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DETERMINANTS OF MUNICIPALITIES' FINANCIAL PERFORMANCE: A KPIs APPROACH

Carlos Manuel Pinheiro[1], João Teixeira Pinto[2]

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[1] Caixa Geral de Depósitos, S.A.; Instituto Universitário de Lisboa (ISCTE-IUL) Business Research Unit (BRU-IUL), Lisboa, Portugal; ISCAL – Instituto de Contabilidade e Administração de Lisboa, Instituto Politécnico de Lisboa; Universidade Europeia, Lisboa.

[2] Caixa Geral de Depósitos, S.A.; Mastering at Universidade Europeia, Lisboa.

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Abstract

Successive weak financial performances have put decentralization of powers and authority to municipalities up for debate. More than half of municipalities' revenue are transfers from State budget which raises questions about their financial sustainability. This study identifies the determinants of financial independence or indebtedness of the 308 Portuguese municipalities, using panel data spanning 2009 to 2018. The results showed that the amount of taxes is the most significant predictor of municipalities total debt and financial independence, while population density only impacts total debt. Our results hold in robustness checks and might interest policy makers and local authorities.

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1. Introduction

Decentralization which has been occurring in the last couple of decades and which is meant to continue has put municipalities under the spotlight. More than being an important employer, with potential to employ even more workers as the municipalities are given more responsibilities, they also play an important role in the economy, with an elevated value of capital expenses. This stresses the importance for municipalities to conduct a sound and stable financial planning.

There is a marked heterogeneity in municipalities, namely, municipalities in the inner lands have less resources, are less populous and therefore less revenue as compared to urban areas. In Portugal it is possible to observe differences between coastal and non-coastal areas, as well as north and south. The migration of population to urban areas is an old paradigm, since a better urbanistic infrastructure leads to centralization, attracting population from non-urban areas, concentrating the population in urban centers (Letelier, 2005).

Therefore, municipalities need to conduct a robust financial planning, which has been problematic, since historically they have had high levels of debt hindering their independence. Due to that, the central government has put in place measures to control leverage, but the response to this control was heterogeneous. Municipalities were especially in difficult debt position until year 2012 when “Lei dos Compromissos e dos Pagamentos em Atraso” (LCPA – Law of Commitments and Late Payments) was made to reduce municipality debt, shortening payments due dates, and forcing expenses contention (Marques, 2016).

The second chapter of the article will focus on motivation for the study. The third chapter addresses the methodology, which intends to explain the models to test the hypotheses. The results are analyzed in the fourth chapter, followed by the respective conclusions, in chapter five.

2. Motivation for managing municipalities independence

Finding good indicators that can predict two of the most important financial indicators for municipalities (Financial Independence and Total Debt), allows the municipalities to work towards achieving good results for those Key Performance Indicators (KPIs), therefore achieving a better performance. Financial performance has been under stress in recent years, especially with only 95 (30,8%) municipalities in 2018 (www.pordata.pt) achieving financial independence.

The main goal of study is to find indicators (KPIs) that can help create municipalities’ Balance Scorecard (BSC), with the aim to achieve a better financial performance, allowing municipalities to supply their inhabitants’ needs, develop their territory and to retain population. This goal is

shown more valuable since there is an historical difficulty of municipalities to manage their debt levels, therefore having worse financial performances.

The prediction model is intended to lead to a better selection of KPIs from municipalities, as well as a BSC that can improve their performance. According to Heery & Noon (2008) KPIs are defined as a measure of achievement, created based on SMART principles, and usually a part of a performance management system. KPIs are present in most organizations, either public or private. KPIs both financial and non-financial provide important information to explain a company's progress towards its goals.

2.1. Performance Measurement in Municipalities

This study is part of an older debate on performance measurements, usually structured in Key Performance indicators (KPIs). KPIs differ from normal performance indicators being that they are the key indicators that should be used by the Board to manage the business (PwC, 2007). Although the KPIs underpinnings have remained the same, the landscape of the economy has shifted recently, especially in the last year due to the Covid-19 pandemic.

As a matter of fact, a recent CMO survey (Delloite, Fuke Fuqua & American Marketing Association, 2021) in the US has found that significant changes occurred during the pandemic. In terms of customer's interaction there was a shift to the increased value of digital experiences, as well as companies trying to do "good", being that most companies turned to opportunities such as building digital interfaces, among others. Digital Gross Domestic Product (GDP) is growing significantly, and the non-digital GDP is declining (In % of the World GDP). Companies have to set new KPIs if they want to survive long term, as digital components are now also important. Another important change in the economic landscape is that the companies are now trying to be more sustainable.

Sustainability in the context of business has two main categories, the effect business has on the environment and on the society (Spiliakos, 2018). Spiliakos (2018) posits that several investors now use new metrics, namely environmental, social and governance (ESG), and that companies with a higher rating in these metrics had a lower cost of debt and equity. Porter and Linde (1995), who focused on resource productivity, rather than focusing on pollution prevention, also showed the company's performance. ESG practices, especially related to non-financial KPIs may be hard to measure due to their non-deterministic or qualitative nature. If companies can find ways to measure these indicators this can lead to assessment of hidden performance problems (Pidun & Felden, 2011).

Another important tool in performance measurement is the Balanced Scorecard (BSC). The BSC includes KPIs defined by the company in a fast but comprehensive view, telling the results of the actions already taken. It can be viewed as an instrument that links performance measures (Kaplan & Norton, 1992).

The structure of the BSC is also changing with the KPIs. Kaplan and McMillan (2021) note BSC should be reimagined for the ESG era, due to consumer preferences shifting towards more sustainable products. The problem is, according to the authors, surpassing the limitations of the accounting and controlling systems prioritizing only financial outcomes. This shows that there is an increased use of non-financial indicators (Monea & Guță, 2011).

KPIs and the BSC are not exclusive to private companies, as public entities are also concerned with good performances. Although theorized that non-profit organizations do not have incentives to seek their maximum profitability, a growing competition for donors, foundations or government funding has raised the question of performance in local public entities, as ever before (Kowalczyk, 2018).

It is also important to recall that municipalities have a vested public interest, a distinguished feature from profit organizations. They are created to serve the public interest. Therefore, KPIs may not always reflect the performance of municipalities in areas like needs or satisfaction (Kloviene & Valanciene, 2013). They are also more susceptible to political, bureaucratical and social forces. The fact that municipalities are accountable to their community forces the creation of more external regulation of bureaucracy to guarantee that the community needs are being fulfilled, and that transparency is present.

Kowalczyk (2017) indicates that KPIs should preferably be done at a larger scale to allow for comparisons between local governments, but the BSC can be implemented at an individual level. It is safe to assume that each municipality can have different goals, which makes the study of KPIs harder when comparing local authorities across countries. Kloviene and Valanciene (2013) also report this complexity, suggesting 10 important components to include, namely the variety of objectives, competition, public interest, organization structure, management and regulatory aspects, data validation, participants/staff, culture, leadership and learning.

