Universidade Europeia

FINANCIAL MANAGEMENT IN MUNICIPALITIES: EMPIRICAL EVIDENCE IN PORTUGAL

By

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Thesis submitted in partial fulfillment of the requirements for

the Master degree in Business Management and Strategy

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Resumo

Com um orçamento de investimentos de 2 mil milhões de euros em 2019, os municípios são um agente económico de peso na administração pública portuguesa e ainda ganharão mais importância caso o processo de descentralização se aprofunde, como se espera ocorra nos próximos anos. A descentralização tem estado suspensa principalmente por razões políticas, mas o desempenho financeiro fraco e sucessivo e a falta de transparência colocaram dúvidas sobre a possibilidade de descentralizar. O facto de a maioria dos municípios ter mais da metade de suas receitas transferidas do orçamento do Estado coloca em causa a sua independência financeira e sustentabilidade. O presente estudo identifica os determinantes da independência financeira ou endividamento de todos os 308 municípios portugueses, representando o desempenho financeiro através dos níveis de endividamento e da independência financeira, utilizando dados em painel que vão de 2009 a 2018, originando 3.080 observações. Os resultados sugerem que a densidade populacional tem um efeito significativo no desempenho financeiro e que outros fatores se destacam, como o número de empresas e a segurança nos municípios portugueses. Os resultados sugerem que a lei promulgada em 2012 pelo Governo Central para limitar os gastos dos municípios e equilibrar as suas finanças teve um contributo decisivo para inverter a tendência de desequilíbrios financeiros que se vinha verificando. Os resultados são confirmados por testes de robustez e podem interessar os políticos e as autoridades locais, ajudando ao processo de descentralização e permitindo agir sobre os indicadores mais importantes, diminuindo a dependência de transferências do Estado para os municípios.

Palavras-chave: Descentralização, Municípios, Desempenho Financeiro, Dívida, Finanças sustentáveis

Abstract

With a total of 2 billion euros in capital expenditures as for 2019, municipalities are a prominent player in Portuguese public administration and even more so in case the decentralization process deepens, as expected in the forthcoming few years. Decentralization has been on hold mostly for political reasons, but successive weak financial performance and lack of transparency have put decentralization of powers and authority to municipalities up for debate. The fact that most municipalities have more than half of their revenue transferred from the State budget raises questions about their financial independence and sustainability. This study identifies the determinants of financial independence or indebtedness of all the 308 Portuguese municipalities, proxying financial performance through indebtedness levels and financial independence, using panel data spanning from 2009 to 2018, yielding 3,080 observations. The results suggest that population density has a significant effect on financial performance and that other factors stand out, such as the number of firms and safety. Our results suggest that the law enacted in 2012 by the Central Government to limit municipalities' expenditures and to balance their finances had a positive contribution to the reversal of financial imbalances. The empirical findings hold in robustness checks and might interest policymakers and local authorities, helping them in the decentralization and acting on the relevant indicators, decreasing the dependence of Government's transfers to the municipalities.

Keywords: Decentralization, Municipalities, Financial Performance, Debt, Sustainable Finances

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List of abbreviations, acronyms and symbols

2SLS – Two-Stage Least Squares

AML – Lisbon Metropolitan Area (Área Metropolitana de Lisbon)

AMP – Porto Metropolitan Area (Área Metropolitana do Porto)

ANMP – National Association of Portuguese Municipalities (Associação Nacional dos Municípios Portugueses)

BE – Left Bloc (Bloco de Esquerda)

BSC – Balanced Scorecard

CapEx – Capital Expenditures

CDS-PP – Christian Democratic Party – People's Party (Partido do Centro Democrático Social – Partido Popular)

CRP – Portuguese Republic Constitution (Constituição da República Portuguesa)

ESG – Environmental, Social and Governance

EU – European Union

FCM – Municipal Cohesion Fund (Fundo de Coesão Municipal)

FEF – Financial Balance Fund (Fundo de Equilíbrio Financeiro)

FSM – Municipal Social Fund (Fundo Social Municipal)

IMI – Tax levied on owners of real estate properties (Imposto Municipal sobre Imóveis)

IMT – Tax levied on real estate transactions (Imposto Municipal sobre Transações)

INE – National Statistical Institute (Instituto Nacional de Estatística)

IRC – Corporate tax (Imposto Sobre o Rendimento das Pessoas Coletivas)

IUC – Tax levied on vehicle owners (Imposto Único de Circulação)

KPIs - Key Performance Indicators

LCPA – Law of Commitments and Late Payments (Lei dos Compromissos e dos Pagamentos em Atraso)

LOE – State Budget Law (Lei do Orçamento do Estado)

LPD – Late Payments Directive

NUTS – Hierarchical Division of Portuguese territory by subregions for statistical purposes (Nomenclatura das Unidades Territoriais para Fins Estatísticos)

OECD - Organization for Economic Co-operation and Development

OLS – Ordinary Least Squares

P&L – Profit and Loss (Statement)

PCP-PEV – Portuguese Communist Party – Green Ecologist Party also known as Unitary Democratic Coalition (Partido Comunista Português – Partido Ecologista os Verdes also known as CDU – Coligação Democrática Unitária)

POCAL – Official Accounting Plan of Local Municipalities (Plano Oficial de Contabilidade das Autarquias Locais)

POCP – Official Plan of Public Accounting (Plano Oficial de Contabilidade Pública)

PS – Socialist Party (Partido Socialista)

PSD – Social Democratic Party (Partido Social Democrata)

SMART – Small, Measurable, Achievable, Relevant, Time-based

SNC-AP – Normalized Accounting System to Public Administrations (Sistema de Normalização Contabilística para Administrações Públicas)

SPSS – Statistical Package for the Social Sciences

1. Introduction

Decentralization of state powers, which has been occurring in the last few decades and which is expected to deepen, has put municipalities under the spotlight around the world (Coll, Prior and Tortosa-Ausina, 2010; Boetti, Piacenza and Turati, 2012; Psycharis, Zoi and Iliopoulou, 2016). In Portugal, municipalities were employing a total of 128,094 workers in 2018 (2.5% of the active population) and a total of 134,430 workers in 2019 (2.6% of the active population in that year), representing an increase of 4.9% in the workforce (www.pordata.pt). The Portuguese news agency Lusa documents that more 19,792 workers joined the public administration in Portugal in 2020, reinforcing the role of municipalities as a major employer in the country. Concomitantly, municipalities assumed more responsibilities. The increasing headcount and central power reshuffling call for ensuring municipalities' sustainability (Lusa, 2021).

Apart from being an important employer, and even more so as more powers are transferred to the local level, municipalities also play other important roles in the economy, with a very significant amount of capital expenditures (a total of 2 billion euros in CapEx in 2019 according to www.pordata.pt). This calls for stricter financial planning against the backdrop of historically high indebtedness levels in a large number of municipalities, no longer allowed by the central government. The Portuguese central government has put in place in the last few decades a program for municipalities to reduce their indebtedness. If they do not achieve specific goals, they are not allowed to engage in new investments and so municipalities have an incentive to reduce their leverage and become financially sustainable. Appropriate levels of debt are necessary to ensure that municipalities do not go through financial distress (Maher and Gorina 2017) and ensure the well-being of citizens at the expense of their taxable income without limiting the ability of future generations to satisfy their needs (Sinervo, 2020).

A measure of financial sustainability is total debt from the liability side of the balance sheet as compared to total assets, but also profit & loss (P&L) revenues and expenses, from which financial costs feature a large part. Nevertheless, it seems that local politicians might still lack putting sustainability on their agendas (Garmini and Grossi, 2018; Sinervo, 2020).

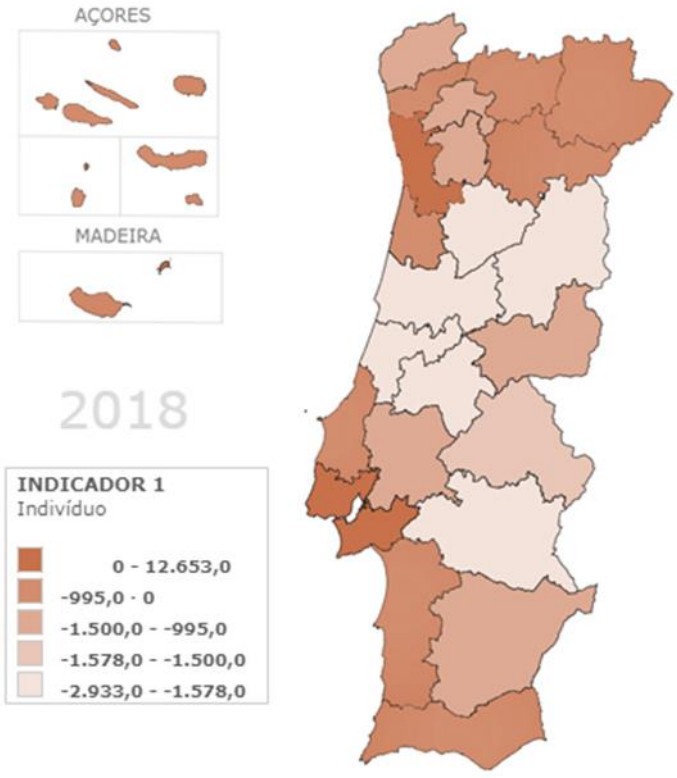
There is marked heterogeneity in Portuguese municipalities. Namely, municipalities in the inner lands have fewer resources, are less populated, and therefore appropriate less own revenue as compared to urban and coastal areas, needing more transfers from the State (so, interior municipalities are less independent, according to data from www.pordata.pt and Fernandes, Camões and Jorge (2019)). In Portugal, we witness differences between coastal and non-coastal

areas, as well as north versus south, as depicted in Figure 1. The migration of population to urban areas is a historic trend. As better urbanistic infrastructures lead to centralization, major cities attract population from non-urban areas, concentrating the population in urban centers (Letelier, 2005). We observe the phenomenon in the Metropolitan Area of Lisbon (AML) and the Metropolitan Area of Porto (AMP). This heterogeneity is represented in Annex 1, which shows a high concentration of population in the littoral, and especially in the urban areas of Lisbon and Porto (AML and AMP). Inland areas have been losing inhabitants.

The heterogeneity of the Portuguese municipalities cannot be dismissed. This discrepancy is striking when analyzing the median of purchasing power in euros per inhabitant, being this value 219 euros in littoral areas, 93.4 euros in interior areas, and 38.1 euros in the islands of Azores and Madeira (Correia and Catarino, 2016).

Figure 1

Population balance by region (NUTS III)



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

It is possible to quickly understand that once again AML and AMP are the only regions able to have good indicators, being the only regions able to attract and keep population, as the interior loses population at a higher rate than the coastal areas[1].

Historically municipalities had few delegated responsibilities. Therefore, the need to achieve sound financial ratios was not very demanding, with transfers from the State making up most of the municipalities' income to service their needs.

Since the end of Portuguese dictatorship regime (Estado Novo), where the power was centralized due to political reasons (Sousa, 2012) the landscape has changed, and we witnessed a stronger movement toward decentralization. A sign of this is the Decree-Law nº. 57/2019 of 30 of April, which delegates by law parishes' competencies, revoking the old law in place which only contemplated an agreement of competencies between municipalities and parishes (Ribeiro, 2021)[2].

Municipalities are year by year taking more responsibilities such as transportation, schools, security, among others. This raises the concern of municipalities being able to achieve a sound financial performance, since without it the municipalities are not able to perform well in servicing their responsibilities, needing more transfers from the State Budget. On the other hand, since there is a heterogeneous distribution, some municipalities lag urbanistic infrastructures and tend to lose population (Letelier, 2005), which may lead to a loss of own revenue and financial imbalances (Veiga, Tavares, Caballo-Cruz, Veiga and Camões, 2015).

Therefore, municipalities are required to conduct robust financial planning, which has been problematic, as historically they have accumulated high levels of debt hindering their performance and the ability to deliver their delegated powers. As a result, the central government has put in place measures to control leverage, but the response to this control was heterogeneous. Several municipalities were in a difficult debt position until the year 2012 when the Law of Commitments and Late Payments (LCPA - Lei dos Compromissos e dos Pagamentos em Atraso) was enacted to reduce municipal debt, shortening payments due dates, and establishing limits to expenses (Marques, 2016).

[1] In the preliminary results from the 2021 Census (available at www.ine.pt) the region of Algarve and the municipalities of Odemira and Braga showed a significant increase in population, which might call for future research.

[2] António Ribeiro published in 2021 an encompassing book catering to the Portuguese Local governing bodies. Across more than 700 pages the author provides statistics and insights on diversified topics spanning constructs, legal underpinnings, statistics and accepted understanding, alongside a hefty number of references including websites and digital bibliography. The book was published when the present study was already penned up but helped redraft some parts to accommodate state-of-the-art knowledge shared by the author, an academic and specialist on Public Management seating on the Board of the Portuguese Municipalities Association.

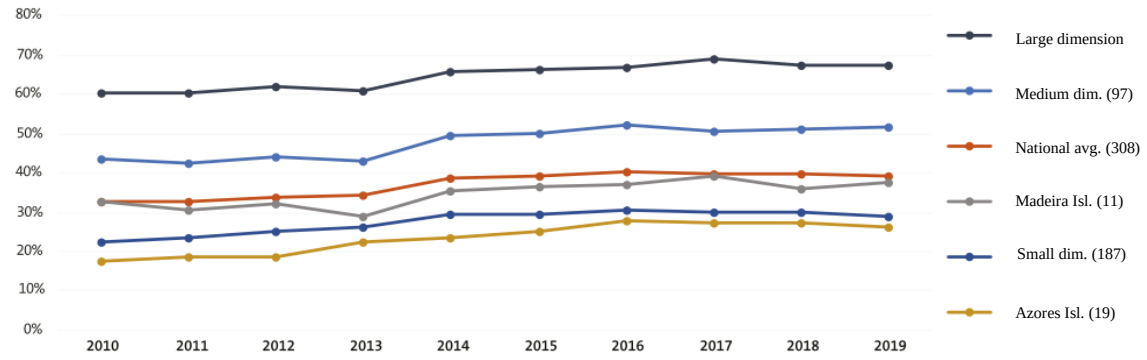
Statistics on municipalities' debt have been made available at Pordata (www.pordata.pt) or by National Statistical Institute (INE - Instituto Nacional de Estatística) (www.ine.pt). Building on the said statistics the analyses on the determinants of financial independence or indebtedness may interest policymakers and local authorities in ensuring that municipalities strive to attain better convergence to sustainable finances. It is worth noting that municipalities are accountable to the central government and that public accountability is at the crux of modern democratic governance acting as a complement of public management (Bovens, 2003).

Our study will focus on unveiling the determinants of indebtedness and financial independence, on the back of enactment of the Local Finances Law (LFL nº. 73/3013 of 3 September). Findings will help municipalities identify factors to monitor the sustainability of their finances. To our knowledge, this is the first study to do so for all Portuguese municipalities using a predictive model and a long period of time.

We begin by analyzing municipalities' historical performance. Figure 2 depicts a growing trend toward better financial independence, as measured by own-generated revenues divided by total revenues.

Figure 2

Evolution of financial independence in Portuguese municipalities (2010-2019) by dimension group



Source: Fernandes, Camões and Jorge (2019).

The financial independence indicator is divided into 6 groups: Large Dimension municipalities (over 100,000 inhabitants), Medium Dimension (between 20,000 and 100,000 inhabitants), Small Dimension (less than 20,000 inhabitants), National Average, and Madeira and Azores Islands separately. Large municipalities (black line) were already considered on average as independent, but they still managed to increase the balance between own revenue and outside

transfers. Medium dimension municipalities (blue line) witnessed a significant recovery and are close to a 50% average of financial independence which is a sound indicator. Small dimension municipalities (dark blue line), as mentioned before, seem to be struggling and not being able to increase their percentage of independence in a significant amount. The national average (orange line) increased in 2014, stabilizing since then without significant oscillations, which can possibly be due to the implementation of LCPA, as well as the settling of new debt limits (Marques, 2016).

The main goal of our study is to unveil indicators that can help explain municipalities' financial sustainability, deploying variables pertaining to a number of factors apart from the most evident which are taxes. Total Debt and Financial Independence are the dependent variables. The Independent variables include Total Taxes (to cater to the effect of tax revenue); Population Density, Businesses p/100 inhabitants and University Students (pertaining to the effect of demographics); Winning Party's Share (which intends to capture the effect of governance) and Environmental Expenses and Crimes p/100 Inhabitants (which intend to analyze the effect of environmental factors and safety factors). The collected data will help further other studies on Portuguese municipalities. Some of these variables tend to be studied singularly related to the main indicators in extant studies (as, for example, Jacob and Hendrick (2013); Pinto (2014); Guedes (2015); Correia and Catarino (2016); Correia and Pinto (2020)), but in this study, we will try to make sense of their effects when together in an encompassing linear regression model. Runs with fixed effects at the municipality level will help capture non-observable effects (Greene, 2020).

The results showed that the amount of taxes is not the most significant predictor of municipalities' total debt and financial independence, rather, population density has the highest effect on financial independence and total debt. Demographic factors also play an important role.

In the second chapter, we analyze factors to monitor performance, that can lead to an improvement in the decision-making process if monitored (Kaplan and Norton, 1992). It is also important to understand what the landscape of municipalities is worldwide; it is relevant to understand if they face the same problems as the Portuguese municipalities and what kind of tools are they using to access performance. Following that, we will need to study and describe the paradigm of Portuguese municipalities. The third chapter review is specially focused on indicators related to several crucial factors that describe municipalities, and for the full period

under analysis. The fourth chapter lays down this study's approach (methodology)- we use a quantitative methodology which allows us to relate the two dependent variables with key independent variables to enter in a predictive, regression models - we use fixed effects and run Two-Stage Least Squares (2SLS) accounting for endogeneity. The econometric setup caters to the precision of the results that are presented in the fifth chapter. The sixth chapter presents the conclusions, summarizing the findings and contributions, as well as avenues for future research.

