Determinants of municipal tax rates: empirical evidence in the Portuguese context

Determinantes das taxas de impostos municipais: evidências empíricas no contexto português

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Abstract
The municipality is the circumscription of the territory in which citizens, associated by common relations (locality, work and traditions) live under an autonomous organisation, for economic, administrative and cultural purposes. The powers to define the tax burden in each municipality raise the question of municipal competitiveness. This study aims to analyse the determinants of municipalities' tax policy options, at the level of municipal tax attractiveness. Presently, the attribution of tax powers has extended to the sphere of local power, where municipalities can decide, in relation to their taxes, to grant tax benefits and reduce the municipal tax burden, that is, tax policy has become a general policy instrument of local authorities. In this context, supported by an international dogma favourable to the increasing attribution of administrative and financial autonomy, the fiscal competence of Portuguese municipalities has been extended. In this exploratory study, we analysed the impact of the

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municipal competence of annual differentiation of the tax burden as a way to observe the ability of local actors to increase municipal competitiveness and local development.


**Resumo**
O município é a circunscrição do território em que os cidadãos, associados por relações comuns (localidade, trabalho e tradições) vivem sob uma organização autónoma, para fins económicos, administrativos e culturais. Os poderes de definição da carga fiscal, em cada município, colocam a questão a competitividade municipal. Este estudo visa analisar as determinantes das opções de política fiscal dos municípios, ao nível da atratividade fiscal municipal. Presentemente, a atribuição de poderes fiscais alargou-se à esfera do poder local, em que os municípios podem decidir, em relação aos seus impostos, conceder benefícios fiscais e reduzir a carga fiscal municipal, isto é, a política fiscal se tornou um instrumento de política geral das autoridades locais. Neste contexto, apoiado por uma dogmática internacional favorável à crescente atribuição de autonomia administrativa e financeira, a competência fiscal dos municípios portugueses foi alargada. Neste estudo exploratório, analisámos o impacto da competência municipal da diferenciação anual da carga fiscal como forma de observar a capacidade dos atores locais para aumentar a competitividade municipal e o desenvolvimento local.


**Introduction**

The issue of tax competition first arose at the level of sovereign states among themselves (Alston & Reisch, 2019). However, the attribution of increasing taxing powers to municipalities has extended to the sphere of local authorities. Considering municipalities may decide, regarding their own taxes and other levies, the granting of tax benefits and, in general, the reduction of the municipal tax burden, tax policy became a general policy instrument of local authorities in Portugal.

In this context, supported by an international dogma favorable to the increasing attribution of administrative (European Commission, 2017) and financial autonomy to local
authorities (OCDE, 2014), the tax competence of Portuguese municipalities has significantly expanded and the trend continues to deepen. On the other hand, internal tax competition is seen as an element of strengthening interregional economic attractiveness, although it is clear that several other factors affect tax competition and the mobility of tax bases within territories (Larin, Boudreau, & Rouleau, 2013). The doctrine supports that municipalities, like states, also compete with each other for the attraction of new direct investments, businesses, and people (Richards & Duif, 2018).

The level of the tax levy is one of the most important elements in shaping the decision on the location of corporate headquarters (Overesch & Wamser, 2010). On the other hand, due to the high international (between states) and national (between levels of governance) tax competition, political actors feel the need to constantly change tax policies to ensure that they are more attractive for international and domestic investment (Bauer, 2020). Likewise, the level of taxation has an important role in the decisions of economic agents and in the choice of territorial areas where companies can establish themselves with tax advantages, although they do not consider it to be the only deciding factor (Larin, Boudreau, Rouleau, 2013).

Currently, in addition to sovereign states, subnational entities also freely compete for national and foreign investment aiming to become increasingly more competitive (Keller & Schanz, 2013). Tax competition derives from the fact that currently, no common and harmonized international tax rules are established (Winckler, 1992) and that there is a certain degree of freedom to decide on the amount of local tax rates (Ahmad, 1997).

The tax market results from the deepening level of development and the opening of trade relations among states and also from the lack of achievement of a true international tax harmonization globally (Giambiagi & Além, 2011). It is in this sense that it is possible to recognize the existence of a fiscal market at local government level (Blöchliger & Pinero-Campos, 2011). The doctrine mentions that states have sought to define responses in order to mitigate the excesses of tax competition through the application of policy instruments that include, above all: the harmonization of the tax base between municipalities and local government and the control of revenues from public fees.

