analyses based on data coming from the Polish market especially in the context of the type of IPO and market conditions.
Purpose of the article: The purpose of this article is to present the results of a study on the costs of IPO conducted on the Warsaw Stock Exchange (WSE) between 2005 and 2020.
Research methods: The hypotheses were verified using the statistical analysis and an econometric linear regression. Analysis covers 249 companies debuting on the WSE between 2005 and 2020. Information on the costs of the analysed offers was obtained from the companies' current reports published after the completion of the share subscription.

Main findings: The analysis confirmed that indirect cost of the offer are higher than direct costs. Although the average total costs of the offer are highest in the case of the issuance of new shares but they are not statistically significant. Furthermore, the higher the value of the offer, the lower its total cost. The interest rates affect the total cost of IPO but the total offer costs may not be directly explained by the activity on the IPOs market. The results of the analysis indicate that the explainability of the estimated model is the biggest for the direct costs. There is also a significant difference between the years with the highest and the lowest total costs of the offer.

Introduction

Going public and the possibility of conducting an offer in a public manner is one of the most important moments in the life cycle of a company. In the long run, its operation on the capital market involves meeting the high standards required of public companies, so companies are ready to do so at a certain stage of their life cycle. There are many explanations in the literature of the motives for a company to go public (Bancel & Mitoo, 2009; Brau & Fawcett, 2006; Maximovic & Pichler, 2001; Kim & Weisbach, 2008; Pagano et al., 1998; Zingales, 1995; Chemmanur & Fulghieri, 1999). However, there are two main reasons for conducting initial public offerings (IPOs): to raise capital and to take advantage of favourable market conditions (Kim & Weisbach, 2008; Ritter & Welch, 2002). The process of an IPO can take various forms. Firstly, it is an issue of new shares by public subscription to raise funds for growth and expansion. In this case, in addition to acquiring the status of a listed company, there is an increase in its share capital. Secondly, it is a public offering of seeling shares by existing shareholders. The company acquires the status of a listed company, the market valuation of its shares and increases the liquidity of the shares traded. This is a typical way to market companies privatised by the State Treasury, as well as a way to divest portfolio companies of private equity and venture capital funds. Thirdly, there is a combined offer, in which there is a simultaneous offer of selling the existing shares and an issue of new shares by public subscription.[1]

Matching the decision to issue shares to market conditions and not just to financial needs is the basis of the market timing theory presented by Baker and Wurgler (2002). This theory, along with trade-off theory, pecking order theory and signalling theory, is based on the models of Modigliani and Miller's models of 1958 and 1963, and represents a significant body of work on capital structure formation. According to this theory, firms adapt to the market by issuing equity when share values are high and issuing debt when share prices are low. The theory, thus, refers to the occurrence of different periods in the market. In the case of a hot market, i.e. a period in which there are high share valuations and, therefore, high investor interest in acquiring

[1] It is important to mention that not all companies are offering shares to be sold during the debut. Some of them only introduce the shares to trading. We are talking about companies which go public in a two-stage process, so to speak, and, thus, those which change their trading floor from an alternative market to a regulated market. The concept of going public is, therefore, broader than that of an initial public offering.

shares, managers are willing to issue shares even if sources of debt capital are still available. In contrast, in the case of a cold market, where there is a significant undervaluation of share prices and consequently low investor demand for the shares, managers opt for internal sources of equity capital or seek outside capital. As Duliniec (2015) notes, decisions to select sources of financing according to "market sense" do not result from companies' desire to optimise their capital structure.

Market timing theory is in line with research by Loughran and Ritter (1995), which shows that the average annual rate of return over the five years following an issue is only 5% for IPO companies. Investing the same amount at the same time in a non-issuing company with roughly the same market capitalisation and holding it for an identical period would yield an average compound annual rate of return of 12%. This means that companies, therefore, take advantage of temporary opportunities by issuing shares when, on average, they are significantly overvalued, and use internal funds or debt when share prices are undervalued.

Aydogan's (2006) research, which shows that the timing of an IPO has a significant impact on the level of the ratio of the size of the capital raised to the company's total assets prior to the IPO, also fits with market timing theory. Aydogan finds that the IPO proceeds of the average cold market IPO company are 54% of its pre-IPO asset value. The same figure for the average hot market IPO company is 76%, an increase of 40% over cold market IPOs.

Chemmanur and Fulghieri (1999) elaborate on the thesis that going public involves costs on the one hand. In addition, there is the need to disclose a lot of confidential information to all investors, then it becomes optimal to go public for companies that are large enough and not those operating at the beginning of their life cycle. This trend is also echoed by Doidge et al. (2017), who find that larger companies choose to go public and smaller companies do not, as there are fixed costs of going public, but no fixed benefits associated with going public. The benefits of being a listed company firstly increase with the size of the company as measured by assets and secondly increase faster than the costs, at least above a certain asset threshold.

Korajczyk et al. (1992) state that a firm issues equity only when the benefits of obtaining this type of financing outweigh the direct costs of issuance plus any adverse selection costs. It may, therefore, choose to issue equity when it expects relatively little information asymmetry. When information asymmetry is particularly high, the adverse selection costs associated with issuing shares are greater, fewer firms choose to go public and they are then more likely to find it optimal to raise alternative types of financing. Delaying an issue in this way can, however, be costly, as the project being financed may lose value if it is postponed due to increased competition or the need to adopt a more costly source of financing. In the context of IPOs, it can, therefore, be inferred that companies will postpone an IPO until the cost of issuing shares has fallen and the increase in capital requirements makes equity issuance the optimal choice to maximise the value of the company.

The decision to raise capital by issuing shares to the public is one of the most important decisions taken in the context of shaping the optimal capital structure, understood as the desired optimal combination of debt and equity that companies seek to achieve and maintain. It is also referred to as the target capital structure, which, by minimising the total cost of capital, will ensure that the value of the enterprise is maximised (Atril, 2006). Neither in financial theory nor in practice is there a single universal formula, the use of which would enable the determination of the most favourable capital structure for a given company, reconciling both the optimum profitability of its own capitals and a reasonable scale of risk (Bień, 2008). Decisions regarding the selection of sources of financing depend on several micro and macroeconomic factors, which are constantly changing (Ickiewicz, 2004; Ostaszewski, 2006; Błach, 2009). The cost of capital is an important criterion used by companies when deciding on a financing source. It can be defined as the relationship of the income expected by capital contributors to the value of their committed capital in the assets of the company (Szczepankowski, 2007). Thus, it corresponds to the rate of return on investment expected by equity owner at an acceptable level of risk (Dudycz, 2005; Jajuga & Jajuga, 2000).

In the Polish literature, surprisingly little attention has been paid to the analysis of the total costs of IPOs. Exceptions include the research of Sieradzki (2016), who studied the total costs of Polish IPOs between 2003 and 2014. There is also a lack of studies in which the subject of research, the total costs of IPOs by type of offering. Other studies available focus on evaluating the costs of offerings involving the issuance of new shares (Puławski, 2013) or/and concern the analysis of direct costs (Wawrzyszak-Misztal, 2015). In contrast, studies available in the daily press tend to focus on a narrowly selected group of companies or period (Rudke, 2021; Kucharczyk, 2021).

The purpose of this article is to present the results of a study on the costs of initial public offerings conducted on the Warsaw Stock Exchange (WSE) between 2005 and 2020.

Literature review and hypothesis development

The arrangement of an IPO involves significant costs for the company, so IPO issuers only retain the net proceeds to use in their business. The costs of an IPO can be distinguished between direct costs and indirect costs.

The estimated direct costs of conducting the offer reflect the fees for activities performed to raise capital and/or for the sale of shares and are disclosed in the prospectus. Upon completion of the subscription or sale of shares related to the admission of securities to trading on the official stock exchange listing market, companies are required under Polish law to publish a report containing, *inter alia*, information on the total amount of the costs which have been included in the costs

of the issue, together with the methods of their settlement in the accounting books and the manner of their recognition in the financial statements (Rozporządzenie…, 2005; 2009; 2018). It is necessary to indicate the amount of the costs by their titles, with a breakdown at least into the costs of preparing and carrying out the offer, the costs of remuneration of the underwriters (for each separately), the costs of drawing up the prospectus, including consultancy costs, and the costs of promoting the offer. Information shall also be given as to the average cost of carrying out the subscription or sale per unit of security being subscribed or sold.

It should be added that some costs, such as the administrative fees for the supervisory authority or the market operator, are fixed in absolute value; consequently, when the value of the issue increases, the costs in terms of average percentage cost per share will decrease. Other costs, such as the cost of remuneration to the process coordinator for the placement of shares, calculated as a percentage of the value of the newly issued or sold shares, are correlated with the size of the offering. However, the commission rate may vary not only depending on the size of the offering, but also on other parameters such as the structure of the offering or the difficulty of the offering. The remuneration arrangements may also be supplemented by various incentives, such as a premium linked to the valuation of the issuer achieved on debut.

Some of the offering costs are mandatory in nature, such as costs related to the employment of the share offeror and the auditor examining the financial statements, costs of court, stamp and notary fees incurred in connection with the process of registering the company's share capital increase, fees for the preparation and submission of documentation to the supervisory authority, fees for registration and record-keeping activities related to the shares being subscribed for to the public and marketed. In contrast, however, some of the direct costs of the offering are optional, as they depend on the decision of the company itself. These include fees paid by the issuer to hired underwriters for sales concessions, for management, for underwriting and for advisers used by the issuer (e.g. legal, financial, strategic, communications). In Poland, only a handful of companies sign underwriting agreements, and these are most often companies that are privatised as part of their IPO (e.g. PZU, PGE, ENEA). For example, in the group of 102 companies in the research of Wawryszak-Misztal (2015), there were only 8 such cases. But it should be emphasised that if such an agreement is concluded and the stabilisation option is exercised, the underwriters' remuneration on this account significantly increases the total costs of the offering.

Chen and Ritter (2000) found that in the US market, underwriting fees of around 7% are higher than in other countries. They report that in Australia, Japan, Hong Kong and Europe, for example, they are approximately half that in the US. Torstilla (2003) indicated that most Asian equity markets have highly standardised gross spreads, mainly at 2% and 2.5%. In Europe, there is less standardisation of fees (clustering phenomenon), but there are some exceptions, for example, in Germany, where 62% of all IPOs have a gross spread of 4%, in France there is some clustering at 3% and in Belgium at 2.5%. Although European IPO markets show less variation in spreads

than the US markets, clusters do appear, and country-by-country data shows that these are most pronounced in the countries with the lowest gross spreads. This "7% phenomenon" was investigated by Hansen (2001) in the context of the existence of price collusion, but his results testify against its existence. Referring to the theory of efficient contract theory, he concludes that investment banks compete in setting 7% fees in IPOs based on reputation, placement services and underpricing. In support of this, he points out that the 7% contract persisted even though the Department of Justice was investigating allegations of collusion.

As reported by Abrahamson et al. (2011), for many years, different types of price setting in offerings were cited as the reason why gross spreads were lower in Europe than in the US. US offerings have for decades been managed using the "book building" method, whereby investment banks collect legally non-binding but serious signals of interest from institutional investors before pricing and allocating shares. European IPOs, on the other hand, used a less time-consuming and, in terms of direct costs, less expensive method of fixed price or organising a tender/auction process. However, their research in a sample of IPOs that took place over a period of 10 years later (1998–2007) confirmed the same figures, despite changes in the types of offering. At the same time, they noted that while gross spreads were lower for larger offerings in both the US and Europe, fees for larger US IPOs tended to increase, while fees for larger European IPOs became increasingly cheaper. Interestingly, they also confirm the phenomenon previously studied by Torstila (2001) using data from 1986 to 1999, that investment banks charge significantly lower fees for IPOs in Europe than for similar IPOs in the US. Even after considering the different parameters of size, issue characteristics, syndicate structure and timing and country effects, there is a "3% wedge" between European and US IPOs showing that European IPOs are always cheaper than US IPOs. Other studies indicate that the direct costs of listing on the WSE are several times lower than on the London Stock Exchange, Nasdaq market or Euronext (Kucharczyk, 2021).

The indirect cost of an offer, meaning its underpricing (or undervaluation), is the ratio of the market price of a share achieved at the debut to its offer price. McDonald and Fisher (1972) called this observed difference between the offer price and the market price the "rent", which is distributed by the offeror to the initial buyers of the shares. Ljungqvist (2007) calculates underpricing in currency units as the amount of "money left on the table". In this view, it represents the difference between the secondary market share price and the offering price, multiplied by the number of shares sold and/or offered in the IPO. The relevant assumption here is that shares sold at the offer price could be sold at the market price on the secondary market. The effect of setting the issue price below the actual market value and, therefore, at a lower level than the IPO price of the shares is a kind of economic cost, i.e. an opportunity cost. Existing shareholders thus suffer an opportunity loss due to the transfer of value to new buyers of shares (Czekaj & Dresler, 2008; Puławski, 2013).

Gale and Stiglitz, on the other hand, referred to the phenomenon of undervaluation as "burning money" (1989).

Indirect costs can also include costs that are extremely difficult to calculate a quantifiable value for. These include, among others, the costs of management time spent working on the offering, or the so-called "green shoe" option, which gives underwriters the right to allot additional shares at the offering price and sell them in the market to cover high investor demand during the subscription (Ross et al., 2008). There are also hard-to-count costs associated with the potential erosion of competitive advantage resulting from the disclosure of material information about the company to a wide range of stakeholders and, in the longer term, also the costs of the risk of losing control of the company resulting from unwanted takeover attempts (Bushee & Miller, 2012; Doidge et al., 2017).

To calculate the indirect costs of an offering, an assessment of the price reaction to the IPO event is used, which is the raw immediate rate of return expressed by the mathematical equation:

$$IC = IR_{i0} = \frac{P_{it} - P_{i0}}{P_{i0}} \tag{1}$$

where:
P_{it} – closing price of the ith offer on the first day of trading
P_{i0} – issue price of the ith offer

The results of many empirical studies conducted worldwide indicate that underpricing is an important indirect cost of an offering. Ritter (1987), in a study of companies debuting on the US market in the period 1977–1982, found that underpricing as an indirect cost of going public averaged 14.80% for firm commitment offers and 47.78% for best effort offers. Money on the table, which can also be described as a transfer of value to investors, is particularly painful for the existing owners of the IPO company. However, as Puławski (2013) rightly points out, there are not infrequent cases of overvaluation of the issue price, which, in turn, drain investors' pockets on the stock market. Numerous studies of underpricing concern the US market (Ritter, 1984; Ljungqvist, 2007; Ibbotson et al., 1988; 1994; Loughran & Ritter, 2004; Loughran et al., 1994; Welch & Ritter, 2002, Barry & Jennings, 1993). However, relatively often this phenomenon is studied in other markets, e.g. Sweden (Rydqvist & Hogholm, 1995), Germany (Ljungqvist, 1997), France (Derrien, 2005), China (Chan et al., 2004). In the Polish market, such research has been conducted, among others, by Siwek (2005), Mamcarz, (2010), Mizerka and Lizińska (2017), Sieradzki (2016), Wołoszyn and Zarzecki (2013), Zarzecki and Wołoszyn (2016), Gemzik-Salwach and Perz (2013), Lizińska and Czapiewski (2014), Pomykalski and Domagalski (2015), or Podedworna-Tarnowska (2013, 2020).

The decision-making dilemmas of issuers conducting an initial public offering in the selection and remuneration of expert legal counsel, auditors and investment

bankers in the context of underpricing was the subject of a study by Beatty and Welch (1996). They showed that underwriters' remuneration depends on the size of the offering, but also that underwriters with a higher reputation are better paid. At the same time, they confirmed a positive correlation of underwriters' remuneration with underpricingbut did not confirm such a correlation concerning the remuneration of lawyers or auditors. Ljungqvist et al. (2003) studying international markets and focusing on the relationship between underpricingand gross spreads found that although foreign issuers pay more for US bank intermediation, they simultaneously obtain lower underpricing. The higher direct costs are, therefore, more than offset by the issuer's savings from the lower amount of money being leftover.

From the point of view of capturing total costs, one of the first empirical studies conducted by Ritter (1987) based on a sample of IPOs that took place between 1977 and 1982 in the US is noteworthy. His results show that best effort offers were more costly for issuers (31.87%) than firm commitment offers (21.22%). At the same time, they show that, in average terms, the total cost of conducting IPO is lower in the sample of best effort offers (31.87%) than the cost of underpricing (47.78%), meaning that at the level of a single offering there were cases with negative returns, indicating at the same time a negative value of money left on the table. Ritter described the method of calculating total costs as "100% minus the net proceeds as a percentage of the market value of securities in the aftermarket". Consequently, total costs are not the simple sum of cash expenses and the average initial rate of return, which can be expressed by the formula:

$$TC_{IPO} = 1 - \frac{1-DC}{1+IC} \tag{2}$$

where:
TC_{IPO} – total costs of the offer
IC – indirect costs (underpricing costs) expressed as simple immediate rate of return
DC – direct costs expressed as a percentage of the offer

After transforming the formula, the formula for calculating the total costs for a single offer has the following form:

$$TC_{IPO} = \frac{DC+IC}{1+IC} \tag{3}$$

Lee et al. (1996), using this formula in their research, report that in the US market for offerings conducted between 1990 and 1994, the average total costs were 18.69%. With the average underpricing costs from this period being 12.05%, the direct costs calculated as a percentage of the total gross proceeds of the share issue was approximately 11%. Since, as mentioned, part of the direct costs are fixed in nature, a significant variation is noticeable depending on the value of the offering: for issues under USD 10 million, they averaged 16.96%, while for proceeds above

USD 500 million, the average cost represented 5.72%. The research, therefore, clearly confirmed the existence of economies of scale in both total direct costs and underpricing costs.

Puławski (2013), examining companies issuing shares during initial public offerings between 2008 and 2012, showed that the total costs of public share subscriptions of companies debuting on the WSE relative to the value of the issue are relatively high for smaller issues and decrease as the value of the issue increases, confirming the occurrence of economies of scale, where the average direct costs of an issue decrease as the size of the issue increases. At the same time, he showed an increase in direct emissions costs during the 2008 financial crisis, which amounted to 25% of emissions revenues. Similar conclusions were also reached by Sieradzki (2016), who reports an average cost of conducting an IPO between 2003 and 2014 of 5.7%, separating out the boom years, i.e. 2004 and 2011, in which costs in the period under study were the lowest (4.3% and 4.1%, respectively) and the downturn years, i.e. 2008 and 2009, in which costs were the highest (7.3% and 8.2%, respectively).

In the context of crisis phenomena, research was also conducted by Wawryszuk-Misztal (2015), who investigated the dynamics and structure of direct costs of the first public share issues on the main market of the Warsaw Stock Exchange in the period 2006–2014. Based on 102 IPOs, she observed the phenomenon of rising costs only in the case of issues with a value of up to PLN 50 million, while the costs of issues incurred by larger issuers were relatively stable, regardless of the occurrence of crisis phenomena. It also showed that in the group of smaller issues, the costs of preparing a prospectus and advisory services increased significantly.

Investments in larger offerings are accompanied by lower risk, as a rule, larger offerings involve larger companies and, therefore, lower risk of their bankruptcy (Baron, 1982; Rock, 1986). Besides, investors are more familiar with firms that make large offerings (Boulton et al., 2018). Consequently, information asymmetry is reduced. As part of building favourable signals and positive attitudes toward the company among investors, makes the first small issue with a low valuation guaranteeing undervaluation, in order to already set a higher price in the next large one (Welch, 1989). Moreover, it is assumed that economies of scale effect will occur with larger offerings (Lee et al., 1996; Puławski, 2013). Accordingly, the value of the offer negatively affects total costs.

Ritter proved that higher underpricing is observed in hot periods in the market (Ritter, 1984). According to Loughran and Ritter (2002), underpricing is significantly related to pre-IPO market returns. Their findings are interpreted as evidence that investment bankers do not make a full adjustment to the offering price despite publicly available information on the market's pre-IPO performance. Lyn and Zychowicz (2003) also reported that underpricing is significantly related to market returns prior to an IPO. Thus, underpricing of offers made during periods of strong market dynamics will be higher and consequently the total costs will be higher as well. The metric mostly used in above mentioned research to determine the impact

of stock market conditions on underpricing is the index of a given market prior to the IPO at various time intervals.

During hot periods in the market, there is increased activity in the IPO market (Ritter, 1984; Boulton et al., 2018). Aggarwal and Rivoli (1990) report empirical findings that are supportive of IPOs being subject to overvaluation or fads in early trading. An inclusion of a market momentum measure is intended to proxy for such periodic market conditions (Lyn & Zychowicz, 2003). Therefore, it can be assumed that IPO market activity is correlated with total costs. On the one hand, higher direct costs can be expected during such periods but on the other hand, lower direct costs can be anticipated resulting from greater competition among advisors assisting in the offering.

It is also interesting whether the macroeconomic variables affecting the cost of money in the debt market, such as the prime rate or WIBOR, affect the cost of the IPO. One would assume that during periods of high interest rates, offering costs would also fall.

Considering theoretical background and research presented, the following hypotheses are proposed:

H1: Indirect costs are higher than direct costs of the IPO.

H2: The total IPO costs depends on the type of the offer.

H3: The total costs of IPO depend on the market condition.

H4: The total IPO costs depend on the prosperity on the IPO market.

H5: The total IPO costs depend on the value of the offer.

Research method

To verify the hypothesis, the analysis covered companies debuting on the Warsaw Stock Exchange between 2005 and 2020. The initial group included 427 debuts. The following entities were excluded:

– companies that changed listing floor from MTS Ceto and NewConnect to the main floor,

– companies debuting after demerger by spin-off,

– foreign companies,

– companies for which data was not available,

– two companies for which the total costs varied widely (including them caused standard deviation amounted to 63%).

The final sample included 249 companies. These included IPOs involving offers to issue shares (135 companies), offers to sell shares (30 companies) and offers combining issuance and sale (84 companies).

Information on the costs of the analysed offerings was obtained from the companies' current reports published after the completion of the share subscription. For this purpose, the data from the website https://infostrefa.com/ was used. Data on the value of the offer, the issue value, the offer price of the shares and the closing price on the first day of trading were obtained from the website https://www.gpw.pl/.

Based on the information obtained on the level of direct offering costs and the gross offer value, offering costs were estimated as a percentage, i.e. in relation to the gross offering value. For companies that only carried out a new issue, the gross offer value was equal to the gross proceeds of the offer.

Direct costs were first analysed for individual companies. In the case of share sale offers, only the costs incurred by the company charged to its financial result were considered (costs incurred by the selling shareholder were ignored). In the case of joint offers, the issuers' reported costs of issuing the shares and the part of the costs of selling the shares borne by the company were taken into account together (the costs borne by the selling shareholder were also omitted). Measure (1) was used to calculate the indirect costs of the offering. In the next step, the method described in Ritter (1987) and Lee et al. (1996) given in formula (2) and (3) was used to count the total costs for each company. Total costs are counted for each company as direct and indirect costs as a percentage of market value. The results are then averaged both for the entire study population and by group in terms of the type of the offer, and then also by year. Therefore, the average cost/market value ratio is different from the ratio of these averages. It is also different from the sum of the component values. The study did not focus on either indicating the structure of total costs or the structure of direct costs.

Then an econometric linear regression model was prepared, with the endogenous variable being the variable indicating the level of total costs, for individual IPO cases.

A stepwise backward variable selection procedure was carried out for the variable determined in this way. Elevenexplanatory variables were selected as the base of variables from which selections were made:

– monthly average values and changes in WIG index for 6 and 12 months prior to IPO, respectively,

– monthly average values and changes in the value of interest rates for 6 and 12 months prior to IPO, respectively,

– the value of the offer after logarithmic transformation,

– year index (0 = 2005, 1 = 2006, 2 = 2007, etc.),

– number of IPOs in the previous month.

Out of presented variable base, the following set of variables was selected using the stepwise backward variable selection method indicated earlier:

– constant – constant in linear model,

– offer_value – value of the offer after logarithmic transformation,

– IPO_prev_month – the number of IPOs in the previous month,

– ir_12m – monthly average percentage changes in interest rates for 12 months prior to IPO,

– year – year index, e.g. 0 = 2005, 1 = 2006, 2 = 2007, etc.,

– if_combined – dummy variable related to combined offering,

– if_new – dummy variable related to new offering.

Consequently, linear model was estimated for the variables thus selected and with total costs as dependent variable (equation 2):

Total_costs = (1) Constant + (2) offer_value + (3) IPO_prev_month + (4) ir_12m + (5) year+ (6) if_combined + (7) if_new

As total costs are not the simple sum of direct costs and indirect costs, the model was also used to test the dependent variables which were *indirect_cost* (equation 1) and *direct_cost*:

Indirect_costs = (1) Constant + (2) offer_value + (3) IPO_prev_month + (4) ir_12m + (5) year+ (6) if_combined + (7) if_new

Direct_costs = (1) Constant + (2) offer_value + (3) IPO_prev_month + (4) ir_12m + (5) year+ (6) if_combined + (7) if_new

With regard to the statistical significance and stability of the variables used in the model, a single-factor analysis was carried out against the dependent variables analyzed (*total_costs*, *indirect_costs*, *direct_costs*). For this purpose, a linear regression model was estimated in which the *total_costs* variable was the target variable against a particular explanatory variable (and constant). The same was carried out for *indirect_costs* and *direct_costs*, respectively. The results of the estimated models are attached to the article's appendix. It is indicated in the estimated models which variables are statistically significant (i.e. at the 1%, 5%, and 10% levels). Standard notation for marking the statistical significance of variables was used here.

A Durbin–Watson test was also conducted to verify the presence of the autocorrelation of model residuals (resulting from, among others, the instability of variables or model misspecification). According to Durbin–Watson statistics, the range of 1–2 indicates the absence or insignificant level of autocorrelation. For all of the estimated models (i.e. the model for the variable *total_cost*, *indirect_cost*, and *direct_cost*), the values of the Durbin–Watson statistics were within the range of 1–2. At the same time, it is worth pointing out that for the variable *direct_cost* for which the estimated model had the highest level of model quality, the Durbin–Watson statistic was close to 2 (i.e. the absence of the problem of autocorrelation of model residuals).

Results

The results of the research show that, in average terms, for the period 2005–2020, the total cost of an IPO on the WSE is 12.66% for the total sample, with the indirect cost due to underpricing amounting to 11.12% on average and direct costs representing 5.78% of the value of the offer on average. As in the cited studies by Ritter (1987), Lee

et al. (1996) and Sieradzki (2016), in the averages, the total cost of conducting an offer, for some of the groups or years studied, lower than the indirect cost resulting from underpricing, as a result of the occurrence of offers with negative returns, indicating at the same time the negative value of money left on the table. This phenomenon is also mentioned by Sieradzki (2016), who, using this methodology and reporting an 18.1% average total cost of conducting IPOs in Poland between 2003 and 2014, shows while for 70 of them these costs were negative, averaging -19%. In the present study covering the period 2005–2020, total costs were negative in 30 cases and averaged at the level of -6.48%.

The results of the research confirmed that the total costs of the offer are highest in the case of the issuance of new shares, at 14.12% (Table 1). Interestingly, the combined offer is the more expensive option (12.53%) than the offer of only selling the existing shares (6.40%). The combined offer is, therefore, a cheaper option than the offer to issue new shares only. It should also be noted that the transfer of value to new investors is lowest with offers of selling the existing shares. This is understandable, as exiting shareholders are keen for the valuation of the shares and the offer price to be as high as possible. This is confirmed, among other things, by empirical studies on the level of underpricing of IPOs carried out as part of venture capital fund divestments, which indicate its lower level compared to other IPOs (Megginson & Weiss, 1991; Barry et al., 1990; Sieradzki & Zasępa, 2016; Rzewuska & Wrzesiński, 2016; Zasępa, 2019). Furthermore, the study confirmed that indirect costs are higher than direct costs in the whole sample. Interestingly, the discrepancy between direct and indirect costs is bigger in the group of debuts with the issue of new shares and combined offer. The reason of lower direct costs in this group is sharing them between the company and the existing shareholders.

Table 1. Cost metrics between 2005 and 2020 depending on the type of offer

Metric	Indirect costs	Direct costs	Total costs
Issue of new shares			
mean	10.96%	8.10%	14.12%
median	4.30%	5.92%	11.73%
Sale of existing shares			
mean	6.40%	1.31%	6.40%
median	2.07%	0.79%	4.67%
Combined offer			
mean	13.05%	3.65%	12.53%
median	6.28%	2.91%	9.04%
Total all offers			
mean	11.12%	5.78%	12.66%
median	5.00%	4.32%	9.70%

Source: Author's own study.

The result confirmed that indirect costs are higher than direct costs in the majority of years. To verify this hypothesis, the Student's *t*-test (paired) for mean and the Wil-

coxon test for median have been carried out. The results confirming the hypothesis H1 are presented in Table 2.

Table 2. Direct and indirect costs

Statistics	Direct costs	Indirect costs
Issue of new shares		
Mean	0.0810	0.1096
Standard deviation	0.0814	0.2471
t-stat (paired)	1.3171	
*p*_value	0.1901	
Median	0.0592	0.0430
z-stat	4365.0	
*p*_value	0.6212	
N	135	
Sale of existing shares		
Mean	0.0131	0.0640
Standard deviation	0.0123	0.1082
t-stat (paired)	2.4901**	
*p*_value	0.0187	
Median	0.0079	0.0207
z-stat	152.0	
*p*_value	0.0978	
N	30	
Combined offer		
Mean	0.0365	0.1305
Standard deviation	0.0244	0.2153
t-stat (paired)	3.9891***	
*p*_value	0.0001	
Median	0.0291	0.0628
z-stat	953.0***	
*p*_value	0.0002	
N	84	
Total costs		
Mean	0.0578	0.1112
Standard deviation	0.0671	0.224
t-stat (paired)	3.67***	
*p*_value	0.0003	
Median	0.0432	0.0500
z-stat	13122.0**	
*p*_value	0.0319	
N	249	

Significance level: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Source: Author's own study.