2. Motives for Municipalities' Financial Independence

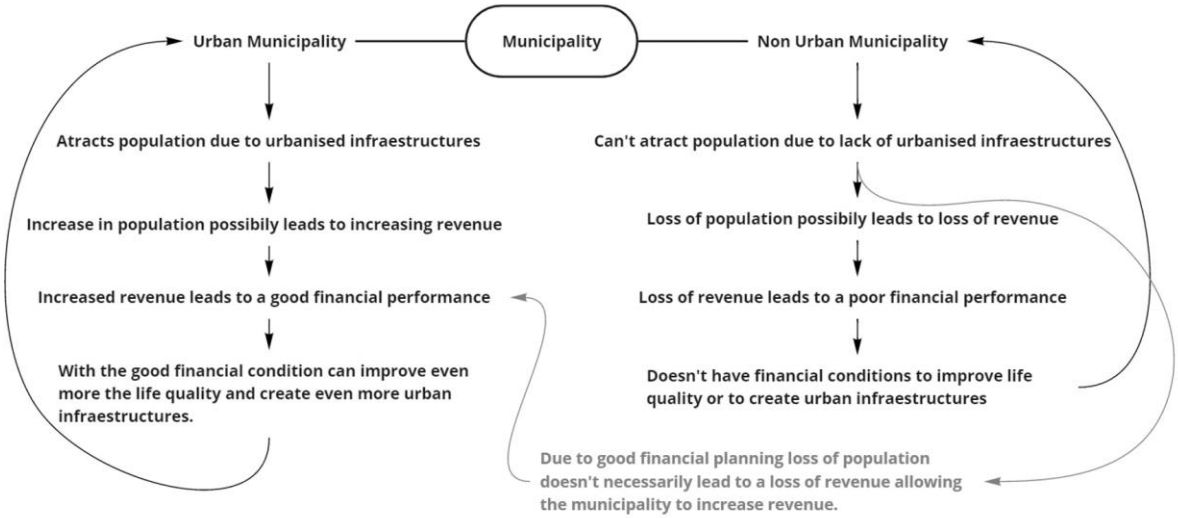
Public financial performance has been under the spotlight for a number of decades around the globe. Still much has to be done. In Portugal, only 95 (30,8%) municipalities achieved financial independence in 2018 (www.pordata.pt).

Municipalities have to cater to their inhabitants' needs, develop their territory and retain population in order to be relevant and fulfill their role. This goal is even more topical since there is a historical difficulty for municipalities to manage their finances, keeping debt levels in a tolerance zone, matching their revenues. Municipalities have the possibility to tap debt and in the past, there seems to be a disconnect between servicing debt and generating revenues. To promote intergenerational equity municipalities should finance themselves through debt only for investments that generate superior utilities than the service of the said debt (Ribeiro, 2021).

The study will enter indicators pertaining to all the Portuguese municipalities, in one single predictive model, unlike other studies. First, we describe the landscape of Portuguese municipalities which are heterogeneous in a number of dimensions. For example, in terms of demography, non-littoral municipalities face more difficulties to attract population and therefore appropriate lower tax revenues. By acting on the determinants of financial independence and implementing goal-oriented policies and incentives, it is possible for non-coastal territories to close the gap with the littoral municipalities, mitigating the cycle of centralization in urban areas (Letelier, 2005) which is depicted in Figure 3 below.

Figure 3

Diagram of municipality landscape in Portugal –Urban/Non-Urban territories' financial cycles



Source: Own elaboration.

Figure 3 motivates this study by depicting how municipalities can revert the lack of population trend via good financial performance, therefore being able to allocate capital expenditures to developing urbanistic infrastructures and adjust a less beneficial demographic cycle (grey line).

This study also intends to contribute to municipalities studies with a large database that consists of a large number of variables[3], therefore, being possible to use this database in other studies, furthering the understanding of Portuguese municipalities performance along with a number of dimensions, namely public finances, sustainability, governance, as well as ethics and transparency. As far as our knowledge goes, this is the first time that the study of the Portuguese municipalities is conducted based on a predictive model especially, including not only financial or demographic variables but also governance, environmental, or security proxies. These factors tend to be studied alone and not in a group of variables to explain what causes the variability of debt and financial independence[4].

[3] Aging Index, Schools (Universities not included), Retention Rates, Habitational Value, Purchase Power per Capita, Turism Businesses, among others.

[4] Other studies have been conducted catering to other jurisdictions and catering to specific factors, as for example, (Jacob and Hendrick, 2013; Correia and Catarino, 2016; Wayenberg, Kuhlmann, 2017; Gray and Barford, 2018; Guga 2018; Muda, Harahap, Erlina, Inting, Maksum and Abubakar, 2018; Dewi, Azam and Yusoff, 2019; Andrews, Ferry, Skelcher, Wegorowski, 2019; Carrilo, Rubio, Galera and Miranda, 2020; Correia and Pinto, 2020)

The predictive model might also lead to a selection of Key Performance Indicators (KPIs) for municipalities to build a future Balanced Scorecard (BSC) that can help them monitor their performance, although the scorecard *per se* is not the focus of the present study[5].

2.1. Local Government Information

As well as businesses, local entities also look for indicators that can help achieve a better performance. Local entities differ from private organizations in a lot of aspects, but they are also required to have good financial performance. As an example, municipalities cannot acquire more debt if they do not have good indicators in the past three years (total debt can't surpass 1.5 times the average of liquid current revenue from the past 3 years, according to art 52º of Law 73/2013). This creates a necessity for municipalities to either control their debt, or to increase their revenue to increase their debt limits.

Decentralization has been on the verge of happening, but for this to happen municipalities need to be self-sufficient. For that to happen municipalities need to look for an increase in performance in their finances, or they won't be able to provide good conditions to their inhabitants without the help from the Government.

If the municipality enters in a situation in which he has a total debt superior at 31 of December of each year to three times the average of liquid current revenue from the past 3 years, they are considered in a position of financial break, by the Law 73/2013. A revision of this Law by the Law 51/2018 left an empty space in the law that does not foresee any mechanism that can be activated in case municipalities reach this limit (Ribeiro, 2021). It is advisable that municipalities conduct stable financial budgets and spendings in order to avoid these types of situations, and also, to assure generational equity.

Some of these are motives that lead municipalities to look for better performances. Although theorized that non-profit organizations do not have incentives to seek their maximum profitability, growing competition for donors, foundations, or government funding has raised the question of performance in local public entities, as ever before (Kowalczyk, 2017).

These key indicators should be used by the Board to manage the business (PwC, 2007), or in this case, by the party in power. But the indicators we measure may be changing. As a matter

[5] According to Heery and Noon (2008) KPIs are defined as a measure of achievement, based on SMART principles (Small, Measurable, Achievable, Relevant, Time-based), 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. These principles can be applied under the perspective of value-based management (Ittner, and Larcker, 2001).

of fact, a recent CMO survey (Delloite, Fuke Fuqua and American Marketing Association, 2021) in the U.S. has found that significant changes occurred during the pandemic. In terms of customer interaction, there was a shift to the increased value of digital experiences, as well as companies trying to do "good". Companies and public entities have to set new indicators 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 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 indicators 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 an assessment of hidden performance problems (Pidun and Felden, 2011).

Most studies emphasize the importance of implementing good indicators for improving performance (Badawy, El-Aziz, Idress, Hefny, and Hossam, 2016), sometimes even creating algorithms capable of obtaining better results than traditional applications (Kaganski, Majak, Karjust, and Toompalu, 2017), being a transversal topic that can be applied to a wide range of areas such as SME (Pirlog and Balint, 2016), suppliers (Bai and Sarkis, 2014), industry (Lindberg, Tan, Yan, and Starfelt, 2015), healthcare (Iljashenko, Bagaeva and Levina, 2019) or corporate finance (Strelnik, Usanova and Khairullin, 2015). Kaplan and McMillan (2021) note that the indicators used 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. There is increased use of non-financial indicators (Monea and Guță, 2011).

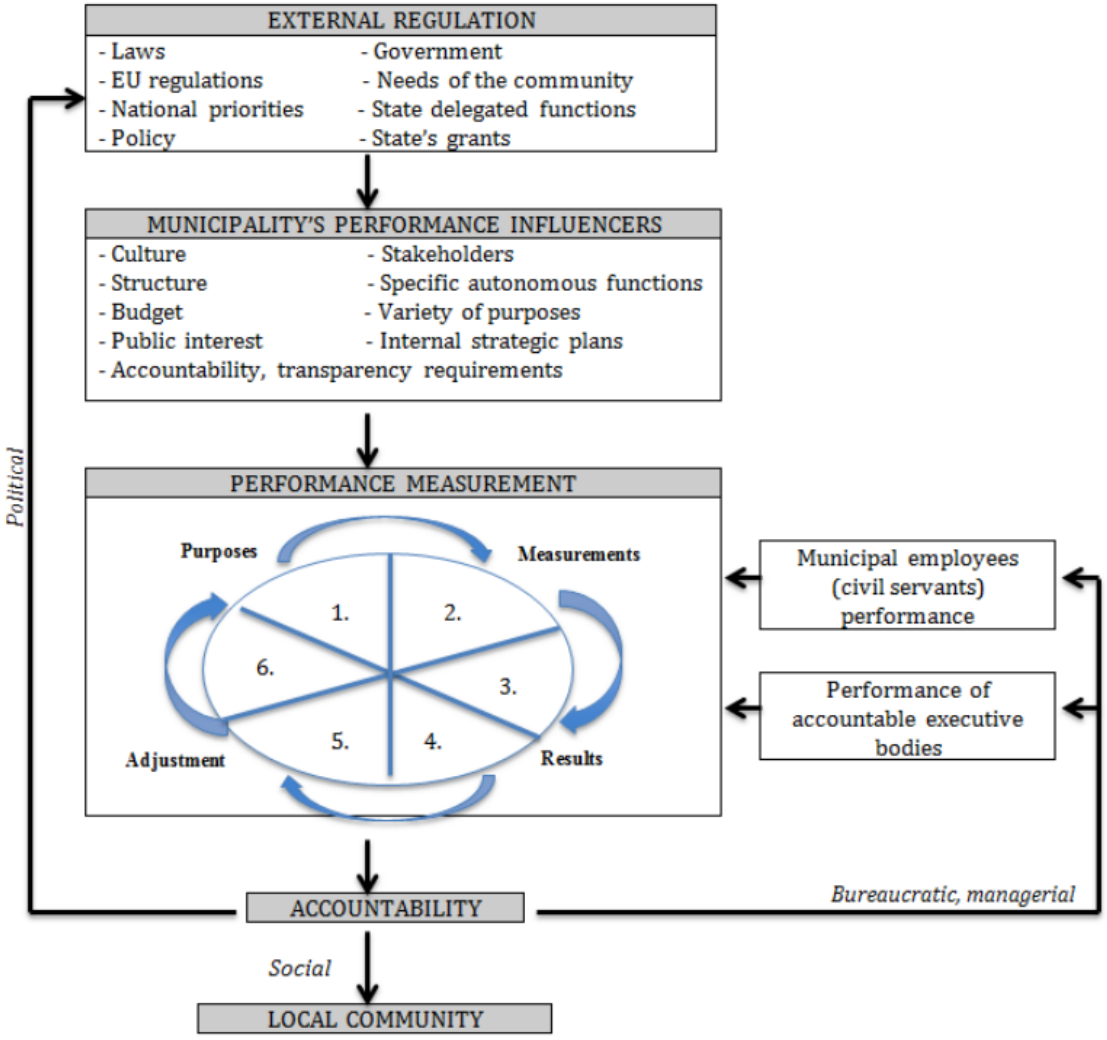
As a suggestion to measuring performance in municipalities after defining their best indicators, it is possible to implement a BSC, that has been shown as an important tool to measure performance (Sousa, 2014; Burtseva and Chausow, 2016; Agarwal, 2020). The BSC includes indicators defined by the company in a fast but comprehensive view. It can be viewed as an instrument that links performance measures (Kaplan and Norton, 1992). Despite the BSC being

an important tool, a study conducted by Roussas and McCaskill (2015), showed that although most people are aware of the BSC, most of them also do not use it in their work

It is worth noting that municipalities have a vested public interest, a feature not present in private profit organizations. The local government is poised to cater to the public interest and improve the well-being of future generations. Therefore, some indicators may not always reflect the performance of municipalities in areas like needs or satisfaction (Kloviene and Valanciene, 2013). Their performance measurement is therefore affected by a different and complex ecosystem as shown in Figure 4.

Figure 4

Diagram of factors that affect municipalities' performance measurement



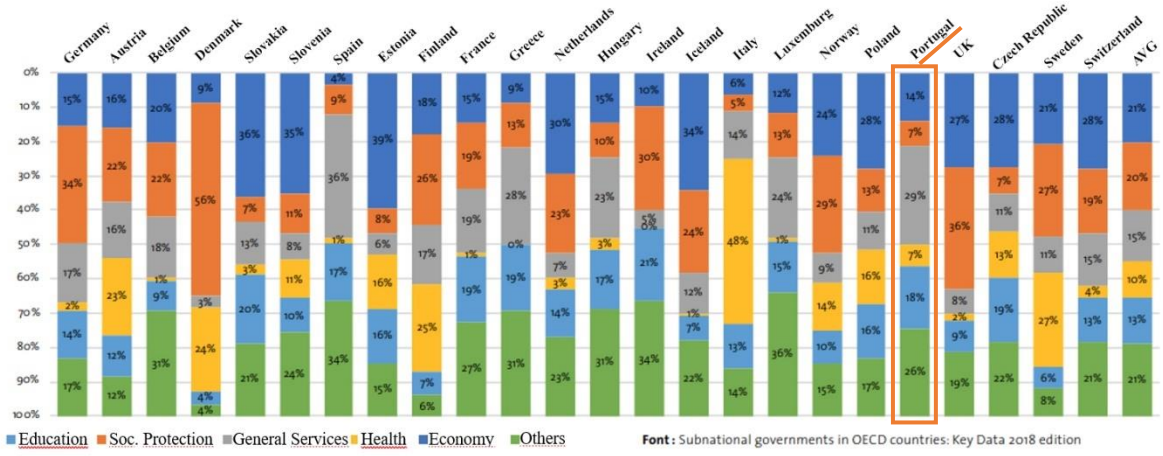
Source: Klovein and Valanciene (2013).

Figure 4 shows that municipalities are susceptible to political, bureaucratical, and social forces more directly than companies do. They are regulated by a large number of entities and are influenced by an array of factors, such as culture, public interest, factors that may not enter when measuring the performance of profit, private entities. They are also more susceptible to political, bureaucratic, 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) posits that indicators 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. This is shown in the figure below.

Figure 5

Share of municipalities' expenses across 24 European countries



Source: Fernandes et al. (2019).

Figure 5 (Which was originally sorted alphabetically by the Portuguese names of these countries) shows that some local governments have a very high percentage of expenses in social protection in cries as Denmark or the United Kingdom. On the other hand, Italy, Portugal, Slovakia, and the Czech Republic spend a small amount on social protection. Italy for example spends 48% on healthcare, a value higher than in any other country. This suggests that the footprint and priorities of local power vary across countries, which increases the difficulty in researching factors that could be widely accepted (Wolman, 2008). In our study, we focus on Portugal, on one hand, because it is our geography of interest and, on the other hand, to avoid

confounding effects of jurisdictions in different maturity stages of centralization versus decentralization.

Kloviene and Valanciene (2013) also find it difficult to deploy factors that could be widely accepted. Despite that, they were able to suggest 10 important components to include in a predictive study of local governments, namely the variety of objectives, competition, public interest, organization structure, management, and regulatory aspects, data validation, participants/staff, culture, leadership, and learning, described in Annex 2. Our study also deploys a number of different dimensions to analyze the subject at hand.

Another factor that is changing performance measurement is digitalization. Digitalization is not a recent topic in municipalities, a study made by Holzer and Manoharan (2011) suggests that municipalities should identify benchmarks in their regions (the study was focused on municipalities websites), so that they could have a good performance in digital terms, in this study, we suggest that municipalities' website should ensure privacy/security, services, and citizen and social engagement. It also noted the gap in e-governance between Organization for Economic Co-operation and Development (OECD) and non-OECD municipalities. Digitalization might also improve public accountability, a must-have in democratic governing bodies (Ribeiro, 2021).

There is also the issue of sustainability, which in Portugal is mentioned in Article 11º of the Budget Framework Law (Ribeiro, 2021). Not only have profit organizations a new task to be sustainable, but municipalities also face this challenge, which can be even more demanding as they have unavoidable responsibilities toward their local communities, namely by contributing to uplift the poor and the vulnerable, a goal that is not new but is still lagging implementation in large parts of the territory, especially inland areas (United Nations, 2013).

2.2. Portuguese Municipalities

Until de 1970s Portuguese municipalities played a minor role in the country, as the dictatorship regime adopted a highly centralized governing model. The inception of democracy brought about a vertical separation of powers (Sousa, 2012), as opposed to the ancient regime in the previous 40 years. In fact, article 6(1) of the Portuguese Republic Constitution (CRP in the Portuguese acronym) stipulates that the "State is unitarian (…) and respects the principles of subsidiarity and autonomy of municipalities and the democratic decentralization of public administration". This represents a major shift in ascribing more responsibilities to local governing bodies and the trend is still apparent - see for example recent news in Expresso from

the Portuguese Prime Minister, where he talks about deepening decentralization in 2024, after a careful analysis to be done in 2023 (Diário de Notícias and Lusa, 2021). This brings even more importance to this topic since understanding the performance and factors of the municipalities' financial independence and total debt will be crucial to advance with decentralization.