2.2. Portuguese Municipalities

In Portugal due to excess of centralization of the dictatorship state until the 1970s, municipalities were not a part of the picture. With the power centralized, municipalities played a small non-relevant role. Therefore, decentralization appears opposing this centralized power as a way to

democratization and vertical separation of powers (Sousa, 2012). In article 6º nº1 of Portuguese Republic Constitution (CRP) it is defined that the “State is unitarian (…) and respects the principles of subsidiarity and autonomy of municipalities and the democratic decentralization of public administration”.

There is, indeed, a trend for decentralization. However, it is a process that has been debated over a long period of time, as it appears that the municipalities are not yet able to be self-sufficient. Bad management still exists. For example, the government threatens to take responsibility over healthcare centers from bad managing municipalities (Kotowicz, 2019). Despite Portuguese municipalities seeming not prepared, the Associação Nacional de Municipios (National Municipality Association) believes that the decentralization will facilitate the sustainable development. For this development, municipalities need funds in accordance with their responsibilities (ANMP, 2020). This is labeled as fiscal federalism.

Fiscal federalism is a process intended to distribute authority, as well as the understanding of which functions and instruments are better centralized or decentralized (Rodden, 2005; Oates, 1999). Municipalities have their own financial autonomy, according to article 6º of Law 73/2013. For municipalities it is usually hard to cater to all the needs that have been transferred from the Portuguese State since the last few decades, since most of them do not have enough revenue. This calls for the subsidiarity principle, so that when the state ascribes a responsibility to a municipality, it also ponders on the nature and requirements for this task (Catarino, Silva, & Cristóvam, 2015). Therefore, since municipalities acquire these responsibilities, it also important to give them the means to obtain revenue, meaning, a financial decentralization (Catarino, 2012).

In Portugal, this is especially done in the form of tax revenue, especially in revenue from Imposto Municipal sobre Transações (IMT), a tax leveled on property transactions, Imposto Municipal sobre Imóveis (IMI), from taxing properties, and a parcel of Imposto Único de Circulação (IUC) from taxing vehicle owners. There are also other smaller revenue sources. All the revenue sources are established by Article 14º of Law 73/2013. It is important to note that, although the municipalities can collect taxes, they are only allowed to create taxes according to the general tax regime of the local municipalities (article 20º of Law 73/2013) which is theorized by Pinto (2014) as a limitation to obtaining resources.

Allowing tax decisions to local governments has been a process that has been implemented in most of the countries around the world, since it is theorized that tax competition leads to a better efficiency in resource allocation, promoting bigger economic growth (Hansali, 2017). Europe has

also tried to adopt this view. As a result, it seems there is a higher level of decentralization, and in result, a higher level of tax decentralization, generating more autonomy on expenses (Catarino & Abraham, 2018).

To control municipalities' level of debt, in February 2012, the publication of LCPA is done in view of forcing the municipalities to reduce their payment deadlines and to cut expenses. These indicators of debt drastically improved after the law was in force (Marques, 2016).

It may seem that Portuguese municipalities have been on the right path to control their debt issues, especially with these government measures, with average debt of municipalities being reduced. A study by Santos and Martinho (2021) suggests that this control is permeable, and suggests that the official data lacks reliability, since it does not have the accurate evaluation of the Late Payments Directive (LPD), and does not set a common methodology for measuring payment behavior of local public authorities.

There is also a significant difference in terms of indicators reported, Beja, district of South Portugal only reports 13 indicators, and Santa Maria da Feira, up north, reports 123 indicators, hindering comparisons. Also 49.7% of the indicators were reported only by one municipality alone (Rosa, 2019). It is important to note that several factors affect finances and there is not one variable explaining financial condition alone (Jacob e Hendrick, 2013).

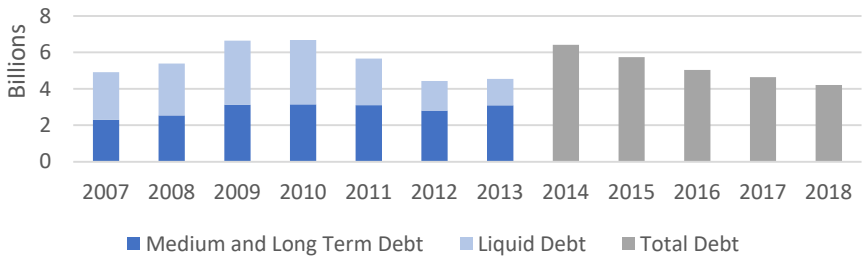
To measure the financial performance of municipalities, the Anuário dos Municipios Portuguese (yearly review of Portuguese municipalities' performance) has one main indicator called Financial Independence. Financial Independence is a term used by Fernandes, Camões & Jorge (2019) which is the ratio between own revenue and the total revenue of the municipality. If a municipality has a ratio of 50 or above the municipality is considered independent. This ratio allows to measure the need of the municipality for state transfers, or if this municipality is in part self-sufficient. According to Pordata (www.pordata.pt), there was a significant increase in the number of Portuguese independent municipalities from 2013 to 2014, which witnessed the number of Portuguese municipalities increase from 66 to 82. Since then, there hasn't been any major increases, with Portuguese municipalities going back-and-forth struggling to gain financial independence, achieving its highest number of 95 municipalities (in 2018 still under 1/3 of municipalities remain not independent).

Debt is another important factor to consider, especially in the terms of sustainability (and intergenerational equity. Debt as seen before, has been a topical issue in Portuguese

municipalities along the years. It is also important to refer that Mather & Gorina (2017) noted that appropriate levels of debt allow municipalities not to go through financial difficulties.

Figure 1

Portuguese municipalities' debt (2007-2018)



Source: Own elaboration with data from www.pordata.pt

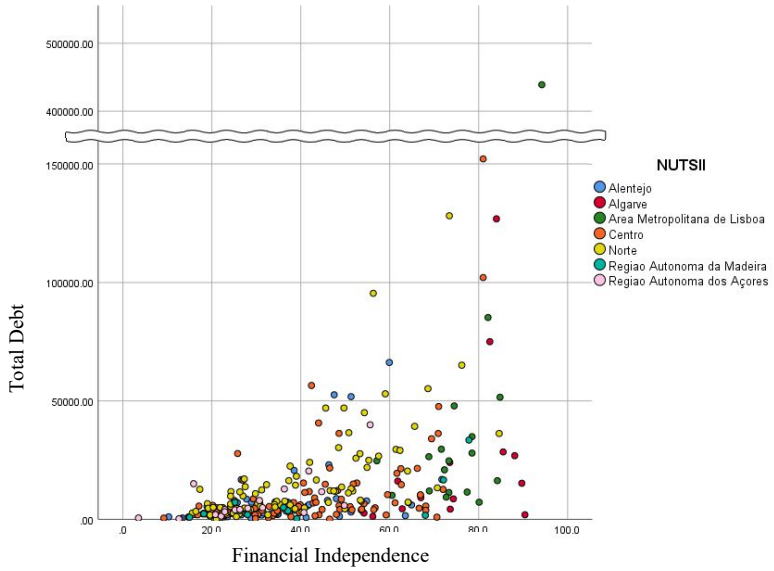
The graph illustrates the innacuracy of the measurement. From 2007 to 2013 the indicators were Medium and Long term debt (dark blue), and liquid debt (light blue). These indicators showed an uncontrolled increased in debt from 2007-2010, and a contention of this debt from 2011 to 2013. Altough the indicators looked promising, in 2013, the new more accurate measurement of debt showed that the Portuguese municipalities did not in fact had 4.5 Billions of debt, but instead they had 6.4 Billions, which forced the municipalities to have an even bigger contention in taking up debt. This was an important step, as seen in Annex 1, which shows shows that the new measurements of debt and debt limits translated into a great reduction in municipalities over the imposed debt limit.