Still, opinions vary on the possible benefits and costs resulting from tax competition. That is, some research concludes that tax competition not only brings local governments' tax policies closer to citizens’ and businesses' preferences (Cibils & Ter-Minassian, 2015) but also incites greater public sector efficiency (Jameti, 2014) and avoids fiscal overspending (Blöchliger & Pinero-Campos, 2011). Others argue that tax competitiveness at the local government level causes a distorted tax structure (Kangasharju, Moisio, Reulier, & Rocaboy,
An increase in local tax disparities (Rusk, 2010) and may give way to the inefficient provision of municipal public services (OCDE, 2022).

Despite the efforts to find measures to coordinate tax competition to levels considered appropriate, the experience of the European Union has taught how difficult it is to achieve a set of general tax rules that can effectively prevent harmful competition. This is especially important when it comes to defining the characteristics of harmful tax competition and to devising and implementing rules that are satisfactorily accepted by Member States (Littlewood, 2004). The absence of tax legislation (Devereux, 2006) has provoked the definition of a set of common principles (Zhang, 2011) and is one of the main factors for competitiveness (Mitschke, 2008) and for attracting investment (Schrenk, Zeile, Popovich, & Elisei, 2012), even at local level (Haracoglou, 2008).

OECD (2015) considers municipal fiscal competitiveness a strategic interaction of tax policy between the various levels of public governance, national and local, to attract direct investment and a way to retain companies and people (OCDE, 2015). Thus, tax competitiveness depends, above all, on the willingness and ability of municipalities to become more fiscally attractive (Götze & Hartmann, 2021).

Several studies claim (Lannoo, 2002) that one of the most relevant elements for the decision-making process is the level of tax levy (Overesch & Wamser, 2010). Tax competition, between horizontal governance levels, provokes political actors to change local tax rates to ensure that they are more attractive compared to other competing local governments (Bauer, 2020) and also, the level of taxation, has a significant role in individual choices (Pires, 1989). However, the tax factor is not the only significant element in decision making (Larin, Boudreau, & Rouleau, 2013), tax competition is also a national reality where local governments compete with each other to be more fiscally competitive (Edwards & Michell, 2008).

Opinions vary on the likely benefits and costs arising from tax competition, including municipal competitiveness. Some studies conclude that tax competition brings local governments' tax policies closer to agents' preferences (Cibils & Ter-Minassian, 2015), incites greater public sector efficiency (Jameti, 2014) and avoids fiscal overspending (Blöchliger & Pinero-Campos, 2011).

However, regardless of theoretical positions, it is certain that the level of tax competitiveness among subnational entities tends to vary over time and is shaped by the scope of their own tax competences (Jones & Temouri, 2016). But also, by the structure of the tax system (Liu, Tai, & Yang, 2020) and by the willingness of political agents (Broome, 2014) to
adopt more attractive tax solutions aimed at increasing municipal competitiveness (Schneider, 1989).

This research aims to assess how the municipal structure, in terms of population and fiscal pressure, contributes to the determination of tax rates and by doing so, delimits the degrees of freedom to define the respective municipal tax rate. The starting theoretical premise is that tax competition among municipalities is based on two structuring factors: (1) the existence of specific national tax policy instruments and legal mechanisms used by municipalities to become fiscally more competitive, such as income taxes, assets or real estate transfers (Coimbra, Costa, & Carvalho, 2011) and, (2) the existence of broad mobility of some tax bases (Mochida, 2008).

**Theoretical Referential**

After the introduction to the theme of tax competition of Portuguese municipalities it becomes necessary to refer to the state of the art. The doctrine argues that municipalities compete with each other to attract new direct investments, companies and people (Richards & Duif, 2018). According to Keller and Schanz (2013), nowadays, besides the States, subnational entities also freely compete for the attraction of national and foreign investment, seeking to become increasingly competitive in comparison with the other local authorities (Edwards & Michell, 2008).

Tax competition, among municipalities, results from the fact that currently no common and harmonized international tax rules on tax bases have been created (Winckler, 1992) and that there is a certain degree of freedom in deciding on the amounts of tax rates to be applied (Ahmad, 1997).

For Giambiagi and Além (2001), the tax market stems from the deepening level of development, the opening of trade relations between states and the lack of a true international tax harmonization. But, despite the recognition of the existence of a tax market, at the local government level, Blöchliger and Pinero-Campos (2011) argue that States have sought to define responses to mitigate the excesses of tax competition, applying policy instruments that include, above all, the harmonisation of the tax base among municipalities and the control of revenues from fees.