There is, indeed, an inescapable trend for decentralization in Portugal and also in some other European jurisdictions (Catarino and Abraham, 2018). However, it is a process that has been debated over a long period of time, as it appears that the Portuguese municipalities might not yet be able to be financially self-sufficient or sustainable. Poor management has been pointed out as a hindrance to sustainable finances (Cucciniello, Porumbescu, and Grimmelikhuijsen, 2016). For example, the government threatens to take away responsibility for healthcare centers from poor managing municipalities (Kotowicz, 2019). Despite Portuguese municipalities seeming not to be prepared yet, National Municipality Association (Associação Nacional de Municípios) believes that the decentralization will facilitate the sustainable development of local communities. However, for the said shift in responsibilities to take place, municipalities need funds to match their heightened obligations (ANMP, 2020). This is denoted as fiscal federalism[6].

Municipalities should have their own financial autonomy, to allow them to "have patrimony and own financial means, which are managed by their bodies", and also "elaborate, approve or modify options of the plan, budget or other documents", "manage their patrimony", "execute tax powers that are legally attributed", "liquidate, collect and use revenue attributed", "order and process legally authorized expenses" and having "access to credit under situations provided for by law", according to article 6 of Law 73/2013.

For municipalities, it is usually hard to supply all the needs that have been transferred from the central government in the last couple of decades, as most of them lack enough revenue. the subsidiarity principle as to be applied, so that when the state ascribes a responsibility to a municipality, it also ponders on the nature and requirements for this task (Catarino, Silva, and Cristóvam, 2015).

[6] Fiscal federalism is a process intended to distribute authority, as well as the understanding of which functions and instruments are better centralized or decentralized (Oates, 1999; Rodden, 2005).

In other words, as municipalities earn more responsibilities, it is of the utmost importance to give them the means to obtain additional revenue, namely through financial decentralization and the adequate financial instruments matching their needs (Catarino, 2012).

In Portugal, this is especially done in the form of tax revenue, especially in revenue from Tax levied on real estate transactions (IMT - Imposto Municipal sobre Transações), Tax levied on owners of real estate properties (IMI - Imposto Municipal sobre Imóveis), and a portion of Tax levied on vehicle owners (IUC - Imposto Único de Circulação). Other revenue sources include "Derrama" (a limit of 1.5% of the taxable profit on Corporates (IRC - Imposto Sobre o Rendimento das Pessoas Coletivas), and several other taxes and fees related to an array of provided services[7],

It is important to note that, although the municipalities can collect fees and taxes, they are only allowed to create taxes according to the general tax regime of the local municipalities, which falls upon "utilities rendered to private entities, generated by municipalities' activities or arising from municipal investments" (article 20 of Law 73/2013) which Pinto (2014) contends is a limitation to obtaining resources. This goes contrary to what is stated by Baskaran and Feld (2013), stating that measures of fiscal decentralization that account for subnational tax autonomy should be preferred. Kioko and Zhang (2019), also found that tax and expenditure limits on local governments have a negative impact on the local government use of tax-supported debt.

The effect of fiscal federalism can be also reduced if there is collusion among the different levels of government (Shadbegian, 1999). Fiscal decentralization is also believed to mitigate corruption in presence of mechanisms that enforce this vertical decentralization (Altunbaş and Thornton, 2012).

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 better efficiency in resource allocation, promoting higher 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 as result, a higher level of tax decentralization, creating more autonomy (Catarino and Abraham, 2018).

[7] Namely revenue that comes from their share of public resources, such as the ones coming from FEF or FSM, value-added collections, revenue from fines stipulated by law, profit from participation in societies or other entities in which municipalities take part, heritage or donations given to the municipalities, own goods alienation and lending revenue especially from municipal obligations. All the revenue sources are established in article 14 of Law 73/2013.

Another source of financing from municipalities is transferred from the State budget. Articles 27 to 35 of Law 73/2013 establish these transfers, namely Financial Balance Fund (FEF - Fundo de Equilíbrio Financeiro) which uses (i) 50% of Municipal Cohesion Fund (FGM - Fundo Geral Municipal); (ii) 50% of Municipal Cohesion Fund (FCM - Fundo de Coesão Municipal)[8], the latter intending to increase municipal cohesion, correcting asymmetries and benefiting less developed municipalities, and (iii) Municipal Social Fund (FSM - Fundo Social Municipal) which consists in budgeted transfers from the State to allow financial conditions for municipalities to conduct their competences in social functions, such as healthcare, education or social support. The corresponding amounts are annually included in the State Budget, that is State Budget Law (LOE – Lei do Orçamento do Estado). Although transfers from State are important, usually an increase in the said transfers leads municipalities to spend more and not alleviate inhabitants from their tax burden (Rios and Costa, 2005).

As mentioned before municipalities also incur in debt to finance their needs. As already stated, this has proved to be problematic when debt levels are high compared to revenues, as municipalities had a hard time servicing their debt, forcing the central government to put measures in place to limit leverage. The income structure of municipalities is also changing, as can be seen in Annex 3, which shows a reduction of the percentage of transfers in the income of municipalities from 45.7% in 2010 to 38% in 2019. Liabilities have also diminished from 6.6% in 2010 to 4.2% in 2019 (especially from 2018 to 2019). On the other hand, tax revenue has witnessed a stark increase from 2010 to 2019 (32.6% to 39.5%).

Although these figures might entail better financial performance, municipalities are still struggling for financial independence, on the back of the reduction of high levels of debt from 2013 to 2014. Financial Independence peaked in 2016 with a 40.5% ratio of Own Revenue over Total Revenue, decreasing to 39.1% in 2019. These figures are a bad prologue for future covid-19 pandemic challenges that might stress financial independence further due to the slowdown of the economy (see, for example, an ongoing study from Católica Business School, conducted by Silva, Kouhen, Gaspar and Leitão (n.d.).

In terms of expenses, Figure 4 suggests that Portuguese municipalities' disbursements are significantly higher on services (29%) than most of Europe (15%). Portugal also allocates a lower percentage of expenses to healthcare and social protection (7% as the average of

[8] Fundo Geral Municipal (FGM, Municipal Cohesion Fund) consists of transfers from the State Budget with the goal to give municipalities financial means to support their attributions.

European Union (EU) allocates 10%). The Portuguese municipalities also spent a below-average percentage on economic activities (14% as the average of EU countries spends 21%). Costs with education and other services show proportions similar to other countries in Europe. Portuguese municipalities' revenues are also lower (14.2% of the total public revenue) than the average municipality revenue in Europe (24.3% of the total public revenue) as seen in Annex 4 and as according to (Fernandes et al. (2019).

This calls for more challenging management in Portuguese municipalities, as compared to other European countries. Also, Portuguese municipalities spend much less on sustainability functions such as social protection and healthcare.

In terms of distribution across the country, as depicted in Annex 1, Portugal has a high concentration of inhabitants in urban areas and a significantly lower concentration of population in rural areas. This is also true when analyzing the same Annex 1 in terms of littoral versus non-littoral zones. What is more curious is when compared to European countries as in Annex 4, Portugal has a lower ratio of municipalities with less than 2.000 inhabitants (2%) than the European average (33%) and has a higher percentage of municipalities with more than 20.000 inhabitants (41%) than the rest of Europe (26%). Although population seems to be more evenly distributed in Portugal (as seen in Annex 4 only 2% of Portuguese municipalities have <2,000 inhabitants compared to the EU average of 33%, and also has 41% of municipalities with >20,000 inhabitants compared to EU average of 26%), as compared to peers, the financial performance is lower as compared to the average (Municipality Revenue (Percentage of Public Revenue) is only 14.2%, compared to EU average of 24.3%).

It Is worth noting that, even whether a larger number of inhabitants might help municipalities be more financially independent there seems not to be the case, which calls for a multivariate model entering other factors in the equation as we explain later.

Portuguese municipalities have also made an effort to improve their planning. As seen in Annex 6, Portuguese municipalities used to estimate their revenue higher than what was to be expected, and as a result, this could cause problems in budget control. Since 2010 there has been a great effort to more accurately forecast revenue, and by 2016 the predicted revenue almost matched budget execution. Despite this effort, there are still challenges that municipalities face. The central government has created measures over the years to address some of these problems.

To control municipalities' level of debt, in February 2012, the publication of LCPA was enacted with the purpose to force the municipalities to anticipate their payments and to cut expenses. It

goes without saying that municipalities not having enough own-generated financial means would recourse to external debt on a systematic basis, hurting their financial independence. Before the law became into force some expenses were charged in municipal entities, not being counted as municipality debt (Ribeiro, 2021). These indicators drastically improved after the law was in force (Marques, 2016). This calls for analyzing the trends before and after the said law became into force in 2012.

Another issue relates to the accounting reporting of public entities, which was based on old accounting systems such as Official Accounting Plan of Local Municipalities (POCAL[9] - Plano Oficial de Contabilidade das Autarquias Locais) or Official Plan of Public Accounting (POCP[10] - Plano Oficial de Contabilidade Pública). These were replaced by Normalized Accounting System to Public Administrations (SNC-AP[11] - Sistema de Normalização Contabilística para Administrações Públicas), intended to standardize accounting norms for public entities, to foster planning, and financial control and transparency (Veloso, 2018). The introduction of SNC-AP has been postponed by municipalities. Only a third was already using it as of 2020 (Agência Lusa, 2020). SNC-AP is thought to be very important since it will allow public entities to make available performance indicators that concomitantly might allow for sounder management and provide accountability (Rosa, 2019).

It appears that Portuguese municipalities have been converging to control and solve their debt issues, especially on the back of the central government measures, as the average indebtedness of municipalities shows a decreasing trend. A study by Santos and Martinho (2021) suggests that this control is still sketchy, and suggests that the official data lacks reliability, as 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.

It is also worth noting that management could also play a role in the financial outcome, as cases of bad management in municipalities are not uncommon, some of the most recent are among others: (i) Bragança letting debts to the municipality prescribe, and the public prosecution office admitting there crimes might be committed (Cerejo, 2021d); tax fraud in Idanha-a-Nova (Cerejo, 2021c); (iii) Guarda municipality with a doubtful public tender offer (Cerejo, 2021b), or (iv) Penacomor mayor letting debt of supporters prescribe (Cerejo, 2021a). Another bad example is the 7 municipalities still have 55 million euros in debt incurred for the Euro 2004

[9] Accounting regime for local power.
[10] Official plan for public accounting.
[11] Normalizing system of accounting for all public entities.

stadiums. This suggests that tighter control is still needed to avoid such hurdles and ensure adequate management of public finances leading to sustainable finances as the ultimate performance goal. The transparency of municipalities can be influenced by several factors such as larger management bodies becoming more transparent, as well as the population with higher access to the internet, lower unemployment in population, higher financial autonomy, and also higher debt (Ribeiro, Nogueira and Freitas, 2017).

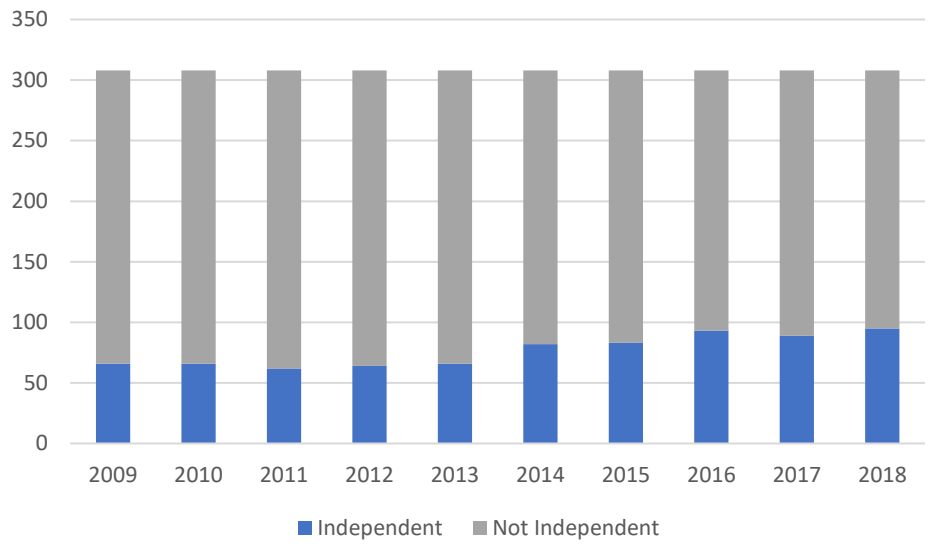
Baião (2020) posits that good financial indicators result in a higher level of transparency. There is also a significant difference in terms of indicators reported. Beja, a district in South Portugal only reports 13 indicators, and Santa Maria da Feira, up North, reports 123 indicators, which hinders comparability. Also, 49.7% of the indicators were reported only by one municipality alone (Rosa, 2019). Cases of bad management/report and the postponement of the implementation of measures adopted by the central government, together with the disparity of indicators used by municipalities, make it difficult to have good performance measurements, therefore, difficult to control and improve the municipalities performance.

It is also important to note that several factors affect finances and there is not a variable on itself capable of explaining financial condition alone (Jacob e Hendrick, 2013). Providing this, it is important that the prediction model created takes into consideration more than one variable, to understand which ones have a bigger effect on the dependent variables.

To measure the financial performance of municipalities, the Yearly Review of Portuguese municipalities' performance (Anuário dos Municípios Portugueses) makes available one main indicator denoted Financial Independence. Financial Independence is a term used by Fernandes et al. (2019) which translates 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 measuring the need of the municipality for State transfers, proxying whether the 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, as Figure 6 suggests.

Figure 6

Evolution of the number of independent Portuguese municipalities (2009-2018)



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

As seen in the graphic and as mentioned before, there was a significant increase in the number of Portuguese independent municipalities from 2013 to 2014, which saw the number of Portuguese municipalities increase from 66 to 82. Since then, there have not been significant increases, with Portuguese municipalities going back-and-forth struggling to gain financial independence, achieving its highest number in 2018 of 95 municipalities. Still under 1/3 of municipalities remain financially independent which calls for stronger effort. It is unknown how the pandemic will affect this trend, especially since the accounting presentation of municipalities was delayed, which will only show the pandemic effects probably around 2022 (reporting 2020 data).

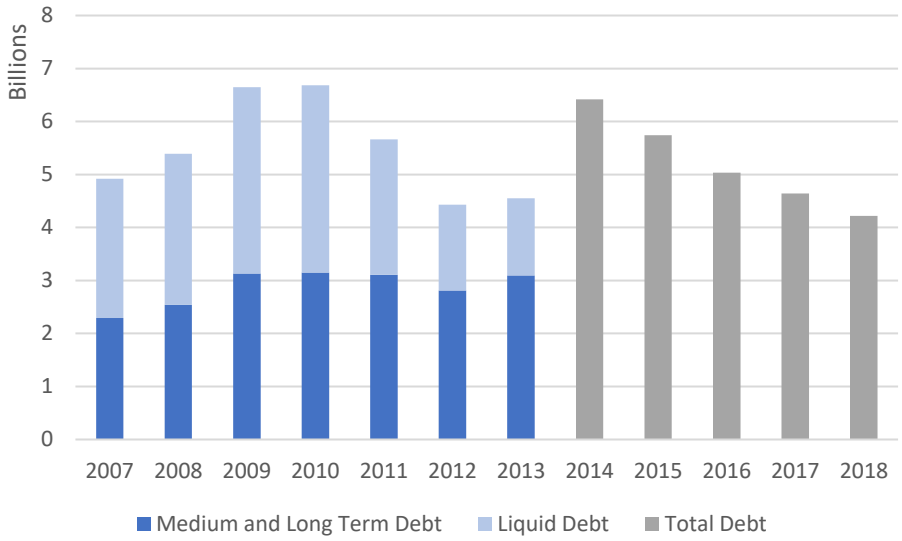
Debt is another important factor to consider, especially in terms of sustainability and intergenerational equity. Debt as seen before has been a topical issue in Portuguese municipalities over the years. Maher and Gorina (2017) noted that appropriate levels of debt allow municipalities not to go through financial difficulties, which is self-explanatory, although challenging at least in the Portuguese case (Other relevant studies that analyze debt include Guedes (2015); Ribeiro (2012); Galińsk (2015); Chatterjee, Bhattacharya, Taylor, and West (2019); Kluza, and Dziemianowicz (2019)).

As mentioned before, debt was a problem of municipalities that was hard to control especially due to an imprecise method of measuring and control, which forced the central government to

take stricter measures, putting in place LCPA to control debt, and changing the indicators in 2013/2014 from liquid debt and medium and long-term debt to total debt ("Portal Autárquico", Municipal website, n.d.). The impact of this change in measurement is visible in Figure 7.