It is also important to highlight that the debt limit is set according to the municipality, meaning that a municipality with better results (total debt can't surpass 1.5 times the average of liquid current revenue from the past 3 years) can acquire more debt an not be over these limits (art 52º of Law 73/2013). Municipalities enter in difficulties in 2014, as shown in Annex 1, which translated in a total of 65 municipalities above their debt limit. In 2018 the same measures yielded 24 municipalities. This shows the importance of having good indicators, as after the change of indicators the results were better.

It is then possible to assume that Financial Independence and Total Debt are the most important indicators in municipalties performance.

Figure 2

Financial Independence and Total Debt of Portuguese municipalities in 2018



Source: Own elaboration with data from www.pordata.pt

Municipalities with higher financial independence incur in higher debt levels. Below 50% of independence the acquiring of debt is very limited, probably due to smaller limits of debt in these municipalities. The above 50% threshold debt it is more disperse, with municipalities choosing to incur or not to incur in high levels of debt. Lisbon, which is the capital municipality and with higher financial independence, also incurs in high levels of debt. Debt also plays an important role in the municipality's growth, although it has to be correctly managed to not jeopardize sustainability. Algarve's municipalities, on the south, show great indicators in terms of independence without incurring in high levels of debt, which may indicate Algarve as a good example to follow, as was also stated by Correia & Pinto (2020).

2.3. Municipalities indicators

Although there are two main indicators that are mostly used in municipalities financial performance assessment, the factors that lead to good performances are yet to be completely unveiled. Some authors single out taxes, population, urbanization, among others. As seen above, financial measurement is also switching from pure financial indicators to other indicators such as sustainability.

2.3.1. Taxes

Financial Performance is a concept that has gained traction since the implementation of fiscal federalism policies (decentralization of revenue instruments). Annex 2 shows an increase in the average of taxes collected by each municipality over the years, which may indicate a higher need for municipalities to finance their activities through taxes. The State transfers have somewhat kept approximately the same amounts since 2014, although in 2018 there was a significant increase. It is not known if the municipalities will need more transfers from the central government due to the pandemic, but with the "European bazooka" having most of its value going to public administration, it is possible that the transfers increase in value, which may hinder financial independence.

The taxes revenue has indeed increased over the years. It is also important to understand which taxes the municipalities are recurring to. Annex 3 shows the total revenue from taxes increases significantly, with one of the main drivers probably being IMT, which follows an almost identical trajectory as the total taxes line. IMT is a revenue that is levied on the transmission of real estate properties. This collection of taxes may increase mainly due to the activity of the real estate market, which has seen speculation increase the value of most real estate properties in Portugal, especially in the metropolitan areas (which may accentuate the differences between metropolitan areas and rural areas).

Due to the covid-19 pandemic, it is expected that the prices of real estate may decline, especially with the end of moratoriums. These factors should be pondered by municipalities as they can entail revenue loss. Despite this, IMI a tax paid real estate owners, which can vary by municipality, has also increased, although only slightly compared to IMT. IUC does not seem to have a high impact in revenue, kept constant over the referred period in low values.

Due to the above analysis, the first hypothesis is:

H1: Is the proportion of taxes in the municipality total income a function of financial independence and total debt?

2.3.2. Demographics

As already stated, there is a high level of heterogeneity in Portugal, according to the division of municipalities by populational size given by Fernandes, Camões and Jorge (2019), it is possible to observe that the most populated municipalities are located in coastal areas, especially in the urban poles (AML and AMP). In a previous study of Portugal municipalities (Correia & Pinto, 2020) it was possible to verify that, the panorama is only getting worse, with the urban areas being

the only ones capable of attracting more population, with most of the other municipalities losing it, especially the interior. The same study observed that most of the financial independence municipalities were either from AML, AMP or Algarve, the later, having especially less population that the first ones, due to this, the studied found out that Algarve and Alentejo Litoral, despite having less population obtained more own revenue per capita than AML.

As it is possible to see from Annex 4, Algarve's municipalities have on average more businesses p/100 inhabitants, and this average has been growing. This allied with the businesses being cyclical, could explain why Algarve having a low population can have bigger revenue. Another interesting point from the graph is that AML is actually one of the regions that has the lowest business p/100 inhabitants on average. This could be due to the fact that AML has a lot of inhabitants, which can reduce the ratio. Posting this it would be interesting to understand if businesses have an effect on the financial performance.

Population has been several times referred in this study as an important factor. As it is possible to see the asymmetries between Portugal in terms of population also mostly occur in terms of financial performance. Correia & Pinto (2020) have also found that there was indeed a correlation between municipalities populational balance and their financial independence. Therefore, population is one of the most important factors and should also be considered in the hypothesis.

The hypothesis will intend to study these 3 factors in a group called demographic factors, which will intend to study the relation between demographical differences and financial indicators between municipalities.

H2: Are demographic factors a function of financial independence and total debt?

2.3.3. Governance

Portugal governance landscape can be described as stable, with mostly two parties governing in cycles (PS, left-center-wing, and PSD, right-center-wing). In the last three governments there were colligations which allowed smaller parties like CDS (Right-Wing), BE (Left-Wing) and PCP-PEV (Left-Wing) to reach governance. The effect is replicated across municipalities, with PS (158) and PSD (98) reaching power in most municipalities, with the smaller parties reaching the power only in an a few municipalities, usually without majority, or through colligations.

Guedes (2015), has found out that the levels of debt without majority in power were usually higher than with majority. The effects on debt of left-wing and right-wing parties didn't seem to have relevance, with their trajectories being identical. This study shows that governance factors like

majorities may have na effect on financial performance, but since it was done with the old measurement of debt, a study done with the nem measurements would be more accurate. Therefore, for a first analysis of this indicator the table below shows the average of financial independence and total debt with and without majority.

Figure 3

Average of Financial Independence and Total Debt with and without majority rule in 2018

	With Majority Rule	Without Majority Rule
Average Financial Independence	40.79%	50.57%
Average Total Debt	12,136,299.01€	26,308,330.85€

Source: Own elaboration with data from www.pordata.pt

The data seem to confirm that indeed, municipalities without majority rule have an higher average debt than those with majority rule. Despite having an higher debt, the municipalities withou majority rule seem to be on average independent, with financial independence averaging 50,57%, on the other hand, municipalities with majority have lower financial independence, with only 40.79% on average. Therefore, and since the results showed notable differences, it is important to test if governance factors may or may not be a fuction of independence and total debt.

H3: Are governance factors a function of independence and total debt?

2.3.4. Sustainability

As mentioned before, more and more companies are taking into consideration sustainability factors in their performance review, hence this factor could not be avoided. Municipality's sustainability could refer to financial sustainability, but also to environmental. Since populations tend to move from rural areas to urban areas, and usually in search of a better quality of life, it is important to understand if these indicators have an effect on the fixation of population and therefore, on the municipality's financial performance.