At the European level, Panayi (2021) states that despite the efforts made to define tax competition harmonization and coordination measures, the European Union experience has taught how difficult it is to achieve a set of general tax rules that can effectively prevent
harmful tax competition and that are reasonably accepted by Member States. It is in this line that Devereux (2006) argues that the absence of international tax legislation favours the idea that one of the main factors of competitiveness and attraction of investment (Mitschke, 2008), companies (Schrenk, Zeile, Popovich, & Elisei, 2012) and people (Florida, 2007) are the tax conditions offered by each of the municipalities (Zhang, 2011).

For the doctrine, one of the most relevant elements for the decision-making process is the level of tax levy (Lannoo, 2002) to be borne by businesses and citizens (Overesch & Wamser, 2010). For Bauer (2020), due to high tax competition, between horizontal governance levels, political actors feel the need to regularly change tax rates to ensure that they are as attractive as possible compared to other competing local governments. However, despite Larin, Boudreau and Rouleau (2013) pointing out that the tax factor is not the only relevant element in the decision-making process, Pires (1989) argues that the level of taxation has a significant weight on individual decisions and choices.

For the OECD (2015), local tax competitiveness is a strategic interaction of tax policy between the various levels of public governance, with the aim of attracting direct investment and a way to retain companies and people. It depends, above all, on the willingness and ability of municipalities to become more attractive, taking into account legal constraints (Götze & Hartmann, 2021), and the willingness of agents to effectively relocate economic activity and their tax base to municipal areas where the tax offer, established by subnational governments, is more competitive (OECD, 2015).

In the doctrine, opinions vary on the likely benefits and costs arising from tax competition. That is, while some studies (Cibils & Ter-Minassian, 2015) conclude that tax competition brings local tax policies closer to agents' preferences, incites greater public sector efficiency (Jameti, 2014) and avoids excessive tax expenditures (Blöchliger & Campos, 2011). Others, in turn, argue that local tax competition leads to a distorted tax structure (Kangasharju, Moisio, Reulier, & Rocaboy, 2006), an increase in tax disparities (Rusk, 2010) and the provision of inefficient municipal services.

Regardless of theoretical positions, it is certain that the level of tax competitiveness, among subnational entities, tends to vary over time and is shaped by the scope of their own tax competencies (Jones & Temouri, 2016), the structure of the tax system (Liu, Tai, & Yang, 2020), political will (Broome, 2014) and the willingness to adopt more attractive local tax solutions (Bahl & Bird, 2018).

The present study focuses on the fiscal competitiveness offered by Portuguese municipalities, taking into account the delegated tax competences and the financial and
budgetary constraints. We start from the theoretical premise that tax competition among municipalities relies, on the one hand, on the existence of legal and national tax policy instruments and mechanisms that can be used by municipalities to become fiscally more competitive, such as income taxes (Coimbra, Costa, & Carvalho, 2011) and, on the other hand, on the wide mobility of tax bases (Mochida, 2008).

**Methodological Procedures**

The approach adopted in this research is mainly quantitative. The objective was to analyse a set of data previously selected to observe and describe the characteristics of the phenomenon, without intervention, by applying a set of statistical techniques to establish possible relationships among the selected variables (Prodanov & Freitas, 2013).

The main advantage of the quantitative approach for the present work, is that it enabled the treatment of financial data of municipalities through statistical techniques, where we highlight the method of least squares.

For this purpose, we used the most recent information available in the financial accounts of municipalities, corresponding to the year 2019, for the 308 Portuguese municipalities.

To assess the level of competitiveness of municipalities, it is first necessary to understand the taxing powers of municipalities and their fiscal space to reduce local tax rates below the legal ceilings. The financing of municipalities comes mainly from tax revenues collected by municipalities and transfers from the State budget. In this section, we will try to explain the role that each item plays in municipal financing and highlight the distribution of the typology of municipal revenues.

In Portugal, the corrected tax revenues, which we represent by $RF_C$ of municipalities, comprise direct taxes (represented by $TD$), indirect taxes (represented by $TI$), and personal income tax ($IRS$) revenues. Thus, we can consider, for each municipality:

$$RF_C = TD + TI + IRS$$

(1)

The revenue from transfers, resulting from funds, as defined in paragraphs a) and b) of no. 1 of article 25 of RFALEI (not including the revenue from personal income tax), represented by $TF_C$, may be obtained through the following formula:
\[ TF_C = FEF_C + FEF_K + FSM \]  

Where:

- \( FEF_C \) represents the current component of the Financial Equilibrium Fund;
- \( FEF_K \) is the capital revenue component of the same fund; and,
- \( FSM \) is the Municipal Social Fund.