Figure 7

Portuguese municipalities debt in millions from 2007 to 2018

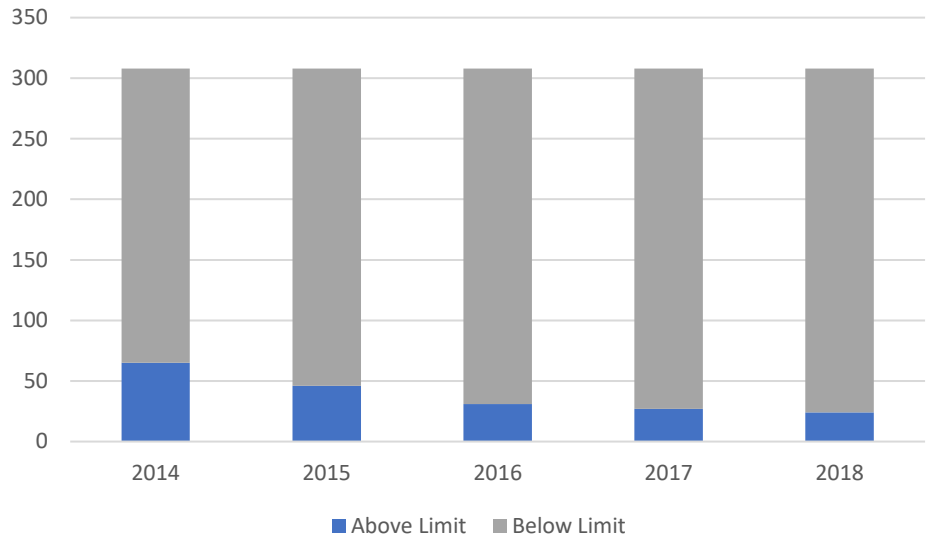


Source: Own elaboration with data from www.pordata.pt

Figure 7 illustrates the inaccuracy 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 a steady increase in debt from 2007-2010 and contention of this debt from 2011 to 2013. Although the indicators looked promising, in 2013, the new more accurate measurement of debt showed that the Portuguese municipalities did not hold €4.5 billion of debt, but instead they had €6.4 billion, which forced the municipalities to have an even bigger contention in taking up debt. This was an important step toward better accuracy, which shows that the new measurements of debt and debt limits translated into a large reduction in municipalities' indebtedness to return to tolerance levels of debt.

Figure 8

Portuguese municipalities above their debt limit



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

The new measurements of debt and debt limits show 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 and not be over these limits (art 52º of Law 73/2013). Municipalities enter difficulties in 2014, which translated into 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. Despite the number of municipalities above total debt being smaller, it is important to understand if between limits the municipalities still have a great need to finance themselves incurring in debt. The figure below shows the number of municipalities that reduced/increased their debt according to the new measurements.

Figure 9

Number of municipalities that reduced or increased their debt (2015-2018)

Trend	2015	2016	2017	2018
Municipalities that reduced their debt	280	267	224	253
Municipalities that increased their debt	28	41	84	55

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

It is possible to see that the number of municipalities that are decreasing their debt has slowed down. The best result was achieved in 2015, probably due to municipalities' need to comply with the new measurements of debt, enacted in the 2012 Law. Since then debt as fluctuated yearly across municipalities, with a great number of municipalities increasing their debt in 2017, but being able to manage better in 2018. This is an important indicator since municipalities should not rely totally on debt to finance their activities, since the sustainability of the municipality should be assured.

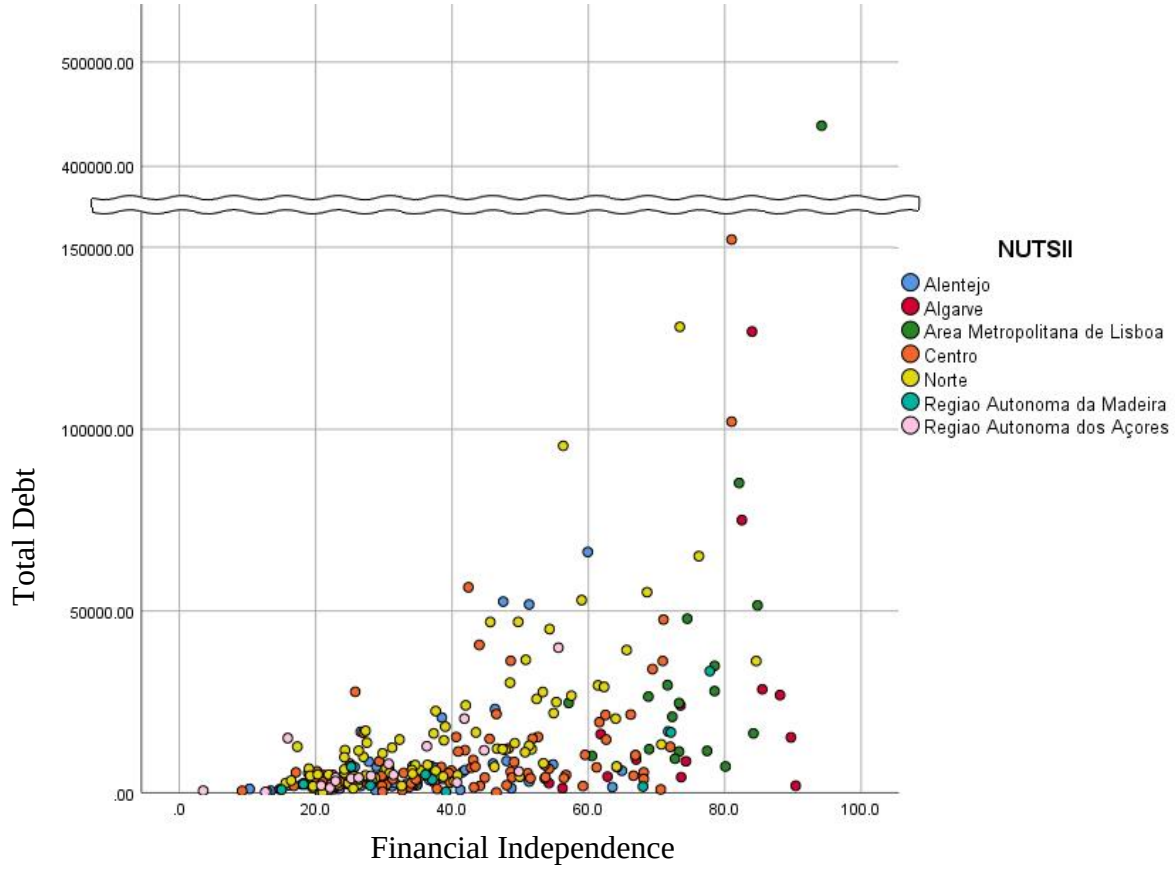
It is then possible to assume that Financial Independence and Total Debt are the most important indicator of f municipalities' performance. This leads to another important analysis that intends to understand the type of municipalities that are incurring in high levels of debt. If the smaller municipalities need debt the most, this may be a bad indicator, since they will probably not have great results to pay their debt in the long term. Better performing municipalities can probably acquire more debt safely, since the good results may assure sustainability.

Before analyzing the graph it is important to note that in theory it is expected that municipalities with higher own revenue incur in less debt (Ribeiro, 2012).

Figure 10 displays the data pairs (Financial Independence; Total Debt).

Figure 10

Financial Independence and Total Debt of Portuguese municipalities in 2018



Source: Own elaboration with data collected 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 dispersed, 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, in the South, show good 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 and Pinto (2020).

3. Municipalities Indicators and Hypotheses

Although two main indicators are mostly used in municipalities' financial performance assessment, the factors that lead to good performance are yet to be totally discovered. Taxes and population may play a role in contributing to financial independence. However financial independence is impacted by pure financial indicators but also by other indicators such as financial development, safety, or sustainability, among others, which may be difficult to measure, as these indicators are not always observable (Pidun and Felden, 2011). Municipalities as any other governing body face governance-related challenges. In the following subchapters, we take a deep dive into these factors.

3.1. Taxes

Financial Performance is a concept that has gained relevance since the implementation of fiscal federalism policies, which build on the decentralization of revenue[12] (Rodden, 2005; Oates, 1999). In Portugal, due to the decentralization process, municipalities have seen their fiscal instruments increase, with the degree of tax decentralization raising since 1979, contributing to more flexibility and better autonomy of municipalities. This is measured by financial independence (Serra, 2011). It is also known that an increase in fiscal revenue leads to an increase in financial efficiency (Ribeiro, Nogueira, Linhares, and Silva, 2019b). However high taxes affect families' disposal income and companies' free net income.

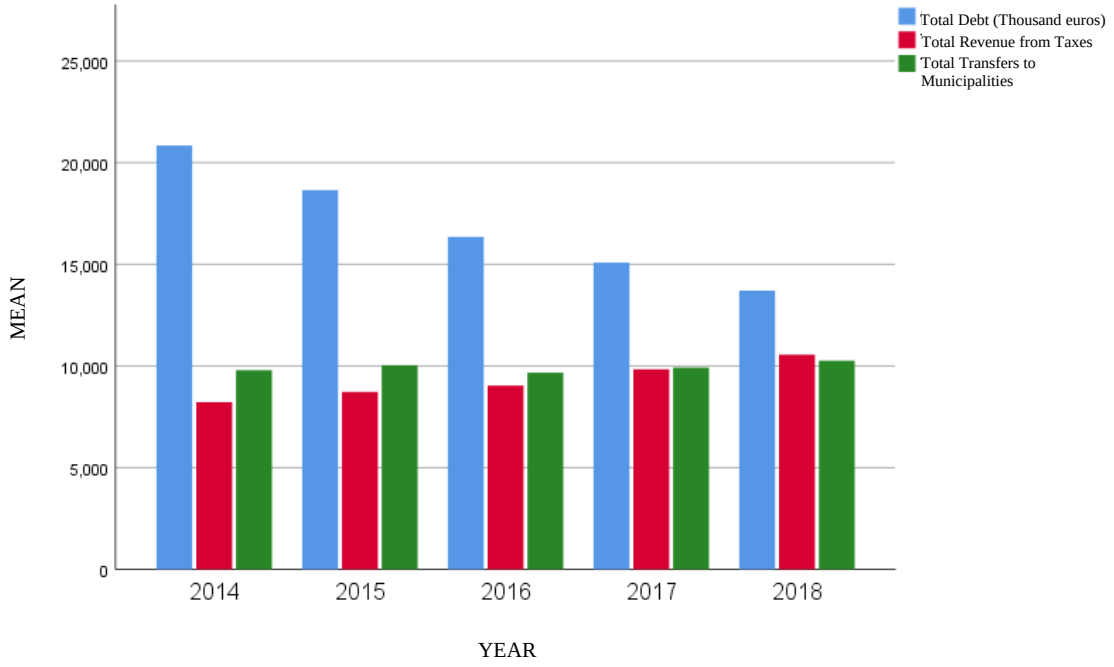
According to Article 103 of the Constitution of the Portuguese Republic, the tax system has two main objectives: (i) to finance the State (municipalities included) and (ii) to redistribute wealth. This sets the tradeoff between increasing taxes to finance higher needs of cash and a fair redistribution. As there are different fees and taxes across municipalities, a competition effect is also present. Municipalities attract more population and firms by providing tax shields or lowering taxes in some circumstances (see also Ribeiro, 2021).

Figure 11 depicts the evolution of the average of taxes, debt, and total taxes in the last 5 years with available data

[12] Decentralization caters to allocating resources to local bodies, in this instance municipalities.

Figure 11

Total Debt compared to Total Taxes Revenue and Total Transfers (2014-2018) in thousand of euros



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

The graph shows an increasing average of taxes collected by municipalities from 2014 to 2018, on the back of the need for municipalities to finance their activities through taxes. Figure 11 shows State transfers as flat since 2014, although in 2018 there was an increase. It might be expected that 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 might translate into lower financial independence in the forthcoming years.

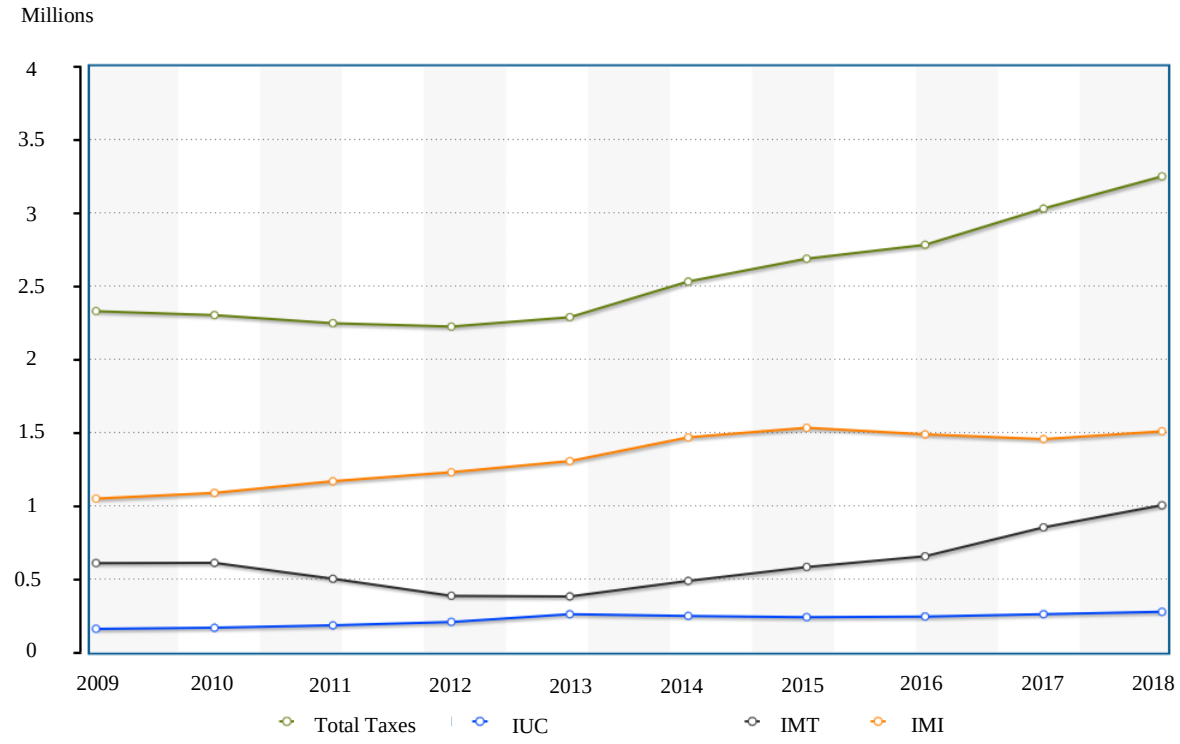
The taxes revenue has indeed increased over the years, with the municipalities objective to finance their operations. It is also important to understand what type of taxes the municipalities are recurring to. As mentioned before the main municipality's taxes are IMI, IMT, and IUC, although other taxes can be collected. The figure below shows the evolution of the different tax revenue.

Figure 11 depicts a decreasing trend in indebtedness. Total debt decreased from 6,419 million in 2014 to 4,219 million in 2018 (-34%). The debt was further reduced in 2019 to 3,940 million.

Figure 12 shows the evolution of tax revenue by type of main taxes, spanning 10 years (2009-2018). Total revenue from taxes increases significantly, with one of the main drivers being IMT, which follows an almost identical trajectory as the total taxes line. IMT is revenue that is levied on the transmission of real estate properties. This collection of taxes may increase due to the activity of the real estate market, which has witnessed stronger speculation increase the value of real estate properties in Portugal, especially in the metropolitan areas (which may accentuate the differences namely in population between metropolitan areas and rural areas). IMT represented more than 1 billion euros in 2018.

Figure 12

Municipalities tax revenue by tax type (2009-2018)



Source: www.pordata.pt.

Due to the covid-19 pandemic, it is expected that the prices of real estate may decline abruptly (Idealista, 2021), especially with the end of moratoriums (Oliveira and Vinha, 2021), which may overflow the market with real estate. These factors should be pondered by the municipalities as they should identify potential revenue loss. Despite this, IMI an annual tax collected over the real estate evaluation value, which can vary across municipalities, has also increased, although only slightly compared to IMT, but has a more constant revenue. IMT and IMI are municipal taxes. IMI has surpassed 1.5 billion euros in 2018. IUC does not seem to have a significant impact on revenue and appears constant over the referred period, keeping low

values. According to Ribeiro (2021), IUC represented revenue of 276.3 million euros in 2018 and 287.3 million euros in 2019 (3.3% increase). Municipalities appropriate only 70% of IUC.

Due to the above analysis, we draw the first hypothesis[13]:

H1: Financial independence and total debt are functions of the proportion of taxes in the municipalities' total income.

3.2. Demographics

As already stated, there is a high level of heterogeneity in Portugal in the distribution of population. According to the division of municipalities by population size, as presented by Fernandes et al. (2019), it is possible to observe that the most populated municipalities are located in littoral areas, especially in the urban poles (AML and AMP). In a previous study of Portugal municipalities (Correia and Pinto, 2020) it was possible to verify that, the asymmetry is becoming stronger, with the urban areas being the only ones capable of attracting more population, with most of the other municipalities losing inhabitants, especially the inland, mainly in Alentejo and Centro, which are Nuts 1 regions.

Nuts are a concept created in the EU as a common norm for statistical purposes so that statistics could be produced in a more common way between regions of member states as well as a better determination of fund distribution. There are 3 levels of NUTS, namely NUTS I, which are regions between 3 million and 7 million inhabitants, NUTS II which are between 800 thousand and 3 million inhabitants and NUTS III between 150 thousand and 800 thousand inhabitants. In Portugal NUTS were adopted in 1986 (Ribeiro, 2021).

Despite this, there is a possibility that population growth generates an increase in the demand for resources and services without the corresponding increase in public income due to other factors such as the population's financial capacity, meaning that populational growth without the corresponding public income which depends not only on the growth of population but also on their financial capacity and economic activity can lead to an increased number of loans and public expenditure, increasing municipal debt (Ribeiro, Nogueira, Linhares, and Basílio, 2019a).