Considering the distribution of costs over the years, it should be noted that, on average, the highest costs were in 2020, where total costs amounted to more than 24% (Table 3). This year was also characterised by the highest average indirect costs (24.5%). Total costs were also relatively high in the year before (20.68%), and in 2009 (21.86%). The study, therefore, confirmed the conclusions of the other presented re-

search (Sieradzki, 2016; Puławski, 2013; Wawryszuk-Misztal, 2015), presenting the increase in costs during the periods of crisis. The noticeable increase in costs in 2020, may be related to the emergency situation caused by the COVID-19 pandemic. The financial crisis in 2008 left its mark on the financial market translating into average low returns for investors and, thus, a negative cost of underpricing for a few issuers and then the increase in total costs is observed in 2009. Interestingly, in 2008, the direct costs exceeded cost of underpricing by almost 10 pp. In contrast, the lowest average total cost applies to 2014–2015.

Table 3. Average costs 2005–2020

Year	Indirect costs	Direct costs	Total costs
2005	9.51%	4.47%	10.99%
2006	24.49%	5.02%	19.60%
2007	17.99%	4.90%	15.60%
2008	0.97%	10.74%	9.82%
2009	14.09%	12.39%	21.86%
2010	5.98%	6.46%	11.35%
2011	4.07%	4.20%	6.98%
2012	11.67%	8.73%	14.17%
2013	7.31%	4.17%	9.43%
2014	1.99%	2.38%	4.19%
2015	0.83%	3.72%	4.19%
2016	4.86%	4.40%	8.42%
2017	2.41%	9.18%	11.51%
2018	12.46%	4.34%	13.68%
2019	14.74%	8.99%	20.68%
2020	24.50%	8.32%	24.25%
Average 2005–2020	11.12%	5.78%	12.66%

Source: Author's own study.

In order to check whether these extreme values in the indicated years are statistically significant, the Student's *t*-test was carried out. The results confirming the statistical significance of these differences are presented in Tables 4–7.

Table 4. Comparison of costs in 2009 and 2014

Type of cost	Measure	2009	2014	*t*-stat	*p*-value
Total costs	mean	0.22	0.04	7.8329***	0.0000
	N	9	11		
	std	0.16	0.04		
Indirect costs	mean	0.14	0.02	6.4244***	0.0000
	N	9	11		
	std	0.14	0.03		
Direct costs	mean	0.12	0.02	5.3600***	0.0000
	N	9	11		
	std	0.14	0.02		

Significance level: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Source: Author's own study.

Table 5. Comparison of costs in 2009 and 2015

Type of cost	Measure	2009	2015	*t*-stat	*p*-value
Total costs	mean	0.22	0.04	7.8884***	0.0000
	N	9	12		
	std	0.16	0.06		
Indirect costs	mean	0.14	0.01	6.9295***	0.0000
	N	9	12		
	std	0.14	0.06		
Direct costs	mean	0.12	0.04	4.9624***	0.0001
	N	9	12		
	std	0.14	0.02		

Significance level: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Source: Author's own study.

Table 6. Comparison of costs in 2014 and 2020

Type of cost	Measure	2014	2020	*t*-stat	*p*-value
Total costs	mean	0.04	0.24	-5.7276***	0.0001
	N	11	2		
	std	0.04	0.15		
Indirect costs	mean	0.02	0.24	-3.5023***	0.0050
	N	11	2		
	std	0.03	0.35		
Direct costs	mean	0.02	0.08	-3.2280***	0.0080
	N	11	2		
	std	0.02	0.07		

Significance level: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Source: Author's own study.

Table 7. Comparison of costs in 2015 and 2020

Type of cost	Measure	2015	2020	*t*-stat	*p*-value
Total costs	mean	0.04	0.24	-4.6235***	0.0006
	N	12	2		
	std	0.06	0.15		
Indirect costs	mean	0.01	0.24	-3.5395***	0.0041
	N	12	2		
	std	0.06	0.35		
Direct costs	mean	0.04	0.08	-2.6964**	0.0194
	N	12	2		
	std	0.02	0.07		

Significance level: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Source: Author's own study.

During periods of weakness in the IPO market as measured by the number of IPOs conducted, competition between advisory firms plays a large role. It is expected that advisers' fees will be lower during bull market periods, which will translate

into lower direct costs. In Figure 1 general yearly statistics are shown, including the number and value of IPOs that took place over the period 2005–2020.

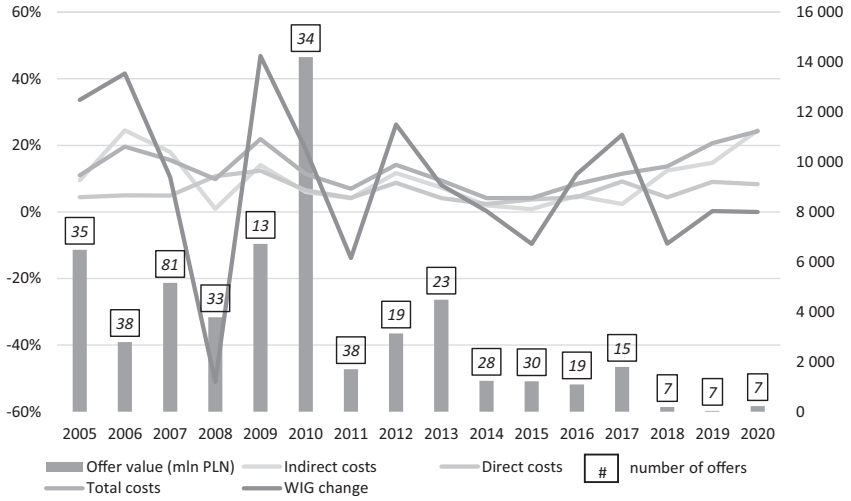

Figure 1. IPO costs versus number and value of IPOs and WIG change

Source: Author's own study.

The results of the estimation of the econometric model in which the endogenous variable is total costs are presented in Table 8.

Table 8. Total costs model – OLS regression results

Model specification and results						
Dep. Variable			total_costs			
Model			OLS			
Method			Least Squares			
No. Observations			249			
Df Residuals			242			
Df Model			6			
Covariance Type			nonrobust			
R-squared			0.092			
Adj. *R*-squared			0.069			
F-statistic			4.084			
Prob (*F*-statistic)			0.000637			
Log-Likelihood			138.91			
AIC			-263.8			
BIC			-239.2			
Variables	coef	std err	t	P>|t|	[0.025	0.975]
const	0.6887***	0.165	4.165	0.000	0.363	1.014
offer_value	-0.0230***	0.007	-3.284	0.001	-0.037	-0.009

Model specification and results						
IPO_prev_month	-0.0035	0.003	-1.020	0.309	-0.010	0.003
ir_12m	-0.0248*	0.013	-1.890	0.060	-0.051	0.001
year	-0.0130***	0.005	-2.621	0.009	-0.023	-0.003
if_combined	0.0165	0.032	0.516	0.607	-0.047	0.080
if_new	0.0149	0.033	0.457	0.648	-0.049	0.079
Tests on model's results						
Omnibus			45.135			
Prob (Omnibus)			0.000			
Skew			0.945			
Kurtosis			5.124			
Durbin–Watson			1.631			
Jarque–Bera (JB)			83.829			
Prob (JB)			6.26e-19			
Cond. No.			360.			

Significance level: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Source: Author's own study.

Note that the type of the offer has been transformed using dummy variables. The reference variable (i.e. the one that is included into const attribute) has been set to be *if_old_sale*, which refers to the type of the offer that is related to sales of existing shares. The rest of the variable types – *if_combined*, and *if_new* – were explicitly included into model specification as binary variables (i.e. dummy transformation was conducted on offer type). The estimated model has low explanatory power (R^2 = 9.2%). The *F*-statistics indicates that the impact of all of the variables combined is statistically significant. The attributes within 5% of statistical importance are *const*, *offer_value*, and *year*.

The results of the estimation of the model with the indirect costs as endogenous variable is the following:

Table 9. Indirect costs model – OLS regression results

Model specification and results	
Dep. Variable	indirect_costs
Model	OLS
Method	Least Squares
No. Observations	249
Df Residuals	242
Df Model	6
Covariance Type	nonrobust
R-squared	0.075
Adj. *R*-squared	0.052
F-statistic	3.271
Prob (*F*-statistic)	0.00412
Log-Likelihood	27.975
AIC	-41.95
BIC	-17.33

Model specification and results						
Variables	coef	std err	t	P>|t|	[0.025	0.975]
const	0.6212*	0.258	2.406	0.017	0.113	1.130
offer_value	-0.0064	0.011	-0.580	0.562	-0.028	0.015
IPO_prev_month	-0.0017	0.005	-0.318	0.750	-0.012	0.009
ir_12m	-0.0662***	0.020	-3.228	0.001	-0.107	-0.026
year	-0.0309***	0.008	-3.981	0.000	-0.046	-0.016
if_combined	0.0106	0.050	0.211	0.833	-0.088	0.109
if_new	-0.0031	0.051	-0.062	0.951	-0.103	0.097
Tests on model's results						
Omnibus			172.286			
Prob (Omnibus)			0.000			
Skew			2.723			
Kurtosis			14.263			
Durbin–Watson			1.821			
Jarque–Bera (JB)			1623.682			
Prob (JB)			0.00			
Cond. No.			360.			

Significance level: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Source: Author's own study.

The estimated model has low explanatory power (R^2 = 7.5%). The *F*-statistics indicates that the impact of all of the variables combined is statistically significant. The attributes within 5% of statistical importance are *const*, *ir_12m*, and *year*.

The estimation for the model in which the endogenous variable was direct costs is the following:

Table 10. Direct costs model – OLS regression results

Model specification and results						
Dep. Variable			direct_costs			
Model			OLS			
Method			Least Squares			
No. Observations			249			
Df Residuals			242			
Df Model			6			
Covariance Type			nonrobust			
R-squared			0.391			
Adj. *R*-squared			0.376			
F-statistic			25.93			
Prob (*F*-statistic)			9.67e-24			
Log-Likelihood			381.30			
AIC			-748.6			
BIC			-724.0			
Variables	coef	std err	t	P>|t|	[0.025	0.975]
const	0.3519***	0.062	5.634	0.000	0.229	0.475
offer_value	-0.0226***	0.003	-8.521	0.000	-0.028	-0.017

Model specification and results						
IPO_prev_month	-0.0015	0.001	-1.131	0.259	-0.004	0.001
ir_12m	0.0173***	0.005	3.495	0.001	0.008	0.027
year	0.0063***	0.002	3.351	0.001	0.003	0.010
if_combined	0.0076	0.012	0.628	0.531	-0.016	0.031
if_new	0.0271**	0.012	2.198	0.029	0.003	0.051
Tests on model's results						
Omnibus			286.979			
Prob (Omnibus)			0.000			
Skew			4.744			
Kurtosis			42.564			
Durbin–Watson			1.992			
Jarque–Bera (JB)			17174.593			
Prob (JB)			0.00			
Cond. No.			360.			

Significance level: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Source: Author's own study.

The estimated model has medium explanatory power ($R^2 = 39.1\%$). The *F*-statistics indicates that the impact of all of the variables combined is statistically significant. The attributes within 5% of statistical importance are *const*, *offer_value*, *ir_12m*, *year*, and *if_new*.

The results of the analysis indicate that the explainability (via external attributes) is the biggest for the direct costs. This result is intuitive, as the indirect cost and total costs (as a function of indirect and direct costs) are both depending heavily on each other. Given the defined research hypothesis, based on the estimated model, the following conclusions can be drawn. Neither total costs, nor direct costs, nor indirect costs do not depend on the offer type. The coefficients next to *if_combined*, and *if_new* are not statistically significant in any estimated model, hence the hypothesis H2 is to be rejected.

The market conditions were included into linear model as a WIG index (changes and levels for various time windows). However, this variable was not statistically significant in any of the models. Moreover, the Condition Index for this variable was high, which indicates the problem of multicollinearity. Changes in interest rates are statistically significant in the estimated models. They negatively affect the total cost of IPO and indirect costs (i.e. an increase in interest rates level is observed along with lower total costs) while positively correlated with direct costs. Hypothesis H3 is to be confirmed partially.

The number of IPOs in the previous month has weak statistical power in each estimated model, so analyzed costs of offers may not be directly explained by the number of IPOs in the preceding month. Thus, hypothesis H4 is to be rejected.

The value of the offer is statistically significant for modeling the direct costs as well as the total costs. Hypothesis H5 is to be confirmed. When modeling indirect costs, the estimated coefficient is not statistically different from zero.

Year index yielded a statistically significant result and with each following year, the total costs of offering decreases by 1.30 pp, and indirect costs by 3.09 pp, while direct costs increased by 0.63 pp.

Conclusions and discussions

The differences in the total costs and the level of underpricing in consecutive years show that the conditions under which the companies go public vary considerably over time. And, in fact, they depend not only on the fundamentals of the company, but also on the overall stock market situation. Aggarwal and Rivoli (1990) argue that, from the point of view of investors, IPOs are a profitable investment in the short term, but the abnormal returns for initial investors should not be interpreted as "money left on the table" from the issuer's point of view, as over longer periods, investments in IPOs yield poor results. This is confirmed by a number of empirical studies in which it was observed that, in the case of abnormally high returns during the debut period, returns calculated over the medium and long term, i.e. several months to several years, were negative compared to the market benchmark (e.g. Loughran & Ritter, 1995; Jenkinson & Ljungqvist, 1996; Ritter & Welch, 2002; Kwit, 2006; Rzewuska & Wrzesiński, 2016). Ibbotson et al. (1994) even argue that the poor long-term performance of IPOs confirms that, despite the short-term under-pricing phenomenon and the subsequent transfer of value to new investors, the cost of raising equity capital is not prohibitively high, especially for young, growing companies. Loughran and Ritter's (1997) research suggests that because IPOs are disproportionately fast-growing companies, they, therefore, take advantage of temporary opportunities by issuing shares when, on average, their value is significantly overvalued, taking advantage of the *de facto* mispricing at the time of going public caused by market inefficiencies. At the time of the offer, the market appears to overestimate this improvement and, therefore, market prices reflect the capitalisation of the temporary improvement in operating performance, and when this specificity of the temporariness of the improved operating performance becomes evident, share prices underperform.

As the results of a study of company IPOs on the WSE show, the total cost of listing a company varies depending on the type of offering. The direct cost alone entails a cost of several percent of the value of newly issued or sold shares, and if we add the cost of underpricing, in relation to the market value of the offer, the company's IPO constitutes a total cost of over 12% on average. At the same time, companies listing on the stock exchange because of the decision of the main shareholder to exit are characterised by a lower total cost of offer, which is due to two reasons. Firstly, such a shareholder is not willing to leave money on the table, so it has the impact on indirect costs. Second, the direct costs are shared by the company and by the shareholder. The cost is lower in a combined offer, which is also due to the

selling shareholder contribution in bearing part of the costs. However, it is important to bear in mind that the costs incurred during an IPO for individual companies vary significantly and their components depend on several factors that are worth analysing in further broader research, also in the context of their impact on individual parts of the costs. Therefore, it is important to look at this issue from a long-term perspective and relate it to the potential benefits of public company status on the capital market, such as access to broad, diversified capital, the prestige of a public company and increased credibility and brand recognition.

References

Abrahamson, M., Jenkinson, T., & Jones, H. (2011). Why don't U.S. issuers demand European fees for IPOs? *Journal of Finance*, *66*(6), 2055–2082. **doi:10.1111/j.1540-6261.2011.01699.x**

Aggarwal, R., & Rivoli, P. (1990). Fads in the initial public offering market? *Financial Management*, *19*(4), 45–57. **doi:10.2307/3665609**

Atril, P. (2006). *FinancialManagement for Decision Makers*. Harlow: Pearson Education..

Aydogan, A. (2006). How persistent is the impact of market timing on capital structure? *The Journal of Finance*, *66*(4), 1681–1710. **doi:10.1111/j.1540-6261.2006.00886.x**

Baker, M., & Wurgler, J. (2002). Market timing and capital structure. *Journal of Finance*, *57*(1), 1–32. **doi:10.1111/1540-6261.00414**

Bancel, F., & Mittoo, U.R. (2009). Why do European firms go public? *European Financial Management*, *15*(4), 844–884. **doi:10.1111/j.1468-036x.2009.00501.x**

Baron, D.P. (1982). A model of the demand for investment banking advising and distribution services for new issues. *The Journal of Finance*, *37*(4), 955–976. **doi:10.1111/j.1540-6261.1982.tb03591.x**

Barry, Ch.B., Muscarella, Ch.J., Peavy, J., & Vetsuypens, M.R. (1990). The role of venture capital in the creation of public companies: Evidence from the going-public proces. *Journal of Financial Economics*, *27*(2), 447–471. **doi:10.1016/0304-405X(90)90064-7**

Barry, Ch.B., & Jennings, R.H. (1993). The opening price performance of initial public offerings of common stock. *Financial Management*, *22*(1), 54–63.

Beatty, R.P. & Welch, I. (1996). Issuer expenses and legal liability in initial public offerings. *The Journal of Law & Economics*, *39*(2), 545–602. **doi:10.1086/467359**

Bień, W. (2008). *Zarządzanie finansami przedsiębiorstwa*. Warszawa: Difin.

Błach, J. (2009). Ewolucja teorii struktury kapitału. *Finanse: Czasopismo Komitetu Nauk o Finansach PAN*, *1*(1), 87–106.

Boulton, T.J., Smart, S.B., & Zutter, Ch.J. (2018). Determinants of variation in IPO underpricing. In D. Cumming & S.A. Johan (Eds.), *The Oxford Handbook of IPO* (pp. 81–107). New York: Oxford University Press.

Brau, J.C., & Fawcett, S.E. (2006). Initial public offerings: An analysis of theory and practice. *The Journal of Finance*, *61*(1), 399–436. **doi:10.1111/j.1540-6261.2006.00840.x**

Bushee, B., & Miller, G. (2012). Investor relations, firm visibility, and investor following. *The Accounting Review*, *87*(3), 867–897. **doi:10.2308/accr-10211**

Chan, K., Wang, J., & Wei, K. (2004). Underpricing and long-term performance of IPOs in China. *Journal of Corporate Finance*, *10*(3), 409–430. **doi:10.1016/S0929-1199(03)00023-3**

Chemmanur, T.J., & Fulghieri, P. (1999). A theory of the going-public decision. *The Review of Financial Studies*, *12*(2), 249–279.

Chen, H.-C., & Ritter, J.R. (2000). The seven percent solution. *The Journal of Finance*, *55*(3), 1105–1131. **doi:10.1111/0022-1082.00242**

Czekaj, J., & Dresler, Z. (2008). *Zarządzanie finansami przedsiębiorstw. Podstawy teorii*. Warszawa: Wyd. Naukowe PWN.

Derrien, F. (2005). IPO pricing in "hot" market conditions: Who leaves money on the table? *The Journal of Finance*, *60*(1), 487–521. **doi:10.1111/j.1540-6261.2005.00736.x**

Doidge, C., Karolyi, G.A., & Stulz, R.M. (2017). The U.S. listing gap. *Journal of Financial Economics*, *123*(3), 464–487. **doi:10.1016/j.jfineco.2016.12.002**

Dudycz, T. (2005). *Zarządzanie wartością przedsiębiorstwa*. Warszawa: PWE.

Duliniec, A. (2015). Wybór źródeł finansowania a optymalna struktura kapitału w przedsiębiorstwie. *Zeszyty Naukowe Uniwersytetu Szczecińskiego, Finanse, Rynki Finansowe, Ubezpieczenia*, *74*(2), 73–82. **doi:10.18276/frfu.2015.74/2-06**

Gale, I., & Stiglitz, J.E. (1989). The informational content of initial public offerings. *The Journal of Finance*, *44*(2), 469–477. **doi:10.1111/j.1540-6261.1989.tb05066.x**

Gemzik-Salwach, A., & Perz, P. (2013). Rynek pierwszych ofert sprzedaży akcji na NewConnect – wybrane zagadnienia. *Annales Universitatis Mariae Curie-Skłodowska. Sectio H, Oeconomia*, *47*(3), 177–185. **doi:10.17951/h.2013.47.3.177**

Hansen, R.S. (2001). Do investment banks compete in IPOs? The advent of the "7% plus contract". *Journal of Financial Economics*, *59*(3), 313–346.

Ibbotson, R.G., Sindelar, J.L., & Ritter, J.R. (1988). Initial public offerings. *Journal of Applied Corporate Finance*, *1*, 37–45. **doi:10.1111/j.1745-6622.1988.tb00164.x**

Ibbotson, R.G., Sindelar, J.L., & Ritter, J.R. (1994). The market's problems with the pricing of initial public offering. *Journal of Applied Corporate Finance*, *7*(1), 66–74. **doi:10.1111/j.1745-6622.1994.tb00395.x**

Ickiewicz, J. (2004). *Pozyskiwanie, koszt i struktura kapitału w przedsiębiorstwach*. Warszawa: SGH.

Jajuga, K., & Jajuga T. (2000). *Inwestycje, instrumenty finansowe, ryzyko finansowe, inżynieria finansowa*. Warszawa: Wyd. Naukowe PWN.

Jenkinson, T., & Ljungqvist, A. (1996). *Going Public. The Theory and Evidence on How Companies Raise Equity Finance*. Oxford: Clarendon Press.

Kim, W., & Weisbach, M.S. (2008). Motivations for public equity offers: An international perspective. *Journal of Financial Economics*, *87*(2), 281–307. **doi:10.1016/j.jfineco.2006.09.010**

Korajczyk, R.A., Lucas, D.J., & McDonald, R.L. (1992). Equity issues with time-varying asymmetric information. *Journal of Financial and Quantitative Analysis*, *27*(3), 397–417. **doi:10.2307/2331327**

Kucharczyk, K. (2021). Ile w praktyce kosztuje wejście na warszawską giełdę? *Parkiet*, 15 February.

Kwit, J. (2006). Wycena spółki przez rynki kapitałowe. In M. Panfil & A. Szablewski (Eds.), *Metody wyceny spółki: perspektywa klienta i inwestora* (pp. 531–556). Warszawa: Poltext.

Lee, I., Lochhead, S., Ritter, J., & Zhao, Q. (1996). The costs of raising capital. *Journal of Financial Research*, *19*(1), 59–74. **doi:10.1111/j.1475-6803.1996.tb00584.x**

Lizińska, J., & Czapiewski, L. (2014). Performance of Polish IPO firms: Size and profitability effect. *Gospodarka Narodowa*, *1*, 53–71. **doi:10.33119/GN/100877**

Ljungqvist, A. (1997). Pricing initial public offerings: Further evidence from Germany. *European Economic Review*, *41*(7), 1309–1320. **doi:10.1016/S0014-2921(96)00035-9**

Ljungqvist, A., Jenkinson, T., & Wilhelm, W.J. (2003). Global integration in primary equity markets: The role of U.S. banks and U.S. investors. *The Review of Financial Studies*, *16*(1), 63–99.

Ljungquvist, A. (2007). IPO underpricing. In B.E. Eckbo (Ed.), *Handbook of Corporate Finance* (pp. 375–422). North Holland.

Loughran, T., Ritter, J.R., & Rydqvist, K. (1994). Initial public offerings: International insights. *Pacific-Basin Finance Journal*, *2*, 165–199. **doi:10.1016/0927-538X(94)90016-7**

Loughran, T., & Ritter, J.R. (1995). The new issues puzzle. *The Journal of Finance*, *50*(1), 23–51. **doi:0.1111/j.1540-6261.1995.tb05166.x**

Loughran, T., & Ritter, J.R. (1997). The operating performance of firms conducting seasoned equity offerings. *Journal of Finance*, 52(5), 1823–1850. **doi:10.1111/j.1540-6261.1997.tb02743.x**

Loughran, T., & Ritter, J.R. (2002). Why don't issuers get upset about leaving money on the table in IPOs? *The Review of Financial Studies*, *15*(2), 413–443.

Loughran, T., & Ritter, J.R. (2004). Why has IPO underpricing changed over time? *Financial Management*, *3*(4), 5–37.

Lyn, E.O., & Zychowicz, E.J. (2003). The performance of new equity offerings in Hungary and Poland. *Global Finance Journal*, *14*(2), 181–195.

Maksimovic, V., & Pichler, P. (2001). Technological innovation and initial public offerings. *The Review of Financial Studies*, *14*(2), 459–494.

Mamcarz, K. (2010). Niedoszacowanie ceny emisyjnej akcji w pierwszej ofercie publicznej jako instrument komunikacji spółek akcyjnych z inwestorami. *Annales Universitatis Mariae Curie-Skłodowska, section H – Oeconomia*, *45*(1), 151–160.

McDonald, J.G., & Fisher, A.K. (1972). New-issue stock price behavior. *The Journal of Finance*, *27*(1), 97–102. **doi:10.1111/j.1540-6261.1972.tb00624.x**

Megginson, W.L., & Weiss, K.A. (1991). Venture capitalist certification in initial public offerings. *The Journal of Finance*, *46*(3), 879–903. **doi:10.1111/j.1540-6261.1991.tb03770.x**

Mizerka, J., & Lizińska J. (Eds.). (2017). *Pierwsze oferty publiczne w Polsce i na świecie. Kontrowersje wokół anomalii rynkowych*. Warszawa: CeDeWu.

Modigliani, F., & Miller, M.H. (1958). The cost of capital, corporation finance and the theory of investment. *The American Economic Review*, *48*(3), 261–297.

Modigliani, F., & Miller, M.H. (1963). Corporate income taxes and the cost of capital: A correction. *The American Economic Review*, *53*(3), 433–443.

Ostaszewski, J. (2006). *Finanse spółki akcyjnej*. Warszawa: Difin.

Pagano, M., Panetta, F., & Zingales, L. (1998). Why do companies go public? An empirical analysis. *Journal of Finance*, *53*(1), 27–64. **doi:10.1111/0022-1082.25448**

Podedworna-Tarnowska, D. (2013). Niedowartościowanie w procesie IPO. *Prace Naukowe Wyższej Szkoły Bankowej w Gdańsku*, *27*, 129–141.

Podedworna-Tarnowska, D. (2020). Niedowartościowanie spółek debiutujących na rynku głównym i alternatywnym Giełdy Papierów Wartościowych w Warszawie. In P. Antonowicz, P. Galiński & P. Pisarewicz (Eds.), *Perspektywa ekonomiczna, finansowa i prawna kreowania wartości w gospodarce* (pp. 267–281). Gdańsk: Wyd. UG.

Pomykalski, P., & Domagalski, M. (2015). IPO underpricing and financial analysts' forecast accuracy in Poland. *Acta Universitatis Lodziensis, Folia Oeconomica*, *1*(310), 117–132. **doi:10.18778/0208-6021.310.09**

Puławski, M. (2013). Koszt pierwszej oferty publicznej na rynku akcji w Polsce w latach 2008–2012. *Zeszyty Naukowe Uniwersytetu Szczecińskiego. Finanse, Rynki Finansowe, Ubezpieczenia*, *63*, 435–447.

Ritter, J.R. (1984). The "hot issue" market of 1980. *The Journal of Business*, *57*(2), 215–240. **doi:10.1086/296260**

Ritter, J.R. (1987). The costs of going public. *Journal of Financial Economics*, *19*(2), 269–281. **doi:10.1016/0304-405X(87)90005-5**

Ritter, J.R., & Welch, I. (2002). A review of IPO activity, pricing, and allocations. *Journal of Finance*, *57*(4), 1795–1828. **doi:10.1111/1540-6261.00478**

Rock, K. (1986). Why new issues are underpriced? *Journal of Financial Economics*, *15*(1–2), 187–212, **doi:10.1016/0304-405X(86)90054-1**

Ross, S.A., Westerfield, R.W., & Jordan, B.D. (2008). *Fundamentals of Corporate Finance*. New York: McGraw-Hill.

Rozporządzenie Ministra Finansów z dnia 19 października 2005 r. w sprawie informacji bieżących i okresowych przekazywanych przez emitentów papierów wartościowych, Dz.U. nr 209, poz. 1744 (Journal of Laws of 2005, No. 209, item 1744).

Rozporządzenie Ministra Finansów z dnia 19 lutego 2009 r. w sprawie informacji bieżących i okresowych przekazywanych przez emitentów papierów wartościowych oraz warunków uznawania za równoważne

informacji wymaganych przepisami prawa państwa niebędącego państwem członkowskim, Dz.U. 2009 nr 33 poz. 259 z późn.zm. (Journal of Laws of 2009, No. 33, item 259, as amended).

Rozporządzenie Ministra Finansów z dnia 29 marca 2018 r. w sprawie informacji bieżących i okresowych przekazywanych przez emitentów papierów wartościowych oraz warunków uznawania za równoważne informacji wymaganych przepisami prawa państwa niebędącego państwem członkowskim, Dz.U. 2018 poz. 757 (Journal of Laws of 2018, item 757).

Rudke, M. (2021). Zróżnicowany koszt ofert publicznych. *Parkiet*, 11 April.

Rydqvist, K., & Hogholm, K. (1995). Going public in the 1980s: Evidence from Sweden. *European Financial Management*, *1*(3), 287–315. **doi:10.1111/j.1468-036X.1995.tb00021.x**

Rzewuska, A., & Wrzesiński, M. (2016). Efektywność inwestycji w spółki przeprowadzające pierwszą ofertę publiczną, ze szczególnym uwzględnieniem spółek portfelowych funduszy private equity. In A. Karmańska & J. Ostaszewski (Eds.), *Przełamywanie dysonansów poznawczych jako czynnik stymulowania rozwoju nauk o finansach* (pp.133–161). Warszawa: SGH.

Sieradzki, R. (2016). *Niedowartościowanie pierwotnych ofert publicznych na przykładzie akcji notowanych na Giełdzie Papierów Wartościowych w Warszawie*. Rozprawa doktorska. Kraków: UE.