There are several indicators where municipalities have expenses to increase their inhabitant's life qualities, such as protection of climate and air, residual management or biodiversity and landscape protection. Although there are other indicators, these are the ones where municipalities spend the most, according to Pordata (www.pordata.pt). AML is the biggest spender in these components, and as seen before is also the place that can fix more inhabitants. North region comes second (Which includes AMP), and then center region. Alentejo and Algarve seem to spend below normal values.

It is then important to analyze the total of expenses in environment by municipalities. The graph below shows these expenses divided by Nuts II, in order to understand which are the municipalities that spend the most. In annex 5, As expected, AML is the region that spends the most in total environmental expenses, with a great increase from 2018 to 2019, with North coming in second place, but lowering their expenses, raising the gap between AML, and reducing the gap between Center, which saw a significant increase from 2016 to 2019. The other regions, as seen before, seem to have expenses below what should be expected. Therefore, it is important to understand if these factors can really lead to a better financial performance.

H4: Are environmental and safety factors a function of financial independence and total debt?

3. Methodology

Due to the object of study being KPIs the methodology approach chosen was the quantitative methodology. Since KPIs are mainly a quantitative subject, this methodology fits the best. Although the literature shows that KPIs are also evolving to other non-quantitative KPIs, due to a large number of data available, it was possible to gather variables that fit these paradigms. The data were collected only from www.pordata.pt, related to the years 2009-2019 in a database that allowed different types of studies.

It is important to note that this database is made of the entire population of municipalities. Since we are working with population data and not a sample, there is no need to account for confidence estimation intervals since the data is not an estimation of the population from a sample, but rather, the population itself.

Another important factor was the use of robustness tests, which consists in removing entries from data when running the regression, in this case, Lisboa, Porto, Lisboa and Porto, and Ilhas, were removed, when running separate regressions. This accounts for the effects of clearly heterogeneous municipalities such as Lisboa, Porto or the Islands of Madeira and Açores. Without the municipalities in the regression, it is possible to denote the consistency of the estimation.

The use of 2SLS allows for a correction in the degrees of freedom. This test will give us an important factor, which is the consistency of the estimations in the first regression model (Greene, 2018). The test was run with the instrumental variable-1 (In Panel A, Total Debt, and in Panel B, Financial Independence), meaning that the data had a lag of 1 year period.

Due to marked heterogeneity in municipalities, and since municipalities are the ideal level of study (not by regions), having all the municipalities in the model implies this heterogeneity, there is a

need to account for it, knowing if the estimators are consistent, therefore, fixed effects are needed (Greene, 2018).

3.1. Methodology and Econometric Setup

For Panel A:

$$\text{Total Debt} = Total\ Taxes \times \beta 1 + Populational\ Density \times \beta 2 + Business\ p100\ inhabitants \times \beta 3 + Univesity\ Students \times \beta 4 + Winnin\ Party'Share \times \beta 5 + Environmenta\ Expenses \times \beta 6 + Crimes\ p1000\ inhabitants \times \beta 7 + \varepsilon$$

For Panel B:

$$\text{Financial Independence} = Total\ Taxes \times \beta 1 + Populational\ Density \times \beta 2 + Business\ p100\ inhabitants \times \beta 3 + Univesity\ Students \times \beta 4 + Winnin\ Party'Share \times \beta 5 + Environmenta\ Expenses \times \beta 6 + Crimes\ p1000\ inhabitants \times \beta 7 + \varepsilon$$

3.2. Variables

The variables were all collected in www.pordata.pt, although some variables had to be transformed, namely, financial independence was calculated with the formula: $Financial\ independence = \frac{Receitas\ Próprias}{Receitas\ Totais}$, and total debt was reduced from 700 Million to 10^3€ to account for big unit variances between data.

The variables were chosen with base in the literature and data review done before in the study. Although the database had lots of variables to choose from, it was impossible to fit every single one of those variables in the model, since it would bias the result.

Therefore, the choices were made to have at least one variable that could answer the pondered hypothesis. This allowed the variables to be grouped according to the hypothesis formulated, which were based on groups, being: Tax Revenue, Demographics, Governance, and Sustainability (Environmental and Safety).

The description of the variables is seen in Annex 6 for Panel A, and Annex 7 for Panel B. It is important to understand the importance of the creating two panels of data. Since the range of the data is different, this may change descriptive statistics such as Mean, Std. Dev., Min or Max.

4. Results

It is possible to denote that none of the variables follow a normal distribution, as per previous Kolmogorov-Smirnoff test made, therefore, in the correlation matrix it will be applied Spearman's row coefficient instead of the Pearson correlation coefficient. Regarding the linear regression model, it is important to state that, according to Greene (2018), normality is often viewed an

unnecessary and possibly inappropriate addition to the regression model, therefore, the fact that the variables do not follow a normal distribution will not interfere with the model.

The correlation matrix is pretty useful, not only to understand the relations between the variables, but also because it allows us to prevent multicollinearity problems. Multicollinearity happens when two variables are perfectly or highly correlated. This can give rise to problems such as coefficients that may have very high standard errors a low significance levels despite the R2 being quite high and coefficients that may have the wrong sign or implausible magnitudes (Greene, 2018). The correlations were accounted for through a correlation matrix between all the variables.

The base regression consists in three models, the first, with only total taxes, populational density and business p/100 inhabitants. The second ads University students and Winning Party's Share. The third one adds environmental expenses and crimes p/1000 inhabitants.

After those three models, the third model went through fixed effects in municipalities, which as mentioned before has the importance of accounting for heterogeneity, then year fixed effects, performed by 2SLS test, which allows to cross the results with the year-1 of the y variable, then the robustness tests, which will allow to account for possible outliers such as Lisbon, Porto, and the Islands of Azores and Madeira. The steps were done in the same way for both Panel A and Panel B.

