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*Pro-Ecological Preferences in Real Estate Tax on the Example of  
Municipal Communes of the Silesian Voivodeship*

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**Abstract**

**Theoretical background:** In the light of the sustainable development paradigm, the concepts and categories of public finance science require verification. This issue concerns, among others, taxes in terms of making them pro-ecological. Therefore, the necessity to research shaping sustainable taxes is justified not only by its importance and topicality but also by the fact that it is not sufficiently recognized in the literature. In particular, this regards research into the Polish tax system.

**Purpose of the article:** The article aims to identify and assess pro-ecological real estate tax allowances and exemptions applied within the local tax authority on the example of municipal communes of the Silesian Voivodeship.

**Research methods:** The article employed literature studies, analysis of the economic aspect of legal acts, in particular local law, simple statistical methods, and elements of comparative analysis. Empirical research was carried out on a full sample (49) of municipal communes of the Silesian Voivodeship. The analysis covered all resolutions of municipal councils from five years, i.e. from 2017 to 2021 (and in some cases also from earlier years), regarding real estate tax allowances and exemptions. In total, this amounts to 580 resolutions, the provisions of which were in force from 2018 to 2021 and are still applicable in 2022.

**Main findings:** The study identified pro-ecological real estate tax allowance and exemption provisions, introduced under the tax authority by the councils of the surveyed municipal communes. The authors proposed their own classification of the preferences in question and carried out their assessment, also in a comparative approach. The conducted research provides the basis for positive verification of the adopted research hypothesis, assuming that pro-ecological real estate tax allowances and exemptions are applied by municipal authorities to a limited extent.

## Introduction

It is not possible to ensure a balance between economic, social, and environmental development solely through the market mechanism, therefore, the active role of the state in this respect should be considered justified. The fiscal policy, including the appropriate shaping of income and expenditure instruments, plays an important role in the pursuit of sustainable development. The most important in the group of income instruments are taxes,<sup>1</sup> the effectiveness of which fosters sustainable development and is closely related to their structure. When focusing on pro-ecological goals, it should be noted that their implementation is primarily supported by dedicated taxes (e.g. related to the exploitation of natural resources). In addition to the use of the so-called environmental taxes, the public authority may also incorporate pro-ecological elements into the structure of other taxes, mainly through appropriate allowances and exemptions.

This article concerns the tax of the greatest fiscal significance in the local tax system in Poland, namely the real estate tax. The study aims to identify and evaluate pro-ecological real estate tax allowances and exemptions used under the tax authority in municipal communes of the Silesian Voivodeship. A research hypothesis was advanced that pro-ecological allowances and exemptions are used by municipal authorities to a limited extent. The article employed the study of domestic literature mainly due to the specific nature of the research and economic analysis of legal acts, in particular local law, also simple statistical methods and elements of comparative analysis. The study is divided into two parts. The first one is devoted to recognizing the potential of real estate tax as a pro-ecological instrument, with particular emphasis on the scope of local tax authority. The second part presents the results of own empirical research

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<sup>1</sup> There were attempts in the literature to define sustainable taxes and sustainable tax systems. For more, see (Cieślukowski, 2016).

conducted on a full sample of municipal communes of the Silesian Voivodeship. The obtained research results became the basis for the drawn assessments and conclusions as well as for outlining the avenues of further research on the issue under consideration.

## 1. The potential of real estate tax as a pro-ecological instrument

### Literature review

To recognize the possibilities offered by the real estate tax in terms of pro-ecological impact, it is necessary to understand its nature as a fiscal instrument, structural elements that affect its suitability to be used for pro-ecological purposes, and to what extent it can be shaped through an active tax policy. The basic legal act for real estate tax is the Act of 12 January 1991 on Local Taxes and Fees. However, to correctly determine the amount of the tax liability, it is necessary to use the tax ordinance and local law – tax resolutions of specific municipalities (Banasik, 2021, p. 12; Szymczak, 2018, p. 153). It is also worth noting that in the case of exemptions from this tax, they may also be introduced in the provisions of other acts. Such a solution, which leads to a lack of transparency in the application of exemptions and difficulties in combining them into a coherent system, has been criticized in the literature (Pahl, 2017, p. 150). The concept of a building and structure is not clearly defined in the Local Tax Act,<sup>2</sup> which is vital for the correct determination of the real estate tax (Kornberger-Sokołowska, 2012, pp. 99–100), or the method of taxation that does not take into account the value of land or buildings is questionable (Swianiewicz, 2004, pp. 56–57). The first premise is particularly important as inaccuracies in the identification of buildings and structures by taxpayers may reduce the fiscal efficiency of the tax (Famulska et al., 2019, p. 70).