Sieradzki, R., & Zasępa, P. (2016). Underpricing of private equity/venture capital backed IPOs. Do they differ from other offers? *Argumenta Oeconomica*, *1*(36), 261–289. **doi:10.15611/aoe.2016.1.11**

Siwek, P. (2005). *Praktyka pierwszych ofert publicznych w Polsce*. Warszawa: CeDeWu.

Szczepankowski, T. (2007). *Wycena i zarządzanie wartością przedsiębiorstwa*. Warszawa: Wyd. Naukowe PWN.

Torstila, S. (2001). What determines IPO gross spreads in Europe? *European Financial Management*, *7*, 523–541. **doi:10.1111/1468-036X.00169**

Torstila, S. (2003). The clustering of IPO gross spreads: International evidence. *The Journal of Financial and Quantitative Analysis*, *38*(3), 673–694. **doi:10.2307/4126736**

Wawryszuk-Misztal, A. (2015). Bezpośrednie koszty emisji akcji w pierwszej ofercie publicznej na GPW w Warszawie. *Prace Naukowe Uniwersytetu Ekonomicznego we Wrocławiu*, *412*, 320–332. **doi:10.15611/pn.2015.412.25**

Welch, I. (1989). Seasoned offerings, imitation costs, and the underpricing of initial public offerings. *The Journal of Finance*, *44*(2), 421–449. **doi:10.1111/j.1540-6261.1989.tb05064.x**

Welch, I., & Ritter, J. (2002). A review of IPO activity, pricing and allocations. *The Journal of Finance*, *57*(4), 1795–1828. **doi:10.1111/1540-6261.00478**

Wołoszyn, A., & Zarzecki, D. (2013). The impact of the January effect on the IPO underpricing in Poland. *Folia Oeconomica Stetinensia*, *13*(1), 121–135. **doi:10.2478/foli-2013-0010**

Zarzecki, D., & Wołoszyn, A. (2016). The impact of value and growth companies on IPO underpricing on the Polish capital market. *Finanse, Rynki Finansowe, Ubezpieczenia*, *4*(82), 325–334. **doi:10.18276/frfu.2016.4.82/2-28**

Zasępa, P. (2019). Trends in underpricing of private equity backed IPO at the capital market in Poland in the years 2000–2018. *Annales Universitatis Mariae Curie-Skłodowska, sectio H – Oeconomia*, *53*(4), 153–162. **doi:10.17951/h.2019.53.4.153-162**

Zingales, L. (1995). Insider ownership and the decision to go public. *Review of Economic Studies*, *62*(3), 425–448. **doi:10.2307/2298036**

Appendix 1. Single-factor analysis

Variable	Variable coeff.	Variable *p*-value	Constant coeff.	Constant *p*-value	R^2
Total_costs					
offer_value	-0.0244***	0.000	0.5589***	0.000	0.060
IPO_prev_month	0.0018	0.564	0.1194***	0.000	0.001
ir_12m	0.0085	0.217	0.0060***	0.002	0.006
Year	-0.0059**	0.017	0.1513***	0.000	0.023
if_combined	-0.0018	0.925	0.1272***	0.000	0.000
if_new	0.0320	0.084	0.1092***	0.000	0.012
Indirect_costs					
offer_value	-0.0059	0.547	0.2158	0.217	0.001
IPO_prev_month	0.0070	0.153	0.0838***	0.001	0.008
ir_12m	0.0065	0.542	0.0852*	0.058	0.002
year	-0.0105***	0.006	0.1554***	0.000	0.030
if_combined	0.0292	0.335	0.1013***	0.000	0.004
if_new	-0.0034	0.906	0.113***	0.000	0.000
Direct_costs					
offer_value	-0.0261***	0.000	0.5204***	0.000	0.322
IPO_prev_month	-0.0014	0.355	0.0631***	0.000	0.003
ir_12m	0.0071**	0.026	0.0297**	0.026	0.020
year	-0.0002	0.860	0.0586***	0.000	0.000
if_combined	-0.0322***	0.000	0.0686***	0.000	0.051
if_new	0.0506***	0.000	0.0303***	0.000	0.142

Significance level: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Source: Author's own study.

DOI:10.17951/h.2022.56.4.161-183

ANNALES
UNIVERSITATIS MARIAE CURIE-SKŁODOWSKA
LUBLIN – POLONIA
VOL. LVI, 4 SECTIO H 2022

TOMASZ SKICA

tskica@wsiz.edu.pl
University of Information Technology and Management in Rzeszów
2 Sucharskiego St., 35-225 Rzeszów, Poland
ORCID ID: https://orcid.org/0000-0002-5620-610X

KATARZYNA MISZCZYŃSKA

katarzyna.miszczynska@uni.lodz.pl
University of Lodz. Department of Public Finance
68 Prez. Gabriela Narutowicza St., 90-136 Łódź, Poland
ORCID ID: https://orcid.org/0000-0003-4924-7605

PIOTR MISZCZYŃSKI

piotr.miszczynski@uni.lodz.pl
University of Lodz. Department of Operations Research
68 Prez. Gabriela Narutowicza St., 90-136 Łódź, Poland
ORCID ID: https://orcid.org/0000-0001-6959-9427

MAŁGORZATA LEŚNIOWSKA-GONTARZ

mlesniowska@wsiz.edu.pl
University of Information Technology and Management in Rzeszów. Department of Entrepreneurship
2 Sucharskiego St., 35-225 Rzeszów, Poland
ORCID ID: https://orcid.org/0000-0003-2228-4983

New Firms Formation in Medical, Creative and Agri-Food Sectors as a Function of Local Conditions and Budget Policy of Polish Communes

Keywords: budget policy; communes; new firms formation; entrepreneurship determinants

JEL: H70; H72; H75

How to quote this paper: Skica, T., Miszczyńska, K., Miszczyński, P., & Leśniowska-Gontarz, M. (2022). New Firms Formation in Medical, Creative and Agri-Food Sectors as a Function of Local Conditions and Budget Policy of Polish Communes. *Annales Universitatis Mariae Curie-Skłodowska, sectio H – Oeconomia*, Vol. 56, No. 4.

Abstract

Theoretical background: The article will help to answer the question what factors contribute to the emergence of new companies in medical, agri-food and creative sectors. Moreover, the aim of the article is to examine to what extent the budget policy of communes determines the creation of new enterprises in each of the analysed sectors separately.

Purpose of the article: The aim of the article is to examine the factors affecting new firms formation in medical, agri-food and creative sectors in Poland, as well as the impact of budget policy of local government units at commune level on entrepreneurship in chosen sectors.

Research methods: The study was conducted by means of a panel econometric model. In particular, the study was based on FEM estimation modelling based on 2,477 communes in the years 2010–2021.

Main findings: The conducted research confirmed that different factors affect new firms formation in studied sectors. The research proved that budget policy of communes influences new firms formation. Moreover, the study confirmed that individual elements of the local budget policy have a different impact on each economic activity. Thus, local budget policy should be profiled in terms of type of activity supported.

Introduction

Nowadays local development is seen as a key factor in overall development and social cohesion (Coffey & Polese, 1985; Vázquez-Barquero & Rodríguez-Cohard, 2019; Kaivanto & Zhang, 2022). Development of a country is one of the crucial tasks of each government and simultaneously probably one of the hardest (Chenery & Taylor, 1968). Local development is intrinsically associated with a multi-dimensional concept of change bringing together economic, social, cultural and environmental dimensions (Kisman & Tasar, 2014, p. 1690). It can be used by local government units (LGUs) as a tool for improving quality of life and supporting inhabitant's empowerment, strengthening local assets and social cohesion (Jones, 2014; Callanan, 2020; Tong & Saladrigues, 2022). This phenomenon can be described as a dynamic process including three key components: inputs, outputs and outcomes (Jouled et al., 2010, p. 10). The inputs include factors such as: area, sense of belonging, community, bottom-up, partnership, endogenous potential and proximity (Parker, 2001). In turn, outputs consist of local beneficiaries, self-help, increased incomes, access to services, quality, efficiency, relocation, diversification, new methods and increased local value. The outcomes consider collective and common goods, development, strategy, regeneration, effectiveness, future, social innovation, empowerment, legitimacy, well-being, amenities and collective intelligence (Jouled et al., 2010, pp.

10–11). Start-ups "arise from a specific context of social, economic and technical connections" that need to be established for them to grow (Baraldi et al., 2019, p. 58). La Rocca et al. (2019, p. 150) argue similarly that we need to learn more about "how ongoing interdependent actions emerge and evolve and ultimately how this affects the development of a new venture".

Local economic development strategies can underline improvement in processes and products, permitting local regions to exploit the market potential. This may concern both services and manufacturing. Local development practitioners may be able to measure in a various way (Robson & Iain, 2008, p. 39). In this context, the article considers the situation of creating new firms in selected sectors from the point of view of budget policy of communes in Poland (Skica et al., 2020). These factors have been described as economic. In addition, control variables were included in the analyses which affect the dynamics of entrepreneurship. The first group was made up of social factors such as education (Storey, 1982; Jafari-Sadeghi et al., 2019), and the second one was institutional (Boettke & Coyne, 2009; Urbano et al., 2019) and political (Skica et al., 2013) variables, representing, among others, the type of commune and its location in voivodeship (Skica et al., 2020).

Therefore, the main goal of the study was to analyse the impact of budget policy of LGUs on new business formation in three sectors: medical, creative and agri-food processing. The selection of sector under question refers to assumptions of "The Central Poland Development Strategy until 2020 with a 2030 Perspective". The solutions proposed in this strategy are based precisely on development and simultaneous support of these three sectors. Moreover, these sectors fit into regional smart specializations (SMART). In addition, there is no research on entrepreneurship presented from the perspective of the relationship between the budgetary policy of communes and new firms formation in these sectors. In the following study, answers to two research questions are provided. What factors contribute to the emergence of new companies in the medical, creative and agri-food sectors? To what extent does the budget policy of communes determine the creation of new enterprises in each of the analysed sectors separately? The authors stated the following hypothesis: the factors supporting the development of entrepreneurship in communes are not only LGUs budget policy, but also social, specialization and location factors.

Thanks to the approach applied, the research is innovative in its nature, thus, contributing to the development of analyses in this area, and its uniqueness results from panel analysis conducted simultaneously in three analysed aspects.

Literature review

New-business formation factors

Entrepreneurship is embedded in the theory and practice of economic growth and development (Hájek et al., 2015). Understanding factors that promote or mitigate entrepreneurship is crucial to regional economic development efforts (Fotopoulos & Storey, 2019; Grau & Reig, 2021), since a high level of new business significantly contributes to regional economic vitality (Lee et al., 2004). Entrepreneurship is a spatially uneven process (Stam, 2010). Literature identifies two trends in analyses in the field of new business formation process, referring to either analysis from the point of view of the decision-making or analysis of determinants of creating new companies (Andersson & Koster, 2011; Jukova et al., 2019).

There is a vast literature dedicated to determinants of new firms formation. Roman et al. (2018) as well as Guzman and Kacperczyk (2019) showed that macroeconomic and demographic variables are the most significant. Access to finance also plays a role in supporting entrepreneurship (Rusu & Roman, 2017; Nguyen, 2020; González-Moralejo et al., 2021; Pervan et al., 2019) and varies considerably from country to country (Kwon & Arenius, 2010). Urrutia and Marzábal (2015) confirmed a positive relationship between access to finance and entrepreneurship in the European Union (EU) and the United States of America (US). Moreover, De Clercq et al. (2012) proved that people's access to financial capital enhances the likelihood to start a business, while Anton and Bostan (2017) identified a strong positive relationship between access to finance and total entrepreneurial activity (TEA).

The notion of entrepreneurship was connected with quality of life (Delfmann et al., 2014; Puciato et al., 2021). The importance of entrepreneurship is being underlined in the literature not only for the economic growth (Fritsch & Mueller, 2007) but also for employment growth (Van Stel & Suddle, 2008; Porter, 2019). The positive relationship between entrepreneurship and agglomeration economies have been presented in the study of Van Stel and Suddle (2008). Delfmann et al. (2014) and Fotopoulos (2014) show a positive relationship between specialization and new firm formation. Fotopoulos (2014) indicates that interregional differences in new firm formation including key factors are time persistent. In turn, Delfmann et al. (2014, p. 1034) reveal that the relationship between entrepreneurship and population change depends heavily on the regional context.

Population growth is the next factor to be listed as a determinant of entrepreneurship (Bosma & Schutjens, 2011; Hopenhayn et al., 2022). Population growth has a positive long-term effect on entrepreneurship. In countries with a growing population and workforce, the share of the self-employed in the workforce is increasing (ILO, 1990).

The level of education constitutes the next entrepreneurship determinant (Backman & Kohlhase, 2022). In many cases this factor was chosen as a proxy of human

capital. Not only did Hájek et al. (2015) do it in their models when estimating entrepreneurship, but also Fotopoulos (2014) showed a positive relationship between this proxy of human capital and new firms.

In the literature there are also presented some other determinants of new-business formation, such as: foreigner status (Delfmann et al., 2014), wage uncertainty (Bishop, 2012), social climate and entrepreneurial culture (Belás et al., 2014; Capelleras et al., 2019; Cosci et al., 2021), evolutionary economic geography and path-dependency (Fotopoulos, 2014), income growth (Lee et al., 2004), as well as policy towards small and medium-sized enterprises (SMEs) and entrepreneurial ecosystems. Minniti (2008) as well as Ferrell and Fraedrich (2021) claim that policymakers shape the business environment by the active support of new and existing business entities through various entrepreneurship policies (Stevenson & Lundström, 2001). De Matteis et al. (2022) as well as Dvouletý and Lukeš (2016) discuss impact of public policies on entrepreneurship. In their opinion, policies focused on self-employed may lead to higher levels of entrepreneurial activity.

The EU membership opens a number of opportunities for starting SMEs (Piasecki et al., 2003). Accession to the EU made it necessary to decentralize institutional system supporting entrepreneurship and build foundations of entrepreneurship support policies by new member states (Rogut & Piasecki, 2020).

Infrastructure and institutional conditions for firms are defined as the business environment. Its role is rooted in the institutional theory and suggests that bad environment of formal institutions might discourage individuals to set up a business (Dempster & Isaacs, 2017).

Explaining the entrepreneurship factors, one cannot ignore an entrepreneurial ecosystem (Spigel, 2017; Volkmann et al., 2021; Leszczyński & Zieliński, 2021). The entrepreneurial ecosystem approach not only sees entrepreneurship as a result of the system, but also sees the importance of entrepreneurs as leaders in the creation of the economic system (Feld, 2012). To conclude, an entrepreneurial ecosystem is a structure that fosters entrepreneurship and governance, to coordinate and motivate entrepreneurial activities by setting rules and norms. Its role and significance in the processes of stimulating entrepreneurship cannot be overestimated (Brooks et al., 2019).

Local fiscal policy effects on LGUs economic development

Financial constraint is one of the crucial determinants of new business creation (Leon 2019; Liargovas et al., 2021). The importance of the fiscal imperative for local economic development is stressed, *inter alia*, by Ojede and Yamarik (2012) and others. Janeba and Osterloh (2013) projected a modern theoretical model of tax competition, including the local level. Their model forecasts that the capital tax on large authorities decreases more strongly with growing interregional rivalry. In

turn, Ojede and Yamarik (2012) studied the influence of taxes on state economic growth. Their results show that sales and property taxes, have a long-term outcome on growth as well. The study of Dennis et al. (2011) finds out that the effective state and local tax rate as a percentage of income of households is significantly influenced by whether a state has a multi-rate income tax, right-to-work laws, the liberalism of a state's electorate, the average tax burden in a state and past tax policy. According to Aničić et al. (2016, p. 263), local tax policy should be adequate, with a predictable amount of tax and incentive for activities that are dominant in the local economic structure (see Rickman & Wang, 2020).

Two fiscal titles, namely the property tax and the tax on means of transport have the greatest impact on the stimulation effects of the local tax policy. They are, therefore, the most effective tools to support local economic development (Felis & Rosłaniec, 2017; Gregova et al., 2021). The indicated reservation refers to the fact that not always applying fiscal preferences even in relation to the above-mentioned, most stimulating tax titles will translate into assumed development effects (Skica & Bem, 2014). Some of the research works directly prove the ineffectiveness of using local tax policy in the processes of stimulating the growth of the tax base (Korolewska, 2014, p. 106). However, communes budgetary policies are not solely based on taxes. Their integral part are expenses, including investment expenses. So, the key question is about their impact on local economic development. Well placed investments result in increasing commune's attractiveness to potential investors (Kożuch, 2006, p. 182). In addition, the real level of investment is very strongly correlated with the incomes of communes, and especially with the amount of their own revenues (Czempas, 1999, p. 37). Kawka (2012) claims that the condition for the effective impact of local authorities on local economic development is the development of infrastructure, which is the main instrument of local economic development. In turn, Barej (2011) proves that public sector investments affect economic development, technical progress, wealth of a given city and the local labour market. This view is shared by Perska (2014) as well as Surówka (2019) who treat investment expenditure as an instrument to support entrepreneurship. De Mello (2002) proves, however, the positive relationship between the three categories of budget expenditure (i.e. expenditure on health, housing and urbanisation) and local economic growth.

The literature explores the relationships between local budget policy and entrepreneurship (Skica et al., 2020), as well as the impact of decentralisation in financial terms on economic development (Bartlett et al., 2013). Despite such a wide spectrum of undertaken research threads, the analyses carried out so far do not provide an unequivocal answer to the impact of individual expenditure categories on entrepreneurship. They also do not identify relationships between the budgetary policies of communes and individual types of economic activity. Finally, in the studies discussed above, inference was based on a relatively narrow research sample. This is an objective limitation for extending research findings to the entire population. This article breaks the limits outlined above, presents a different approach to research on the

dynamics of new registrations, providing the significant added value in explaining the studied phenomenon of entrepreneurship.

Research methods

New-registered entities in analysed sectors – basic notion

The territorial division of Poland has a three-stage character. It is divided into 16 voivodeships, 314 counties, 66 cities with counties rights and 2,477 communes (i.e. 302 urban communes, 642 urban-rural communes and 1,533 rural communes). The communes have the widest range of tasks, and the largest scope of financial independence. They constitute the lowest level of the administrative division. Due to the fact that the structure of own revenues includes local taxes and fees, they have the greatest potential to shape a pro-development budget policy.

Phenomenon of the impact of LGUs on new firms formation depends on many socio-economic factors specific to a given sector of the economy. Only in the years 2012–2017, the number of newly established enterprises increased on average by 1.8% in the medical sector and 4.17% in the creative industry. In the agri-food industry, a drop in the number of newly established enterprises was recorded on average by 0.26%. The smallest fluctuations in the number of newly established firms were noticed in the medical industry. As for the spatial diversification, there was no clear trend in the formation of new enterprises depending on their location in individual voivodeships. It should be emphasised, however, that the upward trend in the number of enterprises in all sectors is noticeable. However, it should be underlined that this trend in creative sector was by far the largest (4.17%), in comparison with the medical and agri-food sectors.

Model specification testing

Undertaking the analysis of the new firms formation over time requires the use of modelling methods that provide an objective and comprehensive picture of the reality under study. This is where econometric modelling helps to achieve the set goals (Jabłońska & Stawska, 2020).

The implementation of the objectives assumed in the study and verification of the research hypothesis were based on the FEM estimation model (Nyström, 2008) in the years 2010–2021. Moreover, the 2,477 communes became the subject of the analysis, because they reflect the lowest level of the country's territorial division, they have the widest range of instruments to stimulate entrepreneurship.

Based on the literature review and analysis of available data (originated from Local Data Bank), potential variables were extracted. The stationary nature of the variables taken into the estimation had been examined (Barbieri, 2005) and confirmed

with the Levin et al. (2002) test after transformation of some variables (soc_bft, Exp_gen, Exp_inv, Grants, Gen_sub and av_salary) into first differences. A preliminary estimation of model parameter estimates was made (Baltagi, 2008). The pooled panel type model, implied lack of individual effects and no change during the analysed phenomenon (Dańska-Borsiak, 2011). All the observations were treated as coming from a simple random sample and the OLS methods were applied. For explanatory variables in the model it was decided, according to literature review, correlation and causality analysis, to choose the following set:

– Av_tax_rate: Average tax rates (the lower the better),

– Grant: Grants, total (the more the better),

– Gen_sub: General subvention total (the less the better),

– Av_salary: Average monthly gross wages and salaries (the lower the better),

– Soc_bft: Family benefits paid in each commune (the lower the better),

– Dvlp_plan_area: The area of the commune covered by the overall plans in force – communes (the more the better),

– Transf_area: Total area of agricultural land for which non-agricultural use was changed in the plans – communes (the more the better),

– Ger_Lessch: Gross education ratio. (the higher the better),

– Exp_gen: General expenditures (the lower the better),

– Exp_inv: Investment expenditures (the higher the better),

– Reg_unemp: Registered unemployed people (the lower the better),

– V: The location of the commune in the voivodeship,

– TP: Metro (Metropolitan communes), Rural (Rural communes), Metro rural (Metro-rural communes).

The general form of estimated models can, therefore, be written as:

$$\mathrm{NE_MED}_{it} = \alpha_0 + \alpha_1 \mathrm{Gen_sub}_{it} + \alpha_2 \mathrm{av_tax_rate}_{it} + \alpha_3 \mathrm{Reg_unemp}_{it} + \alpha_4 \mathrm{Transf_area}_{it} + \alpha_5 \mathrm{Soc_bft}_{it} + \alpha_6 \mathrm{av_salary}_{it} + \alpha_7 \mathrm{Exp_gen}_{it} + \alpha_8 \mathrm{Grants}_{it} + \alpha_9 V_{it} + \alpha_{10} TP_{it} + \varepsilon_{it}, \quad (1)$$

$$\mathrm{NE_CR}_{it} = \alpha_0 + \alpha_1 \mathrm{Gen_sub}_{it} + \alpha_2 \mathrm{av_tax_rate}_{it} + \alpha_3 \mathrm{Reg_unemp}_{it} + \alpha_4 \mathrm{Transf_area}_{it} + \alpha_5 \mathrm{Soc_bft}_{it} + \alpha_6 \mathrm{av_salary}_{it} + \alpha_7 \mathrm{Exp_inv}_{it} + \alpha_8 \mathrm{Ger_lessch}_{it} + \alpha_9 V_{it} + \alpha_{10} TP_{it} + \varepsilon_{it}, \quad (2)$$

$$\mathrm{NE_AGF}_{it} = \alpha_0 + \alpha_1 \mathrm{Gen_sub}_{it} + \alpha_2 \mathrm{Av_tax_rate}_{it} + \alpha_3 \mathrm{Reg_unemp}_{it} + \alpha_4 \mathrm{Transf_area}_{it} + \alpha_5 \mathrm{Dvlp_plan_area}_{it} + \alpha_6 \mathrm{Soc_bft}_{it} + \alpha_6 \mathrm{Av_salary}_{it} + \alpha_7 \mathrm{Exp_inv}_{it} + \alpha_8 V_{it} + \alpha_9 TP_{it} + \varepsilon_{it}, \quad (3)$$

where: *i*-commune for *i*=1,...,321, *t*-year, for *t*=1,...,11, variables description – see Table 4, α_0,... α_{10}, α_m, for *m*=1,...3, α_l, for *l*=1,...16, α_k for *k*=1,..., 19, α_n for *k*=1,..., 32 – structural parameter of the model, ε_{it} – random component of the model.

where: *i*-commune for *i*=1,...,321, *t*-year, for *t*=1,...,11, variables description – see Table 4, α_0,... α_{10}, α_m, for *m*=1,...3, α_l, for *l*=1,...16, α_k for *k*=1,..., 19, α_n for *k*=1,..., 32 – structural parameter of the model, ε_{it} – random component of the model.

The appropriate estimation procedure was determined based on the assumptions regarding constancy or randomness of group and time effects, i.e. selection of the appropriate pooled model, a fixed effects (FEM) or variable effects (REM) model was made. Therefore, a FEM estimation model was used to estimate the creation of a model of new enterprises in the analysed sectors (details are available on request).

Results

The analysis was conducted from the perspective of three sectors: medical, creative and agri-food. Table 1 presents the results of estimation of the models' parameters.

Table 1. Estimation results

Variables	Creative sector	Agri-food sector	Medical sector
const	1.45734** (0.0127)	1.61574*** (<0.0001)	1.82593*** (0.0001)
Gen_sub	−4.46748e-09*** (0.0004)	9.17949e-010** (0.0418)	-2.34000e-09** (0.0328)
Av_tax_rate	0.0230828*** (<0.0001)	-0.00462897*** (0.0018)	0.0112094*** (<0.0001)
Reg_unemp	8.85449e-05*** (<0.0001)	1.92355e-07 (0.9744)	6.64007e-05*** (<0.0001)
Transf_area	0.000339957*** (<0.0001)	1.48725e-06 (0.9337)	0.000130339*** (0.0003)
Soc_bft	4.43238e-06 (0.4525)	-6.30584e-06*** (0.0058)	1.09222e-05** (0.0318)
Av_salary	0.000231753 (0.1965)	-0.0021375** (0.0107)	0.000213552 (0.1578)
Dvlp_plan_area	−2.20666e-06 (0.6074)	8.98763e-07 (0.6840)	5.98212e-06* (0.0971)
Exp_inv	7.63339e-010 (0.2667)	2.81720e-010** (0.0418)	-5.17069e-010 (0.4714)
Ger_lessch	−0.00455091*** (<0.0001)	0.00318848*** (<0.0001)	-0.00421784*** (<0.0001)
Exp_gen	−4.31476e-010*** (0.0057)	-1.50291e-011 (0.7802)	-2.32528e-10 (0.1682)
Grants	6.56959e-09*** (<0.0001)	-5.68277e-010* (0.0588)	2.84696e-010*** (<0.0001)
vv_1			
vv_2			
vv_3	0.450441*** (<0.0001)	−0.0304902 (0.6191)	−0.132489 (0.2566)
vv_4	−1.06732*** (<0.0001)	−0.0481003 (0.4749)	−0.693367 *** (<0.0001)
vv_5	0.675657*** (<0.0001)	0.294987*** (<0.0001)	−0.175769 (0.1403)

Variables	Creative sector	Agri-food sector	Medical sector
vv_6	0.759077*** (<0.0001)	0.0888072 (0.1701)	−0.356693*** (0.0024)
vv_7	0.649505*** (<0.0001)	0.0853645 (0.2339)	−0.414018*** (0.0016)
vv_8	1.13544*** (<0.0001)	0.0818651 (0.3239)	−0.234587 (0.1460)
vv_9	0.548372*** (0.0023)	0.0258277 (0.7556)	−0.215297 (0.1699)
vv_10	−0.232064 (0.2716)	0.506832*** (0.0002)	−0.506026*** (0.0076)
vv_11	−1.17289*** (<0.0001)	−0.0314174 (0.7482)	−1.02530*** (<0.0001)
vv_12	0.896388*** (0.0002)	0.281575** (0.0135)	−0.333187 (0.1026)
vv_13	−0.438763 (0.1068)	0.128180 (0.3182)	−0.816652*** (0.0005)
vv_14	−0.754481** (0.0105)	0.171924 (0.2217)	−0.501293* (0.0515)
vv_15	−0.518048 (0.1252)	0.435781*** (0.0078)	−0.816189*** (0.0042)
vv_16	−1.74352*** (<0.0001)	0.402763** (0.0325)	−1.08272*** (0.0012)
Rural	-0.366415*** (<0.0001)	0.0481003** (0.0413)	-0.438589*** (<0.0001)
Metro	1.26196*** (<0.0001)	-0.0982062*** (0.0002)	1.27246*** (<0.0001)
Metro-rural			
VIF<10 Robust HAC estimation			

Source: Authors' own study.

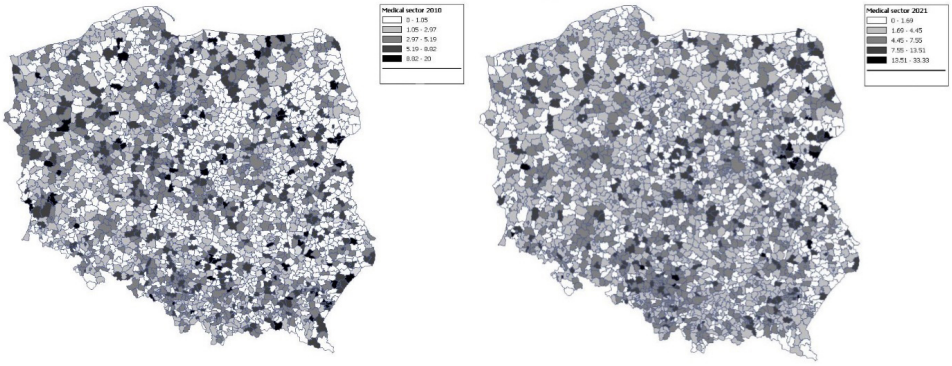

Figure 1. Spatial diversification of new registered medical sector entities in analyzed years

Source: Authors' own study in PQStat.

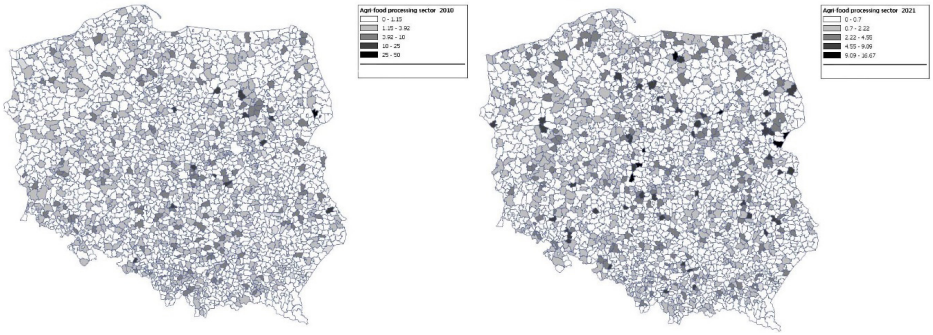

Figure 2. Spatial diversification of new registered agri-food processing sector entities in analyzed years

Source: Authors' own study in PQStat.