State transfers aim at fiscal equity. They aim at compensating municipalities for the difference in their revenue collection capacity or due to the provision of costly public services through the transfer of financial resources. These transfers allow municipalities to provide their citizens with a similar set of public goods and services at a similar tax burden (Dougherty & Forman, 2021). Therefore, we can write that the total revenue of the municipality (represented by \( TR \)) can be defined as follows:

\[ TR = RF_C + TF_C + OR \]  

Where:

- \( OR \) represent the other revenues that are not tax revenues or correspond to funds’ transfers.

In view of the objective of this paper to evaluate the possible effects that may explain the determination of the rate of a given tax, several models were estimated in which the rate of each tax is explained by several variables related to the municipality's budget structure, to assess the ability of municipalities to be more competitive. The model defined for each of the tax rates, takes the following form:

\[ tx(t)_i = \beta_1 + \beta_2 PF_t + \beta_3 PR_t + \beta_4 Wt_t + \beta_5 PR_t^2 + \varepsilon_i \]  

Where:

- \( tx(t)_i \) represents the tax rate \( t \) for municipality \( i \);
- \( PF_t \) is the weight of municipal funds on the total effective revenues of the municipality;
- \( PR_t \) corresponds to the budgetary pressure, assessed by the weight of debt in the debt ceiling; and,
- \( Wt_t \) is the weight of tax revenue \( t \) in tax revenue.
The estimation process involved, in a first stage, estimating the model $tx(t)_i$ by the method of least squares and identifying the existence of outliers. In the second stage, the model was re-estimated with the correction for outliers and heteroscedasticity. Once the model was estimated, the rate of each of the other taxes was added individually as a regressor, and the explanatory capacity of this variable was assessed. A dummy variable with multiplicative effects on the tax rate considered was also introduced to identify whether the potential explanatory effect of the tax rate depends on the size of the municipality's population. The dummy variable, $D(Px)$, was constructed so that it assumes the value 0 in the case where the municipality's population percentile is lower or equal to $Px$ and 1 in the case where the population percentile is higher than $Px$. The $Px$ percentile was determined, for each of the situations, in a recursive manner and the order of the percentile that maximized the value of the estimated model's determination coefficient was selected. Thus, the model applied for the present analysis was as follows:

$$tx(t)_i = \beta_1 + \alpha_1 tx(z)_i + \alpha_2 D(Px)tx(z)_i + \beta_2 PF_i + \beta_3 PR_i + \beta_4 WT_i + \beta_5 PR_i^2 + \epsilon_i \quad (5)$$

With the model presented, we seek to identify the determinants of tax rates as well as to understand the influence that the determination of one tax rate exerts on the other rates, that is, to empirically assess whether there is, or not, a transfer of the tax burden between taxes. Again, with this model, our objective is to assess the determinants of tax rates and, thus, to assess the capacity of tax competitiveness through the tax rates over which the municipality has the ability to decide.

**Analysis and Discussion of Results**

To discuss the results, we consider it relevant to highlight three essential aspects. First, this is an exploratory study on the fiscal competitiveness of Portuguese municipalities. Second, it aims to indicate a possible methodology to analyse the fiscal attractiveness of municipalities. Finally, we intend to contribute to the academic debate around the theme of local fiscal competitiveness and attractiveness.

Population distribution is one of the variables used to analyse the ability of Portuguese municipalities to be, or not, fiscally competitive. Brülhart, Bucovetsky, and Schmidheiny (2015) argue that fiscal disparities between municipalities are due to the ability of large municipalities to raise tax revenues from so-called agglomeration economies, i.e., the larger
the municipality, the greater the asymmetry in the application of tax rates. Thus, according to this theory, this situation is expected to occur in Portuguese municipalities with high population density.

A first observation relates to the distribution of population across municipalities, given its relevance for this research. As Table 1 shows, there is a wide asymmetry in the distribution of inhabitants by municipalities. Around 68.5% of the municipalities with fewer than 25,000 inhabitants represent 21.2% of the total Portuguese population. On the other hand, 7.8% of the total municipalities have more than 100 thousand inhabitants and represent 44% of the total Portuguese population.