From an ecological perspective, the taxable subject matter in the form of land is important. On the one hand, the land is the primary factor of production for which there is increasing demand. On the other, degradation and climate change reduce the available land (Kalkuhl et al., 2018, p. 349), which is one of the elements of the environment that requires protection (Goździewicz-Biechońska, 2017, p. 78). An attempt to balance the need for land use and constructing new buildings and structures with environmental protection can be an important premise for differentiating tax rates or introducing exemptions.

The local nature of the real estate tax is not limited to the fact that it contributes to the commune's budget. Municipal councils have limited tax authority (Orlikowska, 2019, p. 127). By this, it should be understood that the authorities of a local government unit cannot establish a new tax, but only have the right to decide on

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<sup>2</sup> The issue of defining a building for the purposes of its taxation was presented by (Etel et al., 2020) and legislative postulates, e.g. in (Zaręba, 2015).

specifically indicated issues concerning the structural elements of already existing taxes (Gońda, 2013, p. 27). There are powers entrusted to administration in the field of taxes, related to the withholding of taxes and providing the possibility of establishing tax law provisions (Borodo, 2015, pp. 86–87). It should be emphasized, however, that not all three categories of rights are present in all local taxes. The indicated competencies, and thus limited tax authority, only apply to local government units at the municipal level (Kosek-Wojnar, 2017, p. 94).

As Filipiak (2015, p. 228) noted, empowering communes with tax authority allows municipal units to perform not only the fiscal function of taxes but also use them for other purposes. The classification proposed by Felis and Szlęzak-Matusiewicz included economic and social functions, where non-fiscal functions are combined with the tasks of the local government unit itself (2019, pp. 49, 53–57). The authors pointed out that the “superficial” system of determining the real estate tax base is not conducive to its use for non-fiscal purposes. However, it should be noted that the direct nature of the tax favors the fact that the introduced preferential, pro-ecological structural elements will be of interest to taxpayers, as they will personally be the beneficiaries of the preferences.

Adamczyk and Dawidowicz (2017, p. 21) indicated that incentive and redistribution functions are non-fiscal functions. The incentive function can be seen as the potential of real estate tax to encourage taxpayers to be more pro-ecological. However, there were indicated difficulties with the concept of using incentives. The first issue concerned the amount of the levy – is it so significant that its management as part of an active tax policy could be reflected in the behavior of taxpayers (*ibid.*, p. 22) or the visible implementation of the intentions of this commune’s policy (Patrzałek et al., 2019, p. 101). Studies showed that lowering tax liabilities, as a rule, leads to lower budget revenues (Łukomska & Swianiewicz, 2015, p. 105). A completely different difficulty may arise when taxpayers, through the exerted pressure, try to expand the catalog of preferences applied in the commune (Surówka, 2013, p. 62). On the one hand, the local government unit has closer contact with taxpayers, and, thus, it can better adjust the system of allowances, exemptions, or rates, but on the other, it is “less anonymous” (*ibid.*). The research by Łukomska and Swianiewicz (2015, pp. 111–112) supported this observation, where for the tax on residential real estate buildings apart from the fiscal incentive, the second most important one turned out to be the incentive related to political capital.

Although for some taxpayers the amount of the liability may be relatively small, the substantial size of the taxpayer base means that the real estate tax is essential, and has a special fiscal value for the functioning of municipalities (Kornberger-Sokolowska, 2012, p. 99; Malinowska-Misiąg, 2019, p. 46). This was also confirmed by empirical research conducted by Felis and Otczyk (2021, p. 84). This influences the inclination of communes to use pro-ecological preferences, as such a decision results in reduced revenues from the most efficient local tax to the commune’s budget (Adamczyk & Dawidowicz, 2017, p. 22). It is therefore important to be aware of the goal and focus on long-term environmental benefits.

The discussed issues do not negate the fact that the very essence of the real estate tax has the potential to be used as a pro-ecological instrument. The legislator harnessed this potential by introducing specific pro-ecological solutions in the Act on Local Taxes and Fees (1991a, Art. 7), which are universally applicable, i.e. in all communes in the country (Table 1).