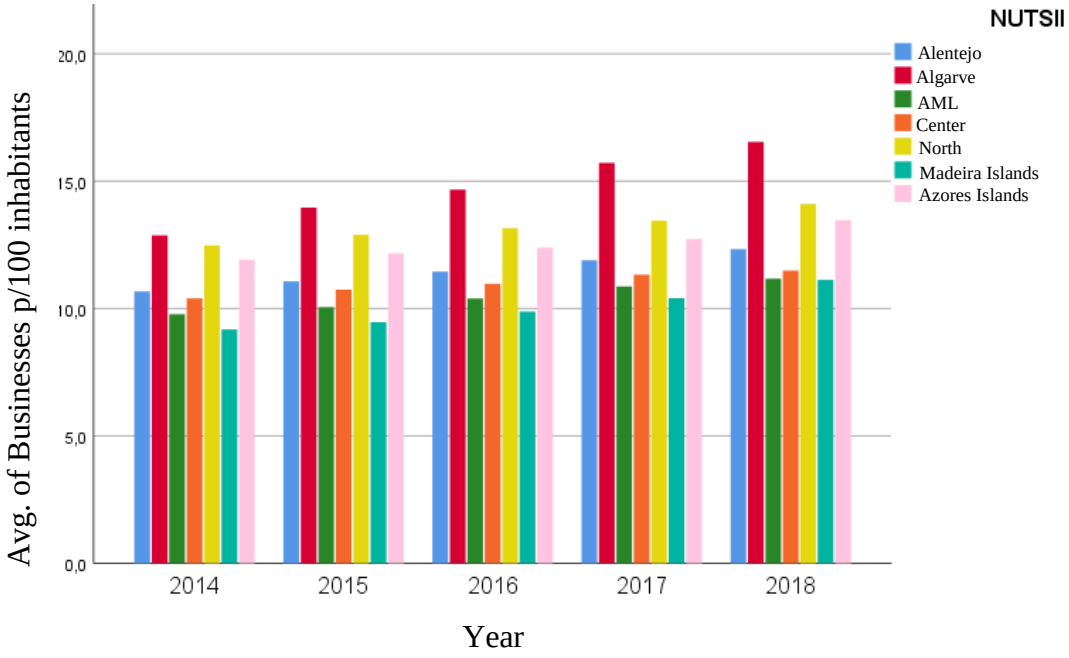
Correia and Pinto (2020) also observed that the most financially independent municipalities were either from AML, AMP, or Algarve, the latter, having less population than the first ones. So, the study found out that Algarve and coastal Alentejo ("Alentejo Litoral"), despite having

[13] The motive for the hypothesis can also be seen in Table 4.

less population appropriated higher own revenue per capita than AML. Although the study does not ponder on what factors may be influencing a higher tax collection per inhabitant, due to Algarve being a tourism center rather than a population center, it is possible that real estate or businesses are driving taxes collection to higher values. Therefore, one important determinant may be the number of headquartered businesses.

Figure 13

Average of Businesses per 100 inhabitants by NUTS II



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

Figure 13 shows that municipalities located in Algarve have on average more businesses p/100 inhabitants as compared to other regions, and this figure has been growing. This fact alongside the cyclicality of businesses' operations, could explain why Algarve having a lower number of inhabitants appropriates a higher proportion of revenue as compared to municipalities with higher number of inhabitants. That is, Algarve's figures face a base effect. It is also worth mentioning that AML is actually one of the regions that has the lowest number of businesses p/100 inhabitants on average. This could also be due to a base effect. As taxes levied on companies' revenue are partially appropriated from municipalities alongside a local tax denoted "derrama"[14] in Portuguese, the fact that AML has a large number of inhabitants reduces the

[14] "Derrama" is a tax revenue that is not mandatory. The municipalities can decide if they want to apply or not this taxation, which affects the taxable profit of domiciled companies not exempted from corporate tax (IRC). It corresponds to a percentage of turnover generated in the geographic area of each municipality, derived forma commercial, industrial or agricultural activity,

ratio. Apart from a direct contribution to taxes businesses have an effect on fostering local sustainable development, namely through employment creation and partnership with other local stakeholders. It is also worth noting that a study by Erden and Holcombe (2005) found that a 10% increase in public investment led to a 2% increase in private investment. Also, private investment was dependent on the availability of bank credit. This illustrates a potential virtuous development cycle.

A related topic to demographics is education. Education denoted as a social mobility factor allows people to achieve better social status, as well as better salaries or opportunities (Breen and Karlson, 2013). Due to this, it is possible to ponder whether having a more educated population with better living conditions could increase directly or indirectly municipalities' tax collection, levying taxes on a larger volume of revenues.

Therefore, another demographic factor that needs to be pondered is the presence of university students, which will indirectly serve as a measure of education in municipalities. To our knowledge, research on the role of higher education institutions and their impact on the municipalities' performance is scant. A few studies on this topic address mainly innovation and the creation of regional microsystems - see, for example, a recent report by the European University Association conducted by Reichert (2019), in which the Portuguese University of Minho (Universidade do Minho) has participated[15]. Portugal has a total number of 290 higher education institutions, with 68 of them located in Lisbon and 39 in Porto (www.pordata.pt). This reflects a centralization of higher education institutions in metropolitan areas, again attracting more population to the cities, and mainly to coastal areas. Figure 14 analyzes the average of our two dependent variables tabulated by the presence of higher education institutions in the region.

Figure 14

Average of Financial Independence and Total Debt in municipalities with and without higher education institutions in the year 2018

Variable	With higher education institutions	Without higher education institutions
Average Financial Independence	57.6%	37.7%
Average Total Debt	34,168,991.82 €	8,225,698.40 €

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

and also to non-residents which have a stable establishment in that territory. Derrama yields more than 350 million euros and corresponds to c. 10% of municipal taxes (Ribeiro, 2021).

[15] Ranks 203rd in RCI rank, ranks 4th in Portugal, has a total of 19,500 students, domiciled in Braga.

It is possible to see clearly that the two main indicators change in municipalities when in presence of higher education institutions. Financial debt, as well as Financial Independence, are both higher in municipalities harboring higher education institutions, once again showing that municipalities with a higher percentage of financial independence incur in higher debt levels. Although the numbers seem clear, it is important to understand the heterogeneity of higher education institutions' location in Portugal, with most of them being in the municipalities of Lisbon and Porto. Therefore, it is important to analyze this indicator together with municipality fixed effects which to capture the marked heterogeneity, as we will explain in more detail in chapter 4.

Population has been several times referred to in this study as an important factor. We witness asymmetries between Portuguese regions in terms of population distribution. A lower number of inhabitants might entail per se less revenue for local governments and higher difficulty in providing public services due to diseconomies of scale. Correia and Pinto (2020) find that there is indeed a correlation between municipalities' population size and their financial independence. Since 2010, more than half of the world population dwells in urban areas, which become more and more populous. In 2020, 56.2 percent of the world population is urban. In Europe the difference across urban and non-urban areas is even more marked, according to the United Nations. This call for entering population in our analysis to ascertain its impact on financial performance.

Hypothesis 2 intends to study the above impacts together in a group we denote demographic factors, catering to study the relation between demographical differences and financial indicators between municipalities.

H2: Financial independence and total debt are a function of demographic factors.

3.3. Governance

Governance is defined as the many satrtegies adopted by indidivuals and institutions, both public or private, to manage common issues, in networks, sometimes complex, primed by tansparency and legitimacy of the stakehloders (Ribeiro, 2021). Accountability is a construct

also linked with governance (see, for example, a recent paper by Papadopoulos (2010), who analyzes the links between governance and accountability) .

Boivard (2005), as cited in Ribeiro (2021), describes good governance as one that raises questions such as involvement of stakeholders, transparency, equality, ethical behaviour, accountability and sustainability.

Portugal's governance environment can be described as stable, with two political parties alternating governing cycles (PS, left-center-wing, and PSD, right-center-wing). In the last three mandates, some coalitions allowed smaller parties like CDS-PP (Right-Wing), BE (Left-Wing), and PCP-PEV (Left-Wing) to reach governance. This trend is replicated across municipalities, with PS (158) and PSD (98) reaching power in most municipalities, with the smaller parties accessing power only in a few municipalities, usually without a majority, or through coalitions (MAI, n.d.). It is also worth noting that there may be an effect caused by the election year which may lead competing parties to increase their local spending (Ribeiro et al., 2019a).

Majority is a very important factor in the municipalities' governance, since the decisions are ruled at a local level by a simple majority rule, unless a special norm has other disposition, requiring a qualified majority (Ribeiro, 2021).

According to Ribeiro (2012) and Guedes (2015), the levels of debt in municilipalities with ruling parties without a majority were usually higher, as compared with those with a 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 affect financial performance - we use the old measurement of debt to be consistent throughout the period of analysis. Therefore, for the first analysis of this indicator, the table below shows the average of financial independence and total debt with tabulated by majority in the executive bodies of the municipality.

Figure 15

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

Variable	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 a higher average debt than those with majority rule. Despite having a higher debt, the municipalities without majority rule seem to be on average more independent, with financial independence averaging 50.57%. On the other hand, municipalities with a 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 function of independence and total debt, entering them in a multivariate analysis (Greene, 2020)

H3: Financial independence and total debt area a function of governance.

3.4. Sustainability

As mentioned before, more and more companies are taking into consideration sustainability factors in their performance review (Spiliakos, 2018). Municipalities' sustainability encompasses financial sustainability, but also environmental factors. Since populations tend to move from rural areas to urban areas (Letelier, 2005), usually, in search of a better quality of life, it is important to understand if these indicators attract more people and therefore contribute to municipalities' better financial performance.

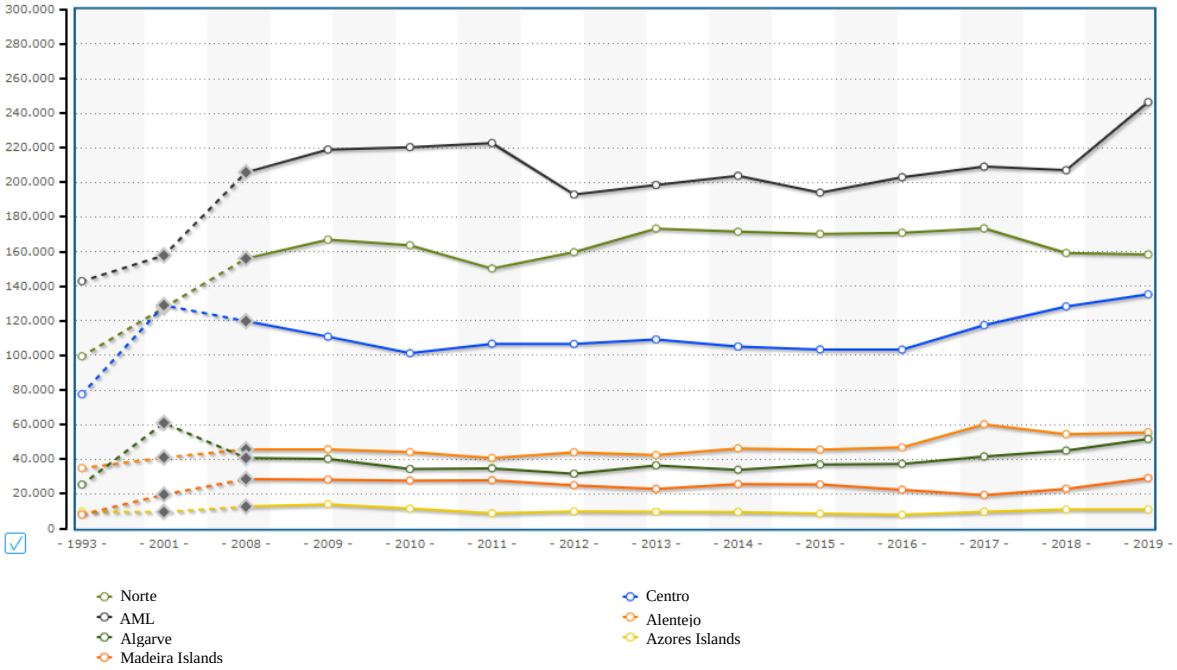
Several indicators pertaining do sustainability might translate the quality of life of inhabitants in municipalities poised to invest in responsible activities, spanning from the environmental ones do social responsibility towards populations. Urban planning is a category in which citizens have high confidence to get sustainability and quality of life (Santos, 2019). Indicators for this available on pordata range from safety and protection to climate and air quality, waste management or biodiversity, or even environment protection as a whole. Although there are other activities, these are the ones in which municipalities spend the most, according to Pordata (www.pordata.pt). The Lisbon Metropolitan Area (AML in the Portuguese acronym) is the largest investor in these components, and as seen before is also the region that attracts more inhabitants, for the better and the worse. AML is considered a green city in Europe[16]. The North region ranks second (which includes AMP), and then ranks the center region. Alentejo and Algarve seem to spend below normal values (Annex 7).

[16] "Lisbon was the first European capital city to sign the New Covenant of Mayors for Climate and Energy in 2016, after achieving a 42% reduction in CO2 emissions from 2002 to 2014, surpassing the 40% initial 2030 goal: and reducing energy consumption by 28% from 2012 to 2017" (European Union, 2020).

This calls for analyzing the expenses allocated to the environment by municipalities. Figure 16 depicts these expenses tabulated by NUTS II (Hierarchical division of Portuguese territory by subregions[17]), in order to understand which are the municipalities that spend the most.

Figure 16

Municipalities total expenses with environmental activities (1993-2019)



Source: www.pordata.pt.

As expected, AML is the region that presents the highest value in total environmental expenses, with a substantial increase from 2018 to 2019. The North region ranks second. In 2019 the gap between AML and the other regions widens, although the gap between AML and the Center narrows. The other regions, as seen before, seem to have expenses below the regions' average. This calls for entering these factors in a multivariate model to ascertain their potential economic and econometrically impact on financial performance of local governments. as we do in Hypothesis 4.

H4: Financial independence and total debt are functions of environmental and safety factors.

[17] Nuts II are a region for statistical purposes between 800 thousand inhabitants and 3 million inhabitants. Fore a more detailed description of NUTS please see chapter 3.2. Demographics.

4. Methodology

The data were collected only from www.pordata.pt, spanning 2009-2018 (the longest timespan with available figures). It is worth noting that our sample is the entire population of municipalities. Since we are working with population data and not a sample, we do not need to account for sample selection bias (Greene, 2020).

We deploy a multivariate analysis to unveil the determinants of financial performance, represented by Financial Independence or Indebtedness. We run regression models entering explanatory variables across a number of dimensions as depicted in Table 1, commenting their goodness-of-fit (Greene, 2020).

We use robustness tests to confirm our results and control for biases. We remove regions that might drive the results due to their relevance, such as, Lisbon, Porto, Lisbon, and Porto, and the Islands, by running separate regressions. This strategy caters to the effects of heterogeneous municipalities such as Lisbon, Porto, or the Islands of Madeira and Azores. Excluding the said municipalities in the runs, it is possible to confirm the consistency of the estimation.

We use the two-stage least squares (2SLS) econometric setup, which is a method entering instrumental variables, controlling for endogeneity that can affect the consistency of the estimation of the ordinary least-squares regression model (Greene, 2020). The test was run with the instrumental variable in t-1 (In Panel A, Total Debt, and in Panel B, Financial Independence), meaning that the data has a 1-year lag.

According to Greene (2020), if heterogeneity or individual effects are presented in the data, entering fixed effects might unveil non-observable variables. Due to marked heterogeneity in municipalities, and since municipalities are more granular than regions having all the municipalities as fixed effects in the econometric setup caters to the heterogeneity and captures what cannot be measured or even observable. This is an alternative of entering more and more variables which could saturate the models and loose degrees of freedom (Greene, 2020). In econometric terms fixed effects at the municipality level is a succinct way of estimation corresponding to entering a dummy for each municipality (except one to avoid multicollinearity).

The runs use the software Statistical Package for the Social Sciences (SPSS) and Stata, widely used in statistical analysis.

A potential limitation is the fact that Debt measures in Portugal changed in 2014, meaning that before that (2007-2013) the measure used was medium and long term debt, which only allowed the regression with Debt as an independent variable to be studied from 2014-2018 (5 years total).

This made it necessary to create two panels of data to be studied, since the two dependent variables were in a different time range, applying the same models to each panel separately. The independent variables will remain the same in the two panels. Panel A will have Total Debt (2014-2018) as the dependent variable with 1,540 observations and Panel B will have Financial Independence (2009-2018) as the dependent variable with 3,080 observations.

We avoid entering variables with significant and high correlation in the same run, to avoid multicollinearity issues.

4.1. Econometric Setup

The formula of the multiple linear regression model is given as follows (Greene, 2020):

$$\begin{aligned} y &= f(x1, x2, \dots, xk) + \varepsilon \\ &= x1\beta1 + \cdots + xk\beta k + \varepsilon \end{aligned} \quad (1)$$

Where y is dependent variable and xi are the explanatory variables, which, in this study, translates into the following formula for Panel A:

$$\begin{aligned} \text{Total Debt}_{it} = {} & Total\ Taxes_{it} \times \beta1 + Populational\ Density_{it} \times \beta2 \\ & + Business\ p100\ inhabitants_{it} \times \beta3 \\ & + University\ Students_{it} \times \beta4 + Winning\ Party'Share_{it} \times \beta5 \\ & + Environmental\ Expenses_{it} \times \beta6 \\ & + Crimes\ p.1000\ inhabitants_{it} \times \beta7 + \varepsilon_{it} \end{aligned} \quad (2)$$

And the following for Panel B

$$\begin{aligned} \text{Financial Independence}_{it} = {} & \\ = {} & Total\ Taxes_{it} \times \beta1 + Population\ Density_{it} \times \beta2 \\ & + Business\ p.100\ inhabitants_{it} \times \beta3 \\ & + University\ Students_{it} \times \beta4 + Winning\ Party'Share_{it} \times \beta5 \\ & + Environmental\ Expenses_{it} \times \beta6 \\ & + Crimes\ p1000\ inhabitants_{it} \times \beta7 + \varepsilon_{it} \end{aligned} \quad (3)$$

4.2. Variables

The variables were all collected from www.pordata.pt, although some variables had to be transformed, namely, financial independence was calculated with the formula:

$$Financial\ independence = \frac{Own\ Revenue}{Total\ Revenue} \quad (4)$$

Financial Independence 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 measures the need for state transfers, or if municipality is in part self-sufficient (Fernandes et al., 2019).