<table>
<thead>
<tr>
<th>Number of residents</th>
<th>Municipalities</th>
<th>Population 2019</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>Total (%)</td>
</tr>
<tr>
<td>Up to 10,000</td>
<td>120</td>
<td>39.0%</td>
</tr>
<tr>
<td>From 10,000 to 25,000</td>
<td>92</td>
<td>29.9%</td>
</tr>
<tr>
<td>From 25,000 to 50,000</td>
<td>39</td>
<td>12.7%</td>
</tr>
<tr>
<td>From 50,000 to 100,000</td>
<td>33</td>
<td>10.7%</td>
</tr>
<tr>
<td>More than 100,000</td>
<td>24</td>
<td>7.8%</td>
</tr>
<tr>
<td>Total:</td>
<td>308</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

Table 1: population by municipalities 2019
Source: Elaborated by the authors.

Ribeiro (2015) alludes in his analysis of the Minho metropolitan area (a region in the north of Portugal) with about 800,000 inhabitants, 600,000 reside in the municipalities of Braga, Barcelos, Guimarães, and Vila Nova de Famalicão. Due to this phenomenon, the author considers it essential to define local policies that guarantee the promotion of competitiveness among the municipalities of the same region (Ribeiro, 2015).

As a means to better display the population dispersion in Portugal for the year 2019, figure 1 represents how the Portuguese population is concentrated by groups (deciles) of municipalities. As can be seen in figure 1, at least 70.0% of the municipalities with the smallest number of inhabitants account for around 21.0% of the total population. On the other hand, 10.0% of the municipalities with the highest number of inhabitants account for around 50.0% of the population. The distribution of the population in the year 2019 corroborates the conclusions presented by the authors, since the trend demonstrates the concentration of the population in medium and large cities (Lucas & Morais, 2021).
The asymmetry in population distribution among the different municipalities determines that the structure of municipal tax revenues is also different among them, namely in what concerns taxes on income or wealth. That is, municipalities with a higher number of inhabitants tend to collect proportionally higher revenue values compared to municipalities with a lower number of inhabitants. Brülhart, Bucovetsky, and Schmidheiny (2015) refers that in models of municipal tax competition that seek to assess how local tax rates differ across municipalities, municipal tax rates tend to be lower in municipalities with smaller populations. It is in this theoretical perspective that we try, in this research, to evaluate if this assumption is also observable for taxes where Portuguese municipalities can set the respective rates.

In terms of financing, in 2019, around 67.0% of total municipal revenue comes from tax revenue $TR_C$ and transfers $TR_C$, while the remaining 33.0% comes from Other Revenue $OR$. That is why, in Portugal, the financing model of local government has been characterized as an imperfect model of financial federalism (Oates, 1999). To assess the revenue structure the 308 municipalities were aggregated into population deciles. The first decile (represented by D1) includes the 10.0% of municipalities with the lowest number of inhabitants, and the tenth decile (D10) the 10.0% of municipalities with the highest number of inhabitants.
Figure 2 shows how the municipal revenue is established and disaggregated by the different deciles. It allows us to conclude that, for the municipalities as a whole, other revenue accounts for 33.0% of the total revenue, adjusted tax revenue for approximately 43.0%, and Funds for approximately 24.0%. An analysis of the distribution of the revenue components by population decile shows that the weight of the other revenue is more or less stable over the deciles, the tax revenue is increasing, and the Funds revenue is decreasing. In the first decile, the tax revenue represents around 7.0% of the total revenue, while in the tenth decile, the value corresponds to 58.0%. On the other hand, when we look at the revenue from public funds, we observe the opposite behavior, that is, in the first decile, the weight of revenue is 58.9%, and then it decreases to around 7.8% in the last decile. This behavior was also observed in Navarro and Pano’s study regarding the financing of Spanish municipalities. In this, the authors indicate that the revenue structure, by population, points to smaller municipalities being more dependent than larger municipalities on government transfers (Navarro & Pano, 2021). It is, therefore, implied that smaller municipalities have less financial autonomy and capacity to finance their activity with taxes and other sources based on their own decisions.
Figure 3 represents the per capita revenues for the various deciles and points out that total tax revenues rise as the municipal population size increases. That is, on average, the amount of tax paid per inhabitant is higher the larger the population size of the municipalities. Concerning transfers and other revenues, the relationship is inverse when compared to tax revenues. Throughout the deciles, tax revenues show an increasing behavior, while transfers, as well as other revenues, are decreasing. The seventh decile represents the decile, where the per capita value of tax revenues, transfers, and other revenues are equivalent.

For the theory state transfers are important for smaller municipalities. However, the Spanish system benefits the larger municipalities (Navarro & Pano, 2021), this means that the criterion for the distribution of transfers from the State budget is mainly the population, but there are currently municipalities that receive considerably more funding per capita than other small or medium-sized cities.