**Table 1.** Statutory pro-ecological exemptions in real estate tax

	Exemption	Justification
1	Located in national parks or nature reserves and serving directly and exclusively to achieve the objectives in the field of nature protection: a) lands located in areas under strict, active, or landscape conservation, (b) buildings and structures permanently connected to the land.	– the importance of the goal of nature protection [the exemption covers those lands and the buildings and structures located on them that are under strict protection (i.e. where no human activity is allowed in a given area), active (protection in the name of which human activity it is permissible) and landscape (defined as preserving the characteristic features of a given landscape)] – compensation for restrictions in the use of real estate resulting from the national park or nature reserve establishment
2	Owned by the State Treasury: a) lands under the surface waters of flowing lakes, b) lands occupied by artificial water reservoirs, except for land transferred to other entities than mentioned (Ustawa, 2017, Art. 211, Ust. 1, Art. 213, Ust. 1,3).	– ecosystem well-being – reduction of tax burdens for units managing waters and water apparatus financed from the state budget
3	Embankment structures, land along embankments and located in inter-embankments, except for those used for business activities by entities other than water companies, their associations, and embankment associations.	– ecosystem well-being – flood protection – compensation for the limited use of the land for economic activity
4	The land that is a wasteland, ecological land, wooded and bushy land, except for the land used for business activities.	– maintaining the ecological balance for wastelands, wooded and bushy land: – low suitability of land for economic use – possible development requires high expenditure for ecological arable land: – protection of valuable natural objects

Source: Authors' own study based on (Goettel, 2015, pp. 120–121; Jermaczek, 2010, pp. 5–6; Kasprzyk & Kondraciuk, 2016, pp. 58–59; Ministerstwo Finansów, 2020, pp. 97–99, Ustawa, 1991a, Art. 7; Ustawa, 2004, Art. 5; Ustawa, 2017, Art. 211, Ust. 1, Art. 213, Ust. 1,3).

When analyzing the statutory pro-ecological exemptions, it should be stated that all of them are subject-related. Since Art. 7 sec. 3 does not apply a closed catalog of subject-related exemptions which may be introduced by communes, this gives many opportunities to introduce regulations that would be pro-ecological (Dziuba, 2015, p. 80). Therefore, it is desirable that communes, knowing the environmental conditions in their area, introduce specific pro-ecological preferences. However, it is necessary to take into account the rules of public aid when introducing tax allowances and exemptions, if tax preferences apply to entrepreneurs.

## 2. The use of real estate tax for pro-ecological purposes in municipal communes of the Silesian Voivodeship in 2018–2022

### Research methods

To verify the adopted research hypothesis that pro-ecological allowances and exemptions are applied by municipal authorities to a limited extent, the research covered all municipal communes of the Silesian Voivodeship. The selection of municipal communes is related to the fact that Silesia is a highly urbanized region. These 49 communes account for 29.34% of the total communes of the province (Urząd Statystyczny w Katowicach, 2019, p. 91), and as much as 72.25% of the population of Silesia lived in these areas at the end of 2020 (Bank Danych Lokalnych..., 2022). This proportion stood at 47.98% for the whole of Poland (*ibid.*). This shows that the industrial past still affects the demographic structure of the region. Although the Silesian Voivodeship is associated with the heavy industry (mainly mining) in the public consciousness, it should be noted that many efforts have been made to balance the industrial character of the region with its environmental heritage over the years (Główny Inspektorat Ochrony Środowiska, 2020, p. 116). Interestingly, the undertaken actions had their specific financial dimension. In 2019, the expenditure on environmental protection amounted to PLN 16,061,245.4 thousand in the Silesian Voivodeship, i.e. 14.7% of all funds incurred in Poland that year, and the expenditure on water management was PLN 3,961,812.8 thousand, which corresponded to 13.6% of expenditure in national terms (Urząd Statystyczny w Katowicach, 2021, p. 60). Nevertheless, the industrialization of the voivodeship still has serious implications for the natural environment. Increased demand for raw materials inevitably translates into an increased amount of waste, which has a significant negative impact on the quality of water, soil, and atmospheric air (Urząd Marszałkowski Województwa Śląskiego, 2022a, p. 63). The share of industrial waste was 94.72% of the total waste of the Silesian Voivodeship, which was 27% nationwide (Urząd Statystyczny w Katowicach, 2021, p. 20, 54). This means that the territory of 3.9% of Poland generates more than a quarter of industrial waste (Urząd Marszałkowski Województwa Śląskiego, 2022b). The raised premise additionally confirms the merits of selecting the research group.