Table 1

Ordinary Least Squares Model – Panel A - Determinants of Total Debt

Dependent Variable: Total Debt	Coef. (Std. error)	Coef. (Std. error)	Coef. (Std. error)	Coef. (Std. error)	Coef. (Std. error)	Coef. (Std. error)	Coef. (Std. error)	Coef. (Std. error)	Coef. (Std. error)
Tax Revenue									
Total Taxes	703.180***	517.670***	548.700***	2.856*	519.735***	700.794***	445.554***	644.830***	584.856***
	(61.641)	(44.015)	(47.448)		(50.440)	(35.756)	(41.119)	(36.913)	(51.471)
Demographics									
Populational Density	18.442***	1.964**	2.013**	23.302***	1.679*	3.121***	5.647***	4.000***	1.770*
	(1.205)	(0.896)	(0.898)		(0.961)	(0.672)	(0.789)	(0.681)	(0.942)
Business p/100 Inhabitants	1.410.549***	-525.861***	-478.629**	117.951***	-404.238*	-282.013**	-338.928**	-258.954*	-472.597**
	(268.208)	(185.801)	(188.810)		(201.237)	(141.121)	(162.532)	(139.059)	(210.234)
University Students		3.812***	3.844***	298.487***	3.652***	0.942***	4.319***	1.634***	3.861***
		(0.088)	(0.091)		(0.098)	(0.116)	(0.081)	(0.169)	(0.095)
Governance									
Winning Party's Share		-51.723	-53.949	1.552	-23.499	-139.039***	-49.162	-123.457**	-41.515
		(65.711)	(65.767)		(69.571)	(49.176)	(56.850)	(48.507)	(72.539)
Environmental									
Environmental Expenses			-146.530	4.136**	-134.151	-102.454	145.217	-51.320	-261.660
			(154.214)		(167.132)	(115.231)	(133.779)	(114.814)	(173.724)
Safety									
Crimes p/1,000 Inhabitants			-100.386	2.605	-85.198	-85.233*	51.616	-42.822	-154.069**
			(64.977)		(69.727)	(48.532)	(56.292)	(48.437)	(76.428)
Constant	-21,684.878***	8702.062*	11,329.994**		8,364.063	10,698.184***	4,644.010	8,814.925**	12,255.766**
	(3,691.374)	(4,528.346)	(4,765.334)		(5,092.281)	(3,559.210)	(4,109.387)	(3,520.635)	(5.163.115)
Robustness Tests	No	No	No	No	No	Excl. Lisboa	Excl. Porto	Excl. Lisboa and Porto	Excl Açores and Madeira
Municipality Fixed Effects	No	No	No	Yes	No	No	No	No	No
Year Fixed Effects	No	No	No	No	Yes	No	No	No	No
Number of Observations	1,540	1,540	1,540	1,540	1540	1535	1535	1530	1390
Adjusted R^2	0.306	0.686	0.686	0.966	0.680	0.421	0.766	0.420	0.689

Note: The data are downloaded from Pordata (www.pordata.pt).

Significance at the 1%, 5%, and 10% levels is denoted by ***, ** and *, respectively.

The first model only presented an R2 of 0.306, which is not enough for a prediction model. In the second model adding the variables university students and Winning Party's Share seem to improve the model, with R2 being o 0.686. Adding environmental expenses and crimes showed no effect. The R2 of the model was kept consistent with the tests made, showing that if the heterogeneity accounted for via the fixed effects of municipalities the model would have an almost perfect R2, allowing to safely predict the financial performance of municipalities. Only removing the municipality of Lisbon seems to affect the model.

Panel A regressions show that the bigger determinant is total taxes, which is the variable that has the biggest effect in the model. The results seem to vary above 400.000, with only the fixed effects test reducing it to 2.856. This may mean that taxes have a great effect on financial independence,

but if the municipalities were heterogenous this may not be the most determinant factor. The effect is always positive, which means that by an increase in taxes, municipalities probably increase their debt. Population balance also seem to have a consistent effect in Total Debt, with the values being also always positive and similar. Business per 100 inhabitants in the first model presents a positive relation, with the same result with fixed effects, but in the second and third model, negative. It is therefore not safe to account for this variable impact in the model.

Wining party's share seems to be mostly negative, which would indicate that municipalities with no majority seem to acquire more debt. With the fixed effects this variable does not seem consistent, increasing its value to a positive number. The results also do not show statistical significance. A similar result is obtained for Environmental Expenses and Crimes p/1,000 Inhabitants, with both not having statistical significance, and changing from negative to positive not only in the fixed effects test, but also when Porto is excluded. It is now important to examine this data in accordance with Panel B.

Table 2

Ordinary Least Squares Model – Panel B - Determinants of Financial Independence

Dependent Variable: Financial Independence	Coef. (Std. error)	Coef. (Std. error)	Coef. (Std. error)	Coef. (Std. error)	Coef. (Std. error)	Coef. (Std. error)	Coef. (Std. error)	Coef. (Std. error)	Coef. (Std. error)
Tax Revenue									
Total Taxes	1.132***	1.131***	1.090***	1,391.137***	1.081***	1.100***	1.087***	1.110***	1.074***
	(0.009)	(0.010)	(0.010)		(0.011)	(0.010)	(0.010)	(0.011)	(0.010)
Demographics									
Populational Density	0.001***	0.000	0.000	0.000	0.000	0.000	0.000*	0.000	0.000
	(0.000)	(0.000)	(0.000)		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Business p/100 Inhabitants	0.178***	0.156***	0.124***	202.387***	0.104**	0.129***	0.128***	0.123***	0.219***
	(0.042)	(0.043)	(0.043)		(0.045)	(0.043)	(0.043)	(0.043)	(0.045)
University Students		0.000**	0.000	1.373	0.000	0.000***	0.000	0.000***	0.000
		(0.018)	(0.000)		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Governance									
Winning Party's Share		-0.004	-0.007	1.553	-0.014	-0.010	-0.006	-0.012	0.000
		(0.014)	(0.014)		(0.015)	(0.014)	(0.014)	(0.014)	(0.015)
Environmental									
Environmental Expenses			0.170***	4.379**	0.159***	0.169***	0.175***	0.156***	0.091***
			(0.032)		(0.034)	(0.032)	(0.033)	(0.032)	(0.035)
Safety									
Crimes p/1,000 Inhabitants			0.107***	28.980***	0.111***	0.107***	0.110***	0.102***	0.112***
			(0.012)		(0.013)	(0.012)	(0.012)	(0.012)	(0.013)
Constant	12.372***	12.849***	9.951***	263.892***	10.706***	9.927***	9.796***	10.216***	9.742***
	(0.498)	(0.916)	(0.980)		(1.046)	(0.973)	(0.982)	(0.978)	(0.992)
Robustness Tests	No	No	No	No	No	Excl. Lisboa	Excl. Porto	Excl. Lisboa and Porto	Excl Açores and Madeira
Municipality Fixed Effects	No	No	No	Yes	No	No	No	No	No
Year Fixed Effects	No	No	No	No	Yes	No	No	No	No
Number of Observations	3,080	3,080	3,080	3,080	3,080	3,070	3,070	3.060	2780
Adjusted R^2	0.866	0.866	0.871	0.964	0.868	0.870	0.869	0.868	0.877

Note: The data are downloaded from Pordata (www.pordata.pt).

Significance at the 1%, 5%, and 10% levels is denoted by ***, ** and *, respectively.

Similar results were obtained in panel B. Total taxes have again a positive coefficient with significance showing that this is one of the most important factors in both total debt and financial independence. Populational Density shows a value of 0 in most of the models showing that in this model population density doesn't cause any changes in financial independence. Business p/100 inhabitants, contrary to panel A, shows a positive coefficient with significance to 1% that is constant in all models.

Winning party's share coefficient, similar to panel A, shows an inconsistent coefficient, with no significance, change from negative to positive when the fixed effects are applied. Environmental expenses showed a positive coefficient in all the models also with significance in all the models.

Crimes p/1000 inhabitants incredibly showed a positive coefficient, showing that an increase in crime is related with an increase in financial independence. The coefficient is constantly positive and has significance in all models. It is then important to answer the hypothesis based on the results obtained.

H1: Is the proportion of taxes in the municipality total income a function of financial independence and total debt?

The proportion of taxes is definitely a factor in both financial independence and total debt, being that in both Panel A the coefficient was always positive and had always significance, even with the fixed effects by the municipality. An interesting fact is that when taxes raise total debt also tends to raise. This can possible be explained to as seen in figure 9, the municipalities that have more independence usually acquire more debt, and since total taxes is a factor of financial independence.