Property tax (IMI), personal income tax, and municipal surcharge are the taxes which municipalities can increase or reduce rates. This decision has a direct impact on the revenue collected and on local fiscal competitiveness. The revenue from these three taxes represents, in terms of the national average, 26.2% of the total revenue of municipalities in 2019. As they are taxes of a different nature, the total revenue collected by each of them is also different.

Figure 4 corresponds, therefore, in percentage terms, to the revenue structure of each of the taxes. As shown in figure 4, the Municipal Property Tax (IMI) produces the most revenue (65.0%), followed by the Personal Income Tax (IRS) with 19.0% and, finally, the Municipal Surcharge (16.0%). Even so, the municipal revenue structure also shows a notable
asymmetry between the municipalities, which has a direct bearing on the effective capacity of the municipalities to be, or not, more fiscally competitive.

Figure 4: revenue structure of IMI, IRS and Derrama (2019)
Source: DGAL, Accounts of Municipalities, 2019.

Figure 5: distribution of the revenue from IMI, IRS and Derrama (2019)
Source: DGAL, Accounts of Municipalities 2019.

Figure 5 shows the revenue share, for each of the taxes, by income decile. As it is possible to observe, approximately 75.0% of the total revenue from the IMI, the PIT, and the Municipal Surtax is concentrated in the municipalities belonging to the two highest deciles, that is, in the 20.0% of the municipalities with the largest population (involving 66.9% of the total population). Despite the asymmetry, the property tax (IMI) revenue appears in all deciles, unlike the municipal surcharge, which is negligible in the first three deciles. The dispersion of municipal surcharge revenue is the most asymmetric. Around 74.4% of the revenue from
this tax is concentrated in the tenth decile and 86.0% in the last two deciles. Of the total personal income tax revenue collected by municipalities in 2019, 63.7% of it is concentrated in the tenth decile. As for the property tax (IMI) income, although asymmetric, presents a better distribution by municipalities, weighing 52.9% in the last decile.

The different distribution of tax revenues by municipalities is determined by the tax base as well as the locally defined tax rates. Consequently, municipalities can decide, within the legal tax limits, the values of IMI, IRS, and Derrama rates (Sanches, 2016).

Figures 6 and 7 show the evolution, over a time span of 10 years of the rates of the different municipal taxes, with the average rates defined by the municipalities for each of the years considered, from 2011 to 2021, and the 10th and 90th percentiles.

As can be seen in Figure 6, notwithstanding the slight reduction in 2020, the average municipal surcharge rate has remained stable over the last few years. Gaspar (2014) considers that it is fundamental to carry out a reform of the Municipal Surtax to reinforce the attractiveness of the Portuguese tax system. Another perspective is presented by Carmo and Fernandes (2013), who argue that tax reform should first involve simplifying the relationship between taxpayers and the tax administration, reducing litigiousness, increasing confidence in the system, and setting a corporate income tax rate that is truly competitive.

Regarding the personal income tax rate, figure 7 shows that the average personal income tax rate increased in 2012—a year characterized by high financial difficulties in Portugal—decreasing gradually from 2015 onwards and with a greater reduction in 2020 and 2021. A possible reason for the reduction in these rates may have been the local elections in 2021. The results obtained are in line with the research of Coimbra, Costa, and Carvalho (2011) on municipal tax competition. These three authors consider that the political cycle has a considerable influence on the determination of tax rates (Coimbra, Costa, & Carvalho, 2011).

According to Figure 8, regarding the evolution of IMI rates, the legal range of rates increased from 0.2% and 0.4%, in 2011, to 0.3 and 0.5%, in 2012 and remained unchanged until 2021. After the slight increase in the average rates, it is possible to analyse a gentle decreasing trend after that year.

As it is possible to see in figures 6, 7, and 8, the average rates of the several taxes registered according to the results obtained, a differentiated behavior for the different groups of municipalities.
Figure 6: distribution of IMI, personal income tax and municipal tax revenue (2019)
Source: Elaborated by the authors.

Figure 7: evolution of personal income tax rates between 2011-2021
Source: Elaborated by the authors.

Figure 8: evolution of IMI rates between 2011-2021
Source: Elaborated by the authors.
Figures 9 and 10 depict the average of the PIT and IMI rates, in 2021, and present the behavior of the rates by population decile. As can be observed, the tendency of the average is
increasing with the population decile, that is, municipalities with more population have, on average, higher PIT rates than municipalities with less population. The same occurs with the property tax (IMI) and Municipal Surcharge rates, in which larger municipalities have, on average, higher tax rates.