In 2015, the communes of the Silesian Voivodeship and their sustainable development policies were studied by the Department of Social and Economic Policy of the University of Economics in Katowice (Lorek, 2017, p. 21). The result of the research was the creation of a ranking of municipalities, choosing as a criterion the degree of advancement of the sustainable development programming process (Lorek, 2019, p. 116). The research showed that 16 municipalities adopted the full range of the criteria and 16 of these municipalities had in part sustainable development policies (*ibid.*, pp. 116–117). The highest percentage of the surveyed communes in the first group of the ranking (i.e. communes that met all the criteria of the analy-

sis) was in municipal communes – 41.03%. There were identified two reasons for this: the best access to an expert base and properly educated public servants (*ibid.*, pp. 116–118). Similar results were provided in the study by Małecka-Ziembińska and Janicka (2022, p. 1). The research looked into the activity level of communes in the field of pro-ecological activities through nature-based solutions (NbS) in Poland. Greater activity through NbS in large urban agglomerations was explained by densely built-up areas, high population density, frequent smog phenomena, and greater expectations of the local community (Małecka-Ziembińska & Janicka, 2022, p. 17). Similar to Lorek's research, the presence of experts was indicated as an asset (*ibid.*). Therefore, one would expect these municipal units to implement active tax policy to the greatest extent. However, the research by Przygodzka (2014, p. 337) proved that the effects of tax authority, measured by the amount of revenue foregone, were the lowest in municipalities from 2008 to 2012. Other studies, focusing on the city of Toruń (Huterska & Huterski, 2014, p. 145), showed that the real estate tax preferences in the sustainable development area were limited solely to exemptions. Concerning the cited research, it was concluded that it would be worth assessing the scope of pro-ecological tax solutions adopted in the Silesian Voivodeship. Another important premise justifying the need for research in this area is the effort to increase the interdisciplinary knowledge about the natural environment and the management of its resources. This would reduce the weaknesses identified in the SWOT analysis in the "Scientific Research" category in the Strategy for Nature Conservation of the Silesian Voivodeship until 2030 (Uchwała, 2012, Załącznik, p. 102).

In the first stage of our research, it was verified how many municipalities in the Silesian Voivodeship introduced pro-ecological solutions in the considered years (Table 2). About 580 legal acts were analyzed. The vast majority of these were resolutions of municipal councils. However, in a few cases, these were resolutions of the Board of the Regional Audit Chamber in Katowice (if the real estate tax regulations introduced by municipal councils did not meet all legal requirements). As a rule, the resolutions of municipalities from 2017 to 2022 were taken into account. However, it should be noted that some municipal communes introduced exemptions in the previous years, which made it necessary to refer to the regulations from before 2017. The oldest introduced exemptions, which were the basis for the analysis, dated back to 2007. Some municipalities included all the provisions on the real estate tax in one resolution for a given calendar year (rates and preferences). Other communes adopted a resolution with rates and a separate resolution indicating the exemptions every year. It also happened that preference regulations were introduced during the calendar year. There were also municipalities where tax resolutions were in force for a period longer than a calendar year and where changes were introduced on an irregular basis.

**Table 2.** Municipalities of the Silesian Voivodeship applying pro-ecological solutions in real estate tax in 2018–2022

	Items	Number of municipalities				
		2018	2019	2020	2021	2022
1	Municipal communes in total, inc.:	49	49	49	49	49
1a	cities with district status	19	19	19	19	19
2	Municipal communes applying pro-ecological solutions in the real estate tax, inc.:	26	26	25	26	25
2a	cities with district status	5	5	4	5	6
3	Dynamics (%) “2” previous year = 100%	–	100	96.15	104	96.15
4	“2” share in “1” (%)	53.06	53.06	51.02	53.06	51.02
5	“2a” share in “1a” (%)	26.32	26.32	21.05	26.32	31.58

Source: Authors’ own study based on the resolutions of municipal councils of the Silesian Voivodeship.

During the entire analyzed period, the number of municipal communes using pro-ecological preferences was very similar. Depending on the year, there were either 25 or 26 municipal units out of the total number of surveyed units, constituting 51.02 or 53.06%, respectively. The cities with district status were selected because 55.61% of the overall population of the Silesian Voivodeship lived in them at the end of 2020 (Bank Danych Lokalnych..., 2022). The share of cities with district rights applying pro-ecological solutions in the overall cities with district rights ranged from 21.05 to 31.58% over the years. However, it was still a lower proportion than in the case where the overall municipal communes were examined. Changes can be observed in the activity of the city of Chorzów, which for the first two years applied the preferences, then ceased to introduce a new pro-ecological exemption in 2021. In 2022, Wisła and Radzionków ceased to apply pro-ecological preferences, but Piekary Śląskie was ranked for the first time. Therefore, in 2022, the total number of municipal communes applying the preferences fell back to 25, but the number of cities with district status increased by 1.