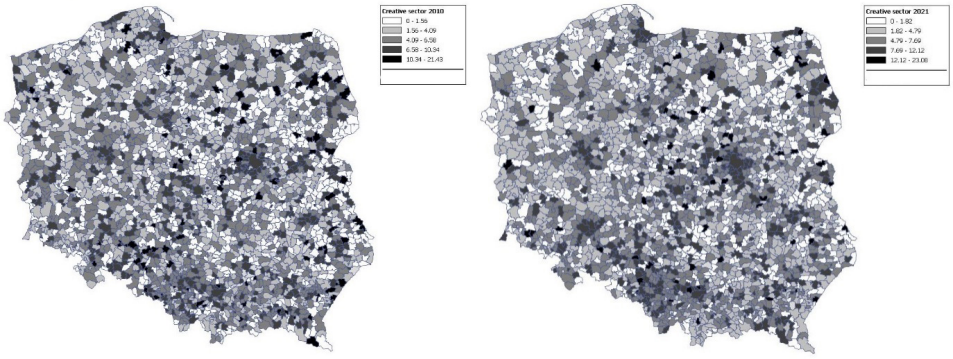

Figure 3. Spatial diversification of new registered creative sector entities in analyzed years

Source: Authors' own study in PQStat.

All the variables that were included in individual models were classified into 5 groups, which was also confirmed in the literature (Belás et al., 2014; Hájek et al., 2015; Jabłońska & Stawska, 2020):

1) economic: revenues (grants, general subventions) and expenditures of communes, registered unemployed people, investment expenditures, general expenditures – implementing policy instruments of economic and financial character,

2) social: gross education ratio (primary schools/lower secondary schools), social benefits,

3) institutional and political: type of commune (metro, rural, metro-rural), location of the commune in the voivodeship,

4) national policy: average salary, average tax rate,

5) spatial architecture: the area of the commune covered by the overall plans, the share of the area covered by the applicable local spatial development plans in the

total area, total area of agricultural land for which non-agricultural use was changed in the plans.

Normality tests for all the models were also conducted and they confirm the normal distribution of the random component. In almost all models the sings of the estimated variables were in line with the authors' expectations. In some cases, however, this has not happened, which may be sector-specific, and is explained in the following description and discussion.

Discussions

In the years 2010–2021, among the economic variables affecting firms formation from the medical sector were general subventions, grants (Harrison & Caron, 2008), gross education ratio, social benefits, the area of the commune covered by the overall plans in force, average tax rate, total area of agricultural land for which non-agricultural use was changed in the plans and registered unemployed people (Delfmann et al., 2014). The sign next to the variable of registered unemployed differs from the authors' expectations. However, it should be noted that the estimated value is very low. Thus, it could be interpreted that as the number of unemployed grows, their tendency to start a business as a solution to financial problems grows (see Nikiforou et al., 2019 or Kaivanto & Zhang, 2022). Contemporary formulations of "necessity" and "opportunity" entrepreneurship are aligned with the situational, contingent approach which emphasizes external environmental factors (like financial problems) over internal psychological traits and states. From a social perspective the social benefits played the most important role. The average salary also tends to be determinant of new firms formation in medical sector (Hegerty & Weresa, 2022). What is more, metropolitan communes were more conducive to the formation of new businesses than rural and metro-rural communes. The location of a given commune in the voivodeship is also not insignificant. In communes located in such voivodeships as Lubuskie, Małopolskie, Mazowieckie, Podlaskie, Pomorskie, Świętokrzyskie, Warmińsko-Mazurskie, Wielkopolskie and Zachodniopomorskie more enterprises were formed than in other parts of Poland (see Figure 1). The healthcare sector in these voivodeships operates more efficiently than in other voivodeships, which was confirmed in the study by Miszczyńska (2018, 2019, 2020). A high percentage of specialist doctors was also observed there, which also directly relates to the quality of services provided (confirmed in study by Rybarczyk-Szwajkowska et al., 2019). The number of specialist medical equipment is also high. In addition, it seems important that in these voivodeships significant expenditures on the healthcare sector are transferred from public funds. Financing possibilities have a direct impact on the financial condition of hospitals, which translates into the effectiveness of their operation which was confirmed in the study by Rastoka et al. (2022).

Among the economic variables affecting the formation of new firms in creative sector were general subventions (Harrison & Caron, 2008), gross education ratio, grants, general expenditures, average tax rate, transformed area, and registered unemployed people (see Cruz & Teixeira, 2021). From a social perspective, the educational level was also revealed as a determinant (Khefacha et al., 2013). From the national policy perspective, the average salary played the most important role (Bosma & Schutjens, 2011). Similarly, as in case of the medical sector, metropolitan were more conducive to the formation of new firms than metro-rural ones. This theory was reflected in research conducted by Barczyk-Ciuła and Satola (2022). As a generator of development, the metropolitan areas enter into functional interactions with neighbouring units, providing them with spatial, economic and social potential. However, as the model states, fewer enterprises from the creative sector are created in rural communes. It is because creative sector is characterised by strong internal differentiation in terms of the organizational forms used and the location of the headquarters (Kasprzak, 2018). Additionally, the creative sector in Poland is also made up of very small companies, often one-person ones, registered in the owner's place of residence. Often, they are family businesses with local employees (Mackiewicz et al., 2009). The location of a given commune in a particular voivodeship was also significant (see Figure 3). This was connected with larger funds allocated for culture than in other voivodeships. The results obtained in the above model coincide with the results of Suchecki's (2014, 2018) research, which confirmed that in these voivodships quite significant amounts were allocated to museums as well as protection and care of historic monuments, libraries, theatres, community centres and houses, day-care rooms and clubs.

The economic variables affecting new firms formation from the agri-food sector include: general subvention, grants, social benefits, average salary, gross education ratio, and average tax rate (Harrison & Caron, 2008; Misiąg et al., 2022). From a social perspective, the social benefits played the most important role. This was confirmed in the research done by Mehralizadeh and Sajady (2005). Without infrastructure the private sector cannot flourish. What is more, the level of average salary was also a determinant of the new firms formation. Moreover, in the agri-food sector only in rural communes the formation of new entities was bigger than in other types of communes. The specification of the analysed area, in this case of rural character, also correlates with global research results (Renski, 2008). According to recent studies (Zivojinovic et al., 2019; Do Adro & Franco, 2020), globalization poses challenges to rural areas given technological advances and intensified competition in agricultural markets.

The obtained modelling results indicate that the location of a given commune in the a particular voivodeship was also significant (see Figure 2). This may be related to the fact that these voivodeships have one of the highest percentages of allocations from the regional EU operational programs (OECD, 2018, p. 158) and are characterized by a predominant share of rural communes, which by their nature naturally favours the development of the agri-food sector.

To sum up, the modelling process considered not only the variables relating to the LGUs policy, but also those relating to the national policy and macroeconomic conditions that affect new firms formation. The analysis considered the impact of national policy on the development of the local government policy by adding general subsidies into inference process. For decades, at the local government authority level, much effort has been seen in the social development arena shadowing efforts to promote local businesses through business development services. National level organs set to promote businesses and to support the business agenda are expected to be the change catalysts and to propagate supportive policies for sustainable local economic development objectives (Issa, 2022).

Similarly, the unemployment was used, which combined elements of national level policies with macro-environment conditions (Kong & Prinz, 2020). Among the explanatory variables, we took also into account the average monthly gross salary, assuming that the higher its level, the lower the propensity to undertake business activity. People employed full-time, receiving stable and attractive wages, will not experience financial incentives to start a business (Rees & Shah, 1986). In contrast to low-income people who treat business activity as an opportunity to improve their own financial situation (Parker, 2001). This hypothesis is confirmed by Wosiek's (2021) study where a rise in unemployment rate has a positive effect on subsequent new business formation. The positive unemployment push effect is expected to be stronger in operational services. A complementary variable for the studied relationship between remuneration and propensity to entrepreneurship is the ratio of the average monthly gross salary in a given area to the national average. This variable makes it possible to capture the relationship between the distance separating counties from the national average and entrepreneurship. In line with the assumption discussed in relation to the previous variable, it was assumed that the greater the difference between the counties and the national average (lower average monthly gross income in the county), the greater the tendency to undertake business activity. A similar interpretation was adopted for the next variable, i.e. amounts of disbursed family benefits. The lower the value of the benefits paid, the higher the propensity for economic activity. Low social benefits are a factor that makes their beneficiaries look for opportunities to improve their income situation in starting a business (Koellinger et al., 2007).

Another variable was tax rates, which are a burden for people running a business. Limited tax jurisdiction enables communes to reduce tax rates (Brzozowska & Kogut-Jaworska, 2016). This stimulates local tax competition for investors (Buettner, 2001). The lower the tax rates, the lower the costs of running a business, and,thus, the more attractive the conditions for business location. Venancio et al.'s (2022) findings suggest that corporate taxation is an imperative constraint for entrepreneurship, particularly for high-quality entrepreneurs. These better-educated individuals find it easier to overcome the hurdles of tax legislation and to make use of the opportunities created by a specific tax reform. Contrary to tax revenues constituting own revenues, grants and subsidies constitute an external source of budgetary revenues

of communes. In the case of subsidies, the key is to link it with the commune's own incomes and its population (Świrska, 2008). The lower the two parameters, the greater the value of the subsidy granted to communes (Miszczuk, 2014). As a result, the smaller the value of the variable representing the subsidy, the more economically and demographically stable the commune is, and, therefore, more attractive for business (Czudec, 2014).

Among the explanatory variables, three were related to land development. The first is the area of the commune covered by the valid spatial development plans. The study assumes that the larger the area is organised with land use plans, the easier it is to assess its suitability for the company's location from the perspective of the availability of investment areas (Dylewski, 2006). The second variable is the share of the area covered by the valid local spatial development plans in the total area. The higher this percentage, the smaller the uncertainty as to the future destination of the remaining areas and,thus, the potential obstacles to the development of economic activity in a given area (Domański, 2002). Another variable is the area of agricultural land for which the use of non-agricultural land has been changed in the plans. Such decisions are often made in connection with the preparation of land for business activity. Thus, the increase in the value of this variable to some extent can be associated with the creation of conditions by the commune for the location of investments and the climate for entrepreneurship (Sztando, 2017).

The research also considered two variables related to education, i.e. gross enrolment rate for primary schools and an analogous variable for lower secondary schools. Both variables represent human capital (Kyriacou, 1992). The higher their level, the higher the human capital resources in the commune. The latter, in the long term, shapes future labour resources, acting as a stimulus for initiating activities in a given area that use endogenous potential (Acs & Armington, 2004; Vodă & Nelu, 2019. Recent research study (Ndofirepi, 2020) shows that the effects of entrepreneurship education variable had a positive and statistically significant relationship with need for achievement, risk-taking propensity, internal locus of control and entrepreneurial goal intentions.

The next two explanatory variables relate to the labour market. They include working people as well as unemployed registered in the commune. The working population constitute a measure of general economic development (Accetturo & De Blasio, 2012). The higher the value of the variable, the more economically developed the commune, and,thus, more attractive for business (Garofoli, 1992). A complementary measure of economic development is the number of the unemployed. The lower the level of the variable, the better the condition of the local economy (Ferragina & Pastore, 2008; Content et al., 2019; García-Estévez & Duch-Brown, 2020), which encourages the establishment of new firms in a given area. The financial status of the commune's inhabitants determines the local demand for products and services offered by economic entities established in a given area (Malmendier & Shen, 2018).

Finally, the generic categories of communes were considered as explanatory variables, distinguishing urban, rural and urban-rural communes and analysing their rela-

tionship with entrepreneurship (Bieńkowska-Gołasa, 2015). Moreover, the voivodeships to which the examined communes were assigned were used as the explanatory variable. In the case of rural communes, it was assumed that their status favours the creation of agri-food enterprises in their area, while in the case of urban-rural and urban communes, it was assumed that they were positively correlated with initiating economic activity in the creative and medical sectors. By including voivodeships in the analysis, the authors aimed to identify spatial patterns in terms of new enterprises in each of the analysed sectors. This procedure will allow them to be compared with the developed regional smart specializations in order to determine whether the strategies adopted in individual regions coincide with the profiles of companies established in their area.

Conclusions

The results of the conducted research study are a source of valuable suggestions for local policy makers responsible for creating the budgetary policy of communes and its potential effects. Examining communes and their budget policies, their implications should be formulated towards local authorities. At the local level, we propose that the implications go in the direction of linking fiscal policy to the sector the authorities want to support. The orientation of the local budget policy should correspond to the specificity of the supported sector (Accordino, 2020).

In connection with the above, local authorities, from a perspective of creative sector, should put emphasis on improving education level and spending investment expenditures in order to obtain higher rate of new business formation. In turn, local policy makers can support agri-food sector using a tool such as development planned area. Supporting development planned area at local level will positively affect the rate of new business formation. As the representatives of the medical sector claim, local authorities should pay attention to the grants, which are key factor determinants for this type of sector.

Furthermore, it is necessary for communes to end their policy called: "one size fits all". Therefore, another element of the recommendations for policy makers should be included: to avoid transferring solutions that work well in one commune onto the ground of another commune. Both of them may be oriented towards supporting other sectors, as a result, copying solutions from one commune to another (in terms of budget policy) will turn out to be ineffective. Fiscal policy should resemble an investment. The current targeting of financial flows is to bring benefits in the future in the form of budget revenue streams resulting from economic entities located in communes. Not well addressed support will not only fail to meet these expectations, but will also core out the general budget. Supporting the budget policy of a specific sector should be related to the location of the commune and its type (e.g. orientation towards the agri-food sector should not take place in communes where the land conditions do not serve this purpose).

To sum up, it should be noted that the hypothesis set in the study was verified positively. Thus, the economic, social, institutional and political factors of Polish communes have a significant impact on the creation of new enterprises in the medical, creative and agri-food sectors (confirmed as well in another research studies: Stuetzer et al., 2018; Solomon et al., 2021). The factors that mostly caused an increase in activity in the medical sector are: general subventions, grants, gross education ratio, social benefits, the area of the commune covered by the overall plans in force, average tax rate, total area of agricultural land for which non-agricultural use was changed in the plans and registered unemployed people. In the creative sector the most important indicators included: general subventions, gross education ratio, grants, general expenditures, average tax rate, transformed area, and registered unemployed people. The creation of new entities in the agri-food sector was mainly conditioned by general subvention, grants, social benefits, average salary, gross education ratio, and average tax rate.

All in all, the visualization of the determinants was aimed at indicating the directions of changes to policy makers, which should be introduced in the development strategies. The attention was drawn to the differences in the creation of new enterprises between different sectors, which should be a hint for policy makers and result in the creation of a new theoretical framework for development strategies depending on the sectors and their characteristics. Thus, it would allow for the adaptation of tools supporting the local development in the context of the creation of new enterprises, and not the other way around.

References

Accetturo, A., & De Blasio, G. (2012). Policies for local development: An evaluation of Italy's "Patti Territoriali". *Regional Science and Urban Economics*, *42*(1–2), 15–26. **doi:10.1016/j.regsciurbeco.2011.04.005**

Accordino, P. (2020). Fiscal policy for sustainable development: The Italian way to promote innovative entrepreneurship according to European Union rules. In V. Mauerhofer, D. Rupo & L. Tarquinio (Eds.), *Sustainability and Law* (pp. 201–219). Cham: Springer. **doi:10.1007/978-3-030-42630-9_11**

Acs, Z., & Armington, C. (2004). Employment growth and entrepreneurial activity in cities. *Regional Studies*, *38*(8), 911–927. **doi:10.1080/0034340042000280938**

Andersson, M., & Koster, S. (2011). Sources of persistence in regional start-up rates – evidence from Sweden. *Journal of Economic Geography*, *11*(1), 179–201. **doi:10.1093/jeg/lbp069**

Aničić, J., Jelić, M., & Đurović, J.M. (2016). Local tax policy in the function of development of municipalities in Serbia. *Procedia – Social and Behavioral Sciences*, *221*, 262–269.

Anton, S.G., & Bostan, I. (2017). The role of access to finance in explaining cross-national variation in entrepreneurial activity: A panel data approach. *Sustainability*, *9*(11), 1–16. **doi:10.3390/su9111947**

Backman, M., & Kohlhase, J.E. (2022). Labor force diversity and new firm formation. *The Annals of Regional Science*, *68*(1), 9–28.

Baltagi, B.H. (2008). *Econometric Analysis of Panel Data* (Vol. 4). Chichester: John Wiley & Sons.

Baraldi, E., Ingemansson-Havenvid, M., Linné, A., & Öberg, C. (2019). Start-ups and networks: Interactive perspectives and a research agenda. *Industrial Marketing Management*, *80*, 58–67.

Barbieri, L. (2005). Panel unit root tests: A review. *Journal of Statistics: Advances in Theory and Applications 1*(2), 117–158.

Barczyk-Ciuła, J., & Satola, L. (2022). Conditions for the development of entrepreneurship in the municipalities of the Krakow Metropolitan Area. *Annals of the Polish Association of Agricultural and Agribusiness Economists*, XXIV, 13–26. **doi:10.5604/01.3001.0016.1359**

Barej, E. (2011). Znaczenie wydatków majątkowych w budowaniu konkurencyjności miast (na przykładzie wybranych miast województwa zachodniopomorskiego. *Folia Pomeranae Universitatis Technologiae Stetinensis. Oeconomica*, *65*, 7–16.

Bartlett, W., Malekovic, S., & Monastiriotis, V. (Eds.). (2013). *Decentralization and Local Development in South East Europe*. Springer.

Belás, J., Bartoš, P., Habánik, J., & Novák, P. (2014). Significant attributes of the business environment in small and medium-sized enterprises. *Economics and Sociology*, *7*(3), 22–39. **doi:10.14254/2071-789X.2014/7-3/2**

Bieńkowska-Gołasa, W. (2015). Entrepreneurship and trends in development of rural communes in Poland. *Economic Science for Rural Development*, *108*, 110–150.

Bishop, P. (2012). Knowledge, diversity and entrepreneurship: a spatial analysis of new firm formation in Great Britain. *Entrepreneurship & Regional Development*, *24*(7–8), 641–660. **doi:10.1080/08985626.2011.617786**

Boettke, P.J., & Coyne, C.J. (2009). Context matters: Institutions and entrepreneurship. *Foundations and Trends in Entrepreneurship, 5*(3), 135–209. **doi:10.1561/0300000018**

Bosma, N., & Schutjens, V. (2011). Understanding regional variation in entrepreneurial activity and entrepreneurial attitude in Europe. *The Annals of Regional Science*, *47*(3), 711–742.

Brooks, C., Vorley, T., & Gherhes, C. (2019). Entrepreneurial ecosystems in Poland: Panacea, paper tiger or Pandora's box? *Journal of Entrepreneurship and Public Policy*, *8*(3), 319–338. **doi:10.1108/JEPP-04-2019-0036**

Brzozowska, K., & Kogut-Jaworska, M. (2016). Władztwo podatkowe w ocenie samodzielności dochodowej gmin w Polsce. *Annales Universitatis Mariae Curie-Skłodowska, Sectio H – Oeconomia*, *50*(1), 327–337. **doi:10.17951/h.2016.50.1.327**

Callanan, M. (2020). Reforming local government: Past, present and future. *Administration*, *68*(4), 201–214.

Capelleras, J.L., Contin-Pilart, I., Larraza-Kintana, M., & Martin-Sanchez, V. (2019). Entrepreneurs' human capital and growth aspirations: The moderating role of regional entrepreneurial culture. *Small Business Economics*, *52*(1), 3–25.

Chenery, H.B., & Taylor, L. (1968). Development patterns: among countries and over time. *The Review of Economics and Statistics*, 391–416.

Coffey, W.J., &Polese, M. (1985). Local development: Conceptual bases and policy implications. *Regional Studies*, *19*(2), 85–93.

Content, J., Frenken, K., & Jordaan, J.A. (2019). Does related variety foster regional entrepreneurship? Evidence from European regions. *Regional Studies*, *53*, 1531–1543. **doi:10.1080/00343404.2019.1595565**

Cosci, S., Meliciani, V., & Pini, M. (2021). Historical roots of innovative entrepreneurial culture: The case of Italian regions. *Regional Studies*, 1–15.

Cruz, S.C.S., & Teixeira, A.A. (2021). Spatial analysis of new firm formation in creative industries before and during the world economic crisis. *The Annals of Regional Science*, *67*(2), 385–413.

Czempas, J. (1999). Skłonność do inwestowania w gminach województwa katowickiego w latach 1992–1996. *Studia Ekonomiczne/Akademia Ekonomiczna w Katowicach*, *6*, 121–152.

Czudec, A. (2014). Znaczenie transferów zewnętrznych w kształtowaniu stabilności finansowej jednostek samorządu terytorialnego. *Nierówności Społeczne a Wzrost Gospodarczy*, *40*, 17–30.

Dańska-Borsiak, B. (2011). *Dynamiczne modele panelowe w badaniach ekonomicznych*. Łódź: Wyd. UŁ.

De Clercq, D., Meuleman, M., & Wright, M. (2012). A cross-country investigation of micro-angel investment activity: The roles of new business opportunities and institutions. *International Business Review*, *21*(2), 117–129. **doi:10.1016/j.ibusrev.2011.02.001**

De Matteis, F., Bianchi, P., Striani, F., & Preite, D. (2022). The relationship between local public policies for economic development and entrepreneurial presence: The Italian case. *Administration & Society*, *54*(1), 117–144.

De Mello Jr, L.R. (2002). Public finance, government spending and economic growth: The case of local governments in Brazil. *Applied Economics*, *34*(15), 1871–1883. **doi:10.1080/00036840210128726**

Delfmann, H., Koster, S., McCann, P., & Van Dijk, J. (2014). Population change and new firm formation in urban and rural regions. *Regional Studies, 48*(6), 1034–1050. **doi:10.1080/00343404.2013.867430**

Dempster, G., & Isaacs, J. (2017). Entrepreneurship, corruption and economic freedom. *Journal of Entrepreneurship and Public Policy*, *2*, 181–192.

Do Adro, F., Franco, M. (2020). Rural and agri-entrepreneurial networks: A qualitative case study. *Land Use Policy*, *99*(2). **doi:10.1016/j.landusepol.2020.105117**

Domański, R. (2002). *Gospodarka przestrzenna*. Warszawa: PWN.

Dvouletý, O., & Lukeš, M. (2016). Review of empirical studies on self-employment out of unemployment: do self-employment policies make a positive impact? *International Review of Entrepreneurship*, *14*(3), 361–376.

Dylewski, M. (2006). Kierunki prowadzenia analizy finansowej w procesie zarządzania finansami. In M. Dylewski, B. Filipiak-Dylewska, & M Gorzałczyńska-Koczkodaj (Eds.), *Finanse samorządowe. Narzędzia, decyzje, procesy* (pp. 144–151). Warszawa: Wyd. Naukowe PWN.

Feld, B. (2012). *Startup Communities: Building an Entrepreneurial Ecosystem in Your City*. New York: Wiley.

Felis, P., & Rosłaniec, H. (2017). Zróżnicowanie fiskalnych skutków polityki podatkowej gmin w Polsce w zakresie podatku od środków transportowych. *Studia Regionalne i Lokalne*, *2*(68), 88–118.

Ferragina, A.M., & Pastore, F. (2008). Mind the gap: Unemployment in the new EU regions. *Journal of Economic Surveys*, *22*(1), 73–113.

Ferrell, O.C., & Fraedrich, J. (2021). *Business Ethics: Ethical Decision Making and Cases*. Boston: Cengage Learning.

Fotopoulos, G. (2014). On the spatial stickiness of UK new firm formation rates. *Journal of Economic Geography*, *14*(3), 651–679. **doi:10.1093/jeg/lbt011**

Fotopoulos, G., & Storey, D.J. (2019). Public policies to enhance regional entrepreneurship: Another programme failing to deliver? *Small Business Economics*, *53*(1), 189–209.

Fritsch, M., & Mueller, P. (2007). The persistence of regional new business formation-activity over time – assessing the potential of policy promotion programs. *Journal of Evolutionary Economics*, *17*(3), 299–315. **doi:10.1007/s00191-007-0056-6**

Garofoli, G. (Ed.). (1992). *Endogenous Development and Southern Europe*. Avebury: Aldershot.

García-Estévez, J., & Duch-Brown, N. (2020). The relationship between new universities and new firms: Evidence from a quasi-natural experiment in Spain. *Regional Studies, Regional Science*, *7*(1), 244–266. **doi:10.1080/21681376.2020.1784778**

Grau, A., & Reig, A. (2021). Operating leverage and profitability of SMEs: Agri-food industry in Europe. *Small Business Economics*, *57*(1), 221–242.

Gregova, E., Valaskova, K., Adamko, P., Tumpach, M., & Jaros, J. (2020). Predicting financial distress of Slovak enterprises: Comparison of selected traditional and learning algorithms methods. *Sustainability*, *12*, 1–17.

González-Moralejo, S.A., Cortés, M.G., & Miquel, J.F.L. (2021). Are small and medium-size food industry firms profitable? Explaining differences in their performance: The case of the Valencia Region. *Economia Agro-Alimentare/Food Economy*, *8*(2), 1–24.

Guzman, J., & Kacperczyk, A.O. (2019). Gender gap in entrepreneurship. *Research Policy*, *48*(7), 1666–1680.

Harrison, J., & Caron, H. (2008). *Foundations in Strategic Management*. Mason: Cengage Learning.

Hájek, O., Nekolová, J., & Novosák, J. (2015). Determinants of new business formation – some lessons from the Czech Republic. *Economics and Sociology*, *8*(1), 147–156. **doi:10.14254/2071-789X.2015/8-1/11**

Hegerty, S.W., & Weresa, M. (2022). The determinants of innovative capacity in the medical sector in Central Europe and across the European Union. *Technological and Economic Development of Economy*, 1–17.

Hopenhayn, H., Neira, J., & Singhania, R. (2022). From population growth to firm demographics: Implications for concentration, entrepreneurship and the labor share. *Econometrica*, *90*(4), 1879–1914.

ILO (International Labour Organization). (1990). *The Promotion of Self-Employment.* Geneva: ILO.

Issa, F.H. (2022). Determining the nexus between national policies and local practices in the promotion of businesses for local economic development in Tanzania. *Journal of Development Policy and Practice*, *7*(1), 53–70. **doi:10.1177/24551333211047698**

Jabłońska, M., & Stawska, J. (2020). The key factors affecting entrepreneurship: A comparative analysis. *Zbornikradova Ekonomskogo Fakulteta u Rijeci: Časopisza Ekonomsku Teoriju i Praksu*, *38*(1), 125–146. **doi:10.18045/zbefri.2020.1.125**

Jafari-Sadeghi, V., Kimiagari, S., & Biancone, P.P. (2019). Level of education and knowledge, foresight competency and international entrepreneurship: a study of human capital determinants in the European countries. *European Business Review*, 1–33. **doi:10.1108/EBR-05-2018-0098**

Janeba, E., & Osterloh, S. (2013). Tax and the city – a theory of local tax competition. *Journal of Public Economics*, *106*, 89–100. **doi:10.1016/j.jpubeco.2013.07.004**

Jones, H. (2014). The best borough in the country for cohesion! Managing place and multiculture in local government. *Ethnic and Racial Studies*, *37*(4), 605–620. **doi:10.1080/01419870.2013.808758**

Jouled, M., Kolosy, K., Pellegrin, J.P., Ramsden, P., Szegvari, P., & Chambon, N. (2010). *Cohesion Policy Support for Local Development: Best Practice and Future Policy Options*. European Commission.

Jukova, E.E., Ilina, I.Y., Gundarin, M.V., Potekhina, E.V., Misanova, I.N., & Zotova, A.I. (2019). Planning a new business: Typical mistakes of a business plan in the service sector. *Journal of Environmental Management and Tourism*, *10*(2), 441–447.

Kaivanto, K., & Zhang, P. (2022). Is business formation driven by sentiment or fundamentals? *The European Journal of Finance*. **doi:10.1080/1351847X.2022.2038648**

Kasprzak, R. (2018). Rozwój sektora kreatywnego w Polsce w latach 2009–2016. *Studia i Prace Kolegium Zarządzania i Finansów*, *162*, 11–23.

Kawka, A. (2012). Wydatki inwestycyjne jako instrument rozwoju lokalnego gmin. *Prace Naukowe Uniwersytetu Ekonomicznego we Wrocławiu*, *243*, 27–34.

Khefacha, I., Belkacem, L., & Mansouri, F. (2013). The decision to start a new firm: An econometric analysis of regional entrepreneurship in Tunisia. *IBIMA Business Review*, *2013*, 1–12. **doi:10.5171/2013.345565**

Kisman, Z.A., & Tasar, I. (2014). The key elements of local development. *Procedia – Economics and Finance*, *15*, 1689–1696. **doi:10.1016/S2212-5671(14)00642-X**

Koellinger, P., Minniti, M., & Schade, C. (2007). "I think I can, I think I can": Overconfidence and entrepreneurial behavior. *Journal of Economic Psychology*, *28*(4), 502–527. **doi:10.1016/j.joep.2006.11.002**

Kong, E., & Prinz, D. (2020). The impact of shutdown policies on unemployment during a pandemic. *Journal of Public Economics*, *17*, 24–72.

Korolewska, M. (2014). Polityka podatkowa gmin i miast na prawach powiatu w zakresie podatku od nieruchomości a wspieranie przedsiębiorczości przez samorząd terytorialny. *Studia BAS*, *1*, 85–108.

Kożuch, A. (2006). Instrumenty zarządzania rozwojem lokalnym. *Roczniki Naukowe Stowarzyszenia Ekonomistów Rolnictwa i Agrobiznesu*, *4*(08), 177–181.