Thus, the fact that the revenue size is higher in municipalities with larger populations can also be justified by the reason that it is in these municipalities that, on average, tax rates tend to be higher (Brülhart, Bucovetsky, & Schmidheiny, 2015). For Giambiagi and Além, the situation occurs mainly because high population density rates stimulate, in larger municipalities, an increase in the supply needs of public goods and services, which translates into higher costs for local governments and high financing needs (Giambiagi & Além, 2011).

<table>
<thead>
<tr>
<th>IRS</th>
<th>IRS/IMI</th>
<th>IRS/Derrama</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model 1</td>
<td>Model 2</td>
<td>Model 3</td>
</tr>
<tr>
<td>Constant</td>
<td>2.417(0.238)***</td>
<td>1.74(0.443)***</td>
</tr>
<tr>
<td>PF</td>
<td>-1.218(0.277)***</td>
<td>-1.11(0.295)***</td>
</tr>
<tr>
<td>PR</td>
<td>1.172(0.202)***</td>
<td>1.028(0.211)***</td>
</tr>
<tr>
<td>WIIR</td>
<td>15.418(1.322)***</td>
<td>15.321(1.319)***</td>
</tr>
<tr>
<td>PR²</td>
<td>-0.179(0.051)***</td>
<td>-0.168(0.052)***</td>
</tr>
<tr>
<td>TxCIMI</td>
<td>2.102(1.031)**</td>
<td>2.826(0.963)***</td>
</tr>
<tr>
<td>D/(P56, TxCIMI)</td>
<td>-1.318(0.438)***</td>
<td></td>
</tr>
<tr>
<td>TxDerrama</td>
<td>0.014(0.1)</td>
<td>0.127(0.103)</td>
</tr>
<tr>
<td>D/(P56, TxDerrama)</td>
<td>-0.381(0.111)***</td>
<td></td>
</tr>
</tbody>
</table>

Table 2: personal income tax (IRS) rate
Note: Values in parenthesis represent the standard errors of the respective coefficients. The standard errors are robust to heteroscedasticity.
Source: Elaborated by the authors.

At the statistical level, table 2 presents the results obtained in the estimation of the models mentioned above for the personal income tax (IRS) rate\textsuperscript{4}. Model 1 suggests that the personal income tax (IRS) rate is negatively correlated with the weight of funds in total revenue, that means Municipalities with higher transfers of funds tend to have a lower personal income tax rate. In municipalities where the budgetary pressure is higher, evaluated by the smaller budgetary space that debt limits impose, they tend to have a higher IRS rate. Similarly,

\textsuperscript{4} We used data from the municipal accounts for the latest year available, 2019 in the estimation of the models. Tax rates were collected in the Portuguese Tax Authority. Debt and limits in the Pordata site.
the effect of the weight of the IRS revenue on total tax revenue has a positive influence on the IRS rate.

In order to assess to what extent and in which sense the other tax rates of property tax and municipal surcharge influence the determination of the personal income tax rate, four additional models were estimated: models 2 and 3 to assess the importance of the IMI rate and models 4 and 5 to assess the effect of the municipal surcharge on the personal income tax rate.

Model 2 shows that the influence of the property tax rate on the personal income tax rate is positive and statistically significant. Thus, on average, changes in the property tax (IMI) rate tend to impact, in the same direction, the personal income tax rate. However, model 3 shows that the effects of changes in the property tax (IMI) rate on the personal income tax rate tend to be smaller in municipalities with a population percentile higher than 63. That is, higher IMI rates are associated with higher personal income tax rates, but for municipalities with a population percentile higher than 63, the spillover effect, although positive, tends to be smaller.

Regarding municipal taxes (models 4 and 5 in table 3), it can be seen that, in model 4, the municipal surcharge does not influence the personal income tax rate, given that the coefficient associated with the variable "municipal surcharge rate" is not statistically significant. However, when we evaluate the effects along the percentiles (model 5) we find that, for municipalities with a population percentile above 56, increases in the municipal surcharge tend to have a decreasing influence on the personal income tax rate. This leads to the conclusion that there is a revenue transfer from the personal income tax, paid by households, to the municipal surcharge, paid by firms.

In sum, fiscal pressure exerts a positive influence on the personal income tax rate, and the weight of transfer revenues shows a negative relation with the personal income tax rate, as municipalities with higher transfers tend to have a lower personal income tax rate. In addition, the IMI rate is positively correlated with the personal income tax rate, although the size of the effect tends to be smaller in municipalities with a larger population. The municipal surcharge has a negative influence but only for larger municipalities.