The further part of the research carried out the identification of the types of pro-ecological preferences introduced in the examined municipalities (Table 3).

**Table 3.** Pro-ecological solutions in real estate tax applied in municipalities of the Silesian Voivodeship in 2018–2022

	Preferences	2018		2019		2020		2021		2022	
		No.	%	No.	%	No.	%	No.	%	No.	%
1	Fire protection	16	39.02	16	39.02	15	40.54	15	38.462	16	41.03
2	Collective wastewater disposal and collective water supply	13	31.71	13	31.71	10	27.03	9	23.077	7	17.95
3	Conversion of heating to ecological heat sources	1	2.44	1	2.44	4	10.81	4	10.256	3	7.69
4	Other	11	26.83	11	26.83	8	21.62	11	28.205	13	33.33
5	Total	41	100.00	41	100.00	37	100.00	39	100.00	39	100.00

Source: Authors’ own study based on the resolutions of municipal councils of the Silesian Voivodeship.

The dominant pro-ecological preference in the analyzed period was the preference in the area of fire protection. In the first two years, 16 communes were identified with these preferences. Later, over the next two years, the number of communes that introduced regulations with fire protection decreased by 1 but returned to the original number in 2022. In the vast majority of communes, it took the form of exempting buildings and land used for fire-fighting purposes, except for business purposes. It was decided to include this exemption in pro-ecological preferences because both in the regulations on the Volunteer Fire Brigades and the State Fire Service references to the natural environment can be found. One of the activity goals in the Act on Voluntary Fire Brigades is environmental protection (Ustawa, 2021, Art. 3). On the other hand, in the Act on the State Fire Service, apart from granting authorizations in the field of fire protection or protection against natural disasters, control, and inspection competencies were also indicated, e.g. by supervising enterprises where there is a risk of industrial accidents (Ustawa, 1991b, Art. 1, 23).

It is also worth noting that apart from fire protection, in Zawiercie there was an exemption of buildings, structures, and land used in connection with the protection of the environment against natural disasters in 2018. Moreover, in Bieruń and Łędziny throughout the studied period, apart from the preferences in the fire protection area, there were also exemptions for land and buildings where tasks related to flood protection were performed. The second most often applied category of preferences was collective wastewater disposal and collective water supply. This is a particularly important category as the share of industrial wastewater discharged in 2019 in Silesia compared to the entire territory of Poland amounted to 26.8%, i.e. (similar to waste) less than 4% of the territory of Poland is responsible for over a quarter of industrial wastewater (Urząd Statystyczny w Katowicach, 2021, p. 46). It may be surprising, therefore, that there has been an unfavorable change in the number of municipalities applying this preference from 13 to 7. Most of the existing regulations referred to structures for collective wastewater disposal, however, it should be noted that this is a very heterogeneous category. In 2018, two municipalities decided to introduce the exemption, and the preferential rates ranged from 0.01 to 1.75% of the tax base, while the standard rate was 2% throughout the analyzed period. In 2019, two municipalities granted the exemption, and eleven applied reduced rates from 0.01 to 1.75% of the tax base. In 2020, there was only 1 exemption, but the spread of rates remained unchanged. In 2021, it was established that 1 exemption was granted and there was an increased fluctuation of preferential rates from 0.01 to 1.9% of the tax base. In 2022, none of the communes applied the exemption anymore. Fluctuations in rates remained unchanged from the previous year and the rates were from 0.01 to 1.9% of the value of the structure.

In their regulations, the surveyed communes usually referred to the definition of a structure used for collective wastewater disposal and collective water supply set out in the Act on Collective Water Supply and Collective Wastewater Discharge (Ustawa, 2001, Art. 2. pkt 14). The very recognition of this structure was difficult

for some communes, sometimes it became a pipeline, another time an apparatus, and sometimes the term “serving for collective water supply” was omitted.