Kwon, S.W., & Arenius, P. (2010). Nations of entrepreneurs: A social capital perspective. *Journal of Business Venturing*, *25*(3), 315–330.

Kyriacou, C. (1992). *Effective Teaching in Schools*. Padstow: Simon & Schuster Education.

La Rocca, A., Perna, A., Snehota, I., & Ciabuschi, F. (2019). The role of supplier relationships in the development of new business ventures. *Industrial Marketing Management*, *80*, 149–159.

Lee, S.Y., Florida, R., & Acs, Z. (2004). Creativity and entrepreneurship: A regional analysis of new firm formation. *Regional Studies*, *38*(8), 879–891. **doi:10.1080/0034340042000280910**

Leon, F. (2019). Long-term finance and entrepreneurship. *Economic Systems*, *43*(2), 1–36. **doi:10.1016/j.ecosys.2018.10.004**

Leszczyński, G.. & Zieliński M. (2021). Food sector as an interactive business world: A framework for research on innovations. *Energies*, *14*, 3312. **doi:10.3390/ en14113312**

Levin, A., Lin, C.F., & Chu, C.S.J. (2002). Unit root tests in panel data: Asymptotic and finite-sample properties. *Journal of Econometrics*, *108*(1), 1–24. **doi:10.1016/S0304-4076(01)00098-7**

Liargovas, P., Psychalis, M., & Apostolopoulos, N. (2021). Fiscal policy, growth and entrepreneurship in the EMU. *European Politics and Society*, 1–22.

Mackiewicz, M., Michorowska, B., & Śliwka, A. (2009). *Analiza potrzeb i rozwoju przemysłów kreatywnych.* Raport wykonany na zlecenie Ministerstwa Gospodarki. Warszawa: ECORYS.

Malmendier, U., & Shen, L.S. (2018). *Scarred Consumption. FRB International Finance Discussion Paper 1259*. Retrieved from https://ssrn.com/abstract=3473070

Mehralizadeh, Y., & Sajady, H.S. (2005). *A Study of Factors Related to Successful and Failure of Entrepreneurs of Small Industrial Business with Emphasis on Their Level of Education and Training.* Paper presented at the European Conference on Educational Research. University College Dublin.

Minniti, M. (2008). The role of government policy on entrepreneurial activity: Productive, unproductive, or destructive? *Entrepreneurship Theory and Practice*, *32*(5), 779–790. **doi:10.1111/j.1540-6520.2008.00255.x**

Misiąg, J., Misiąg, W., Palimąka, K., Rodzinka, J., & Skica, T. (2022). *Publiczne wsparcie rolnictwa i rozwoju obszarów wiejskich w świetle celów Wspólnej Polityki Rolnej UE i polskiej polityki rozwoju*. Rzeszów: Wyd. Aspra.

Miszczuk, A. (2014). Rozwój obszarów wiejskich w regionalnych dokumentach strategicznych 2014–2020 (na przykładzie województw: lubelskiego i podkarpackiego). In W. Kamińska, K. Heffner (Eds.), *Polityka spójności UE a rozwój obszarów wiejskich: stare problemy i nowe wyzwania* (pp. 219–243). Studia KPZK PAN CLVI.

Miszczyńska, K. (2018). The non-parametric approach in the assessment of the effectiveness of the health care sector in Poland. *Metody Ilościowe w Badaniach Ekonomicznych*, *19*(4), 228–237. **doi:10.22630/MIBE.2018.19.3.21**

Miszczyńska, K. (2019). *Efektywność szpitali publicznych w Łodzi*. Łódź: Wyd. UŁ.

Miszczyńska, K. (2020). *Uwarunkowania zadłużenia szpitali w Polsce*. Łódź: Wyd. UŁ.

Ndofirepi, T.M. (2020). Relationship between entrepreneurship education and entrepreneurial goal intentions: psychological traits as mediators. *Journal of* Innovation *and* Entrepreneurship, *9*(2). **doi:10.1186/s13731-020-0115-x**

Nguyen, T.T. (2020). The impact of access to finance and environmental factors on entrepreneurial intention: The mediator role of entrepreneurial behavioural control. *Entrepreneurial Business and Economics Review*, *8*(2), 127–140.

Nikiforou, A., Dencker, J.C., & Gruber, M. (2019). Necessity entrepreneurship and industry choice in new firm creation. *Strategic Management Journal*, *40*(13), 2165–2190.

Nyström, K. (2008). The institutions of economic freedom and entrepreneurship: Evidence from panel data. *Public Choice*, *136* (3–4), 269–282.

OECD (2018). *OECD Reviews of Rural Development Policies: Poland 2018*. OECD Publishing.

Ojede, A., & Yamarik, S. (2012). Tax policy and state economic growth: The long-run and short-run of it. *Economics Letters*, *116*(2), 161–165. doi:10.1016/j.econlet.2012.02.023

Parker, P. (2001). Local-global partnerships for high-tech development: Integrating top-down and bottom-up models. *Economic Development Quarterly*, *15*(2), 149–167. **doi:10.1177/089124240101500204**

Perska, A. (2014). Wydatki inwestycyjne jednostek samorządu terytorialnego jako instrument wspierania przedsiębiorczości. *Przedsiębiorczość – Edukacja*, *10*, 285–294. **doi:10.24917/20833296.10.21**

Pervan, M., Pervan, I., & Ćurak, M. (2019. Determinants of firm profitability in the Croatian manufacturing industry: Evidence from dynamic panel analysis. *Economic Research – Ekonomska Istraživanja*, *32*, 968–981.

Piasecki, B., Rogut, A., & Smallbone, D. (2003). *The Impact of Poland's Integration with the European Union on SME Sector*. University of Lodz. Retrieved from http://wz.uni.lodz.pl/katpipp/eng/abstr/abstrleng.html

Porter, K.K. (2019). Conclusion: The "Next" Supplier Diversity Disruption: Supplier Inclusion. In *Implementing Supplier Diversity* (pp. 133–134). Cham: Palgrave Macmillan.

Puciato, D., Rozpara, M., Bugdol, M., Borys, T., & Słaby, T. (2021). Socioeconomic determinants of health-related quality of life of entrepreneurs. A cross-sectional study. *International Journal of Environmental Research and Public Health*, *18*(22), 12103.

Rastoka, J., Petkovic, S., & Radicic, D. (2022). Impact of entrepreneurship on the quality of public health sector institutions and policies. *International Journal of Environmental Research and Public Health*, *19*(3), 1–25.

Rees, H., & Shah, A. (1986). An empirical analysis of self-employment in the UK. *Journal of Applied Econometrics*, *1*(1), 95–108.

Renski, H. (2008). New firm entry, survival, and growth in the United States: A comparison of urban, suburban, and rural areas. *Journal of the American Planning Association*, *75*(1), 60–77. **doi:10.1080/01944360802558424**

Rickman, D., & Wang, H. (2020). US state and local fiscal policy and economic activity: Do we know more now? *Journal of Economic Surveys*, *34*(2), 424–465.

Robson, B., & Iain, D. (2008). *Defining the Objectives of Local Development Strategies. Making Local Strategies Work Building the Evidence Base*. OECD. **doi:10.1787/9789264044869-3-en**

Rogut, A., & Piasecki, B. (2020). *Entrepreneurship and the Middle-Income Trap: The Case of Poland. A Research Agenda for Entrepreneurship Policy*. Cheltenham – Northampton: Edward Elgar Publishing.

Roman, A., Bilan, I., & Ciumaş, C. (2018). What drives the creation of new businesses? A panel-data analysis for EU countries. *Emerging Markets Finance and Trade*, *54*(3), 508–536**.** **doi:10.1080/1540496X.2017.1412304**

Rusu, V.D., & Roman, A. (2017). Entrepreneurial activity in the EU: An empirical evaluation of its determinants. *Sustainability*, *9*(10), 1679. **doi:10.3390/su9101679**

Rybarczyk-Szwajkowska, A., Cichońska, D., & Holly, R. (2019). Postrzeganie jakości szpitalnych świadczeń zdrowotnych przez kadrę zarządczą szpitali publicznych. *Medycyna Pracy*, *67*(3), 365–373. **doi:10.13075/mp.5893.00233**

Skica, T., Bem, A., & Żygadło, K. (2013). The role of local government in the process of entrepreneurship development. *Finansowy Kwartalnik Internetowy e-Finanse*, *9*(4), 1–24.

Skica, T., & Bem, A. (2014). Rola samorządu terytorialnego w procesach stymulowania przedsiębiorczości. *Studia Regionalne i Lokalne*, *1*(55), 79–92.

Skica, T., Czyżewska, M., & Gajecki, L. (2020). Local Development as a Function of Budgetary Policy and Entrepreneurship. In *Finance and Sustainability* (pp. 125–140). Cham: Springer.

Solomon, S., Bendickson, J.S., Liguori, E.W., & Marvel, M.R. (2021). The effects of social spending on entrepreneurship in developed nations. *Small Business Economics*, *58*, 1–13. **doi:10.1007/s11187-021-00458-9**

Spigel, B. (2017). The relational organization of entrepreneurial ecosystems. *Entrepreneurship Theory and Practice*, *41*(1), 49–72. **doi:10.1111/etap.12167**

Stam, E. (2010). *Entrepreneurship, Evolution and Geography. The Handbook of Evolutionary Economic Geography*. Cheltenham: Edward Elgar.

Stevenson, L., & Lundström, A. (2001). *Patterns and Trends in Entrepreneurship/SME Policy and Practice in Ten Economies*. Vällingby: Elanders Gotab.

Storey, D.J. (1982). *Entrepreneurship and the New Firm*. Kent: Beckenham.

Stuetzer, M., Audretsch, D.B., Obschonka, M., Gosling, S.D., Rentfrow, P.J., & Potter, J. (2018). Entrepreneurship culture, knowledge spillovers and the growth of regions. *Regional Studies*, *52*(5), 608–618. **doi:10.1080/00343404.2017.1294251**

Suchecki, A.M. (2014). Spatial diversification of the regional expenses on culture in Poland 2003–2012. *Comparative Economic Research*, *17*(4), 237–252.

Suchecki, A.M. (2018). Spatio-temporal decomposition of the growth of communal budgets expenses on culture in Poland in 2003–2016. Implementation of the SSANOVA model. In M. Papież & S. Śmiech (Eds.), *Proceedings of the 12th Professor Aleksander Zelias International Conference on Modelling and Forecasting of Socio-Economic Phenomena*.

Surówka, K. (2019). The influence of revenue sources on the financial independence and investment activity of communes and cities with 'powiat' rights in Poland. *Prace Naukowe Uniwersytetu Ekonomicznego we Wrocławiu*, *63*(7), 136–154.

Sztando, A. (2017). *Ponadlokalna perspektywa zarządzania strategicznego rozwojem lokalnym na przykładzie małych miast*. Wrocław: Monografie i Opracowania UE.

Świrska, A. (2008). Subwencje jako źródło dochodów gminy. *Zeszyty Naukowe SGGW – Ekonomika i Organizacja Gospodarki Żywnościowej*, *65*, 167–180.

Tong Y., & Saladrigues R. (2022). An analysis of factors affecting the profits of new firms in Spain: Evidence from the food industry. *Agricultural Economics – Zemedelska Ekonomika*, *68*(2), 28–38.

Urbano, D., Aparicio, S., & Audretsch, D. (2019). Twenty-five years of research on institutions, entrepreneurship, and economic growth: what has been learned?. *Small Business Economics*, *53*(1), 21–49.

Urrutia, D.M., & Marzábal, Ó.R. (2015). Factores explicativos de la creación de empresasen Europa: una propuesta desde la perspectiva institucional. *Revista de Economía Mundial*, *40*, 91–122.

Van Stel, A. & Suddle, K. (2008). The impact of new firm formation on regional development in the Netherlands. *Small Business Economics*, *30*(1), 31–47.

Vázquez-Barquero, A., & Rodríguez-Cohard, J.C. (2019). Local development in a global world: Challenges and opportunities. *Regional Science Policy & Practice*, *11*(6), 885–897.

Vodă, I.A., & Nelu, F. (2019). Impact of personality traits and entrepreneurship education on entrepreneurial intentions of business and engineering students. *Sustainability*, *11*(1192), 1–19. **doi:10.3390/su11041192**

Volkmann, C., Fichter, K., Klofsten, M., & Audretsch, D.B. (2021). Sustainable entrepreneurial ecosystems: an emerging field of research. *Small Business Economics*, *56*(3), 1047–1055.

Wosiek, M. (2021). Unemployment and new firm formation: evidence from Polish industries at the regional level. Equilibrium. *Quarterly Journal of Economics and Economic Policy*, *16*(4), 765–782. **doi:10.24136/eq.2021.028**

DOI:10.17951/h.2022.56.4.185-206

ANNALES
UNIVERSITATIS MARIAE CURIE-SKŁODOWSKA
LUBLIN – POLONIA
VOL. LVI, 4 SECTIO H 2022

SYLWIA WAJNBRENER

sylwia.wajnbrener@edu.uekat.pl
University of Economics in Katowice. Faculty of Economics
1 Maja 50 St., 40-287 Katowice, Poland
ORCID ID: https://orcid.org/0000-0002-3466-4054

DOMINIKA WERCZYŃSKA

dominika.werczynska@uekat.pl
University of Economics in Katowice. Faculty of Economics
1 Maja 50 St., 40-287 Katowice, Poland
ORCID ID: https://orcid.org/0000-0003-1056-737X

JULIA WŁODARCZYK

julia.wlodarczyk@ue.katowice.pl
University of Economics in Katowice. Faculty of Economics
1 Maja 50 St., 40-287 Katowice, Poland
ORCID ID: https://orcid.org/0000-0001-5689-454X

Determinants of Preferred Retirement Age in an Aging Society

Keywords: retirement age; aging of the population; retirement preferences; relative deprivation; gender differences

JEL: J11; J14; J32; J26

How to quote this paper: Wajnbrener, S., Werczyńska, D., & Włodarczyk, J. (2022). Determinants of Preferred Retirement Age in an Aging Society. *Annales Universitatis Mariae Curie-Skłodowska, sectio H – Oeconomia*, Vol. 56, No. 4.

Abstract

Theoretical background: The process of aging has profound economic consequences for many countries, as it increases the number of beneficiaries of the pension system and extends the period of receiving pension benefits. We claim that understanding individual preferences concerning the retirement age is one of the key factors of successful reforms of pension systems and a prerequisite to convince a greater number of individuals to retire later.

Purpose of the article: The aim of the article is to determine factors influencing the decision on the moment of retirement. The analysis takes into account socio-economic characteristics of individuals (including gender, age, education, health and income), as well as individual expectations and relative deprivation. The second goal is to compare preferences of men and women concerning the retirement age.

Research methods: The empirical part of the article exploits a dataset based on primary research conducted in Poland which is one of the fastest aging countries in Europe (data for $N = 448$ respondents were collected with the help of an online questionnaire from April to May 2021). Both purposes are achieved with the help of econometric methods (OLS, quantile, and logit regressions).

Main findings: We show that individuals have heterogeneous preferences concerning the retirement age, but on average they are willing to retire later than others (and often later than the official retirement age). We argue that one of the driving forces behind this phenomenon is associated with aversion towards relative deprivation. We demonstrate that individual preferences concerning the retirement age are not directly dependent on the current situation of respondents (depicted, e.g. by their education, health, place of living or income), but are determined by their expectations concerning their material situation when retired and by preferences regarding others. We also discuss some differences between men and women with regard to the preferred retirement age (e.g. women are more frequently ready to retire later than the official retirement age compared to men, but in general propose lower retirement age than men for both genders).

Introduction

The process of aging is one of the most pronounced demographic processes with profound economic consequences for many countries, especially advanced ones (Bednarczyk, 2015). In particular, aging of the society increases the number of beneficiaries of the pension system and extends the period of receiving pension benefits. These factors significantly affect the solvency of the pension system (Maier, 2016). In order to counteract this negative phenomenon, many countries increase the statutory retirement age and create incentives motivating individuals to remain professionally active longer (OECD, 2021). These incentives can be presented in various ways. Recent literature on nudging (e.g. Thaler & Sunstein, 2008) emphasizes the role of choice architecture (covering the number of options available, their attributes, the way they are presented, the character of the default option, etc.) in shaping behavior of individuals in many areas, including retirement.[1]

The starting point of the article is that understanding individual preferences concerning the retirement age is one of the key factors of successful reforms of pension

[1] In general, the literature on nudging (including Thaler & Sunstein, 2008) focuses more on decisions concerning retirement saving rather than the moment of retirement. To a large extent, this is associated with greater constraints imposed on the retirement age by the government and greater sovereignty of individuals with regard to their saving strategies.

systems and a way to design a choice architecture inducing a greater number of individuals to retire later. In other words, better knowledge of behavioral aspects of retirement is a prerequisite for achieving higher level of individual and social well-being.

Therefore, the aim of the article is to determine factors influencing the decision on the moment of retirement. The analysis takes into account socio-economic characteristics of individuals (including gender, age, education, health and income), as well as less frequently discussed behavioral aspects, associated with individual expectations and relative deprivation.

The empirical part of the article is based on primary research conducted in Poland (data for $N = 448$ respondents were collected with the help of an online questionnaire). The choice of Poland is motivated by three facts. First, Poland is one of the fastest aging countries in Europe (cf. UN, 2019; PARP, 2020).[2] Second, for women its official retirement age is the lowest in the European Union (cf. Figure 1). Finally, Poland is expected to experience the largest decrease in replacement levels in the European Union.[3]

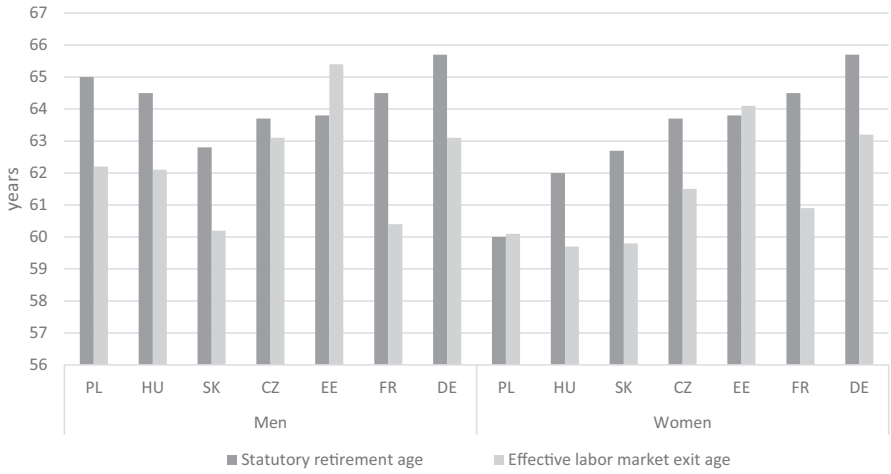

Figure 1. Statutory retirement age and effective labor market exit age in selected European countries

PL – Poland, HU – Hungary, SK – Slovakia, CZ – Czech Republic, EE – Estonia, FR – France, DE – Germany

Source: Authors' own study based on (OECD, 2021).

[2] Acedański and Włodarczyk (2018) show that due to aging, Poland is likely to enjoy lower interest rates and a faster growth in investment and GDP per capita than other advanced economies, however, results of their simulations show strong dependence on the retirement age.

[3] Assuming no changes in the statutory retirement age there will be a decrease in retirement income from 61% of an employment income before retirement in 2016 to 24% in 2060 (European Commission, 2018).

As exhibited in Figure 1, the statutory retirement age in Poland amounts to 65 years for men and 60 years for women. This retirement age was stipulated by the reforms conducted in Poland as early as in 1954 (Zieleniecki, 2012). Interestingly, in 2013, the retirement regulations were changed and the statutory retirement age was supposed to increase gradually to 67 years for men and women (ZUS, 2013). As this intervention met with a negative public reaction, the pension system reform was reversed and the retirement age was lowered again in 2017 (ZUS, 2017). This reform reversal is yet another argument in favor of investigating retirement age preferences in Poland.

The statutory retirement age in Poland is different for men and women (which is no longer the case of the majority of European countries) (Kietlińska, 2018). As a consequence, a shorter average period of employment among women and their longer period of life after labor market exit compared to men increase the risk of old-age income poverty among women (cf. Tomar et al., 2021). Therefore, the second goal of the article is to compare preferences of men and women concerning the retirement age. Both purposes are achieved with the help of econometric methods (OLS, quantile and logit regressions).

An original contribution of this article to the literature is to show that the retirement age preferred by individuals for themselves is different and on average higher than the retirement age individuals would choose for other representants of the same gender (or, to put it in a normative way, the retirement age at which others *should* retire). We claim that individuals have heterogeneous preferences concerning the retirement age, but on average they are willing to retire later than others. We argue that one of the driving forces behind this phenomenon is associated with aversion towards relative deprivation.

The remainder of the article is organized as follows. The next section provides the overview of the literature on factors influencing the retirement decisions. The subsequent section presents the methods used in research, while the next one discusses obtained results. The final section concludes.

Factors influencing the decision to retire – literature review

Freedom of choice with regard to the retirement age in many countries is significantly constrained by the legal environment defining the statutory retirement age. Nevertheless, the discrepancies between the statutory retirement age and the average effective age of labor market exit (as presented in Figure 1) clearly demonstrate that individual decisions play a non-negligible role in this area.

The literature has offered many explanations of retirement decisions, including characteristics of individuals, their financial situation, attitude toward work, as well as cultural and systemic factors (see Table 1).

Table 1. Determinants of the preferred retirement age

Sphere	Factors encouraging earlier retirement	Factors encouraging prolonged professional activity
Individual characteristics	– poor health, disabilities – risk of not reaching the retirement age (and not benefitting from the period of retirement in terms of income and leisure) – lower educational attainment – gender (being a woman)	– good health – increasing individual life expectancy – higher educational attainment – gender (being a man)
Current and future financial situation of an individual	– high individual wealth – medium or high level of remuneration[a] – present bias, myopia, hyperbolic discounting, planning fallacy, affective forecasting	– perspective of increased savings – very low or very high level of remuneration[a] – farsightedness, exponential discounting, long-run planning, financial literacy
Family considerations and caring responsibilities	– high demand for caring from family members	– low or no care demand from family members
Character of work performed	– physical work – work based on age-depreciating skills – lower-level position – employment uncertainty (e.g. experienced or expected periods of unemployment)	– cognitive work – work based on age-appreciating skills – higher-level position – self-employment
Attitude toward the job performed	– job dissatisfaction	– job satisfaction
Culture and social-dependent perception of work	– work as a source of dissatisfaction (e.g. in Eastern Europe) – low preferred retirement age by surroundings	– work as a source of satisfaction (e.g. in Western Europe) – high preferred retirement age by surroundings
Characteristics of the pension system in a given country	– high generosity of the fiscal system – general trust in public institutions – political stability – low statutory retirement age	– low generosity, fiscal constraints – general distrust in public institutions – political instability – high statutory retirement age

[a] The relationship between remuneration and the preferred retirement age is potentially nonlinear due to substitution and income effects. With replacement rate below 100% individuals with very low remuneration may not be in position to satisfy their basic needs with pension income, so they are forced to work longer. With higher levels of remuneration this pressure decreases, however, at a certain level individuals may again become motivated to work longer, both due to their current satisfaction with their income and the perspective of increased retirement benefits in the future.

Source: Authors' own study based on (Phillipson & Smith, 2005; Chybalski, 2018; Vermeer et al., 2016; Knoll, 2011; de Tavernier & Roots, 2015; McGarry, 2002; Jedynak, 2022a; Pilipiec et al., 2020; Iwański et al., 2021; Riedel et al., 2015).

As presented in Table 1, the literature on preferences pertaining to the retirement age has discussed objective factors associated with the situation of the individual (such as health or the character of work) and macroeconomic environment, as well as some subjective factors (e.g. the subjective feeling of job satisfaction or dissatisfaction).

On average, many objective processes observed over recent years could encourage later retirement. Increasing life expectancy, greater problems with fiscal discipline coupled with structural changes in the labor market are a common experience of many countries. For instance, individuals working in the service sector usually are able to work longer than those performing physical work (Lopez Garcia

et al., 2021).[4] Besides, there is an increasing demand on the labor market for highly qualified workers who want to retire later (Hess et al., 2021).

The statutory retirement age acts as a universal anchor, a reference point upon which individuals determine the gains and losses resulting from ceasing their professional activity earlier or later (Jedynak, 2022b; Knoll, 2011). An important issue is associated with the differences in weight people attach to these gains and losses (Sieczkowski, 2017). With replacement rates below 100%, delaying retirement implies both a higher monthly income due to postponing retirement and an increase in the future retirement benefit. However, at some point the desire to rest, enjoy free time, and realize life goals becomes more important than additional earnings (Krzyżowski et al., 2014).

In this article, we argue that the decision to retire is not only framed in the statutory retirement age, but also driven by interdependence of preferences and retirement decisions of others. For instance, leisure is more appreciated when shared with a life partner or a spouse. Individuals reaching the retirement age often decide to extend their professional activity when their life partner continues to be professionally active (Vermeer et al., 2019). Other studies, however, proved that women living in relationships retire earlier than single women (Nicolaisen et al., 2012). This shows that there are no universal behavioral patterns within households (possibly due to interference of income and substitution effects for particular household members).

In general, the opinion of children and spouses has the greatest impact on retirement decisions (Vermeer et al., 2019), but these decisions are influenced also by behavior of other individuals and information communicated via mass media and social media. Erp et al. (2014) show the importance of social norms, default options, as well as reference-dependent utility as likely explanations for the observed heterogeneity of individual propensities to retire. In fact, individuals treat the statutory retirement age as a benchmark and then define their own point of reference that directly influences their retirement decision (Behaghel & Blau, 2012). Thus, there are two reference points – an objective and a subjective one.

As already mentioned in the introduction, this article pays special attention to relative deprivation which is a concept less frequently discussed in the literature on retirement. In short, relative deprivation refers to a situation when an individual: a) does not possess X, b) sees others possessing X (importantly, this perception does not have to depict reality), c) wants to possess X, and d) thinks that possessing X is attainable (Runciman, 1966). The concept of relative deprivation allows to capture both material and immaterial objects, including income or pension benefits.

Relative deprivation can have an ambiguous impact on retirement decisions. On the one hand, relative deprivation felt by older individuals at the workplace, stemming from comparisons with younger workers, can be a factor encouraging

[4] In Poland the employment in the service sector increased from 53% in 2005 (GUS, 2010) to 60% in 2021 (GUS, 2022).

earlier retirement (cf. Tougas et al., 2004; Topa & Alcover, 2015). On the other hand, one can expect that potential retirees will compare their financial status during the retirement period with other retired individuals as well. On average, it is likely that the comparison group of future retirees will be larger than the group of former comparators from the workplace. Therefore, among farsighted individuals the aversion toward relative deprivation can induce prolonged economic activity.

Besides, even though inequalities among the retirees are not as pronounced as among the working population, they are much more persistent and unlikely to be changed. Włodarczyk (2018) shows that elder cohorts suffer more from relative deprivation than younger cohorts: the former focus on the present (their current status is their source of life satisfaction), while the latter do not feel dissatisfaction when their incomes are low, because they can expect higher incomes in the future.

Importantly, relative deprivation does not only directly (affectively) influence retirement decisions, but also indirectly as it is linked to other factors, such as health. Within a given reference group relative deprivation has a negative effect on individual health (cf. Deaton, 2001; Eibner et al., 2004; Eibner & Evans, 2005; Kondo et al., 2015; Mishra & Carleton, 2015) and is significantly associated with premature mortality (Åberg Yngwe et al., 2012) and elevated individual suicide risk (Daly et al., 2013).

To recapitulate, there are many objective and subjective factors influencing the decision when to retire, referring to the situation of the individual as well as the whole economy. In particular, the decision to retire later can be driven by the aversion toward relative deprivation, while currently experienced relative deprivation (along with its health consequences) can lead to earlier retirement.

Description of data and research methods

Our empirical analysis of retirement age preferences exploits a dataset obtained from an online survey conducted in April and May 2021 in Poland. The link to the questionnaire was posted on social media like Facebook and LinkedIn and on Internet fora.[5] The sample consists of 448 respondents. The characteristics of the research sample is presented in Table 2.

[5] Social media groups and Internet fora referred to a wide range of topics: from politics, investment and entrepreneurship to parenting, volunteering and charity. This allowed to reach a more diversified group of respondents.