H2: Are demographic factors a function of financial independence and total debt?

The results showed populational density as a factor of total debt, but not on financial independence, as a matter-of-fact population density showed no variation at all in financial independence. This, as Correia and Pinto (2020) said, could possibly be attributed to municipalities that have a higher revenue per capita being able to compensate their lack of population, not necessarily depending on high levels of populational density to increase their financial independence. It is then intriguing how a higher populational density could be a factor of total debt (when populational density is higher total debt is higher), but there is a possibility that this could be attributed to a higher need of municipalities to finance their populational needs through debt. Businesses p/100 habitants showed inconsistent values related to total debt, so it is not possible to determine a relation between the two. In panel B however, this variable had constant positive outputs with significance, showed that businesses p/100 habitants are a factor of financial independence, being that a municipality that has more businesses is probably more independent. University students had identical results as populational density, with the positive coefficient related to total debt and a nil coefficient related do financial independence, this could possibly be attributed to similar reasons as the pondered in populational density results.

H3: Are governance factors a function of independence and total debt?

It is imprecise to say that governance factors could be a function of financial independence and total debt, due to the inconsistent values presented. Although the values presented in figure 8

indicated a possible relation in terms of financial independence and total debt, these weren't totally confirmed by the regressions. In panel A the variable presented a negative value (which would indicate that the less percentage of the winning party the more debt the municipality would probably acquire), but the results showed no significance and the results changed signs when the regression was done with fixed effects, so it is not possible to confirm that this variable is a factor of total debt. The variable showed similar coefficient results in panel B, with smaller coefficients, so it is not possible to consider this variable as a factor (it is not a good predictor).

H4: Are environmental and safety factors a function of financial independence and total debt?

In panel A the results for both environmental variables were similar to winning's party share, having negative coefficients that turn positive when the regression is done with fixed effects, always with no significance, therefore, it is no possible to assume environmental and safety factors as a function of total debt. In panel B the results were different, showing consistent positive values with significance. It is the possibly to say that environmental and safety factors are a function of financial independence. When environmental expenses increase there seems to be an increasing in financial independence. This result could possibly have two explanations, it is possible that financial independent municipalities having a more stable financial picture, choose to invest in environment factors, but it is also possible that municipalities that invest in the environment propitiate other conditions that could indirectly influence financial independence, therefore this relation. Crimes p/1000 habitants also showed a positive relation, meaning that when crime is higher financial independence is also higher. As counterintuitive as this may seem, it is possible that this has to do with social factors, such as the escaping from the interior (usually not independent municipalities) to littoral areas (usually independent) could lead to an unbalance in unemployment and an increasing in criminality in these areas. Therefore, this relation shows that if a municipality has an increase in financial independence, it is possible that there would be an increase in crime, being a factor that should be monitored so that this effect does not occur.

5. Conclusions

This study highlights the change in paradigm related to KPIs. Organizations are now much more focused on non-financial KPIs which was not the case years ago. Factors like sustainability or environmental causes are bow being considered. Although this should also be applied to municipalities, they still lack these factors in their performance assessment.

As a matter of fact, Portuguese municipalities have been lacking good financial performances over the years which therefore could be reflected in a not so good development, therefore tending

to lose population to urban areas which are better developed and have better performances, and by losing population, also losing revenue, in a cycle that is hard to break. Adding to this, Portuguese municipalities had a hard time in the past managing their debt, which was not sustainable long term until the central government took measures to control their debt (by imposing new metrics and limits). Despite that recovery, the Portuguese municipalities still face a lot of difficulties being independent, with most municipalities not being able to achieve the 50% of financial independence necessary to achieve a good level of financial sustainability.

The results showed that taxes are the primal indicator for both total debt and financial independence. Although there might seem feasible to think that the more revenue, the less debt the municipalities would incur, there seems to be an effect where municipalities with higher financial independence seem prone to acquire more debt, especially due to the limitations being at higher amounts of debt. Despite being the bigger factor, the coefficient was reduced when using fixed effects which may indicate that if heterogeneity is removed from municipalities, the weight of taxes in financial performance may be reduced. Population density was shown to be a factor of total debt but not on financial independence, being that most likely municipalities with more population need to incur in more expenses to accommodate their needs. The model showed however that, contrary to what was previously thought, populational density on itself is not a factor of financial independence. Universities had similar results to populational density.

Businesses also were shown to be a factor of financial independence, with the more businesses p/100 habitants a municipality has, the more likely it is to have more financial independence. This goes according to Correia & Pinto (2020) who estimated that the real factor could not be the population itself but the ability to obtain higher revenues with smaller populations that could make the difference, as seen in Algarve, which has more businesses per 100 inhabitants that other municipalities.

It is not possible to relate environmental and safety factors to total debt, however, these factors have importance in financial independence. Municipalities with higher environmental expenses are more likely to be more independent, this shows the importance that the environment can possibly have in life quality of the inhabitants of municipalities, as well as the preoccupation of municipalities to spend more in environmental causes. Crimes, on contrary to what would be preferable for municipalities, show that the more crimes a municipality has, the more likely it is to be financial independent.

This does not necessarily mean that crimes on itself have an effect on financial independence, but rather, that financial independent municipalities may be more prone to criminality, which is an alarming factor that should be studied deeply and considered in the municipality's performance, as a preventive way to control crime while increasing financial performance.

The variable chosen to represent governance was not a good estimator, and therefore it is not possible to take conclusions from this variable. Despite this, the numbers presented when non-majority and majority municipalities are intriguing and deserve to be studied in a deeply manner.

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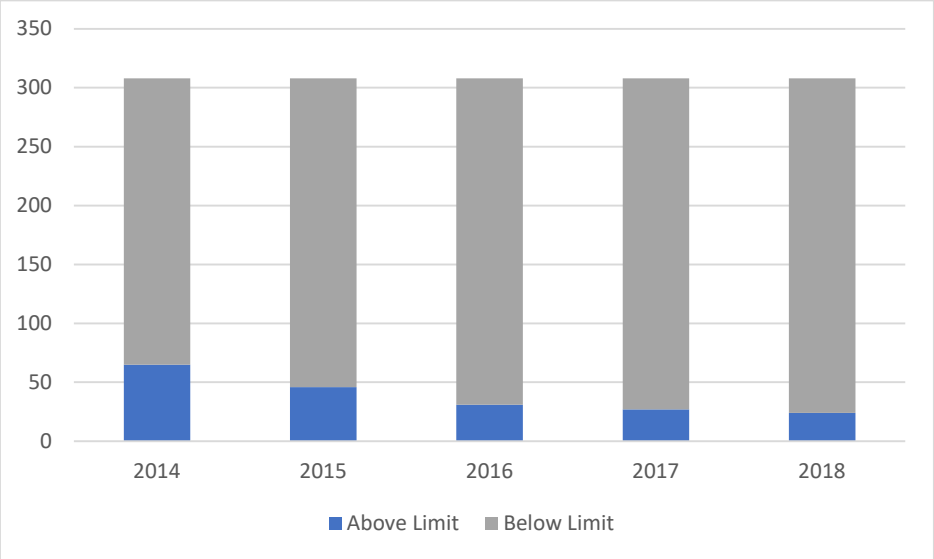
Annexes