Several introduced preferences constitute a group whose common denominator is the personal commitment of the inhabitants of communes. Preferences in areas such as converting heating to ecological heat sources, thermal insulation, thermal modernization, or installing apparatus harnessing the forces of nature are largely based on the pro-ecological activities of taxpayers. They can also be seen as one of the incentives that would encourage citizens to take specific actions. The ecological awareness of the inhabitants of large agglomerations, including students studying there, was one of the most important potential factors for harnessing pro-ecological activities to a greater extent in these communes (Małecka-Ziemińska & Janicka, 2022, p. 17). Adamek and Ziernicka-Wojtaszek determined that although there is interest in pro-ecological issues, the state of knowledge of the population still requires improvement (2018, p. 1653). Unfortunately, these preferences were introduced to a limited extent by local authorities in the years 2018–2022. The actions undertaken by the authorities of the Żywiec municipality deserve attention, as for the entire period under the study, there was an exemption for residential buildings not related to conducting business activities, where thermal insulation was completed consisting of the replacement of windows and insulation of the building (Uchwała, 2017, § 1, pkt e). Moreover, in the years 2018–2019, there was an exemption for real estate not related to conducting business activity, where apparatus harnessing the forces of nature (water, wind) were installed (*ibid.*, § 1, pkt d).

The second commune with interesting regulations in this area was Wodzisław Śląski, where the resolution of February 1, 2021 introduced the exemption of real estate and land related to the thermal modernization of residential buildings. The preference will apply until the end of 2023 (Uchwała, 2021a, § 1). Another preference introduced in Wodzisław Śląski was the exemption of residential buildings or their parts where the heat source was replaced and it was in force throughout the entire study period. The pro-ecological nature of preferences is determined by the adopted definition of heat source replacement, which states that it is the decommissioning of a coal-fired boiler or a coal-fired furnace for a heat pump, connection of the building to the heating network, a heating source using: electricity, gas, heating oil, as well as biofuel and solid fossil fuels in single-fire, high-efficiency low-emission boilers with an automatic fuel supply that meets the requirements of class 5 under the PN-EN 303-5: 2012 standard or eco-design (Uchwała, 2018a, § 1, pkt 1). A similar exemption was introduced in Rybnik and was in force in the years 2020–2021. Its scope covered residential buildings in which ecological heat sources were used, regardless of whether they had been used before, whether the replacement took place or whether the construction of the real estate with an ecological heat source was completed after the introduction of an exemption (Uchwała, 2019, § 2). Moreover, Radlin and Rydułtowy should be mentioned, where reduced rates were in force for residential buildings in which ecological heat sources were used in the years 2020–2022. For

Radlin, for the entire three-year period, the rate was PLN 0.06 per 1 m<sup>2</sup> of the real estate, and for Rydułtowy – PLN 0.01 per 1 m<sup>2</sup>. In Radlin, in the same period, the basic rate for residential buildings increased from PLN 0.76 to PLN 0.82 per 1 m<sup>2</sup>. On the other hand, in Rydułtowy, the basic rate for residential buildings also increased from PLN 0.78 to PLN 0.84 per 1 m<sup>2</sup>. In both municipalities, an ecological heat source is defined in the same way as in Wodzisław Śląski.

An important issue characteristic of the Silesian Voivodeship is land destruction and degeneration. The activities of business entities in the field of mining and quarrying of energy and non-energy resources are accountable for 91.6% of these processes (Urząd Statystyczny w Katowicach, 2021, p. 43). The tax instrument in this area is hardly used. In Częstochowa, during the entire period under the study, a reduced rate was applied for land under heaps created as a result of dumping mine spoil, except for land where economic activity is conducted. Every year, the rate for 1 m<sup>2</sup> increased by PLN 0.01 and it rose from its initial value of PLN 0.10 in 2018 to PLN 0.14 in 2022. In Chorzów, by the resolution of November 25, 2021, an exemption was introduced for land with active thermally dumps of post-mining waste. The land is owned by Chorzów, but based on the contract, the dependent owner will undertake the “liquidation and restoration of the destructed land to the utility value” (Uchwała, 2021b, § 1).

Another area of preference that fell under the “other” category is landfilling. In Bielsko-Biała, exemptions were applied to buildings or their parts, structures or their parts, and land used for waste storage activities in the years 2018–2019 (Uchwała, 2011, § 1, pkt 4). Another interesting category is the increased rate in the area of waste management, which was applied in Knurów in 2019–2022. It concerned land, buildings, or their parts used for economic activity consisting of waste management, except for buildings or their parts used for the operation of regional municipal waste processing installations or installations intended for the substitute service of municipal waste management regions, within the meaning of Art. 35 of the Waste Act (Uchwała, 2018b, Załącznik 1, pkt 1d). The Act on Waste assumes for waste management the collection, transport, or processing of waste, including sorting, together with the supervision of the mentioned activities, as well as the subsequent handling of waste disposal sites and activities performed as a waste seller or a waste broker (Ustawa, 2012, Art. 3). Taking into account the internalization of environmental costs as an ecological criterion for assessing a balanced tax (Cieślukowski, 2014, p. 201), the introduced preference should be assessed positively. In 2019, the increased rate for buildings amounted to 102.44% of the base rate for real estate where business activity was conducted, and in the case of land – 108.14% of the base rate.