The variables were chosen based on the existing studies and available data. It is worth noting that database Pordata deploys complete data pertaining to Portuguese municipalities from 2009 onwards, hence our choice to select the period of analysis from 2009 onwards. Also at the time of the study the most recent available data was up to 2018. The recent book by Ribeiro (2021) helped select the variables for Portuguese municipalities across the relevant dimensions (Financial performance; Tax revenues; Demographics; Governance; and Safety). We avoid saturate the models using only a limited number of variables.

Therefore, the choices were made to have at least one variable that could test the hypotheses, but without them being correlated among each other. 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). Table 1 and Table 2 list the variables deployed.

Table 1

Variables in the models, including their transformation

	Transformation	Description
Dependent Variables		
Log Total Debt	Log	Main indicator of Portuguese municipalities (Fernandes et al., 2019).
Financial Independence	Own Revenue/ Total Revenue	Main indicator of Portuguese municipalities (Fernandes et al., 2019).
Independent Variables		
Tax Revenue		
Total Taxes	No transformation	It is the main source of revenue for municipalities. It is expected that municipalities with higher own revenue incur in less debt (Ribeiro, 2012).
Demographics		
Log Population Density	Log	Positive correlation between population and financial independence (Correia and Pinto, 2020). Population growth generates higher demand for resources (Ribeiro et al., 2019a).
Business p/100 Inhabitants	No transformation	When analyzing Algarve, one of the municipalities that have high financial independence with a smaller population (Correia and Pinto, 2020) it was found that it has a higher average of businesses per 100 inhabitants by municipalities than other regions (NUTS II). For the reason municipalities with higher own revenue incur in less debt we will expect that debt will be lower in municipalities with more businesses.
Log University Students	Log	The average financial independence of municipalities with higher education institutions was higher (57.6%) than those without higher education institutions (37.7%) as well as their debt. Education level is also pondered to influence financial efficiency (Afonso and Fernandes, 2018, as cited in Ribeiro et al., 2019b).
Governance		
Winning Party's Share	No transformation	Levels of debt without the majority in power were usually higher than with the majority (Guedes, 2015). Average Financial Independence in municipalities with majority rule is lower (40.79%) than in municipalities without majority rule (50.57%).
Environmental		
Environmental Expenses	No transformation	More companies are taking into consideration sustainability factors in their performance review (Spiliakos, 2018).
Safety		
Crimes p/1,000 Inhabitants	No transformation	Crimes will serve as a proxy for quality of life in the municipality in terms of the municipalities' sustainability.

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

The logarithmic transformation (log) intends to smoothen the distribution in order to avoid the central tendency measures (mean) to be driven by extreme values.

4.2.1 Descriptive Statistics

We opt to consider two distinct panels, pertaining to different periods of analysis, but keeping the same explanatory variables, to avoid confounding effects. Panel A considers the period using the new measurement methodology of financial performance, while Panel B uses a longer period in which two measurement methodologies of financial performance coexist. Since the range of the data is different, this might change descriptive statistics such as Mean, Std. Dev., Min or Max.

Table 2 lists the variables deployed in Panel A which pertains to the 2014-2018 period and uses Total Debt to measure financial performance.

Table 2

Descriptive Statistics - Panel A in which Total Debt is the dependent variable for the 2014-2018 period

Variables	Description	Mean (Std dev)	Min	Max	Units
Dependent Variable					
Log 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.	8.901 (1.297)	2.360	13.470	Log
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					
Log Population Density	It is given by the average population p/km^2 in a municipality. The population is given by an average of population in that municipality in that year.	4.346 (1.479)	1.386	8.936	Log
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
Log University Students	These are students of the municipality that are enrolled either in a university or polytechnic not necessarily in that municipality.	1.523 (3.003)	0.000	11.667	Log
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).

To account for extreme values in variables we created logarithmic variables (of 10) for Total Debt, Population Density and University Students.

Total debt then has a std. dev. of 1.297, and a min and max that are not too far apart.

Total taxes on the other hand seem to vary more than debt, with a high St dev, also having a high minimum and maximum amounts, which shows high variation in municipalities' ability to obtain revenue.

Population density is one of the variables that showed a high variation hence the logarithm was able to reduce the std. dev. to 1.479.

Businesses per 100 inhabitants on the other hand is a variable with more concentrated values a lower Std. Dev, and a minimum closer to the max, which can indicate that businesses are scattered across municipalities.

University students also had high variation, still showing a std. dev. of 3.003 after transformation to logarithm.

Winning Party's Share has an average of 51%, which means that, on average, the winning party enjoys the majority rule. The std. dev at 9.413 and minimum 26.800 and maximum 83.100 suggest that some winning parties may have to rely on the support of political coalitions.

Environmental expenses exhibit low variation.

The range of the number of Crimes p/1000 inhabitants is wide, with some municipalities reporting 0 crimes (minimum) and others 86.7 crimes p/1000 (maximum).

Table 3 lists the variables deployed in Panel B which pertains to the whole period of 2009-2018 and the dependent variable is named Financial Independence.

Table 3

Descriptive Statistics - Panel B in which Financial Independence is the dependent variable for the 2009-2018 period

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 for 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					
Log Population Density	It is given by the average population p/km2 in a municipality. The population is given by an average of population in that municipality in that year.	4.366 (1.468)	1.468	8.936	Log
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
Log University Students	These are students of the municipality that are enrolled either in a university or polytechnic not necessarily in that municipality.	7.071 (1.744)	0.000	11.724	Log
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).

Variables of Panel B exhibit a similar variation to Panel A's variables. In this panel we also used Log Population Density and Log University Students.

It is worth analyzing financial independence in this panel, which shows that financial performance in Portugal is heterogeneous, with a mean of 38.2% (below the 50% mean) and a std dev of 18.723. The average might signal low financial independence from the majority of municipalities.

The variables will then be used to test the hypotheses, based on the expected signs which are presented in Table 4. The underpinnings for expecting an increasing (plus sign) or decreasing (minus sign) function of a particular variable in explaining the dependent variation is presented immediately after Table 4, for succinctness.

Table 4

Expected signs for the coefficients to be estimated for the independent variables, tabulated by hypotheses

	Independent Variables	Motive	Panel A Expected Sign	Panel B Expected Sign
H1	***Tax Revenue***			
	Total Taxes	It is the main source of revenue for municipalities. It is expected that municipalities with higher own revenue incur in less debt (Ribeiro, 2012).	-	+
H2	***Demographics***			
	Log Population Density	Positive correlation between population and financial independence (Correia and Pinto, 2020). Population growth generates higher demand for resources (Ribeiro et al., 2019a).	+	+
	Business p/100 Inhabitants	When analyzing Algarve, one of the municipalities that have high financial independence with a smaller population (Correia and Pinto, 2020) it was found that it has a higher average of businesses per 100 inhabitants as compared to municipalities in other regions (NUTS II). As municipalities with higher own revenue may incur in less debt we will expect that debt will be lower in municipalities with more businesses.	-	+
	Log University Students	The average financial independence of municipalities with higher education institutions was higher (57.6%) than those without higher education institutions (37.7%), as well as their debt. Education level is also pondered to influence financial efficiency (Afonso and Fernandes, 2018, as cited in Ribeiro et al., 2019b).	-	+
H3	***Governance***			
	Winning Party's Share	Levels of debt without the majority in power were usually higher than with the majority (Guedes, 2015). Average Financial Independence in municipalities with majority rule is lower (40.79%) than in municipalities without majority rule (50.57%).	-	-
H4	***Environmental***			
	Environmental Expenses	More companies are taking into consideration sustainability factors in their performance review (Spiliakos, 2018).	+	-
	Safety			
	Crimes p/1,000 Inhabitants	The number of crimes per 1,000 inhabitants proxies safety and consequently quality of life in the municipality, fostering municipalities' sustainability.	-	+

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

To test H1 we use Total Taxes, which is expected to have a positive relationship with Financial Independence due to being the main source of own revenue, but not with Total Debt (Ribeiro 2012), meaning that we are expecting that if taxes raise municipalities will have better performance and will be able to lower their indebtedness levels. To test H2 we use 3 variables, all expected to have a positive influence on Financial Independence (Correia and Pinto, 2020). We are also expecting that the growth in population and increasing numbers of university students drive municipalities to issue more debt to finance higher populational needs (Ribeiro et al., 2019a). The effect of businesses in a region is expected to translate into lower debt, that is into a municipality with more sustainable finances. For H3 we use Winning Party's Share, and it is expected that the less share the winning party has the higher financial independence it has as well as more issued debt (Ribeiro, 2012; Guedes, 2015). H4 will be tested with

Environmental expenses and Crimes p/1,000 inhabitants, and it is expected that the higher the expenses in environmental factors the higher independence the municipality has, as well as less debt, because it is expected that efficiency is higher avoiding expenditures to solve issues that otherwise might arise (Porter and Linde, 1995; Spiliakos, 2018). The number of Crimes, on the other hand, are expected to have an opposing effect. A municipality that has higher criminality levels is expected to have less financial independence and higher debt because it might have to allocate extra expenditures in ensuring safety.

4.2.2. Normality tests

To measure correlations between pairs of variables we test whether they follow a normal distribution, since the Pearson correlation coefficient can only be applied effectively to normally distributed variables. In case the variables do not follow a normal distribution, Spearman's rho will be the most suited correlation coefficient (Schober, Boer and Schwarte, 2018).

Table 5

Normality Tests of the two panels of data

	Kolmogorov-Smirnov - Panel A		Kolmogorov-Smirnov - Panel B	
Variables	Statistics	Significance	Statistics	Significance
Dependent Variable				
Log Total Debt / Financial Independence	0.040	0.000	0.092	0.000
Independent Variables				
Tax Revenue				
Total Taxes	0.121	0.000	0.124	0.000
Demographics				
Log Population Density	0.048	0.000	0.048	0.000
Business p/100 Inhabitants	0.120	0.000	0.114	0.000
Log University Students	0.475		0.474	
Governance				
Winning Party's Share	0.034	0.000	0.028	0.000
Environmental				
Environmental Expenses	0.110	0.000	0.113	0.000
Safety				
Crimes p/1,000 Inhabitants	0.090	0.000	0.079	0.000

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

The results suggest that we can discard the hypothesis that the variables do not follow a normal distribution (all variables have $significance < 0.00$), as per previous Kolmogorov-Smirnoff test. These results also allow us to choose the better test for measuring correlation, therefore in

the correlation matrix it will be applied Spearman's rho coefficient instead of the Pearson correlation coefficient. However due to large number of sampled observations (in excess of 1,500 in Panel A and of 3,000 in Panel B) we can anyway consider that the variables follow a gaussian distribution (Greene, 2020).

4.2.3. Correlations

The correlation matrix is useful, not only to understand the relationship between the variables but also because it allows us to prevent multicollinearity problems, not entering variables with high and significant correlations in the same run. 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 and low significance levels despite the high coefficient of determination R^2 and the estimated coefficients that may have the wrong sign or implausible magnitudes (Greene, 2020). The correlations were accounted for through a correlation matrix between all pairs of variables as presented in Table 6. Panel A relates the independent variables between themselves and Total Debt, as Panel B relates the independent variables between themselves and Financial Independence.

Table 6

Panel A Correlation Matrix – Total Debt 2014-2018

	1	2	3	4	5	6	7	8
1 Log Total Debt	1							
2 Total Taxes	**0.632**	1						
3 Log Population Density	**0.609**	**0.792**	1					
4 Business p/100 Inhabitants	**-0.161**	**-0.160**	**-0.290**	1				
5 Log University Students	**0.484**	**0.470**	**0.399**	0.006	1			
6 Winning Party's Share	**-0.354**	**-0.371**	**-0.303**	**0.075**	**-0.225**	1		
7 Environmental Expenses	**0.207**	**0.375**	**0.306**	**0.071**	**0.132**	**0.207**	1	
8 Crimes p/1,000 Inhabitants	**0.181**	**0.276**	**0.088**	**0.143**	**0.215**	**-0.119**	**0.107**	1

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

Numbers in bold denote significance at the 1% level.

In Panel A, we can enter all the variables in one model without multicollinearity problems, since the variables do not exhibit high correlations. Total Taxes seems to be positively correlated with Total Debt, as well as Population density. The other variables do not seem to have high economic correlation, apart from University students which shows a value close to 0.484.

Table 7

Panel B Correlation Matrix – Financial Independence 2009-2018

	1	2	3	4	5	6	7	8
1 Financial Independence	**1**							
2 Total Taxes	**0.942**	**1**						
3 Log Population Density	**0.714**	**0.756**	**1**					
4 Business p/100 Inhabitants	**0.163**	**0.142**	**-0.128**	**1**				
5 Log University Students	**0.445**	**0.462**	**0.400**	**0.098**	**1**			
6 Winning Party's Share	**-0.308**	**-0.319**	**-0.246**	-0.023	**-0.189**	**1**		
7 Environmental Expenses	**0.450**	**0.446**	**0.306**	**0.099**	**0.164**	**-0.241**	**1**	
8 Crimes p/1,000 Inhabitants	**0.307**	**0.294**	**0.197**	**0.097**	**0.221**	**-0.081**	**0.134**	**1**

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

Numbers in bold denote significance at the 1% level.

The previous analysis applies to Panel B, with no major differences.

After obtaining the output of the regressions it will be possible to analyze them through the Durbin-Watson test. The Durbin-Watson test reveals if the regressions have autocorrelation problems, with the results varying from 0 to 4, with values close to 2 showing no evidence of autocorrelation (Greene, 2020).

Since we are using a Panel Data Model, the empirical literature has not focused on autocorrelation, but rather on a cross-sectional variation and time series models (Usually organized in of a dataset of one individual measured at multiple time intervals, as in panel data we have datasets from multiple individuals measured at multiple time intervals). Due to this we will not focus on testing for autocorrelation, and we will cater to heteroscedasticity via the Breusch-Pagan/Cook-Weisberg test, and for heterogeneity via fixed effects (Greene, 2020). The test is based on the following hypotheses;

H0: Homoscedasticity is present.

H1: Homoscedasticity is not present.

If p-value <0.005 we will reject H0.

For Panel A, we obtained a chi-square statistic of 11.540, and a p-value of 0.001 (<0.05) and for Panel B, we chi-square amounts to 73.860, and p-value to 0.000 (<0.05), which means that for both Panels we reject H0 and accept H1, confirming that homoscedasticity is not present. To account for heteroscedasticity, we will use robust estimators (Greene, 2020), running a regression with the option of robust in Stata.

4.2.4. Chow test

As previously explained, we run two models due to the change in measurement of financial performance. Panel A uses data of Total Debt from 2014 on. Building on the difference in measurement, we choose to test whether this change translated into a structural break. To test for structural breaks, Greene (2020) suggests performing the Chow Test. The Chow Test consists in sampling two groups of data in a regression model to check for a statistically significant change in the estimated coefficients, first running a regression with all observations, then running a regression with the pre-break observations, and afterwards with post-break observations. This test will be run in our baseline model (Ordinary Least Squares (OLS) 3 as depicted in Table 8).

The Chow Test will check the following hypotheses:

H0: There is no structural break in the debt indicator from 2013 to 2014.

H1: There is a structural break in the debt indicator from 2013 to 2014.

In case the F Chow Statistic < F Critical Value, then we assume H0, meaning there is no structural change in the relationship trend. The formula to obtain the F Chow statistic is the following:

$$F\ Chow = \frac{(RSS - (RSS_1 + RSS_2))/k}{(RSS_1 + RSS_2)/(n_1 + n_2 - 2k)} \quad (5)$$

Where RSS is the residual value of the regression with the whole timespan, RSS1 is the residual pre-break, and RSS2 is the residual post-break, k is the number of variables in the model in this case 8, and n1 and n2 are the number of years for each tested period.

$$F\ Chow = \frac{(1.300 \times 10^{18} - (0.158 \times 10^{18} + 0.770 \times 10^{18}))/8}{(0.158 \times 10^{18} + 0.770 \times 10^{18})/(3080 - 2 \times 8)} = 154.10 \quad (6)$$

We will assume a F Critical Value for 5% significance with n=3080 (observations) and k=8 (variables). This gives us a F Critical Value of 1.938. As we can see F Chow > F Critical Value, that is 154.10>1.938, suggesting that we can assume there is a structural break in the trend. However, this break might entail a reversal in the trend or just a discontinuity caused by the calculation method with no significant impact on the relationship between a specific regressor and financial performance, a parallel shift in the latter case. The succinct way to ascertain which

condition is present is to run regression models with both Panels, one at a time. This is the strategy we adopt and whose results are deployed in the forthcoming sections.