Annex 1

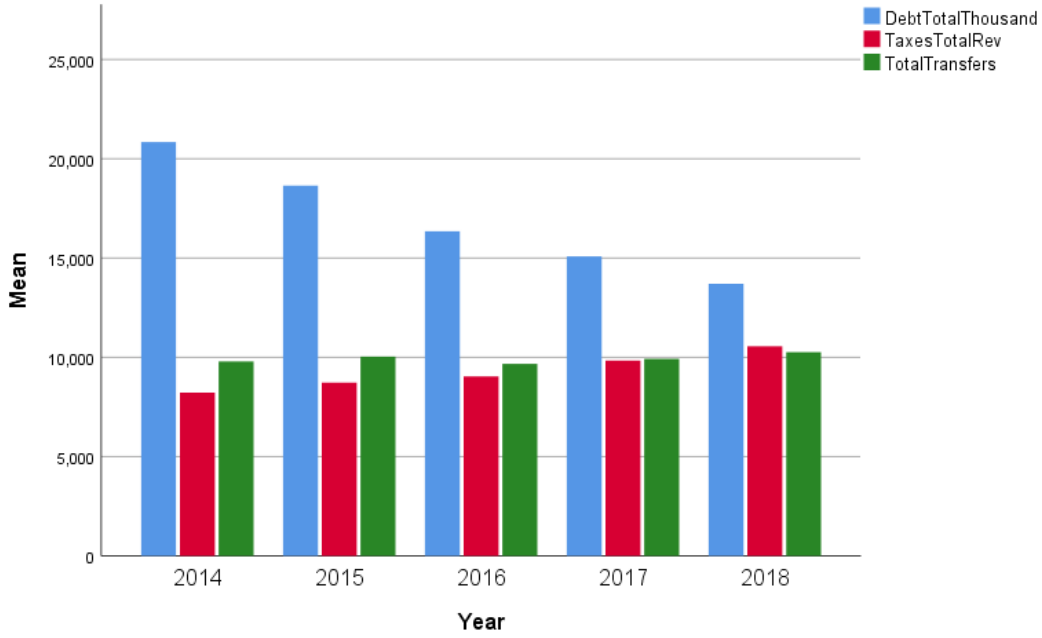
Number of municipalities above and below of debt limit (2014-2018)



Source: Own elaboration with data from www.pordata.pt

Annex 2

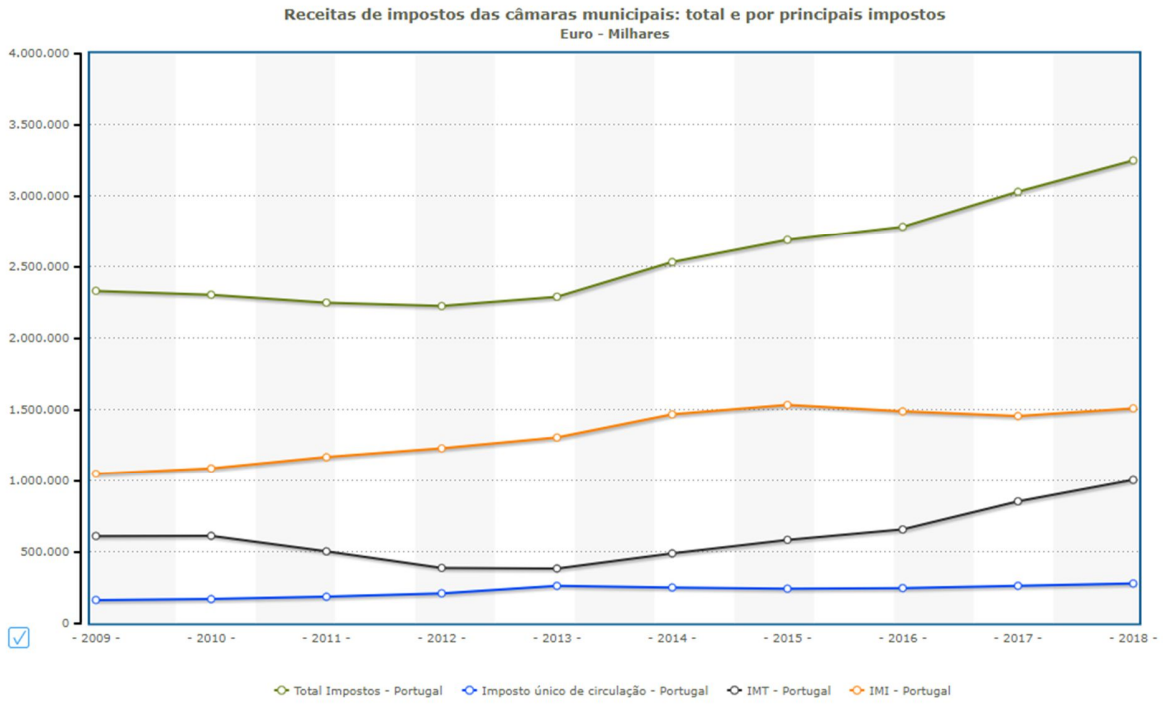
Comparison between Average Debt, Average Taxes Revenue, and Average Transfers (2014-2018)