In the following years, the increased rates – concerning the basic ones for real estate related to business activity – were as follows: 101.42%, 103.50%, and 103.13%. For land, the increased rates in this period were: 107.95%, 108.79%, and 108.42% of the basic rate.

The complexity of the concept of green areas brought some difficulty to our study. In the Nature Conservation Act, an extensive definition has been adopted,

which states that these are arranged areas with technical infrastructure and buildings functionally related to them, covered with vegetation, performing public functions, in particular parks, lawns, promenades, boulevards, botanical and zoological gardens, open-air playgrounds and historical buildings, cemeteries, greenery accompanying roads in the area of buildings, squares, historic fortifications, buildings, landfills, airports, railway stations, and industrial facilities (Ustawa, 2004, Art. 5, Ust. 21). The literature showed that these areas can exercise the following functions: recreational, ecological, rest, and health (Chojecka, 2014, p. 52). Therefore, it should be borne in mind that local authorities may identify significantly different goals when granting exemptions for land on which cemeteries or zoos are located. Therefore, it was decided to select only those exemptions for which the intention is clear and motivated by pro-ecological considerations.

In the analyzed period, three preference areas related to green areas in municipal communes can be distinguished. To begin with, the real estate exemptions with a green roof, a green facade, or a vertical garden should be indicated. The first such regulations in Silesia were introduced in Katowice by the resolution of July 22, 2021, where the duration of the preferences was set until June 30, 2024. Solely, residential buildings were exempted (Uchwała, 2021c, § 1, 7). In 2022, Częstochowa also had regulations in the same scope. The literature broadly discusses the benefits of using green roofs in economic, financial, and ecological terms, and the ease of their implementation as a pro-ecological instrument (Kwiecińska & Zwoździak, 2017, p. 139). Real estate tax exemptions for creating a green roof are a novelty in tax regulations. Therefore, the fact that related resolutions have already been adopted in two communes in urbanized Silesia is a positive development. Accordingly, it would be beneficial for other communes to introduce similar regulations in the voivodeship.

The second of the selected preferences related to green areas is the exemption of the land submitted to the “Metropolitan Flower Meadows” program (Uchwała, 2021d, § 1). The program’s goal was chosen as the selection criterion corresponding to one of the assumptions of the EU Biodiversity Strategy 2030, which refers to “stopping and reversing the downward trend of the pollinator population” (Górnośląsko-Zagłębiowska Metropolia, 2022).

The third area had the most general scope. It included the preference that was in force in Chorzów in 2018–2019, regarding reduced tax rates for land and buildings located on them, which are public walking and leisure parks, available free of charge to public use, not related to and unoccupied for business purposes. A similar exemption was in force for the entire period of the study in Wojkowice, and it covered the entire green area of the city.

The last preference in the “other” category was applicable throughout the study period in the two communes of Bieruń and Łędziny. The exemption applied to buildings where economic activity was conducted “from which the rental income is allocated for statutory purposes concerning the development of public tasks (...) in the area of environmental protection” (Uchwała, 2021e, § 3, pkt 8). The incentive

may be a stimulus for the inhabitants to support pro-ecological projects, and thus, increase the environmental awareness of the entire community.

The pro-ecological instruments covered by the analysis, used by communes under the assigned tax authority in the real estate tax, are very heterogeneous. The vast majority of these were exemptions (in 13 preference areas). There were also reduced rates (in 3 preference areas). Most often, municipalities introduced reduced rates for buildings used for collective wastewater disposal and collective water supply. It should also be emphasized that there were also increased rates for land and buildings related to waste management in the analyzed period. It should be noted that the variety of the instruments used is greater than that identified in the studies for the city of Toruń (Huterska & Huterski, 2014, p. 145), which allows for a positive assessment of the application of tax authority by the municipalities of the Silesian Voivodeship in terms of the instruments used in the surveyed preference areas.