As for the property tax (IMI) rate, we observe (similarly to the personal income tax) that a proportionally higher revenue from transfers of funds in the municipality's revenue is related to a lower IMI rate. Additionally, greater difficulties in the local revenue budget exert a positive influence on the level of IMI rates. Conversely, the IMI rate tends to decrease as the budgetary difficulties (other revenues) are lower.
The results also allow the conclusion that there is a positive relationship between the PIT rate and the IMI rate, although the latter decreases for municipalities with a population percentile higher than 16. Similarly, the municipal surcharge is positively correlated with the property tax (IMI) rate. However, this percentile decreases in size when we consider the population percentile higher than 33.
In the case of the municipal surcharge (table 4), the weight of the funds also exerts a negative influence on the determination of the rate, the tax pressure has a positive influence, and the weight of the municipal surcharge revenue, in the total tax revenue, has a positive influence.

In the case of municipal surcharges, the IMI rate is not statistically significant (models 4 and 5 of table 3), so there is no evidence that this rate (IMI) influences the municipal surcharge rate. The influence of the personal income tax rate on the municipal surcharge rate (models 3 and 4 of table 4) is positive, in particular for municipalities in the population percentile above 13.

Considering the objectives of this research, we find that the public policy of shaping the municipal tax burden by reducing local tax rates accentuates the levels of fiscal attractiveness and municipal competitiveness and can have direct effects on the municipalities' tax policy options to attract people and productive investment.

From the assessment made of the year 2019, for the three taxes assessed, we observe that tax rates tend, on average, to be higher in municipalities with larger population size. Therefore, on average, municipalities with a higher number of inhabitants tend to have fewer transfers from the state budget and more own tax revenues.

**Final Considerations**

Considering the results of this research can have direct effects on the municipalities' tax policy options to attract people and productive investment, we find that the public policy, shaping the municipal tax burden by reducing local tax rates, accentuates the levels of fiscal attractiveness and municipal competitiveness.

From the assessment made of the year 2019, for the three taxes assessed, we observe that tax rates tend, on average, to be higher in municipalities with larger population size. Therefore, on average, municipalities with a higher number of inhabitants tend to have fewer transfers from the state budget and more own tax revenues.

The empirical assessment developed in this research also allows us to conclude that the level of municipal tax rates depends on the municipal budgetary pressure. On the other hand, municipalities that receive lower transfers from the State Budget have, on average, higher tax rates.

Additionally, although there seems to be evidence of a shift of the tax burden from households to firms, the data suggests that higher personal income tax rates are, on average,
associated with higher IMI and municipal surcharge rates, even though the magnitude depends on the population size of the municipalities. For municipalities with larger numbers of inhabitants, increases in the municipal tax rate seem to be associated with reductions in the personal income tax rates.

Another piece of evidence is that the property tax rate (IMI) rate depends positively on the personal income tax rate, though in an amount that decreases as the population size increases. The municipal surcharge also seems to be positively correlated with the personal income tax rate, especially in more populated municipalities.

The evidence suggests that tax competition among municipalities is conditioned by circumstances that are not reduced to the decision to increase or decrease local tax rates by municipalities. The size of the tax bracket, the size of the population, and budgetary constraints are important aspects that may condition or even hinder tax competition between municipalities.

These conclusions are in line with the studies conducted by Larin, Boudreau, Rouleau, and Bauer, especially concerning the factors that influence local tax competitiveness, even if the level of attractiveness does not depend exclusively on the tax factor.

The reduction in local tax rates may have been caused by the 2021 municipal elections. The results now obtained are in line with the research of Coimbra, Costa, and Carvalho (2011) on municipal tax competition. Similar to this research, the data we have obtained also suggests that the political cycle has a considerable influence on the determination of tax rates. These do not necessarily change in the sense of bringing them closer to the subjects’ preferences.

According to figure 8, regarding the evolution of IMI rates, we conclude that the legal range of rates increased from 0.2% and 0.4% in 2011 to 0.3 and 0.5% in 2012, remaining unchanged until 2021. This range oscillation was also observed by Kangasharju, Moisio, Reulier, and Rocaboy, who consider that a greater difference in local rates may result in an increase in local development differences and greater budgetary difficulties.

Notwithstanding the results obtained, our analysis is limited as it only covers one year of data. It is important to assess in future studies the evolution over time of municipal decisions regarding the tax rates set, as well as to include other variables in further research.

References


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