Source: Own elaboration with data from www.pordata.pt

Annex 3

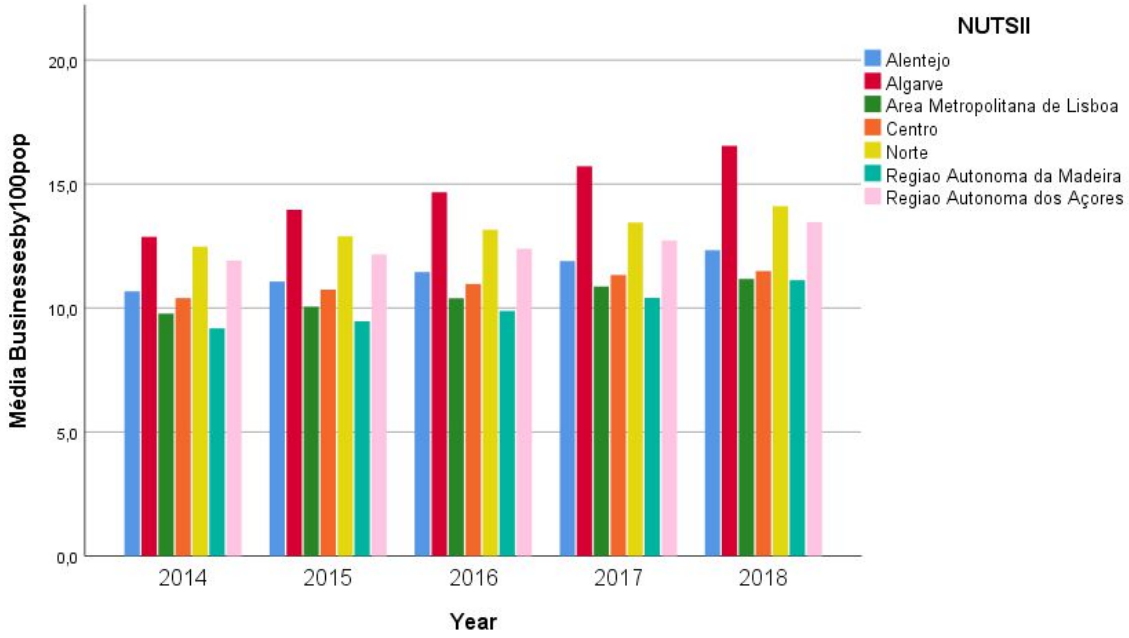
Municipalities total expenses 2009-2018



Source: www.pordata.pt

Annex 4

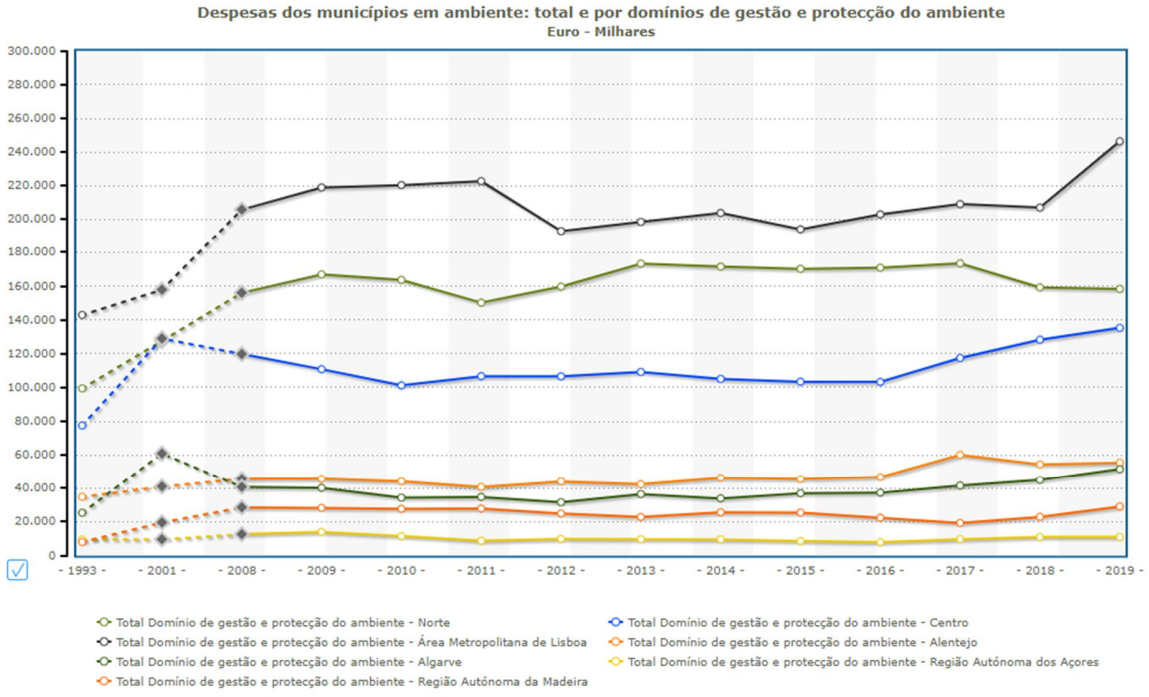
Average of Businesses by 100 inhabitants by Nuts II in the years of 2014-2018



Source: Own elaboration with data from www.pordata.pt

Anexo 5

Municipalities total environmental expenses (1993-2019)



Source: www.pordata.pt

Annex 6

Descriptive Statistics - Panel A of data which analysis Total Debt as dependent variable in the years of 2014-2018

Variables	Description	Mean (Std dev)	Min	Max	Units
Dependent Variable					
Total Debt	It is the total debt of the municipalities in a determined year and the principal measurement of debt in the municipalities. This value cannot exceed 1.5 the average of liquid revenue in the 3 prior years.	16,922.654 (18.723)	0.000	708,012.86	10^3 €
Independent Variables					
Tax Revenue					
Total *Taxes*	It is the percentage of taxes revenue in the total revenue. This includes IMT (Tax over property's transactions), IMI (Tax over properties) and IUC (Circulation tax).	23.324 (15.670)	1.200	75.700	Percentage
Demographics					
Populational Density	It is given by the average of population p/km^2 in a municipality. The population is given by an average of population in that municipality in that year.	291.921 (797.079)	4.000	7,604.400	Ratio
Business p/100 Inhabitants	These are only the non-financial businesses in a municipality per 100 inhabitants.	11.926 (3.191)	6.200	25.500	Ratio
University Students	These are students of the municipality that are enrolled either in a university or polytechnic not necessarily in that municipality.	1,170.75 (7,650.487)	0.000	116,676	
Governance					
Winning Party's Share	It is the vote share that allowed the Party to be elected. Shares above 50% are considered majorities.	51.064 (9.413)	26.800	83.100	Percentage
Environmental					
Environmental Expenses	It is the percentage of the total expenses that goes to the environmental expenses. These can include expenses with municipality water, energy, environment protection, waste or land management.	7.122 (4.017)	0.200	63.700	Percentage
Safety					
Crimes p/1,000 Inhabitants	These are registered crimes by the police per 1000 inhabitants. It includes all types of crimes such as domestic violence or stealing among others.	27.761 (9.984)	0.000	85.700	Ratio

Note: The data are downloaded from Pordata (www.pordata.pt).

Annex 7

Descriptive Statistics - Panel B which analysis Financial Independence as dependent variable in the years of 2009-2018

Variables	Description	Mean (Std dev)	Min	Max	Units
Dependent Variable					
Financial Independence	It is the ratio between own revenue and the total revenue of the municipality. If a municipality has a ratio of 50 or above it is considered independent. This ratio allows to measure the need that the municipality has of state transfers, or if this municipality is in part self-sufficient.	38.211 (18.723)	1.100	100.000	Percentage
Independent Variables					
Tax Revenue					
Total Taxes	It is the percentage of taxes revenue in the total revenue. This includes IMT (Tax over property's transactions), IMI (Tax over properties) and IUC (Circulation tax).	20.971 (15.174)	0.000	75.700	Percentage
Demographics					
Populational Density	It is given by the average of population p/km2 in a municipality. The population is given by an average of population in that municipality in that year.	294.965 (808.623)	4.000	7,604.400	Ratio
Business p/100 Inhabitants	These are only the non-financial businesses in a municipality per 100 inhabitants.	10.973 (2.924)	4.500	25.500	Ratio
University Students	These are students of the municipality that are enrolled either in a university or polytechnic not necessarily in that municipality.	1,206.86 (7,812.700)	0.000	123,444	
Governance					
Winning Party's Share	It is the vote share that allowed the Party to be elected. Shares above 50% are considered majorities.	51.878 (9.121)	26.800	83.100	Percentage
Environmental					
Environmental Expenses	It is the percentage of the total expenses that goes to the environmental expenses. These can include expenses with municipality water, energy, environment protection, waste or land management.	6.594 (4.162)	0.000	63.700	Percentage
Safety					
Crimes p/1,000 Inhabitants	These are registered crimes by the police per 1000 inhabitants. It includes all types of crimes such as domestic violence or stealing among others.	29.956 (11.100)	0.000	123.100	Ratio

Note: The data are downloaded from Pordata (www.pordata.pt).