Table 2. Characteristics of the research sample (*N* = 448)

Specification		Frequency	Percent	Average preferred retirement age by group (in years)		
				Whole sample	Women	Men
Gender	Women	316	70.5	67.1	67.1	–
	Men	132	29.5	67.9	–	67.9
Age	17–25 years	165	36.8	68.8	67.9	70.9
	26–35 years	102	22.8	68.9	68.8	69.2
	36–50 years	99	22.1	67.6	67.9	67.0
	More than 50 years	82	18.3	62.1	61.4	63.2
Place of living	Village	73	18.3	67.2	67.8	65.7
	City with up to 50,000 inhabitants	137	15.6	69.6	69.7	69.5
	City with up to 100,000 inhabitants	82	16.3	66.0	65.5	67.7
	City with up to 250,000 inhabitants	86	19.2	65.3	64.7	66.9
	City with more than 250,000 inhabitants	70	30.6	67.0	66.4	68.2
Education level	Primary	7	1.6	66.4	63.8	70.0
	Vocational	20	4.4	61.5	59.9	63.0
	Secondary	116	25.9	64.9	64.2	66.2
	Incomplete higher	99	22.1	70.0	69.4	71.5
	Higher	206	46	68.0	67.9	68.1
Average monthly income per person	Up to PLN 1,000	31	7.0	66.9	65.6	72.5
	From PLN 1,001 to PLN 2,000	83	18.5	66.2	66.1	66.7
	From PLN 2,001 to PLN 3,000	129	28.8	66.7	66.4	67.7
	From PLN 3,001 to PLN 4,500	120	26.8	68.2	68.9	66.9
	From PLN 4,501 to PLN 6,000	40	8.9	66.2	66.0	66.7
	More than PLN 6,000	45	10.0	69.9	69.8	70.0
Type of work	Physical work	60	13.4	63.6	62.2	65.6
	Physical and cognitive work	108	24.1	66.4	65.7	67.9
	Cognitive work	280	62.5	68.4	68.4	68.7
Health status	Very good	111	24.8	69.6	69.6	69.5
	Good	223	49.8	67.3	66.9	68.3
	Neither good nor bad	69	15.3	66.0	65.1	68.2
	Bad	42	9.4	64.0	64.1	63.8
	Very bad	3	0.7	60.7	60.7	–
Saving for the future	No	148	33.0	66.2	66.1	66.5
	Yes	300	67.0	67.9	67.6	68.5
Expected change in the standard of living after retirement	Significant decrease	195	43.5	68.8	68.8	68.9
	Decrease	178	39.7	67.8	67.2	69.2
	No change	22	4.9	61.9	59.7	66.6
	Increase	51	11.4	62.5	61.6	63.6
	Significant increase	2	0.5	58.5	57.0	60.0
Plans concerning professional activity after retirement	Will work for sure	90	20.09	70.3	70.3	70.4
	Likely to work	131	29.24	68.5	67.4	70.9
	Not sure	42	9.38	63.8	65.8	62.0
	Likely not to work	160	35.71	66.4	65.9	68.5
	Will not work for sure	25	5.58	61.8	59.2	63.5

Note: In estimations presented in the next section, the following categories were merged: primary and vocational education, bad and very bad health as well as increase and significant decrease in case of expected change in the standard of living after retirement.

Source: Authors' own study.

The average preferred retirement presented in Table 2 is calculated upon individual preferences within a given group. Importantly, the question concerning the preferred retirement age was accompanied by a figure illustrating hypothetical replacement rates (Figure 2).[6]

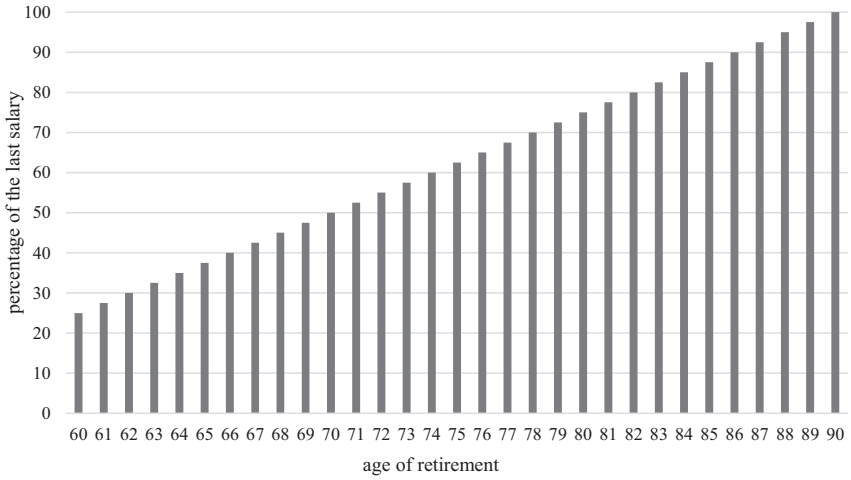

Figure 2. Stylized pension projections for Poland included in the questionnaire

Source: Authors' own study.

Even though Figure 2 presents a simplified picture of potential development of replacement rates in Poland (as discussed in footnote 6), it helps to provide a common reference point to all respondents and, thus, reduces bias associated with individual perceptions in this area.

The respondents were also asked about the retirement age preferred for other individuals representing both genders (this question appeared in the questionnaire before the question concerning individual preferences). Individual preferences are markedly different than those regarding others (Table 3).

[6] This stylized pension projection is based on already mentioned estimates of the European Commission (2018) predicting replacement rates in Poland around 24% of an employment income before retirement in 2060, as well as official estimates (cf. Gov, 2018; ZUS, 2021) showing that each additional year of professional activity can potentially increase pensions by about 8%. For the sake of simplicity, we decided to present a linear relationship between the retirement age and the replacement rate. Thus, presented projections are overvalued for low retirement age in forthcoming decades (European Commission estimates refer to an average replacement rate) and undervalued for high retirement age. In order to offer a common reference point to all respondents, we decided to present the same projection both to men and women despite differences in life expectancy.

Table 3. Preferred retirement age for others and oneself across genders

Preferences regarding others	Total	Men	Women
Average retirement age for men	62.8	63.9	62.3
Average retirement age for women	60.3	62.6	59.4
Median retirement age for men	65.0	65.0	62.5
Median retirement age for women	60.0	65.0	60.0
Preferences regarding oneself	Total	Men	Women
Average preferred retirement age	67.3	67.9	67.1
Median preferred retirement age	65.0	65.0	65.0

Source: Authors' own study.

Table 3 clearly exhibits differences in preferences between men and women with regard to other men and women. However, the *t*-test shows that in case of individual preferences difference between men and women is statistically insignificant, while median preferred retirement age is the same for men and women. The relationship between individually preferred retirement age, preferences concerning others and the official retirement age is presented from another angle in Table 4.

Table 4. Preferred retirement age vs. official retirement age and preferences concerning others by gender (%)

Fraction of respondents willing to work	…official retirement age		…age preferred for respondent's gender	
	Men	Women	Men	Women
Shorter than…	36.4	14.2	10.6	4.7
Exactly as long as…	15.2	28.8	43.9	32.9
Longer than…	48.5	57.0	45.5	62.3

Source: Authors' own study.

As exhibited in Table 4, some individuals are willing to work shorter than the official retirement age, however, the fraction of those that would like to work shorter than others is much smaller – the vast majority of respondents is willing to work at least as long as others.

In line with the literature discussed in the previous section and relationships exhibited by the data, it is hypothesized that preferences pertaining to the retirement age depend on many factors. In particular, higher retirement age (both for individuals and with regard to others) is preferred by men and individuals that are younger, better educated, live in larger cities, enjoy better health, perform cognitive work and receive higher levels of income. Besides, individual preferences regarding retirement age depend on preferences regarding others and individual expectations concerning the future.

These hypotheses are verified statistically. Separate OLS and quantile (median) regressions are run for the retirement age preferred for others and for individuals themselves, both for the sample as a whole and for subsamples including men and women.[7]

[7] As a robustness check, we also run logit regressions for two dependent variables: willingness to work longer than the official retirement age and willingness to work longer than the retirement age

Results

First results concerning the determinants of preferred retirement age for men, women and individual respondents are presented in the appendix (Table A.1 for OLS regressions and Table A.2 for quantile regressions). Accordingly, preferred retirement age for others depends on education (but only in case of women possessing primary, vocational or secondary education who want others to retire earlier), gender (women propose lower retirement age), age (retirement age preferences follow an inverted-U relationship), type of work (in some estimations physical and cognitive or cognitive work was associated with proposals of higher retirement age for others), high incomes (in some specifications earning more than PLN 6,000 relative to the lowest category was correlated with proposals of higher retirement age). In case of quantile regressions also health appeared to be important in some specifications: better health is associated with higher retirement age preferred for others. Suggestions regarding others were also related to individual plans concerning professional activity after retirement. Individuals that planned not to work (likely or for sure) suggested lower retirement age for others. Saving for the future and place of living were statistically insignificant. In turn, individual preferences in the majority of specifications did not depend on age and health, education, type of work, but mostly on individual plans and expectations concerning the period of retirement. Therefore, one can conclude that conducted research does not confirm significance of all relationships stipulated by the hypotheses formulated in the previous section.

Main results are displayed in Table 5, which contains (apart from variables included in models presented in Tables A.1 and A.2) preferred retirement age for the same gender as an independent variable explaining individual preferences concerning the retirement age.

Table 5. Determinants of the preferred retirement age

Model	(1)	(2)	(3)	(4)	(5)	(6)
Regression	OLS regression			Quantile (median) regression		
Subsample	Total	Men	Women	Total	Men	Women
Expected change in the standard of living after retirement (reference category: significant decrease)						
– decrease	-0.330	1.226	-1.366	-0.115	1.314	-1.561
	(1.002)	(1.974)	(1.246)	(1.103)	(1.519)	(1.555)
– no change	-5.012**	-0.691	-7.993***	-2.824	-1.835	-5.993*
	(2.198)	(4.195)	(2.777)	(2.421)	(3.228)	(3.468)
– increase or	-4.620***	-3.741	-5.687***	-2.769	-1.751	-4.096
significant decrease	(1.551)	(2.598)	(2.103)	(1.708)	(1.999)	(2.627)

proposed by the respondents for their gender. These estimations are supplemented by OLS and quantile (median) regressions for the following dependent variables: difference between individually preferred retirement age and official retirement age and the difference between individually preferred retirement age and the retirement age proposed by the respondents for their gender (see Table A.3 in the appendix).

Model	(1)	(2)	(3)	(4)	(5)	(6)
Plans concerning professional activity after retirement (reference category: will work for sure)						
– likely to work	-1.461	3.013	-3.208**	-0.334	3.188	-1.483
	(1.310)	(2.610)	(1.586)	(1.443)	(2.009)	(1.981)
– not sure	-3.568*	-3.297	-1.175	-3.283	-1.612	-1.540
	(1.861)	(3.090)	(2.609)	(2.049)	(2.377)	(3.258)
– likely not to work	-3.069**	-0.694	-4.273***	-1.373	-0.0219	-2.448
	(1.266)	(2.796)	(1.498)	(1.394)	(2.151)	(1.871)
– will not work for	-3.250	0.390	-7.780**	-1.729	0.334	-1.598
sure	(2.314)	(3.563)	(3.457)	(2.548)	(2.742)	(4.317)
Age	0.410	0.157	0.664*	0.0313	0.0459	-0.0184
	(0.285)	(0.498)	(0.369)	(0.313)	(0.383)	(0.461)
Age^2	-0.00624*	-0.00366	-0.00976**	-0.000723	-0.00130	-0.000560
	(0.00361)	(0.00626)	(0.00472)	(0.00397)	(0.00482)	(0.00589)
Preferred retirement	0.683***	0.717***	0.621***	0.893***	1.108***	0.677***
age for the same gender	(0.111)	(0.183)	(0.148)	(0.123)	(0.141)	(0.184)
Observations	448	132	316	448	132	316
R-squared	0.245	0.357	0.257			
Pseudo R2				0.2035	0.3279	0.1957

Note: Variables: gender, saving for the future, education levels, place of living, levels of average monthly income per person, type of work, health status (see Table 2) as well as constant are included, but not reported. Standard errors in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Source: Authors' own study.

Introduction of a variable depicting preferences concerning others significantly increases the measures of fit, but makes many other variables portraying the situation of an individual insignificant.

The central conclusion drawn from conducted calculations is that individual preferences concerning the retirement age are not directly dependent on the current situation of respondents (depicted, e.g. by their education, health, place of living or income), but are determined by their expectations concerning their material situation when retired and by preferences regarding others. Estimations run as a robustness check (cf. Table A.3) confirm obtained results.

As far as retirement age preferences are concerned, differences between men and women refer mostly to:

– more heterogenous preferences of women compared to men,

– greater probability of earlier retirement of women than men when no change or an increase in the standard of living after retirement is expected (relative to those individuals that expect significant decrease in their standard of living),

– women are more frequently ready to retire later than the official retirement age compared to men, but in general propose lower retirement age than men for both genders,

– more women would like to retire later than other women compared to male respondents and other men (in absolute numbers), however, the effect that people want to retire later than the preferred retirement age for representants of the same gender is stronger for men than women.

Concluding remarks

Conducted research shows that the official retirement age is often different than the retirement age preferred by individuals for themselves and for others.

On average, the respondents are willing to work longer than the official retirement age and to work longer than the representants of the same gender as the respondent. This outcome can be explained by rational economic calculation (as in absolute terms prolonged professional activity translates into higher lifetime income), but also by interdependence of preferences and aversion toward relative deprivation channeled into the desire to work longer than others (to receive income higher in relative terms). Both phenomena influence the retirement preferences in the same direction. However, the second explanation seems to be more plausible, because individuals declare willingness to work longer, but not *much* longer than others.

Naturally, one can expect heterogeneity – peer effects may be important only for a fraction of a society, while some individuals will be interested in their own income and utility from leisure. However, in general, making information about social retirement preferences public may be an incentive to prolong professional activities for many persons. If they learn that others would like to work longer than the official retirement age, they may change their individual preferences. Such a situation resembles a sequential game allowing to achieve social equilibrium gradually (in case of heterogeneous preferences one solution, i.e. one official retirement age, may not be optimal from the point of view of individual and social welfare).

Therefore, our findings have important practical implications. Greater transparency with regard to the effective retirement age and social retirement preferences due to aversion toward relative deprivation may invite prolonged professional activity and potentially increase the acceptance of gradual increases in the statutory retirement age. The government plays an important role in this process not only as a decision maker, but also as a provider of public goods such as: public information about preferences concerning the retirement age, public information about the risks associated with early retirement, public health care (especially preventive health care services) and public education, including financial education. For instance, in financial literacy rankings (cf. OECD, 2020), countries characterized by a higher official retirement age score higher than countries with a lower retirement age (such as Poland).

Conducted research allowed to draw many interesting conclusions concerning interdependence of preferences regarding the retirement age or differences between men and women, however, it is subject to some limitations and can be treated as

a pilot study. Therefore, future research in the analyzed area could involve a larger sample, include different projections in the questionnaire (e.g. portraying exponential growth in replacement rates) and apply other methods (e.g. structural equation modelling). An interesting path of research is associated with monitoring retirement age preferences and their heterogeneity in time. From the practical point of view, future research could also address the issue of premises and consequences of equalizing statutory retirement age for men and women or even resigning from official regulations pertaining to the retirement age. The government can monitor and communicate citizens' retirement age preferences to induce prolonged activity due to interdependence of preferences and engage in retirement-age targeting, including nudging and leaving some freedom of choice about the retirement age to future retirees.

References

Åberg Yngwe, M., Kondo, N., Hägg, S., & Kawachi, I. (2012). Relative deprivation and mortality – a longitudinal study in a Swedish population of 4.7 million, 1990–2006. *BMC Public Health*, *12*, Article No. 664. **doi:10.1186/1471-2458-12-664**

Acedański, J., & Włodarczyk, J. (2018). Demographics, retirement age, and real interest rates in Poland. *Central European Journal of Economic Modelling and Econometrics*, *10*(4), 355–185. **doi:10.24425/cejeme.2018.125876**

Bednarczyk, T. (2015). Wyzwania demograficzne dla systemów emerytalnych w Unii Europejskiej. *Annales Universitatis Mariae Curie-Skłodowska, Sectio H – Oeconomia*, *49*(2), 33–50. **doi:10.17951/h.2015.59.2.33**

Behaghel, L., & Blau, D. (2012). Framing social security reform: Behavioral responses to changes in the full retirement age. *American Economic Journal: Economic Policy*, *4*(4). **doi:10.1257/pol.4.4.41**

Chybalski, F. (2018). *Wiek emerytalny z perspektywy ekonomicznej: studium teoretyczno-empiryczne*. Warszawa: C.H. Beck.

Daly, M.C., Wilson, D.J., & Johnson, N.J. (2013). Relative status and well-being: Evidence from U.S. suicide deaths. *Review of Economics and Statistics*, *95*(5), 1480–1500. **doi:10.1162/REST_a_00355**

Deaton, A. (2001). Relative deprivation, inequality, and mortality. *NBER*, *Working Paper No. 8099*. **doi:10.3386/w8099**

Eibner, C., Sturm, R., & Gresenz, C.R. (2004). Does relative deprivation predict the need for mental health services? *The Journal of Mental Health Policy and Economics*, *7*, 167–175.

Eibner, C., & Evans, W.N. (2005). Relative deprivation, poor health habits, and mortality. *Journal of Human Resources*, *40*(3), 591–620. **doi:10.3368/jhr.XL.3.591**

Erp, F., Vermeer, N., & van Vuuren, D. (2014). Non-financial determinants of retirement: A literature review. *De Economist*, *162*(2). **doi:10.1007/s10645-014-9229-5**

European Commission. (2018). *The 2018 ageing report. Economic and budgetary projections for the EU member states 2016–2070*. Retrieved from: https://www.oecd-ilibrary.org/finance-and-investment/pensions-at-a-glance-2021_f735ea2f-en

Gov. (2018). *7 zasad emerytalnych*. Retrieved from: www.gov.pl/web/rodzina/7=-zasad-emerytalnych?fbclid-IwAR0afvBvMuCmoZAsY7WeyqMaFCMRuZoy9BJ4K0gBYqrMPl7U8CjsPPYtAKo

GUS. (2010). *Polska w liczbach*. Retrieved from https://stat.gov.pl/obszary-tematyczne/inne-opracowania/inne-opracowania-zbiorcze/polska-w-liczbach-2010,14,3.html?contrast=default

GUS. (2022). *Polska w liczbach*. Retrieved from https://stat.gov.pl/obszary-tematyczne/inne-opracowania/inne-opracowania-zbiorcze/polska-w-liczbach-2022,14,15.html

Hess, M., Naegele, L., Becker, L., Mäcken, J., de Tavernier, W. (2021). Planned retirement timing in Europe: Are Europeans adapting to the policy of extending working lives. *Frontiers in Sociology*, *6*. **doi:10.3389/fsoc.2021.691066**

Iwański, R., Tomczak, Ł., & Lipska-Sondecka, A. (2021). Decreasing the retirement age in the view of dynamically ageing population in Poland. *Athenaeum. Polskie Studia Politologiczne*, *71*(3). **doi:10.15804/athena.2021.71.05**

Jedynak, T. (2022a). *Behawioralne uwarunkowania decyzji o przejściu na emeryturę*. Warszawa: C.H. Beck.

Jedynak, T. (2022b). Does the formulation of the decision problem affect retirement? – Framing effect and planned retirement age. *International Journal of Environmental Research and Public Health*, *19*(4). **doi:10.3390/ijerph19041977**

Kietlińska, K. (2018). Przyczyny kryzysu ubezpieczeń emerytalnych we współczesnym świecie na przykładzie Polski. *Annales Universitatis Mariae Curie-Skłodowska, sectio H – Oeconomia*, *52*(1), 83–95. **doi:10.17951/h.2018.52.1.83**

Knoll, M. (2011). Behavioral and psychological aspects of the retirement decision. *Social Security Bulletin*, *71*(4).

Kondo, N., Saito, M., Hikichi, H., Aida, J., Ojima, T., Kondo, K., & Kawachi, I. (2015). Relative deprivation in income and mortality by leading causes among older Japanese men and women: AGES cohort study. *Journal of Epidemiology and Community Health*, *69*(7), 680–685. **doi:10.1136/jech-2014-205103**

Krzyżowski, Ł., Kowalik, W., Suwada, K., & Pawlina, A. (2014). *Młodzi emeryci w Polsce. Między biernością a aktywnością*. Warszawa: Wyd. Naukowe Scholar.

Lopez Garcia, I., Mullen, K., & Wenger, J. (2021). The role of physical job demands and the physical work environment in retirement outcomes. Michigan Retirement and Disability Research Center, *Working Paper No. 437*.

Maier, M. (2016). System zabezpieczenia emerytalnego a starzenie się społeczeństwa w Polsce. *Prace Naukowe Uniwersytetu Wrocławskiego*, *451*, 230–239. **doi:10.15611/pn.2016.451.19**

McGarry, K. (2002). Health and retirement: Do changes in health affect retirement expectations. *NBER Working Paper No. 9317*.

Mishra, S., & Carleton, R.N. (2015). Subjective relative deprivation is associated with poorer physical and mental health. *Social Science & Medicine*, *147*, 144–149. **doi:10.1016/j.socscimed.2015.10.030**

Nicolaisen, M., Thorsen, K., & Eriksen, S. (2012). Jump into the void? Factors related to a preferred retirement age: Gender, social interests, and leisure activities. *International Journal of Aging and Human Development Index*, *75*(3), 239–271. **doi:10.2190/AG.75.3.c**

OECD. (2020). *International survey of adult financial literacy*. Retrieved from https://www.oecd.org/financial/education/oecd-infe-2020-international-survey-of-adult-financial-literacy.pdf?fbclid=IwAR1WfGN6QFF11QHSGxeQEBYLCg_gMbZkYNEGxVXlz-lDGoFF4Zu-L8RTXeM

OECD. (2021). *Future retirement ages*. Retrieved from https://www.oecd-ilibrary.org/sites/ca401ebd-en/1/3/3/6/index.html?itemId=%2Fcontent%2Fpublication%2Fca401ebd-en&_csp_=9d37797bd84847326841f27f588be463&itemIGO=oecd&itemContentType=book&fbclid=IwAR22w6elnB3t-jBBZLkfLn-RO86wWvssu8JIt8bQxrQbF_-1mc24vqfY7sNg

PARP. (2020). *Starzenie się społeczeństwa – wyzwanie dla rynku pracy. Aktywizacja pracowników 50+*. Retrieved from https://www.parp.gov.pl/component/publications/publication/starzenie-sie-spoleczenstwa-wyzwanie-dla-rynku-pracy-aktywizacja-pracownikow-50

Phillipson, C., & Smith, A. (2005). Extending working life: A review of the research literature. Department for Work and Pensions Research Reports, *Research Paper No. 299*.

Pilipiec, P., Groot, W., & Pavlova, M. (2020). The Analysis of Predictors of Retirement Preferences over Time. *Journal of Population Ageing*, *15*. **doi:10.1007/s12062-020-09305-3**

Riedel, M., Hofer, H., & Wögerbaueret, B. (2015). Determinants for the transition from work into retirement in Europe. *IZA Journal of European Labor Studies*, *4*(4). **doi:10.1186/s40174-014-0027-5**

Runciman, W.G. (1966). *Relative Deprivation and Social Justice: A Study of Attitudes to Social Inequality in Twentieth-Century England*. Berkley: University of California Press.

Sieczkowski, W. (2017). Behawioralne aspekty decyzji dotyczących dodatkowego zabezpieczenia emerytalnego (wnioski dla Polski). *Wiadomości Ubezpieczeniowe*, *4*.

Tomar, S., Baker, K., Kumar, S., & Hoffmann, A. (2021). Psychological determinants of retirement financial planning behavior. *Journal of Business Research*, *133*, 432–449. **doi:10.1016/j.jbusres.2021.05.007**

de Tavernier, W., & Roots, A. (2015). When do people want to retire? The preferred retirement age gap between Eastern and Western Europe explained. *Studies of Transition States and Societies*, *7*(3), 7–20.

Thaler, R.H., & Sunstein, C.R. (2008). *Nudge: Improving Decisions about Health, Wealth, and Happiness*. New Haven – London: Yale University Press.

Topa, G., & Alcover, C.M. (2015). Psychosocial factors in retirement intentions and adjustment: A multi-sample study. *Career Development International*, *20*(4). **doi:10.1108/CDI-09-2014-0129**

Tougas, R., Lagace, M., De La Sablonniere, R., & Kocum, L. (2004). A new approach to the link between identity and relative deprivation in the perspective of ageism and retirement. *Aging and Human Development*, *59*(1), 3. **doi:10.2190/3WTN-63QQ-EJMG-BGYA**

United Nations. (2019). *World Population Prospects 2019. Vol. II: Demographic Profiles*. Retrieved from https://www.un.org/development/desa/pd/content/world-population-prospects-2019-volume-ii-demographic-profiles

Vermeer, N., van Soest, A., & Mastrogiacomo, M. (2016). Demanding occupations and the retirement age. *Labour Economics*. **doi:10.1016/j.labeco.2016.05.020**

Vermeer, N., van Rooij, M., & van Vuuren, D. (2019). Retirement age preferences: The role of social interactions and anchoring at the statutory retirement age. *De Economist*, *167*, 307–345. **doi:10.1007/s10645-019-09350-0**

Włodarczyk, J. (2018). *Interpersonalne porównania dochodów w perspektywie integracji monetarnej Polski ze strefą euro*. Warszawa: Wyd. Naukowe PWN.

World Health Organization. (2015). *World report on ageing and health*. Retrieved from https://www.who.int/publications/i/item/9789241565042

Zieleniecki, M. (2012). Ewolucja wieku emerytalnego w ustawodawstwie polskim – perspektywa historyczna. *Wiek Emerytalny*, 8–23.

ZUS. (2013). *Zmiany w przepisach emerytalnych od 1 stycznia 2013 r. wynikające z ustawy z dnia 11 maja 2012 r. o emeryturach i rentach z Funduszu Ubezpieczeń Społecznych oraz innych ustaw*. Retrieved from https://www.zus.pl/-/zmiany-w-przepisach-emerytalnych-od-1-stycznia-2013-r-wynikajace-z-ustawy-z-dnia-11-maja-2012-r-o-emeryturach-i-rentach-z-funduszu-ubezpieczen-spolecz?fbclid=IwAR19EQuuZT0n_z1aKq56sjJ9RmHiRIQSh_0jtUXMMFGeulySjm3o3rNcxPY

ZUS. (2017). *Zmiany w przepisach emerytalnych od 1 października 2017 r*. Retrieved from https://www.zus.pl/-/zmiany-w-przepisach-emerytalnych-od-1-pazdziernika-2017-r-?fbclid=IwAR1S8k4-GcufEPQePMXS6OD6n4jLIoZzDtSBLUCp9nCt9W7WdMU90uslviE

ZUS. (2021). *Prezes ZUS: im dłuższa praca, tym wyższa emerytura*. Retrieved from: www.zus.pl/-/prezes-zus-im-dluzsza-praca-tym-wyzsza-emerytura?fbclid=IwAR1O3iYXBoCtARFTTx9IqlOhZxduNX-Pcqn8_VCC0sIQa5MmjyCz4GWwtnI

Appendix

Table A.1. Preferred retirement age for men, women and individual respondents (OLS)

Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Variables	Preferred retirement age for men			Preferred retirement age for women			Preferred retirement age for oneself		
Subsample	Total	Men	Women	Total	Men	Women	Total	Men	Women
Expected change in the standard of living after retirement (reference category: significant decrease)									
– decrease	0.104	-0.282	0.402	-0.287	-0.996	0.116	-0.298	1.023	-1.294
	(0.417)	(1.060)	(0.462)	(0.451)	(1.125)	(0.497)	(1.045)	(2.106)	(1.281)
– no change	-0.718	1.655	-1.570	-1.289	0.283	-1.614	-5.448**	0.497	-8.995***
	(0.914)	(2.247)	(1.026)	(0.990)	(2.384)	(1.104)	(2.291)	(4.465)	(2.846)
– increase	0.00922	-1.147	0.442	-1.076	-2.078	-0.382	-5.123***	-4.564	-5.925***
	(0.644)	(1.390)	(0.780)	(0.698)	(1.476)	(0.839)	(1.615)	(2.763)	(2.163)
Plans concerning professional activity after retirement (reference category: will work for sure)									
– likely to work	-0.696	-1.140	-0.617	-0.398	-1.018	-0.283	-1.711	2.195	-3.383**
	(0.545)	(1.397)	(0.588)	(0.590)	(1.483)	(0.633)	(1.365)	(2.777)	(1.631)
– not sure	-2.307***	-2.748*	-1.770*	-1.391*	-2.409	-0.396	-4.600**	-5.269	-1.422
	(0.771)	(1.637)	(0.967)	(0.835)	(1.737)	(1.041)	(1.932)	(3.253)	(2.683)
– likely not to work	-1.150**	0.147	-1.513***	-0.925	-0.0616	-1.245**	-3.671***	-0.589	-5.046***
	(0.525)	(1.501)	(0.551)	(0.569)	(1.593)	(0.593)	(1.316)	(2.983)	(1.529)
– will not work for	-2.931***	-3.480*	-2.250*	-1.571	-2.050	-1.078	-4.707*	-2.107	-8.449**
sure	(0.957)	(1.883)	(1.280)	(1.037)	(1.998)	(1.378)	(2.400)	(3.741)	(3.552)
Gender: woman	-1.817***			-3.232***			-1.977*		
	(0.440)			(0.477)			(1.104)		
Age	-0.363***	-0.638**	-0.277**	-0.725***	-0.952***	-0.621***	-0.0423	-0.300	0.278
	(0.114)	(0.260)	(0.133)	(0.124)	(0.276)	(0.143)	(0.287)	(0.517)	(0.368)
Age^2	0.00455***	0.00771**	0.00364**	0.00820***	0.0104***	0.00713***	-0.000888	0.00187	-0.00534
	(0.00145)	(0.00328)	(0.00171)	(0.00158)	(0.00348)	(0.00184)	(0.00365)	(0.00651)	(0.00473)

Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Education (reference category: higher)									
– incomplete	0.167	-0.655	0.309	-0.0544	-1.864	0.385	1.333	0.947	2.057
higher	(0.513)	(1.302)	(0.560)	(0.556)	(1.381)	(0.602)	(1.287)	(2.587)	(1.553)
– secondary	-1.113**	-0.630	-1.290**	-1.842***	-1.307	-1.978***	-2.124	-1.667	-1.679
	(0.516)	(1.195)	(0.586)	(0.559)	(1.269)	(0.630)	(1.293)	(2.376)	(1.625)
– primary or	-2.246**	-0.764	-2.792**	-3.143***	-1.798	-3.065**	-2.252	0.975	-4.394
vocational	(0.990)	(2.029)	(1.208)	(1.073)	(2.154)	(1.300)	(2.483)	(4.033)	(3.351)
Type of work (reference category: physical work)									
– physical and	0.625	0.841	0.627	1.817**	0.627	2.528***	1.373	-1.018	2.377
cognitive work	(0.653)	(1.487)	(0.759)	(0.707)	(1.578)	(0.817)	(1.636)	(2.954)	(2.105)
– cognitive work	-0.291	0.121	-0.250	0.420	-0.461	1.233	0.824	-0.443	0.928
	(0.664)	(1.453)	(0.790)	(0.719)	(1.542)	(0.850)	(1.665)	(2.887)	(2.191)
Income higher than	2.014**	1.854	1.169	3.071***	2.359	2.886**	0.799	-1.612	2.099
PLN 6,000	(1.013)	(2.558)	(1.164)	(1.098)	(2.714)	(1.252)	(2.540)	(5.083)	(3.228)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	69.76***	73.20***	66.96***	76.28***	80.55***	70.73***	73.07***	75.61***	66.81***
	(2.429)	(5.381)	(2.812)	(2.632)	(5.711)	(3.026)	(6.089)	(10.69)	(7.800)
Observations	448	132	316	448	132	316	448	132	316
R-squared	0.180	0.254	0.155	0.360	0.373	0.339	0.177	0.260	0.212

Note: Control variables include binary variables for: saving for the future, place of living, levels of average monthly income per person (except of the highest category), health status (see Table 2). Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Source: Authors' own study.