The conducted research was supplemented by identifying whether there is a geographic proximity effect in the analyzed municipalities in terms of the application of pro-ecological preferences in the real estate tax. Based on the analysis, two regions were identified where there is a cluster of communes applying pro-ecological preferences in the real estate tax. The first group consists of: Bieruń, Łędziny, Imielin, Katowice, Chorzów, Czeladź, Będzin, Wojkowice, and Piekary Śląskie. Sławków could also be included in this group but Sosnowiec separates it from the rest of the communes. Although this group of municipalities applied pro-ecological preferences, there is no uniform application of these preferences in these units, and thus, the geographic proximity effect for the entire cluster was not observed. The biggest similarities in regulations were identified in the case of fire protection preferences, 6 units out of 10 municipalities had regulations in this regard, and in the case of preferences for collective wastewater disposal and collective water supply – 4 units out of 10 municipalities. It should be noted that the geographic proximity effect was strong for Bieruń and Łędziny, where similar preferences were used throughout the analyzed period. The only difference between them is the reduced rate for structures related to collective wastewater disposal.

The second group included: Rybnik, Radlin, Rydułtowy, Pszów and Wodzisław Śląski. The cluster could also include Racibórz and Knurów, which are separated from other units by communes other than municipalities. For this group, there is no strong geographic proximity effect. The municipalities apply preferences, but not uniformly. In the case of preferences for collective wastewater disposal and collective water supply, 5 out of 7 units had similar regulations in 2018–2019. Later, the number of units with these preferences dropped to 2. For the first two years of the analysis, Radlin, Rydułtowy, and Wodzisław Śląski applied the same reduced rate of 1.5% of the tax base for structures, whereas for Rybnik it was 1%, and for Knurów – 0.01%, while the basic rate was 2%. Very similar provisions were applied in Radlin and Rydułtowy over the five years studied. The only facet that distinguishes these municipalities is the reduced rate of ecological heat sources.

## Results

The most important conclusions related to pro-ecological preferences used in the real estate tax in municipalities of the Silesian Voivodeship in the years 2018–2022 are the following:

1. During almost the entire analyzed period, the number of municipalities using pro-ecological preferences was very similar. Depending on the year, it was either 25 or 26 units, which accounted for slightly more than half of all analyzed communes.

2. The municipalities applied various types of preferences. The study identified 15 of them. The most frequently preferred areas were: fire protection, collective wastewater disposal, collective water supply, and the conversion of heating to ecological heat sources.

3. For the analyzed areas of pro-ecological preferences, the vast majority of municipalities applied tax exemptions, while a few municipalities introduced reduced rates.

4. During the analyzed period, the strong geographic proximity effect was not identified for a broader set of municipal units. However, similar provisions were adopted in the municipalities of Bieruń and Łędziny and the municipalities of Radlin and Rydułtowy.

## Conclusions

Tax preferences can be an important instrument in supporting sustainable development. The specific nature of the real estate tax contributes to the incorporation of pro-ecological allowances and exemptions into its structure. This is mainly due to the subject matter of taxation, which includes land, i.e. one of the essential elements of the natural environment, and buildings and structures, i.e. objects introduced into this environment. The very large size of the subject base of this tax is also important, which means that it may have a strong leverage effect on taxpayers, the more so as this tax is a direct tax as a rule. It is also relevant that the revenues from this tax are of significant importance in financial support for the budgets of municipalities. Therefore, it should be assumed that charging symmetrically with the real estate tax may significantly deplete taxpayers' financial resources, and thus should increase their interest in possible preferences. It should also be pointed out that municipal authorities are provided with specific tax authority, and this raises the possibility of shaping pro-ecological preferences in the real estate tax, taking into account local environmental conditions. Therefore, irrespective of the statutory pro-ecological allowances and exemptions, which are generally applicable, it would be desirable to introduce other local preferences in this respect. The research carried out on a full group of municipal communes of the Silesian Voivodeship permits the conclusion that pro-ecological allowances and exemptions are applied by the commune authorities

to a limited extent. This generalization results from the conclusions and detailed assessments made based on this study. Therefore, the adopted research hypothesis was positively verified. The assessment implies further research, and the question arises of whether the identified allowances and exemptions are effective, and to what extent they are utilized by taxpayers. The limited application of the category in question also indicates the need to identify the premises of this state of affairs, including the different conditions of the municipal tax authority. The obtained research results also confirm the legitimacy of broader, comprehensive research on pro-ecological income and expenditure fiscal instruments used at the local level, taking into account their mutual relations and the scale of application.

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