5. Results

5.1 Econometric Setup

The baseline model consists of three runs. The first run enters Tax Revenue (proxied by Total taxes) and Demographics (proxied by the Log of Population density, and Businesses p/100 inhabitants. The second run adds the Log of University students and a Governance measure (Winning Party's Share). The third one adds Environmental and Safety factors, proxied by Environmental expenses and Crimes p/1000 inhabitants, respectively.

We run fixed effects on municipalities, which as mentioned before accounts for unobserved factors. It is a fact that Pordata (www.pordata.pt) deploys thousands of Statistics about Municipalities, in Portugal and Europe. However, on one hand it is not feasible to saturate an econometric model with a large number of variables, losing degrees of freedom and risking multicollinearity issues[18], and, on the other hand, some effects result from factors that cannot be measured or even observable (Greene, 2000; Wooldridge, 2010).

We enter year fixed effects to avoid a particular year driving the results.

We also run two-stage least squares (2SLS), entering the lagged value of the dependent as an instrument.

In additional robustness tests we exclude possible extreme cases such as Lisbon, Porto, and the Islands of Azores and Madeira, that might drive the results in the econometric setup.

All the steps were carried out in the same way, both for Panel A and for Panel B.

5.2 Findings

Although we run plain vanilla OLS regressions as depicted in columns 1 to 3, we are more interested in analyzing the findings for panel 4 which enters municipalities' fixed effects, for the reasons expended above. Table 8 presents the results of Panel A. We witness a bias in OLS findings, unfortunately the most used model in previous studies on municipalities, toward the obvious determinant of good financial performance: tax revenue. We might consider that a municipality has sustainable finances in case it collects large suns of taxes. Intuitively, high volumes of taxes can indeed contribute to sustainability. However our results suggest that are forces are at play, both observable and non-observable ones. In the last category there might

[18] Looking at correlations only among pairs of explanatory variables can be limiting, as non-linear association can be present and not captured by Pearson or other linear correlations.

be, for example, governance factors, as governance effects are felt mainly when things go wrong as our previous examples of foul play but governance itself occurs mostly behind closed doors. A similar stance applies to safety.

In sum, plain vanilla OLS only capture marginal effects of the selected variables and can therefore give biased results versus the results of fixed effects models that cater to the unobserved effects. Most authors used plain vanilla OLS (Melo, 2013; Ribeiro et al (2019a); Ribeiro et al (2019b); Pereira, Martinho and Santos (2020)) or even just correlations coefficients (Santos, 2019; Correia and Pinto, 2020). Also, empirical studies on local governments (especially Portuguese) financial performance are scarce. Therefore, we will focus on regression 4, with municipality fixed effects.

We additional run a robust regression as some variables present high variation and some extreme cases might also be present.

Table 8

Baseline Model – Panel A - Determinants of Total Debt

Dependent Variable: Log Total Debt	OLS	OLS	OLS	Municipality Fixed Effects	2SLS (Lag. Var.)	Robust Reg.	Robust Reg.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	(Std. error)	(Std. error)	(Std. error)	(Std. error)	(Std. error)	(Std. error)	(Std. error)
Instrumental Variable							
Log Total Debt (t-1)					0.987***		
					(0.008)		
Tax Revenue							
Total Taxes	0.032***	0.021***	0.019***	-0.011***	-0.001	-0.003	-0.010***
	(0.002)	(0.002)	(0.003)	(0.003)	(0.001)	(0.003)	(0.003)
Demographics							
Log Population Density	0.274***	0.230***	0.239***	4.060***	0.015	0.419***	4.060***
	(0.026)	(0.025)	(0.026)	(0.564)	(0.008)	(0.046)	(0.801)
Business p/100 Inhabitants	-0.007	-0.147	-0.018**	-0.115***	-0.002	-0.123***	-0.115***
	(0.008)	(0.008)	(0.008)	(0.013)	(0.002)	(0.013)	(0.017)
Log University Students		0.101***	0.099***	0.020	0.002	0.078***	0.020
		(0.009)	(0.009)	(0.020)	(0.003)	(0.017)	(0.014)
Governance							
Winning Party's Share		-0.157***	-0.003***	-0.003**	0.000	-0.005***	-0.003
		(0.002)	(0.003)	(0.001)	(0.001)	(0.002)	(0.002)
Environmental							
Environmental Expenses			0.002	0.002	-0.002	0.002	0.002
			(0.006)	(0.003)	(0.002)	(0.003)	(0.003)
Safety							
Crimes p/1,000 Inhabitants			0.007**	0.003***	0.001	0.006**	0.003
			(0.003)	(0.002)	(0.001)	(0.003)	(0.003)
Constant	7.054***	8.228***	8.089***	-7.105***	0.032	8.554***	-7.105**
	(0.145)	(0.212)	(0.220)	(2.550)	(0.095)	(0.284)	(3.616)
Municipality Fixed Effects	No	No	No	Yes	No	No	Yes
Number of Observations	1,540	1,540	1,540	1,540	1,540	1,540	1,540
Adjusted R^2	0.426	0.478	0.479	0.360	0.959	0.366	0.360

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

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

As we can see if we used a plain vanilla OLS we would have obtained results that would indicate taxes would have a positive and the most prominent effect on debt, meaning that the more taxes the municipality collected, the higher their debt, and although this results were obtained by other authors such as Fernandes (2010), Melo (2013), the fixed effects model shows that higher tax collection contributes to a lowering of the debt of the municipality validating the findings of Lobo (2012) and Ribeiro et al. (2019a).

But most importantly the fixed effects models (column 4) unveils other relevant determinants, economically more important than taxes. Although taxes help lower debt, their effect is not the most important in the model since they only have a coefficient of -0.011 (sig < 0.001).

The highest effect of the model is the Log of Population Density, which in other models would have a lower coefficient, however in the fixed effects model we can see the preponderance of

this indicator (coefficient of 4,060 and sig < 0.001). It is important to note that, even if this variable was run as logarithmic of 10, accounting for this the effect the coefficient would still be higher than total taxes. This coefficient validates the staggering importance that the higher demand for resources (Ribeiro et al., 2019a) may have on debt and contradicts the findings by Melo (2013) that municipalities with higher population have less debt. Cantador (2017) concluded that populational density had no effect on municipalities performance. We posit that from a theoretical point of view demographics could contribute to better financial performance due to economies of scale or could hinder financial performance due to higher complexity. Which force is preponderant, can only be explained empirically, and this what we present in this study.

Businesses p/100 inhabitants is also shown to be a very important estimator, in demographic terms. If we just used normal OLS models, we would obtained results with lower or no significance with low coefficients. Hence we would have discarded this variable, that is also rarely used in studies of local governments, which should not be the case, since our results suggest that this variable is indeed a relevant determinant of debt (coefficient of -0.115 and sig < 0.001). This suggests that businesses have a very important role in helping lowering the municipalities debt. Our point of view is that firms are the major employers, in our recent period of analysis, as other sectors of the economy have been losing weight in the economy. More companies headquartered in a municipality help foster the development and per capita GDP, thus contributing to a dynamic economic microsystem, in part appropriated by the local governments.

The fixed effects model suggests that University students has little effect with no significance (0.020 and sig > 0.010), which would have not been the case if we ran a basic model, obtaining higher values with significance. Although we were expecting this variable to influence financial efficiency due to it being a proxy of education level (Afonso and Fernandes, 2018, as cited in Ribeiro et al, 2019b), this variable has no significance to debt levels. Since the number of higher education institutions in the country is limited and rather concentrated in few cities, a significant effect might depend on another measure, which is not at hand in the available databases. Or even the effect might come out only in some more developed regions.

The estimates of Winning Party's Share actually provide results similar to plain vanilla OLS, which validates the results of Ribeiro (2012), Melo (2013), and Guedes (2015). However, this

coefficient is economically too small (-0.003 and sig < 0.005) to have an important effect on debt.

Environmental Expenses showed no significance (0.002 and sig > 0.010) and Crimes p/100 Inhabitants had a low coefficient (0.003 with sig < 0.001).

The estimates of the robust regression are similar to the fixed effects run.

In Table 9 we present robustness checks on the previous results, which are confirmed.

Table 9

Robustness Tests – Panel A - Determinants of Total Debt

Dependent Variable: Log Total Debt	Excl. Lisbon (OLS) (1)	Excl. Porto (OLS) (2)	Excl. Lisbon & Porto (OLS) (3)	Excl. Islands (OLS) (4)	Excl. Lisbon (OLS) (5)	Excl. Porto (OLS) (6)	Excl. Lisbon & Porto (OLS) (7)	Excl. Islands (OLS) (8)
	(Std. error)	(Std. error)	(Std. error)	(Std. error)	(Std. error)	(Std. error)	(Std. error)	(Std. error)
Tax Revenue								
Total Taxes	0.020***	0.019***	0.019***	0.019***	-0.011***	-0.011***	-0.011***	-0.007**
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Demographics								
Log Population	0.221***	0.245***	0.239***	0.247***	4.064***	4.087***	4.060***	3.233***
Density	(0.026)	(0.026)	(0.026)	(0.026)	(0.567)	(0.564)	(0.564)	(0.545)
Business p/100	-0.023***	-0.017**	-0.018**	-0.002	-0.115***	-0.112***	-0.114***	-0.131***
Inhabitants	(0.008)	(0.008)	(0.008)	(0.008)	(0.014)	(0.013)	(0.013)	(0.013)
Log University	0.095***	0.100***	0.099***	0.093***	0.020	0.020	0.020	0.014
Students	(0.009)	(0.009)	(0.009)	(0.009)	(0.020)	(0.020)	(0.020)	(0.019)
Governance								
Winning Party's	-0.016***	-0.016***	-0.016***	-0.017***	-0.003**	-0.027**	-0.027**	-0.003***
Share	(0.003)	(0.003)	(0.003)	(0.003)	(0.001)	(0.001)	(0.001)	(0.001)
Environmental								
Environmental	0.002	0.003	0.002	-0.001	0.002	0.001	0.002	0.001
Expenses	(0.006)	(0.007)	(0.006)	(0.007)	(0.003)	(0.003)	(0.003)	(0.003)
Safety								
Crimes p/1,000	0.004	0.008***	0.007**	0.004	0.003	0.003*	0.003	0.002*
Inhabitants	(0.003)	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)	(0.002)
Constant	8.288***	8.017***	8.089***	8.040***	-7.088***	-7.207***	-7.105***	-3.205
(Std. error)	(0.225)	(0.224)	(0.220)	(0.224)	(2.556)	(2.541)	(2.551)	(2.450)
Municipality Fixed Effects	No	No	No	No	Yes	Yes	Yes	Yes
Number of Observations	1,535	1,535	1,530	1,390	1,535	1,535	1,530	1,390
Adjusted R^2	0.465	0.475	0.479	0.488	0.347	0.354	0.360	0.475

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

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

It is possible to denote that even excluding potential extreme cases we obtain similar results with the fixed effects model.

Table 10 presents the results for Panel B, the whole period of analysis.

Table 10

Baseline Model – Panel B - Determinants of Financial Independence

Dependent Variable: Financial Independence	OLS (1)	OLS (2)	OLS (3)	Municipality Fixed Effects (4)	2SLS (Lag. Var.) (5)	Robust Reg. (6)	Robust Reg. (7)
	(Std. error)	(Std. error)	(Std. error)	(Std. error)	(Std. error)	(Std. error)	(Std. error)
Instrumental Variable					0.741***		
					(0.011)		
Tax Revenue							
Total Taxes	1.065***	1.072***	1.027***	0.688***	0.291***	0.828***	0.688***
	(0.012)	(0.013)	(0.013)	(0.019)	(0.014)	(0.067)	(0.087)
Demographics							
Log Population Density	1.109***	1.160***	1.155***	-19.579***	0.101	2.788***	-19.579***
	(0.126)	(0.128)	(0.126)	(2.653)	(0.083)	(0.578)	(4.273)
Business p/100	0.284***	0.291***	0.239***	0.349***	0.026	0.526***	0.349***
Inhabitants	(0.044)	(0.044)	(0.043)	(0.046)	(0.027)	(0.077)	(0.062)
Log University Students		-0.115**	-0.139***	-0.334**	-0.047	-0.031	-0.334
		(0.047)	(0.046)	(0.148)	(0.030)	(0.137)	(0.259
Governance							
Winning Party's Share		-0.005	-0.008	-0.015	-0.017*	-0.012	-0.015
		(0.014)	(0.014)	(0.010)	(0.009)	(0.014)	(0.013)
Environmental							
Environmental Expenses			0.149***	0.041	0.019	0.075*	0.041
			(0.032)	(0.028)	(0.021)	(0.045)	(0.046)
Safety							
Crimes p/1,000			0.115***	-0.069***	0.029	-0.017	-0.069***
Inhabitants			(0.012)	(0.012)	(0.029)	(0.014)	(0.016)
Constant	7.920***	7.900***	5.222***	108.514***	3.625***	3.572*	108.514***
(Std. error)	(0.696)	(1.066)	(1.076)	(12.036)	(0.701)	(1.888)	(20.359)
Municipality Fixed Effects	No	No	No	Yes	No	No	Yes
Number of Observations	3,080	3,080	3,080	3,080	3,080	3,080	3,080
Adjusted R^2	0.869	0.869	0.874	0.237	0.952	0.858	0.237

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

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

Compared to the normal OLS, taxes also play an important role, although in the fixed effects model it is possible to see that the coefficient is diluted (in the fixed effects we have a coefficient of 0.688 with sig < 0.001 versus 1.027 with sig < 0.001 in plain vanilla OLS). More than that we also have other factors that gain relevance. Despite losing importance, taxes are still one important estimator. Taxes is the main source of own revenue of the municipalities hence we were expecting that the estimator was high (Taxes was also validated as a factor of financial efficiency by Ribeiro et al., 2019b), although we were expecting that this was the most important estimator, this was not the case.

Despite taxes being an important estimator, Log of Population Density is the highest coefficient in the model (-19.579 with sig < 0.001). These results go in accordance with what we obtained in the previous panel, showing that higher population contributes to a worse performance. It is

important to note that this is a logarithmic variable, but despite that, the coefficient is still fairly high compared the other variables. This, as in the previous panel, shows that there is a significant effect of the higher demand for resources by larger populations (Ribeiro et al., 2019a), and does not accord with Cantador (2017) who concluded that populational density had no effect on municipalities performance.

Businesses p/100 inhabitants have a similar result to plain vanilla OLS, however the coefficient is slightly higher (0.349 with sig < 0.001). Businesses importance is relevant, and its coefficient is high enough to be considered as an important factor.

University Students coefficient was slightly higher compared to the normal OLS models (0.349 versus 0.239), but the significance changed to sig < 0.005. This result is possibly due to the same effects generated by populational growth.

Winning's party share shows a low coefficient and no significance (-0.015 and sig > 0.010), hence we believe this variable is not important to financial independence. From an analysis to the data presented at Pordata, on average the municipalities with majority had lower financial independence, but we could not prove this to be the case in the regression models. Ribeiro et al. (2019b) has tried to prove this but was also not able to.

As previously seen in the first panel, contrary to what we were expecting due to the growing importance of sustainability factors (Spiliakos, 2018), Environmental Expenses have no effect of Financial Independence, exhibiting a coefficient of 0.041 and sig > 0.010.

The estimate on Crimes, on the other hand, amounts to -0.069 with sig < 0.001. Again plain vanilla OLS would have told a different story suggesting that a higher criminality rate would improve the municipality's financial performance. The fixed effects model showed that this was not the case, and that there is indeed benefit in a municipality that has lower crime rates, in terms of financial performance.

The robust regression (column 7) with fixed effects showed the same coefficients as the model on column 4, which is reassuring.

Table 11 presents robustness checks on the previous results for this longer period of analysis, for which we conducted some more tests, having a larger number of observations for each subsample.

Table 11

Robustness Tests – Panel B - Determinants of Financial Independence

Dependent Variable: Financial Independence	Excl. Lisbon (OLS) (1)	Excl. Porto (OLS) (2)	Excl. Lisbon & Porto (OLS) (3)	Excl. Islands (OLS) (4)	Excl. Lisbon (OLS) (5)	Excl. Porto (OLS) (6)	Excl. Lisbon & Porto (OLS) (7)	Excl. Islands (OLS) (8)
	(Std. error)	(Std. error)	(Std. error)	(Std. error)	(Std. error)	(Std. error)	(Std. error)	(Std. error)
Tax Revenue								
Total Taxes	1.034***	1.025***	1.031***	0.989***	0.697***	0.691***	0.700***	0.670***
	(0.013)	(0.013)	(0.013)	(0.014)	(0.019)	(0.013)	(0.020)	(0.020)
Demographics								
Log Population	1.085***	1.189***	1.119***	1.472***	-20.100***	-19.548***	-20.077***	-22.177*
	(0.127)	(0.127)	(0.128)	(0.125)	(2.729)	(0.127)	(2.740)	(2.691)
Density	0.214***	0.250***	0.226***	0.360***	0.343***	0.349***	0.342***	0.335**
Business p/100 Inhabitants	(0.044)	(0.043)	(0.044)	(0.045)	(0.046)	(0.044)	(0.046)	(0.046)
Log University	-0.157***	-0.128***	-0.147***	-0.190***	-0.332**	-0.333**	-0.332**	-0.113***
Students	(0.046)	(0.046)	(0.046)	(0.045)	(0.148)	(0.046)	(0.148)	(0.158)
Governance								
Winning Party's Share	-0.008	-0.008	-0.008	0.001	-0.014	-0.014	-0.014	-0.015
	(0.014)	(0.014)	(0.014)	(0.014)	(0.010)	(0.014)	(0.010)	(0.011)
Environmental								
Environmental Expenses	0.145***	0.155***	0.150***	0.070**	0.036	0.040	0.034	0.059
	(0.032)	(0.032)	(0.032)	(0.035)	(0.028)	(0.032)	(0.028)	(0.031)
Safety								
Crimes p/1,000 Inhabitants	0.108***	0.120***	0.112***	0.122***	-0.068***	-0.068***	-0.067***	-0.080**
	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)	(0.014)
Constant	5.901***	4.823***	5.510***	3.771***	110.242***	107.968***	109.716***	120.542**
(Std. error)	(1.094)	(1.089)	(1.111)	(1.077)	(12.334)	(1.094)	(12.346)	(12.169)
Municipality Fixed Effects	No	No	No	No	Yes	Yes	Yes	Yes
Number of Observations	3,070	3,070	3,060	2,780	3,070	3,070	3,060	2,780
Adjusted R^2	0.872	0.872	0.870	0.883	0.229	0.226	0.420	0.304

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

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

Running the robust regressions with fixed effects to verify if the results were close to those of the previous fixed effects model, we verify that the results are similar showing no significant differences.