Table A.2. Preferred retirement age for men, women and individual respondents (quantile regression at median)

Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Variables	Preferred retirement age for men			Preferred retirement age for women			Preferred retirement age for oneself		
Subsample	Total	Men	Women	Total	Men	Women	Total	Men	Women
Expected change in the standard of living after retirement (reference category: significant decrease)									
– decrease	-0.287	-0.593	-0.293	-0.359	-0.107	-0.0673	-1.245	-0.161	-1.695
	(0.502)	(1.020)	(0.648)	(0.533)	(1.313)	(0.636)	(1.025)	(2.022)	(1.440)
– no change	-1.094	2.251	-2.285	-1.665	3.807	-1.757	-5.269**	0.866	-7.038**
	(1.102)	(2.162)	(1.439)	(1.168)	(2.783)	(1.412)	(2.248)	(4.287)	(3.198)
– increase	-0.730	-0.0252	-0.122	-1.407*	-1.310	-0.0507	-5.020***	-3.134	-4.923**
	(0.777)	(1.338)	(1.094)	(0.823)	(1.722)	(1.073)	(1.584)	(2.653)	(2.430)
Plans concerning professional activity after retirement (reference category: will work for sure)									
– likely to work	-0.532	0.796	-0.0953	0.126	0.625	0.157	-1.640	2.546	-2.502
	(0.657)	(1.345)	(0.825)	(0.696)	(1.731)	(0.809)	(1.340)	(2.666)	(1.833)
– not sure	-2.160**	-1.255	-2.050	-0.601	1.960	0.117	-4.988***	-3.560	-3.012
	(0.929)	(1.576)	(1.357)	(0.985)	(2.028)	(1.331)	(1.896)	(3.123)	(3.015)
– likely not to work	-1.235*	0.954	-1.869**	-0.578	2.172	-0.998	-3.337**	-1.899	-3.657**
	(0.633)	(1.445)	(0.773)	(0.671)	(1.860)	(0.759)	(1.291)	(2.864)	(1.718)
– will not work for	-3.204***	-1.305	-3.590**	-0.805	1.260	-1.383	-5.366**	-2.133	-4.967
sure	(1.154)	(1.812)	(1.796)	(1.224)	(2.332)	(1.762)	(2.355)	(3.592)	(3.992)
Gender: woman	-2.002***			-3.696***			-2.761**		
	(0.531)			(0.563)			(1.084)		
Age	-0.436***	-0.562**	-0.443**	-0.788***	-1.018***	-0.672***	-0.780***	-0.446	-0.654
	(0.138)	(0.250)	(0.186)	(0.146)	(0.322)	(0.182)	(0.281)	(0.496)	(0.413)
Age^2	0.00541***	0.00714**	0.00591**	0.00923***	0.0119***	0.00812***	0.00835**	0.00429	0.00669
	(0.00175)	(0.00315)	(0.00239)	(0.00186)	(0.00406)	(0.00235)	(0.00358)	(0.00625)	(0.00532)
Education (reference category: higher)									
– incomplete	-0.351	-1.490	0.136	-0.0447	-1.522	0.204	2.060	0.821	2.597

higher	(0.619)	(1.253)	(0.785)	(0.656)	(1.613)	(0.771)	(1.263)	(2.484)	(1.745)
– secondary	-1.191*	-0.476	-1.642**	-2.215***	-0.744	-2.207***	-2.291*	-0.290	-3.035*
	(0.622)	(1.151)	(0.822)	(0.659)	(1.481)	(0.806)	(1.268)	(2.281)	(1.827)
– primary or	-3.239***	-1.653	-3.768**	-3.091**	-1.325	-3.158*	-1.926	-0.506	-4.835
vocational	(1.194)	(1.953)	(1.694)	(1.266)	(2.514)	(1.662)	(2.437)	(3.872)	(3.765)
Type of work (reference category: physical work)									
– physical and	0.385	0.289	-0.528	0.402	2.338	1.280	0.863	-1.256	2.199
cognitive work	(0.801)	(1.398)	(1.108)	(0.849)	(1.800)	(1.087)	(1.633)	(2.772)	(2.463)
– cognitive work	0.669	2.046	-0.0743	1.640**	3.179*	2.634**	1.298	-0.830	1.639
	(0.787)	(1.431)	(1.065)	(0.834)	(1.842)	(1.045)	(1.605)	(2.836)	(2.366)
Income higher than	1.376	0.239	2.534	3.343**	0.852	3.778**	4.845*	-1.488	4.855
PLN 6,000	(1.221)	(2.462)	(1.633)	(1.295)	(3.168)	(1.602)	(2.492)	(4.880)	(3.628)
Health status (reference category: very bad and bad)									
– neither good nor	1.199	3.028*	1.472	0.660	4.784**	-0.520	1.910	5.112	-0.157
bad	(0.963)	(1.752)	(1.286)	(1.021)	(2.255)	(1.262)	(1.965)	(3.474)	(2.858)
– good	2.072**	3.935**	1.122	1.391	4.403**	0.981	1.458	2.363	0.339
	(0.867)	(1.566)	(1.173)	(0.920)	(2.016)	(1.151)	(1.770)	(3.105)	(2.607)
– very good	1.564	3.110*	0.930	0.832	3.147	0.905	2.063	2.869	0.573
	(0.952)	(1.711)	(1.273)	(1.009)	(2.202)	(1.249)	(1.942)	(3.392)	(2.828)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	71.87***	72.42***	70.12***	77.30***	75.18***	71.01***	82.95***	78.01***	80.53***
	(2.928)	(5.179)	(3.945)	(3.105)	(6.666)	(3.870)	(5.975)	(10.27)	(8.766)
Observations	448	132	316	448	132	316	448	132	316

Note: Control variables include binary variables for: saving for the future, place of living, levels of average monthly income per person (except of the highest category) (see Table 2). Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Source: Authors' own study.

Table A.3. Willingness to retire later than the official retirement age

Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Regression	Logit regression			OLS regression			Quantile (median) regression		
Dependent variable	Binary variable equal to 1, if individual preferred retirement age is higher than official retirement age			Difference between individual preferred retirement age and official retirement age			Difference between individual preferred retirement age and official retirement age		
Subsample	Total	Men	Women	Total	Men	Women	Total	Men	Women
Expected change in the standard of living after retirement (reference category: significant decrease)									
– decrease	-0.294	-0.184	-0.260	-0.330	1.226	-1.366	-0.115	1.314	-1.561
	(0.268)	(0.639)	(0.330)	(1.002)	(1.974)	(1.246)	(1.103)	(1.519)	(1.555)
– no change	-1.481**	0.200	-2.352***	-5.012**	-0.691	-7.993***	-2.824	-1.835	-5.993*
	(0.617)	(1.331)	(0.801)	(2.198)	(4.195)	(2.777)	(2.421)	(3.228)	(3.468)
– increase or	-1.420***	-2.000**	-1.414**	-4.620***	-3.741	-5.687***	-2.769	-1.751	-4.096
significant increase	(0.428)	(0.895)	(0.555)	(1.551)	(2.598)	(2.103)	(1.708)	(1.999)	(2.627)
Plans concerning professional activity after retirement (reference category: will work for sure)									
– likely to work	-0.0713	1.439*	-0.662	-1.461	3.013	-3.208**	-0.334	3.188	-1.483
	(0.359)	(0.818)	(0.443)	(1.310)	(2.610)	(1.586)	(1.443)	(2.009)	(1.981)
– not sure	-0.845*	-1.247	-0.411	-3.568*	-3.297	-1.175	-3.283	-1.612	-1.540
	(0.512)	(1.082)	(0.678)	(1.861)	(3.090)	(2.609)	(2.049)	(2.377)	(3.258)
– likely not to work	-0.590*	0.216	-1.002**	-3.069**	-0.694	-4.273***	-1.373	-0.0219	-2.448
	(0.340)	(0.864)	(0.414)	(1.266)	(2.796)	(1.498)	(1.394)	(2.151)	(1.871)
– will not work for	-1.644**	-0.301	-3.223**	-3.250	0.390	-7.780**	-1.729	0.334	-1.598
sure	(0.799)	(1.283)	(1.349)	(2.314)	(3.563)	(3.457)	(2.548)	(2.742)	(4.317)
Gender: woman	1.441***			6.097***			6.002***		
	(0.336)			(1.172)			(1.290)		
Age	0.0199	0.0103	0.0670	0.410	0.157	0.664*	0.0313	0.0459	-0.0184
	(0.0779)	(0.175)	(0.0977)	(0.285)	(0.498)	(0.369)	(0.313)	(0.383)	(0.461)

Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Age^2	-0.000540	-0.000875	-0.00112	-0.00624*	-0.00366	-0.00976**	-0.000723	-0.00130	-0.000560
	(0.001000)	(0.00225)	(0.00127)	(0.00361)	(0.00626)	(0.00472)	(0.00397)	(0.00482)	(0.00589)
Preferred retirement	0.275***	0.298***	0.286***	0.683***	0.717***	0.621***	0.893***	1.108***	0.677***
age for the same gender	(0.0359)	(0.0788)	(0.0447)	(0.111)	(0.183)	(0.148)	(0.123)	(0.141)	(0.184)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	448	132	316	448	132	316	448	132	316
R-squared				0.269	0.357	0.257			
Pseudo R^2	0.2899	0.4140	0.2900				0.2191	0.3279	0.1957

Note: Control variables include binary variables for: saving for the future, education levels, place of living, levels of average monthly income per person, type of work, health status (see Table 2).Constant not reported. Standard errors in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Source: Authors' own study.

DOI:10.17951/h.2022.56.4.207-224

ANNALES
UNIVERSITATIS MARIAE CURIE-SKŁODOWSKA
LUBLIN – POLONIA
VOL. LVI, 4 SECTIO H 2022

PIOTR WETOSZKA

piotr.wetoszka@umcs.pl
Maria Curie-Skłodowska University. Faculty of Economics
5 Marii Skłodowskiej-Curie Sq., 20-031 Lublin, Poland
ORCID ID: https://orcid.org/0000-0002-7196-0899

Participatory Budgets in Poland and Germany: Towards a Single Model?

Keywords: participatory budget; policy convergence; innovation diffusion; Poland; Germany

JEL: O35; O38; R51

How to quote this paper: Wetoszka, P. (2022). Participatory Budgets in Poland and Germany: Towards a Single Model? *Annales Universitatis Mariae Curie-Skłodowska, sectio H – Oeconomia*, Vol. 56, No. 4.

Abstract

Theoretical background: Participatory budgets (PBs) have become a widely known innovation used to engage citizens in policymaking. Since 2011, citizens in Polish municipalities can decide on how a portion of local budget can be spent. In Germany, PBs originally served the purpose of getting feedback from citizens in the context of fiscal strains. However, since about 2015, German PBs are increasingly taking after the model established in Poland, establishing fixed pools of funds. Does it present a case of between-country convergence in the functionalities of PBs and their quality? So far, such comparative questions remained mostly unanswered in the field of PB-related studies.

Purpose of the article: The aim of the paper was to investigate this possibility of convergence in PB-quality by comparing the state of and changes in the quality of PBs with fixed funds between Poland and Germany. To evaluate the quality and scope of functionality of PBs, the amount of planned PB-funds per capita and participation rates (voter turnout levels) were inspected. Two research hypotheses were formulated. The first one stipulates a higher performance level of Polish PBs by the two criteria, across a variety of municipality types. The second hypothesis posits that the differences in the quality of PBs tend to diminish over time, as the latest to innovate launch their first experiments.

Research methods: Works on the diffusion of PBs in both countries were reviewed to provide background for the study. Two datasets were constructed containing data on the two measures of PB-quality, the popu-

lation size, and the status of innovator. The data were first compared graphically. In a later step, statistical methods were applied, including variance analysis for the two dependent variables related to PB-quality at once (MANOVA) and for each of them separately (ANOVA). Results of the study were presented and discussed in the context of interactions between innovators and potential adopters in social networks, as well as political agendas in the two countries of interest.
Main findings: Research findings allowed to confirm the research hypotheses. PBs in both countries have been mostly simple innovations of limited quality, but those in Poland tended to perform better, judged by the two chosen criteria. The gap, especially for PB-funds, is closing, but that does not mean that in the course of innovators' and regulators' actions a unified innovation model has emerged. PBs in both countries utilize their functionalities in diverse ways, based on specific experiences and traditions in policymaking. Thus, PBs in Poland and Germany have different trajectories of development with fixed pools of funds as the simplistic innovation core that makes them highly adaptable in different policy contexts.

Introduction

Since the first, successful experiment in Porto Alegre at the end of the 1980s (Novy & Leubolt, 2005), participatory budgets (PBs) have become a global phenomenon with about 11–12,000 reported cases on almost every continent (Dias et al., 2019). In Europe, first PBs appeared at the turn of the centuries: in 1998, first German experiment was launched, francophone countries joined in soon after (Sgueo, 2016). For about a decade, Spain had stood out with exceptional PB-growth rates (Francés et al., 2018).

Spain's successor in that regard became Poland, where the first PB was introduced in by Sopot in 2011. Within eight years, the country witnessed a rapid increase in the number of PBs: from roughly 50 to over 200 cases (Bednarska-Olejniczak & Olejniczak, 2018, p. 346). For Germany, about 70–100 PB-experiments were identified as of 2017 (Vorwerk et al., 2018). These estimations take account of a high diversity and multifunctionality of participatory mechanisms sharing the PB-label in the country (Rahman & Tewari, 2014).

In first PBs in Germany, launched in the early 2000s, the focus was on cost-saving measures with citizens mostly as consultants. Since the middle 2010s, German municipalities have been increasingly introducing or switching to PB-formulas with fixed pools of funds for investment projects. These procedures appear similar to the solutions chosen by most, if not all, municipalities in Poland. Should this be interpreted as a sign of convergence in the quality of PBs between the two countries?

Before another wave of PBs came to Europe in the second decade of the 21st century, such convergence trends reaching beyond country borders were not part of scholarly discourse (Sintomer et al., 2010). This has been due to a general scarcity of cross-country comparisons in literature. Any (dis)similarities between PBs in Poland and Germany have also not been subject to any scientific studies so far, to the best of the author's knowledge.

The aim of the underlying paper was to fill this research gap with a quantitative study of how Polish and German PBs with fixed funds differ in their functionalities. To assess PBs' functions, two measures were chosen: planned PB-spending per cap-

ita and the voter turnout in PB-procedures. The former corresponds to the allocative function of PBs and the technocratic dimension of participation (Cabannes & Lipietz, 2018). The latter reflects the political legitimation of the procedures and the trust in power holders, held accountable for their actions (Masser et al., 2013). Higher levels of these variables reflect higher quality (performance) of participatory mechanisms.

Innovations tend to get simplified over time (Ganuza & Baiocchi, 2012). In the context of PBs, such transformations include the abandonment of political rhetoric (e.g. social justice), inherent, e.g. in the original Porto Alegre model, and changes in the level of pre-determined funding. This makes PBs easier to implement in different political scenarios. This is best exemplified by the loss of the originally urban status of modern PBs: they can be increasingly found in peripheral, rural areas, in both Poland and Germany (Herzberg, 2018; Leśniewska-Napierała, 2019). The process is ongoing: the new German variants present another "reincarnations" of the innovation, just as the PB that came earlier to Poland had been deprived of some complex elements. Considering the above, two research hypotheses were formulated:

1. Polish PBs tend to have higher planned PB-spending per capita and participation rates.

2. Differences in planned PB-spending per capita and participation rates between Poland and Germany tend to diminish with time.

To test the hypotheses, graphical presentation of data and variance analysis were applied. The latter is a regression technique used to determine how one or more dependent variables change across the variables grouped by one or more criteria. The study follows a popular analytical framework (French et al., 2008). Firstly, multivariate variance analysis (MANOVA) was applied on the collected data. Secondly, follow-up tests were performed to verify the results and to determine at which levels of independent variables the outcome variables vary the most. For that purpose, univariate ANOVA tests alongside with multiple pairwise comparisons were performed (Weinfurt, 2000). MS Excel and *R* with *rstatix* package (Kassambara, 2021) were used for statistical computations. Results of the study were presented and discussed in the context of mechanisms that may have influenced the observed trends. These include, most importantly, political agendas and social networks where innovators interact – both within and between the countries of interest.

In the following section, international literature was reviewed to provide background on the evolution of PBs in Poland and Germany, in the context of the global diversity of innovation models.

Literature review

Several ideal types of PBs were discussed in literature (Sintomer et al., 2008, 2012). The "Porto Alegre in Europe" model constitutes a reinterpretation of a highly deliberative, justice-oriented original scheme, made adaptable to European standards

of policymaking. It introduces some mechanisms of discussion and keeps the allocative function at its centre, while limiting the pool of funds being subject to discussion. Hence, the model does not pretend to be an instrument to "radically democratize democracy" (Cabannes & Lipietz, 2018, p. 70) by giving citizens the ultimate right to decide. Instead, budgetary decisions remain the prerogative of local authorities.

In two other models, "proximity participation" and "consultation on public finances", the role of civic society is reduced even further. Citizens are expected to act as consultants, i.e. comment on the ideas put forward by local authorities and, sometimes, deliver their own ones. The "proximity" component in the latter variant relates to the level of neighbourhoods where voting and meetings take place. Local government retains its position as the ultimate decision-maker.

As for another model called "community funds" (or "community development"), its principal component is a pool of funds dedicated to districts or neighbourhoods. A greater role in this variant of innovation may be played by third sector institutions. These may act as funds providers, beneficiaries, as well as maintainers of procedures, often in collaboration with local administration.

Different policies towards innovation diffusion adopted by national and regional authorities shaped the preference or necessity for certain PB-models to be chosen in both countries under inspection. In Poland, the diffusion of PBs was for a long time a "search for optimal solutions by individual cities" (Kurdyś-Kujawska et al., 2017, p. 117). This changed in 2018, as a legal PB-framework (Ustawa z dnia…) was introduced, altering the rules of the game. These included making PB mandatory for cities with *powiat* rights[1] and standardizing its features, such as the minimal required share of the local budget dedicated to PB.

Arguably, Polish PBs reached maturity and homogeneity already a couple of years before the said changes in law (Mączka et al., 2021). They have, in fact, since the beginning represented the group of "traditional PBs" (Lehtonen, 2021), with a relatively strong position of local officials and the role of citizens not limited to, but mostly expressed in submitting and selecting projects. These are the features characteristic of the "Porto Alegre in Europe" model.

Unlike in Poland, the spread of PBs in Germany was originally led top-down. Leaving the very first case in Mönchweiler (1998) aside, PBs originated in North Rhine-Westphalia, as part of an experiment run by regional authorities together with some non-governmental institutions (Ministry of Internal Affairs of North Rhine-Westphalia & Bertelsmann Foundation, 2003). These early cases presented a response to fiscal problems of German municipalities: PBs were thought of as one way of explaining the situation to citizens and engaging them in choosing the best cost-saving means. Thus, until about 2005, PBs in Germany were mostly interpretations of the consultative model. In a second wave, some district-level

[1] Cities with *powiat* rights in Poland are 66 independent entities: they do not belong to any county, but themselves have a status as one and fulfil certain county-level duties (i.e. in the area of public safety).

PB-schemes were developed in Berlin boroughs. They mixed elements of purely consultative procedures with some functionalities from the proximity participation model (Sintomer et al., 2008). Soon after, the global financial crisis in 2007–2008 brought a return of consultative models used by municipalities, again, in the hope of improving their fiscal condition.

The logic of citizens as consultants has vastly shaped the common features of a once popular type of German PBs referred to as *Bürgerhaushalt* (Kersting et al., 2016; Ruesch & Wagner, 2014). In this innovation variant, citizens were able to submit and comment on ideas put forward by other citizens or municipal authorities, and, often, to vote on the ideas picked as best. While the subject of discussion was the entire budget or some central investment areas, citizens' input was limited to recommendations or ideas to beconsidered by local authorities, ultimately free to decide on their own.

Bürgerhaushalt has been losing on popularity since the middle 2010s (Märker, 2015). Its successor, called *Bürgerbudget*, is a Polish-type, project-oriented PB, with a fixed amount of reserved funds and the mechanism of voting, mostly by all or selected citizens. Between 2014 and 2017, the number of German PBs of the new type doubled, and its share rose from less than 15 to over 40% of all experiments in the country (Vorwerk et al., 2018, p. 9). The new model is the main choice for the latest to adopt a PB, including municipalities in eastern regions of the country – most notably in Brandenburg (Herzberg et al., 2020; ORBIT, 2010).

Research methods

Municipal websites were, for the most part, a sufficient source of information on planned PB-pools per capita and participation rates. However, a preliminary search for data confirmed that the needed information was generally less available for German municipalities, especially as regards voter turnout. Sometimes, no popular voting was in place, either because it was not meant or necessary to be performed, or it was replaced with voting by a selected body of representatives.

Considering this, the decision was made to build two separate databases. In the first dataset, pairs of municipalities with data on planned PB-spending per capita only were assembled, preferably announced in 2019 (to be spent in 2020) or the closest one possible. Per capita values were chosen due to the easiness of their calculation and a straightforward interpretation (How much does a single citizen "get" from PB?). To assure data comparability between countries and across years, values were brought to the common purchase power parity standard (PPP) with Eurostat conversion rates (Eurostat, n.d.). In a further step, corresponding participation rates were added, based on numbers of voters in relation to all residents in the municipality. Information was stored in dataset 2, with only those records kept where data on the two dependent variables representing PB-functionalities were available.

The procedure was repeated for Polish municipalities, chosen non-randomly to match their German counterparts. Matching criteria were municipality size, its economic functions, and the status of innovator. The profiles of innovators as presented by Rogers (2003) were crucial to establish a balanced design of the data. The first half of the innovators' population, the early, more risk-friendly adopters needed to be matched together. The same applied to the second, more conservative half of innovators – the late adopters. Analogically, big communes, usually with greater traditions in adopting participatory mechanisms, were to be paired with other big, urban entities. Municipalities with specific functions (e.g. health resorts, or industrial centres) and often unique procedures needed to be matched with entities having similar characteristics.

Ultimately, a list of 168 municipalities, or 84 pairs, was assembled in the database 1. Dataset 2 comprises 86 municipalities grouped in 43 pairs. Besides the two dependent variables, the year in which decision on funds allocation was reported. For example, value "2020" corresponds to a PB-cycle initiated in 2020, with funding planned to be spent, in most cases, in 2021. Also, three grouping variables were introduced into the databases: "Poland", "small" and "laggard". These binary variables took value 1 for, respectively, the country of origin being Poland, for a small municipality, and for a laggard. As late adopters, laggards tend to follow the trends and prefer less complex solutions (Rogers, 2003). Many among the late mass of adopters are at the same time smaller entities, often isolated in their peer networks. The two grouping variables "small" and "laggard" constitute in part alternatives, but considered jointly, they may help uncover some variation among the marauders. A sample of the second dataset, used for the most calculations, was provided in Table 1.

Table 1. Preview of dataset 2

Pair no.	Municipality	Year of decision on funds allocation	PB-funds per capita (in PPP)	Participation rate	Poland	Small	Laggard
1	Dąbrowa Górnicza	2020	13.07	0.0572	1	0	0
1	Jena	2020	0.2	0.0093	0	0	0

Source: Author's own study.

Results

Polish and German participatory mechanisms differ in the quality (Figure 1). Values for German PBs tend to cluster around the coordinate system origin; they are typically combinations of relatively small per capita pools of funds (often less than 6 PPP) and participation rates mostly below 10%. The opposite is true for Poland, where double as much per capita or even more is spent within PB-schemes, and the engagement of citizens tends to be higher, occasionally reaching beyond 30%. The two dependent variables are linearly correlated with each other. This is true for the

whole main dataset ($r = 0.44$), and even more so for German cases only, for which a moderate positive correlation was observed ($r = 0.58$). For Polish PBs, the value indicates a state between non-correlation and a very low positive correlation ($r = 0.15$).

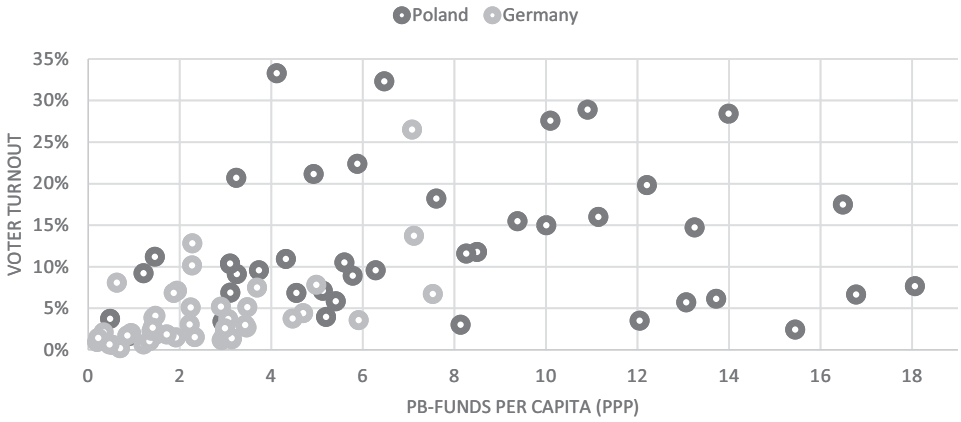

Figure 1. PB-funds per capita and participation rates (dataset 2)

Source: Author's own study.

The observed differences can be confirmed visually in greater detail (Figures 2 and 3). PBs in Germany are more homogenous, especially regarding the values for planned per capita spending. In that respect, one extreme value was observed for Poland: as much as 27.91 PPP per capita was declared to be spent in a PB performed in Kołbaskowo (West Pomerania). As for Germany, one outlier in terms of voter turnout is Steinberg am See (Bavaria), where over ¼ of only about 1,000 residents cast their vote in 2019.

To assess data representativeness in the main dataset 2, an additional check with the first dataset was performed, resulting in a similar picture. In the second database, almost all values for Polish communes fall into the range of 1–18 PPP (see Figure 2). In dataset 1, within the range of 1–15 PPP, about ¾ of all observations can be found. These statistics correspond with the distribution of PB-spending per capita across a variety of Polish municipalities that launched their PB in 2015 (ZMP, 2015). As for German cases, no issues with representativeness were expected: dataset 1 contains observations for the vast majority of PBs with fixed pools of funds performed until 2021. Some rare exceptions of left-out PBs included district-level procedures that could not be paired with any counterparts from Poland.

Observations from other sources were used to assess data representativeness for participation rates. Voter turnout levels in the years 2016–2018 ranged from 3 to more than 70%, with median levels between 10 and over 20% (NIK, 2019, p. 44). Hence, it can be assumed that author's data reflect the diversity of participation rates

in Poland. For PBs with no fixed PB-pools in Germany, participation levels calculated for a variety of citizen activities (such as posting in a forum or answering a survey) typically remain below 5% (Masser, 2013).

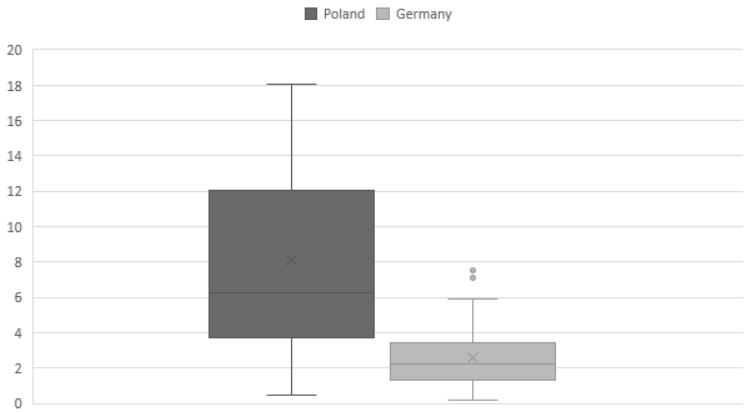

Figure 2. PB-funds per capita (PPP) (dataset 2, *N* = 86)

One outlier value for Poland was hidden for greater clarity of the figure.

Source: Author's own study.

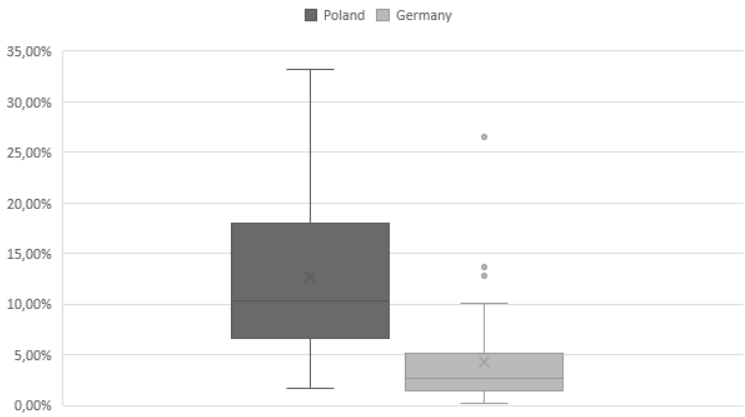

Figure 3. Participation rates (dataset 2, *N* = 86, outliers hidden)

Source: Author's own study.

The data were checked for meeting variance analysis assumptions, initially with "Poland" as the sole grouping variable. To correct for non-normal distribution and non-linearity of dependent variables, square roots of both outcome variables were taken and pairs with outliers were removed. This resulted in the final number of 66 observations (33 pairs). Box's *M* test for the homogeneity of multiple variance-cova-

riance matrixes yielded a statistically positive result ($p = 0.0497$). However, the close margin (for $p = 0.05$) and the balanced design of the dataset allowed to continue the analysis. Nonetheless, to account for the slight violation of the homogeneity criterion, a robust Pillai statistic (V) was used in the assessment of models. Other candidates for grouping variables were tested as well, but Levene's test indicated in each case a violation of variance homogeneity ($p > 0.05$).

Ultimately, one MANOVA model was constructed with "Poland" as the single grouping variable. Results confirmed that the difference in PB-performance across Polish and German municipalities is statistically significant ($F_{2,63} = 23.97$; $p < 0.001$; $V = 0.43$). A series of follow-up tests was performed to investigate variance in the data caused by attributes of communes other than their country of origin. Firstly, several ANOVA tests were launched (Tables 2–4). Eight models for the two dependent variables were constructed: models 1 to 4 for planned per capita funds and models 5–8 for participation rates. Three grouping variables ("Poland", "small", "laggard") along with interaction terms were included. Additionally, models 1′ to 4′ were developed for the single variable "funds" for data stored in dataset 1. Again, outliers were removed and a necessary Box-Cox transformation was applied, this time using a lambda parameter ($\lambda = 0.18$).

The results strongly indicate that the between-country difference in PB-quality remains statistically significant for the two dependent variables treated separately. Grouping by other variables does not yield consistent and statistically significant results. It is fair to claim that belonging to one of the countries is a strong, but not the sole predictor of how much is spent within PB-schemes. Binaries "small" and, especially, "laggard" form statistically significant interaction terms with "Poland" as the main variable. This suggests that some differences in PB-functionalities may result from traits of certain types of innovators, acting within a given political context. However, the relevance of interaction terms can be also at least partly explained by the dominance of laggards in the German subsample, with any of them being also small municipalities. For such smaller entities, it may be easier to achieve higher per capita values of PB-funds, as well as to mobilize local community to participate in voting.

Table 2. ANOVA test for "funds" as a dependent variable (dataset 2, $N = 66$)

Variable	Model 1 (Poland)	Model 2 (Poland*small)	Model 3 (Poland*laggard)	Model 4 (Poland*small*laggard)
Poland	$F = 24.57$ $p < 0.001$***	$F = 25.65$ $p < 0.001$***	$F = 30.26$ $p < 0.001$***	$F = 29.77$ $p < 0.001$***
small		$F = 0.02$ $p = 0.88$		$F = 0.03$ $p = 0.87$
Poland*small		$F = 4.79$ $p < 0.05$*		$F = 5.79$ $p < 0.05$*
laggard			$F = 1.4$ $p = 0.24$	$F = 1.53$ $p = 0.22$
Poland*laggard			$F = 15.4$ $p < 0.001$***	$F = 9.71$ $p < 0.01$**

Variable	Model 1 (Poland)	Model 2 (Poland*small)	Model 3 (Poland*laggard)	Model 4 (Poland*small*laggard)
Poland*small				$F = 1.08$ $p = 0.3$
Poland*laggard*small				$F = 1.4$ $p = 0.24$

***$p < 0.001$, **$p < 0.01$, *$p < 0.05$

Source: Author's own study with *R* (*rstatix*).

Table 3. ANOVA test for "funds" as a dependent variable (dataset 1, $N = 152$)

Variable	Model 1′ (Poland)	Model 2′ (Poland*small)	Model 3′ (Poland*laggard)	Model 4′ (Poland*small*laggard)
Poland	$F = 125.4$ $p < 0.001$***	$F = 138.634$ $p < 0.001$***	$F = 146.98$ $p < 0.001$***	$F = 160.97$ $p < 0.001$***
small	-	$F = 5.72$ $p < 0.05$*	-	$F = 9.15$ $p < 0.01$**
Poland*small	-	$F = 12.172$ $p < 0.001$	-	$F = 3.38$ $p = 0.07$
laggard	-	-	$F = 0.38$ $p = 0.541$	$F = 0.412$ $p = 0.52$
Poland*laggard	-	-	$F = 27.51$ $p < 0.001$***	$F = 30.19$ $p < 0.001$***
laggard*small				$F = 5.48$ $p < 0.05$*
Poland*laggard*small				$F = 0$ $p = 0.97$

***$p < 0.001$, **$p < 0.01$, *$p < 0.05$

Source: Author's own study.

Table 4. ANOVA test for outcome variable "voter turnout" (dataset 2, $N = 66$)

Variable	Model 5 (country)	Model 6 (Poland*small)	Model 7 (Poland*laggard)	Model 8 (Poland*small*laggard)
Poland	$F = 40.55$ $p < 0.001$***	$F = 43.55$ $p < 0.001$***	$F = 41.04$ $p < 0.001$***	$F = 41.67$ $p < 0.001$***
small		$F = 0.08$ $p = 0.7838$		$F = 0.07$ $p = 0.788$
Poland*small		$F = 6.65$ $p < 0.05$*		$F = 6.15$ $p < 0.05$*
laggard			$F = 0.78$ $p = 0.38$	$F = 1.3$ $p = 0.26$
Poland*laggard			$F = 1.99$ $p = 0.16$	$F = 0.14$ $p = 0.71$
laggard*small				$F = 0.08$ $p = 0.78$
Poland*laggard*small				$F = 0.03$ $p = 0.86$

***$p < 0.001$, **$p < 0.01$, *$p < 0.05$

Source: Author's own study.

In the last step of the analysis, Tukey Honest Significant Differences tests were performed to investigate for which levels or combinations of grouping variables the quality of PBs changes. Observations were firstly grouped by the variables "small" and "laggard" (Table 5). While results for the larger sample in the first dataset show statistically significant results for both levels of both grouping variables, strongest effects, most consistent across the models, occurred for non-small/non-laggard combinations in dataset 2, which is more balanced with respect to the population size and the innovator status. On the whole, earlier, more populous adopters from Poland and Germany differ in their PB-quality more than do smaller, more hesitant innovators.

Table 5. Multiple pairwise comparisons for Poland and Germany (dataset 2)

Dataset	Outcome variables	Small		Laggard	
		Yes	No	Yes	No
1 (N = 152)	funds	p.adj < 0.001***	p.adj < 0.001***	p.adj < 0.001***	p.adj < 0.001***
2 (N = 66)	funds	p.adj < 0.05*	p.adj < 0.001***	p.adj = 0.07	p.adj < 0.001***
	turnout	p.adj < 0.01**	p.adj < 0.001***	p.adj < 0.001***	p.adj < 0.001***
	funds and turnout	p.adj = 0.23	p.adj < 0.01 **	p.adj = 0.22	p.adj < 0.01**

***p < 0.001, **p < 0.01, *p < 0.05. The term "p.adj" stands for adjusted p-values (with Bonferroni correction)

Source: Author's own study.

Multiple pairwise comparisons were performed again for non-grouped variables to inspect in detail what levels of which grouping variables account for the most variance in the data. Several interesting observations could be made, especially as regards PBs in Poland. As for PB-spending per capita, Polish laggards represent a unique group, both within the country, and compared with German laggards and non-laggards. As far as participation rates are concerned, Polish communes of type small/laggard do not vary statistically significantly from other entities in the country, but they do differ from PBs in all types of German communes.

Overall, PBs in Poland represent a more homogenous group that stands out positively with their quality when compared with their German counterparts. Two outcome variables contribute to this general picture of disparities, although, judging by the F-values (see Tables 1–4), the differences in participation rates can be expected to be larger. With time, the observed differences diminish, especially in terms of planned PB-spending per capita.

Discussion

Several factors may have contributed to the observed convergence, as well as to the susceptibility of each of the two PB-functionalities to change. Closing the between-country gap in PB-funding was brought about in a natural course of events.

Necessary budgetary cuts induced by the COVID-19 pandemic affected PB-schemes in Polish cities with higher levels of per capita PB-funds to a greater extent than they did in case of German communes. Yet, traditionally higher levels of spending could have also created room for taking flexible approaches to resolve fiscal strains. Polish laggards introduced their first PBs shortly before or already in times of COVID-19 restrictions. Most of them planned their procedures with the new legal framework that came into force in 2019 (Ustawa z dnia…) already in mind. One of the introduced requirements forced municipalities PB-adopters to spend no less than 0.5% of total budget expenditures. Considering this, the COVID-related necessity to reallocate municipal funds may have encouraged municipalities to choose safe but law-compliant solutions, such as fixed, but not predetermined funds levels, depending on current expenditures. A similar logic can be applied to some earlier PB-adopters that could reduce their per capita-spending within PBs, justifying their decisions by reference to the new framework.

Since participation levels reflect more general trends in how local authorities are perceived by the society, they change dynamically across the lifespan of PBs (Miasto 2077, 2019). Arguably, though, the nature of Polish PBs has been in the long-term conducive to maintaining a recurring interest in participation. This has to do with the nature of many modern PBs depicted as "quasi-referenda" (Sześciło, 2015), where groups of citizens (or institutions) act as competitors in a "race for funding". In the light of collective action theory, this presents the case of an exclusive reward (Olson, 1971) that keeps the stakeholders engaged throughout the course of participation. The feature of popular vote in Polish PBs has affirmed itself with the growing popularity of e-participation. Yet, it has not come without costs: Polish PBs tend to offer less diverse possibilities to get involved, as opposed to some earlier German experiments, but also compared with other PBs in the region, e.g. in Slovakia and Croatia (Džinic et al., 2016).

As far as Germany is concerned, low participation rates have been one of the main diagnosed problems in the utilization of PBs in the country (Zepic et al., 2017). Somewhat ironically, the risk of such a malfunction was perceived already by the developers of the first PBs in the country in the early 2000s. These schemes were constructed to address citizens selectively and get feedback from them, provide information on how local budgets work, and, occasionally, engage some of them in submitting proposals on a variety of projects – but many of them ended up as short-lived experiments. Pure cost-saving PBs that came later, with no possibilities to propose investment projects, present another, crass example of such failed initiatives (Holtkamp & Bathge, 2012).

While the concept of *Bürgerbudget* does present a change in the way of thinking about PBs in Germany (Berlin Institut für Partizipation, 2021), it appears to have its own issues. With some municipalities repeatedly announcing PB in the volume of EUR 1 or 2 per capita, pools remain at a limited, non-flexible level. Orientation towards project-based procedures may enhance their credibility, but certainly not if

it is the local government that makes the ultimate decisions. Moreover, institutional actors, most notably sport organisations, are often on an equal footing with individual citizens, as far as the right to submit and win a project is concerned. This raises concerns over the true civic nature of these "civic budgets", as they are sometimes called. Such situations had been occasionally reported in Poland as well, where they were met with heavy criticisms (NIK, 2019). In Germany, however, it appears to be a fundamental part of corporatist policymaking with the objective to satisfy different stakeholders of the process and help escape the trap of "political disenchantment" once again (Busse & Schneider, 2015). Instead, though, a vicious cycle emerges: non-participation leads to local government's frustration, which in turn delivers arguments in favour of reducing the scope of PB even further or abolishing it altogether (Neunecker, 2016).

This is symptomatic of a general issue of political mobilization embedded in participatory governance tools with a strong direct democracy component (Mærøe, 2021; Parvin, 2018). If the monetary "reward" is illusionary, even the most politically active "middle-aged, well-educated men" (Masser, 2013) may find no reason to engage in procedures. It is in this context that the positive, if only moderate, relation between low-level participation rates and PB-funds per capita for Germany noted earlier (see Figure 1) should be seen.

Having considered critical voices towards modern PBs, it must be acknowledged that *Bürgerbudgets* differ among each other and may come with interesting solutions to learn from. In that context, the example of partner cities at the Polish-German border can be recalled: Zgorzelec in Lower Silesia and Görlitz in Saxony (Oder-Partnerschaft, 2018). Since these cities were once one municipal body, this case may be considered a quasi-natural experiment which highlights the relevance of policymaking culture on the formation of PBs. In both Zgorzelec and Görlitz, fixed pools of PB-funds were assigned: approx. EUR 1 euro per capita in Görlitz and over EUR 2.5 per capita in Zgorzelec (not much by either Polish or German standards). However, while in Zgorzelec the decision to allocate these funds was left to all citizens in popular vote, the responsibility for decision-taking in Görlitz was assigned to collective bodies in districts – a citizen assemblies. It may be argued that deciding over a smaller portion of funds, but in conditions supporting a compromise, may, in fact, enhance the corporatist participatory democracy. This may come about in ways that go unnoticed if only the general mobilization of citizens, expressed by voter turnouts, is considered. While deliberation may, just as direct democracy, disfavour the politically least engaged citizens, it can be successfully applied on a small scale (e.g. in one or several city areas) with the potential to contribute to the "larger-scale process of opinion-formation" (Curato et al., 2022, p. 8).

To illustrate the value of social networks for learning and experience sharing, conducive to innovative behaviour, further examples from Poland and Germany can be provided. As Eberswalde (Brandenburg) switched from the traditional German *Bürgerhaushalt* to *Bürgerbudget* in 2012, it could have been inspired by the freshly

initiated procedure in Sopot, the Polish PB-forerunner. Although the deliberation-oriented instrument in Eberswalde remained rather an exception as a successful German PB of the new type, it quickly became an inspiration for other German municipalities to follow (Berlin Institut für Partizipation, 2021). Parallelly, local authorities in Eberswalde's partner city Gorzów Wielkopolski (Lubusz) must have observed the merits of deliberation. Thus, already at an early stage, they decided to lean towards compromise-oriented solutions, preferring discussion to voting (Daniel, 2019). This preference was limited to one type of projects (for schools) and did not come without its problems, with some of the winning investments benefiting narrow groups of citizens. Still, the choices made by Gorzów Wielkopolski present a step forward in pushing the limits of the "Porto Alegre for Europe" model, when compared to what could be originally achieved in the procedure launched by Sopot.

As far as Germany is concerned, Brandenburg and Saxony are among the few regions that have been witnessing an upsurge in interest in the *Bürgerbudget* model. Arguably, relatively weak PB-traditions in the East, but also in the wealthier southern lands of Bavaria and Baden-Württemberg opened the possibility to start afresh, while learning from mistakes others make. Favourable demographic structures encourage even more to "rebrand" PBs, for example, as a tool to politically engage not citizens in general, but the youth or other social groups in particular (Herzberg et al., 2020). In small and middle German municipalities, much underused potential to innovate still exists. This makes Polish innovators even greater sources of inspiration, with the village funds (sometimes considered a special PB-type) being implemented in rural areas (Herzberg, 2018) – often not instead of, but in addition to, classic PBs.

PBs appear, on the one hand, as "politically malleable device[s]" (Ganuza & Baiocchi, 2012, p. 1). Their susceptibility to change and limited functionality, while sources of concern, allow them to successfully diffuse and find application in various political and cultural contexts. In both analysed countries, the diffusion of PBs remains an unfinished process. The new wave of procedures in Germany may be seen as an intermediary step in reshaping local governance structures, leading to the introduction of other, possibly more powerful solutions for the citizens to have a say in local matters (Vorwerk, 2019). A possible path, already explored by some municipalities, is the integration of PBs into smart city frameworks. As for Poland, the worn-off yet steady inflow of PB-adopters in the years 2020–2021 does not exclude the possibility of a scenario change in the future – both in quantitative terms and with respect to the quality and functionalities of the innovation in question.

Conclusions

The research findings allowed to confirm the first and the second hypotheses. On the whole, Polish and German represent innovations of limited quality, if contrasted with, e.g. the solution in Porto Alegre. The between-country comparison undertaken

in the study shows that PBs in Poland tend to have higher quality, judged by per capita spending and participation levels, but the gap, especially for PB-funds, is closing. These convergence trends, however, should not be interpreted as a path towards a unified model. Country-specific issues, including the German corporatist way of policymaking, make PBs in both countries follow slightly different trajectories of development.

The underlying work is of both methodical and practical importance for international researchers and policymakers. The author's study presents a simple framework for contrastive analysis on cross-country aggregated data, which can be modified in several ways. Instead of per capita values, PB-spending in relation to total municipal budget can be used, which would enhance the analysis with the self-perceived importance of PB for municipalities. Furthermore, values for executed rather than planned PB-funds can be utilised to better reflect the allocative outcome of procedures.

As the availability of data on PBs rises, researchers may find it useful to follow quantitative approaches in comparing the quality of PB across municipalities or regions. This is much needed in a young research field of participatory democracy, dominated by case studies – valuable on their own, but limited in delivering generalizations. Still, qualitative research should be further developed and used, e.g. to delve deeper into how local authorities are held accountable for their actions and how marginalised groups get involved in decision-making processes. Such complex topics, not intended to be part of author's framework, require more work on establishing international criteria for the assessment of PBs and other participatory mechanisms.

The study results underscore the necessity to look at the changing position of Polish municipalities as policymakers. Originally, a group of late innovation-takers, they may increasingly shape the way the innovation is perceived by others. The rising popularity of participation mechanisms in Eastern Europe (e.g. Slovakia, Romania) and Baltic countries (e.g. Estonia) calls for a presence of good examples to follow, and these must not necessarily recall the ideal picture of PB based on experiences made by Porto Alegre. At the same time, it becomes crucial for Polish municipalities to take the opportunity to learn from others as well. They need to experiment further, perhaps with more consensus-oriented techniques – not necessarily as a substitute, but as an extension of the procedures already in place.

References

Bednarska-Olejniczak, D., & Olejniczak, J. (2018). Participatory budgeting in Poland in 2013–2018 – six years of experiences and directions of changes. In N. Dias (Ed.), *Hope for Democracy: 30 Years of Participatory Budgeting Worldwide* (pp. 337–354). Portugal: Epopeia Records/Oficina.

Berlin Institut für Partizipation. (2021). *Bürgerbudgets in Deutschland. Formen, Bedeutung Und Potenziale Zur Förderung Politischer Teilhabe Und Bürgerschaftlichen Engagements*. Berlin. Retrieved from https://www.bipar.de/?smd_process_download=1&download_id=20616

Busse, S., & Schneider, S.H. (2015). Die Evaluation von Bürgerbeteiligung Als Politikberatung: Praxis, Herausforderungen und Empfehlungen Am Beispiel Bürgerhaushalt. *Zeitschrift für Politikberatung*, *7*(1–2), 3–13. **doi:10.5771/1865-4789-2015-1-2-3**

Cabannes, Y., & Lipietz, B. (2018). Revisiting the democratic promise of participatory budgeting in light of competing political, good governance and technocratic logics. *Environment and Urbanization*, *30*(1), 67–84. **doi:10.1177/0956247817746279**

Curato, N., Sass, J., Ercan, S., & Niemeyer, S. (2022). Deliberative democracy in the age of serial crisis. *International Political Science Review*, *43*(1), 55–56. **doi:10.1177/0192512120941882**

Daniel, K. (2019). Budżet obywatelski – analiza porównawcza Gorzowa Wielkopolskiego i Opola. *Kwartalnik Prawo – Społeczeństwo – Ekonomia*, *4*, 5–21.

Dias, N., Enriquez, S., & Júlio, S. (2019). *Participatory Budgeting World Atlas*. Faro: Epopeia/Oficina.

Džinic, J., Svidronová, M., & Markowska-Bzducha, E. (2016). Participatory budgeting: A comparative study of Croatia, Poland and Slovakia. *NISPAcee Journal of Public Administration and Policy*, *9*(1), 31–56. **doi:10.1515/nispa-2016-0002**

Eurostat. (n.d.). Retrieved from https://ec.europa.eu/eurostat/web/purchasing-power-parities/data/database

Francés, F., Carratalá, L., & Ganuza, E. (2018). 20 years of participatory budgeting in Spain. In N. Dias (Ed.), *Hope for Democracy: 30 Years of Participatory Budgeting Worldwide* (pp. 275–287). Portugal: Epopeia Records/Oficina.

French, A., Macedo, M., Poulsen, J., Waterson, T., & Yu, A. (2008). *Multivariate Analysis of Variance*. San Francisco: San Francisco State University.

Ganuza, E., & Baiocchi, G. (2012). The power of ambiguity: How participatory budgeting travels the globe. *Journal of Deliberative Democracy*, *8*(2). **doi:10.16997/jdd.142**

Herzberg, C. (2018). Bürgerbudgets Zur Stärkung Einer Lebendigen Ländlichen Gesellschaft ? Neue Ansätze Für Die Dorf- Und Regionalentwicklung. *Ländlicher Raum*, *3*, 16–18.

Herzberg, C., Rumpel, M., & Poplawski, R.(2020). *Studie Bürgerbudgets in Brandenburg – Perspektiven Für Jugendbeteiligung*. Potsdam: mitMachen e. V./JUBU – Jugendbeteiligung bei Bürgerbudgets.

Holtkamp, L., & Bathge, T. (2012). Lokale Bürgerbeteiligung in der Haushaltskrise. *dms – der moderne staat – Zeitschrift Für Public Policy, Recht Und Management*, *5*(1), 47–64. **doi:10.3224/dms.v5i1.04**

Kersting, N., Gasparikova, J., & Iglesias, A. (2016). Local democratic renewal by deliberative participatory instruments: Participatory budgeting in comparative study. In S. Kuhlmann & G. Bouckaer (Eds.), *Local Public Sector Reforms in Times of Crisis*. *National Trajectories and International Comparisons* (pp. 317–331). Palgrave Macmillan. **doi:10.1057/978-1-137-52548-2_18**

Kassambara, A. (2021). *rstatix*: *Pipe-friendly framework for basic statistical tests (0.7. 0)* [computer software].

Kurdyś-Kujawska, A., Zawadzka, D., Kwiatkowski, G., & Rosiński, R. (2017). Participatory budgeting in Polish cities: Funds' allocation mechanism. In A. Bem, K. Daszyńska-Żygadło, T. Hajdíková, & P. Juhász (Eds.), *Finance and Sustainability*. Springer Proceedings in Business and Economics (pp. 107–120). Cham: Springer. **doi:10.1007/978-3-319-92228-7_10**

Lehtonen, P. (2021). Policy on the move: The enabling settings of participation in participatory budgeting. *Policy Studies*, *43*(5), 1036–1054. **doi:10.1080/01442872.2021.1895981**

Leśniewska-Napierała, K. (2019). Participatory budgeting as a new instrument of social participation in Poland's rural areas. *Studia Obszarów Wiejskich*, *53*, 77–93. **doi:10.7163/sow.53.6**

Masser, K. (2013). *Participatory budgeting as its critics see it*. Retrieved from https://www.buergerhaushalt.org/en/article/participatory-budgeting-its-critics-see-it/

Masser, K., Pistoia, A., & Nitsche, P. (2013). *Bürgerbeteiligung und Web 2.0. Potentiale und Risiken webgestützter Bürgerhaushalte*. Wiesbaden: Springer VS.

Mærøe, A., Nort, A., Tsap, V., & Pappel, I. (2021). Increasing citizen participation in e-participatory budgeting processes. *Journal of Information Technology and Politics*, *18*(2), 125–147. **doi:10.1080/19331681.2020.1821421**

Mączka, K., Jeran, A., Matczak, P., Milewicz, M., & Allegretti, G. (2021). Models of participatory budgeting. Analysis of participatory budgeting procedures in Poland. *Polish Sociological Review*, *216*(4), 473–492. **doi:10.26412/psr216.03**

Märker, O. (2015). *Die Neuerfindung der Bürgerhaushalte*. Retrieved from https://gutvertreten.boell.de/2015/05/14/die-neuerfindung-der-buergerhaushalte

Miasto 2077. (2019). *Raport: Budżet obywatelski w polskich miastach*. Retrieved from https://www.miasto2077.pl/wp-content/uploads/2019/03/Raport-Budz%CC%87ety-Obywatelskie-w-polskich-miastach.pdf

Ministry of Internal Affairs of North Rhine-Westphalia in collaboration with Bertelsmann Foundation. (2003). *Kommunaler Bürgerhaushalt in Nordrhein-Westfalen. Zweiter Zwischenbericht*. Retrieved from: https://www.buergerhaushalt.org/sites/default/files/downloads/zwischenberich-nrw-2.pdf

Neunecker, M. (2016). Kein Geld, geht nicht, machen wir schon. *vhw FWS 5*, 233–238. Retrieved from https://www.vhw.de/fileadmin/user_upload/08_publikationen/verbandszeitschrift/FWS/2016/5_2016/FWS_5_16_Neunecker.pdf

NIK (Najwyższa Izba Kontroli). (2019). *Funkcjonowanie budżetów partycypacyjnych (obywatelskich)*. Retrieved from https://www.nik.gov.pl/plik/id,21186,vp,23818.pdf

Novy, A., & Leubolt, B.(2005). Participatory budgeting in Porto Alegre: Social innovation and the dialectical relationship of state and civil society. *Urban Studies*, *42*(11), 2023–2036. **doi:10.1080/00420980500279828**

Olson, M. (1971). *The Logic of Collective Action: Public Goods and the Theory of Groups*. Harvard: Harvard University Press. **doi:10.2307/j.ctvjsf3ts**

ORBIT. (2010). *Bürgerhaushalte in Ostdeutschland. Entwicklungsstand Und Handlungsempfehlungen*. Retrieved from https://www.weiterdenken.de/sites/default/files/buergerhaushalte_ostdeutschland_hbs_studie.pdf

Parvin, P. (2018). Democracy without participation: A new politics for a disengaged era. *Res Publica*, *24*(1), 31–52. **doi:10.1007/s11158-017-9382-1**

Rahman, S., & Tewari, A. (2014). *Case Study of E-Participatory Budgeting*. Retrieved from https://www.researchgate.net/profile/Anurag-Tewari-2/publication/260892513_Case_Study_of_E-Participatory_Budgeting/links/004635329b70fe8096000000/Case-Study-of-E-Participatory-Budgeting.pdf?origin=publication_detail; **doi: 10.13140/2.1.3469.0889**

Ruesch, M., & Wagner, M. (2014). Participatory budgeting in Germany – citizens as consultants. In. N. Dias (Ed.), *Hope for Democracy. 25 Years of Participatory Budgeting Worldwide* (pp. 287–298). Portugal: Epopeia Records/Oficina.

Rogers, E. (2003). *Diffusion of Innovation*. London – New York: New Press.

Oder-Partnerschaft. (2018). *Workshop „Bürgerbudget – der bessere Bürgerhaushalt? Ein deutsch-polnischer Vergleich am Beispiel der Europastadt Görlitz/Zgorzelec" zeigt unterschiedliches Vorgehen*. Retrieved from http://www.oder-partnerschaft.eu/aktuelles/2018/10869/

Sgueo, G. (2016). Participatory budgeting: An innovative approach. *SSRN Electronic Journal*. **doi:10.2139/ssrn.2712213**

Sintomer, Y., Herzberg, C., & Röcke, A. (2010). Verfahren und Modelle des Bürgerhaushalts und ihre Umsetzung in Deutschland. *Internationaler Kongress zu Modellen des Bürgerhaushalts*. Berlin, 21 January 2010. Centre Marc Bloch.

Sintomer, Y., Herzberg, C., & Röcke, A.(2008). Participatory budgeting in Europe: Potentials and challenges. *International Journal of Urban and Regional Research*, *32*(1), 164–178. **doi:10.1111/j.1468-2427.2008.00777.x**

Sintomer, Y., Herzberg, C., & Röcke, A. (2012). Transnational models of citizen participation: The case of participatory budgeting. *Journal of Public Deliberation*, *8*(2).

Sześciło, D. (2015). Participatory budget in Poland: Quasi-referendum instead of deliberation. *Hrvatska i Komparativna Javna Uprava : Časopis Za Teoriju i Praksu Javne Uprave*, *15*(2), 373–388. **doi:342.573:352/353(438)**

Ustawa z dnia 11 stycznia 2018 r. o zmianie niektórych ustaw w celu zwiększenia udziału obywateli w procesie wybierania, funkcjonowania i kontrolowania niektórych organów publicznych (Dz.U. 2018, nr 130, poz. 1349).

Vorwerk, V., Gonçalves, M., Stepniak, L., & Schneider, H. (2018). *9. Statusbericht Bürgerhaushalt in Deutschland (2014–2017)*. Retrieved from https://www.buergerhaushalt.org/sites/default/files/ 9._Statusbericht_Buergerhaushalt.pdf

Vorwerk, V. (2019). Vom Bürgerhaushalt über das Bürgerbudget zum Finanzreferendum? Was Politik von Stuttgart und Zürich über Bürgerbeteiligung lernen kann. *eNewsletter Wegweiser Bürgergesellschaft*. Retrieved from https://www.buergergesellschaft.de/fileadmin/pdf/ gastbeitrag_vorwerk_190125.pdf

Weinfurt, K. (2000). Repeated measures analyses: ANOVA, MANOVA and HLM. In L.G. Grimm & P.R. Yarnold (Eds.), *Reading and Understanding More Multivariate Statistics* (pp. 317–361). Washington, D.C.: American Psychological Association.

Zepic, R., Dapp, M., & Krcmar, H. (2017). E-Partizipation und keiner macht mit. *HMD Praxis der Wirtschaftsinformatik*, *54*(4), 488–501. **doi:10.1365/s40702-017-0328-z**

ZMP (Związek Miast Polskich). (2015). *Budżet obywatelski w Polsce*. Retrieved from https://web.archive.org/web/20160425085846/http://miasta-polskie.pl/zwiazekmp/portal/web/uploads/pub/pages/page_154/text_images/Budzet_partycypacyjny_w_Polsce_ZMP_luty2015.xls