Table 12 summarizes the results obtained.

Table 12

Summary of hypotheses' validation

Hypothesis	Validation	Panel A Fixed Effects – Total Debt		Panel B Fixed Effects – Financial Independence	
H1: The proportion of taxes in the municipality's total income is a function of financial independence and total debt.	Validated	Total Taxes -0.011*** (0.003)	Taxes play an important role on Total Debt and Financial Independence. Contrary to the results obtained by other authors such as Fernandes (2010), Melo (2013), the fixed effects model showed that higher tax collection contributes to a lowering of the debt of the municipality validating the findings of Lobo (2012) and Ribeiro et al. (2019a).	Total Taxes 0.688*** (0.019)	In terms of Financial Independence, although relevant, Population Density proved to be more important.
H2: The demographic factors are a function of financial independence and total debt.	Validated	Log Population Density 4.060*** (0.564) Business p/100 Inhabitants -0.115*** (0.013) Log University Students 0.020 (0.020)	The hypothesis was validated for Population Density (highest coefficient in both panels), and for businesses (high coefficients and significance in both panels).	Log Population Density -19.579*** (2.653) Business p/100 Inhabitants 0.349*** (0.046) Log University Students -0.334** (0.148)	Population Density is the highest coefficient, and businesses also have high coefficients and significance. Although University Students were not significant when the Dependent Variable was Total Debt, the effect of this variable was important on Financial Independence.
H3: Governance factors are a function of independence and total debt.	Partially Validated	Winning Party's Share -0.003** (0.001)	We were only able to validate that the variable Winning Party's Share is a factor of Total Debt, and although this goes in accordance with Ribeiro (2012), Melo (2013) and Guedes (2015), the coefficient is really low, downplaying the importance of this variable.	Winning Party's Share -0.015 (0.010)	Not validated
H4: Environmental and safety factors are a function of financial independence and total debt.	Partially Validated	Environmental Expenses 0.002 (0.003) Crimes p/1,000 Inhabitants 0.003*** (0.002)	The variable Crimes p/1000 inhabitants had no significant values for Total Debt, as well as Environmental Expenses for both panels.	Environmental Expenses 0.041 (0.028) Crimes p/1,000 Inhabitants -0.069*** (0.012)	We could only validate that Crimes p/1000 inhabitants were a factor of Financial Independence. Environmental Expenses had no significance for both panels.

Source: Own elaboration

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

We were able to validate H1 and H2, while partially validating H3 and H4. The most important factors were the ones used to answer H1 and H2 while the factors used to answer H3 and H4, although significant, had low coefficients.

6. Conclusions

Decentralization has become an even more topical issue in Portugal. It has been in the political agenda in the last decades, since the fall of Estado Novo in 1974, and now the Prime Minister is referring to the theme in its campaign for the forthcoming elections, promising to progress on regionalization more steadily until 2024 (Lusa, 2021).

This stance calls for Portuguese municipalities' financial sustainability, as they will be ascribed more powers, but most importantly, will have more duties to their inhabitants. By having to deploy a wider range of services to the communities.

Portuguese municipalities have been lacking good financial performance over the years (Ribeiro, 2021). Also, worse-performing municipalities tend to lose population to urban areas (Letelier, 2005) which are better developed and have better performances, and by losing population, they are also losing revenue, in a non-benefiting and self-feeding cycle that is hard to break.

Adding to this, Portuguese municipalities had a hard time managing their debt in the past, which was not sustainable until the central government undertook measures to control their indebtedness (by imposing new metrics and limits). Despite the recovery in some local governments, the Portuguese municipalities still face several hurdles to stay independent. Most municipalities are not able yet to achieve the 50% ratio of financial independence, defined as a threshold to financial sustainability.

Our study uses a fixed effects model (Municipality Fixed Effects), yielding a total of 3,080 observations from 2009-2018, in a panel data setup. The fixed effects model caters to unobserved effects that usually are missed in the vanilla OLS models, deployed in most previous studies. We have also included all 308 municipalities in the study, which is the all universe. To our knowledge the sample and the econometric setup are a novel contribution to empirical studies on municipalities.

Our results suggest that the most important factor of the municipalities' financial performance is population density. Although previous studies believed that taxes, from being the own source of revenue of municipalities, would have the largest impact, and also that attracting population could improve indicators (Melo, 2013) or even have no effect (Cantador, 2017), our results have a different contribution. We find that financial performance is a decreasing function of population density. This is most likely caused by the effect of higher expenses due to higher services demand from population growth and higher complexity of running larger hubs.

Although taxes are an important indicator, contrary to what was supposed by Fernandes (2010) and Melo (2013) (it is important to note that in 2010 a 2013 the available data and local government landscape was different, but despite this, Lobo (2012) in the same time span, believed lower debt levels were helping in reducing debt), and from a preliminary view of Figure 10 higher revenue from taxes does not translate into acquiring more debt. Rather, this revenue source helps lower debt levels, a finding according to Lobo (2012)'s and Ribeiro et al. (2019a)'s empirical results.

Businesses have a significant importance to financial performance, helping in the lowering of Debt and contributing to Financial Performance. The estimate of Businesses (proxying the number of firms headquartered in the municipality) was economically higher and the importance of this variable cannot be understated. We found no studies that ran this variable, hence we believe this could be a great help to policy makers and local authorities, as so far this may have been an unknown fact.

Other less economically significant determinants include the presence of University Students, which were not relevant to Debt but decreased Financial Independence. Winning Party's Share was believed by many authors to influence debt (Ribeiro, 2012; Melo, 2013; Guedes, 2015). One might expect that sustainability factors that are more used nowadays and are gaining popularity (Spiliakos, 2018) were going to influence results. However, these factors do not present an influence on Debt levels. Environmental Expenses also had no effect on Financial Independence, with only the coefficient of Crimes p/1000 inhabitants being relevant.

In sum, municipalities also should thrive to attract and fixate more businesses. This was one of the estimators that was considered to lower Debt and increase Financial Independence in the models. Although Taxes are for sure important, it is important to understand that there is a limit of taxation to where municipalities start putting a lot of stress in their inhabitants and possibly businesses. On the other hand, there is possibly no measurable limit to how much businesses can a municipality attract and fixate. Our results suggest that although municipalities only have one main source of income, this source has the counter effect of population density. There was a generalized perception that since there was a concentration in urban areas that were more developed and had higher financial independence, that population could be influencing performance. Also, we find that sustainability factors such as environment or safety play little to no influence on financial performance. Majority rule, which was believed to be a determinant

of Debt, has only a minor effect. Our results suggest that Businesses have a great impact in municipalities performance, which opens a new angle for Portuguese municipalities to explore.

Our results can help local authorities to gauge their financial performance and become fitter for the expected decentralization process.

6.1. Limitations

Limitations to the study included the change in measures of debt in municipalities, which only allowed to run the model with 5 years of data in Panel A, being that a model englobing a longer period could have yielded better results. This change was proved to be structural by the Chow-Test. Other indirect limitations are the fact that municipalities still lack transparency, meaning that with more accurate data from the municipalities it would be possible to fine-tune the estimators.

6.2. Suggestions for future research

For future studies, we suggest a factorial analysis with the aim to describe the variability among the many available variables. Also, this study could be repeated in the future within a larger period of time, especially including updated data.

It could also be important to understand the effect of the new accounting system in local government's indicators. It is important to note that only a third of the public entities was already using it as of 2020 (Agência Lusa, 2020), which can delay the effects caused by this measure.

Other studies could be conducted analyzing the impact of covid-19, showing how the pandemic affected the municipalities performance, or in other hand, how the municipalities performance influenced a better response to covid incidence in municipalities.

Another suggestion would be how education plays an important role in municipalities' performance, either by municipalities' infrastructures such as higher education institutions or schools, by the municipality's ability to retain higher qualification employees. We did not measure directly the municipalities education level, rather university students were used. But it is understandable that municipalities may not be also able to retain graduates, which is also an interesting effect to be studied.

In terms of Governance it would be interesting to analyze the voting demographics, since when doing the literature review, we found that younger voters are correlated with an increase in debt

at the state level, but on the other hand, elderly voters are correlated to decreased debt (Ellis, Schancsberg, 1999).

To verify which areas of business are more important to municipalities is a possible research avenue. In forthcoming studies, the importance of environmental expenses can be studied with other variables, deepening the studying and the understanding of the type of relationship of these indicators with the municipalities.

Analyzing case studies in Portuguese municipalities applying a BSC that contains the key variables here identified, to ascertain the potential increase in its financial performance, especially with incentive-based goals for the municipality staff, translates into another possible avenue.

There could also be space for a comparative analysis of these indicators and other similar indicators in other countries, studying how different municipalities around the world react to different environments.

The above possible studies are possible using our large database and Pordata (www.pordata.pt).

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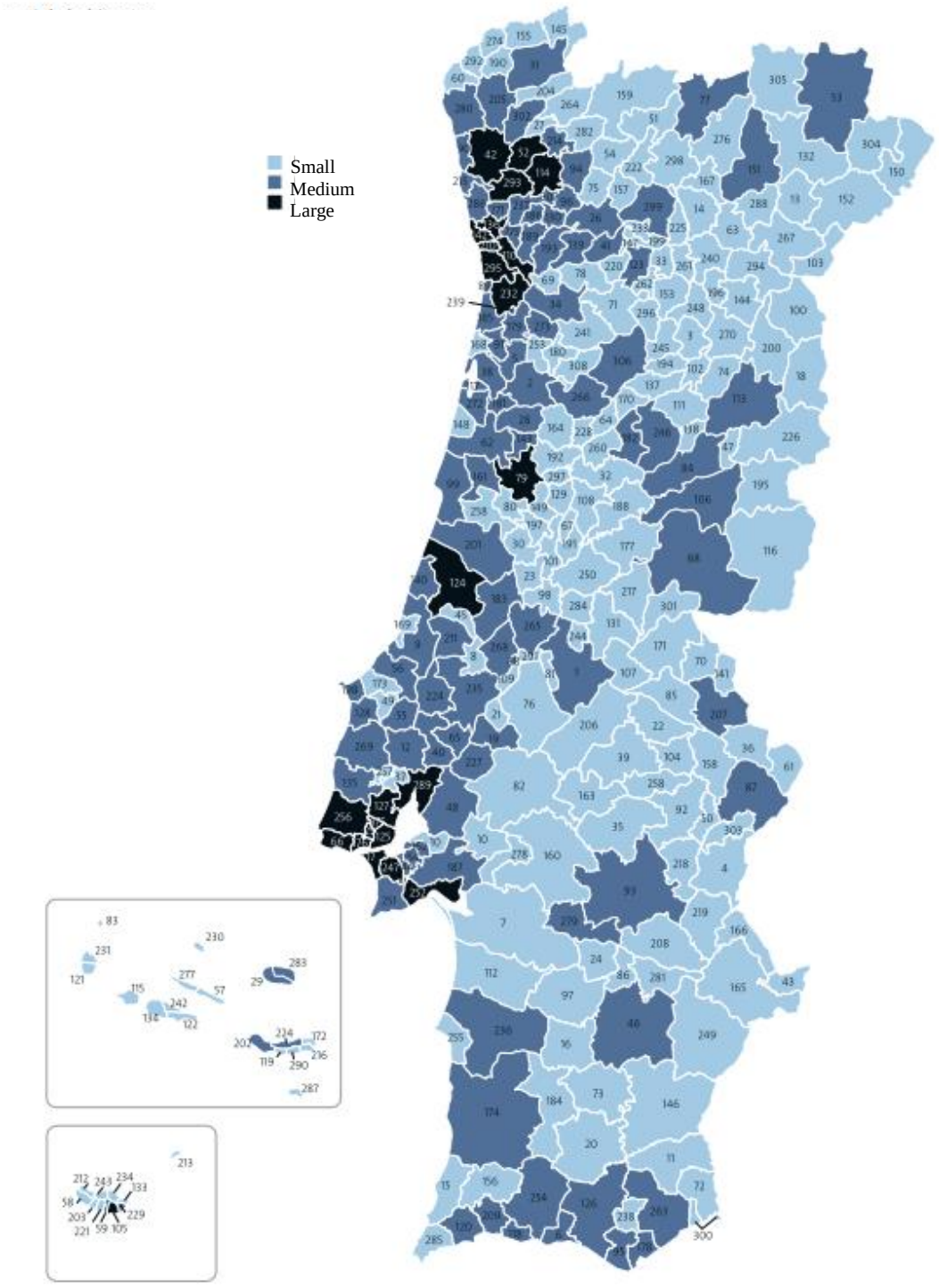
8. Annexes

Annex 1

Distribution of small, medium and large municipalities in Portugal in 2019



Note: 24 Small municipalities have less than 20,000 inhabitants, 98 Medium municipalities have between 20,000 and 100,000 inhabitants and 186 Large ones over 100,000.

Source: Fernandes et al. (2019).

Annex 2

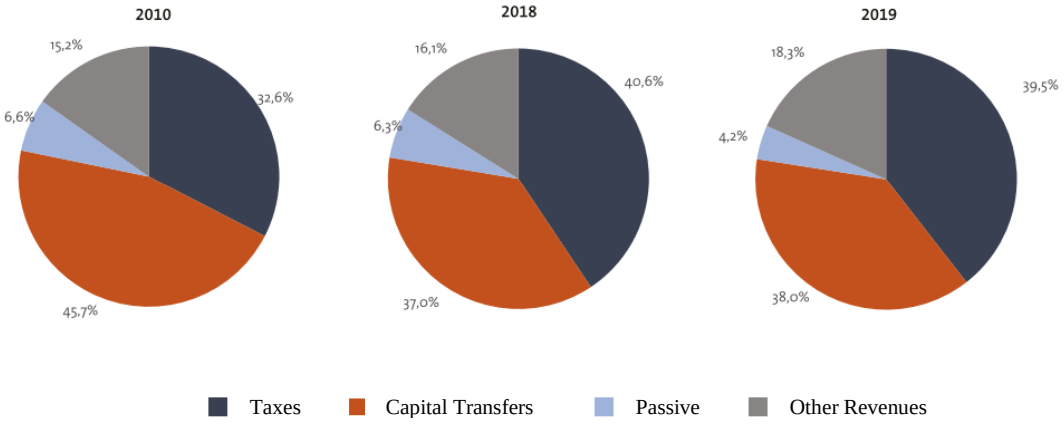
Components of performance measurement in municipalities

	Component	Aim
1.	Variety of objectives	To develop a number of different performance indicators, including mutual impact
2.	Competition	To prepare a list of standardized criteria, against which indicators must be evaluated, made more comparable
3.	Public interest	To ensure the level of community satisfaction, commitment by identifying customer needs, conducting customer satisfaction surveys, benchmarking services
4.	Organizational structure	To ensure proper reporting within the organization
5.	Management, regulatory aspects	To ensure the benefit from information for entities
6.	Data validation	To ensure valid date in order to create and communicate an accurate picture
7.	Participants/Staff	To train staff to collect and validate relevant data
8.	Culture	To set the vision, ambitions, priorities, targets, staff management, motivation, support systems, to monitor response to demands, understanding and use of performance measurement
9.	Leadership	To ensure an effective performance measurement framework, link to other aspects of corporate governance (risk, financial management)
10.	Learning	To train staff to understand and trust performance measurement

Source: Kloviene and Valanciene (2013).

Annex 3

Structure of revenue collected in 2010, 2018 and 2019



Source: Fernandes et al. (2019).

Annex 4

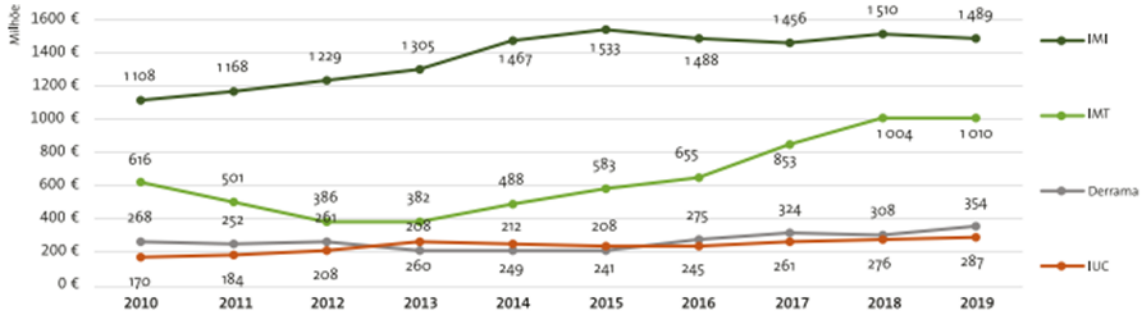
Characterization of Portuguese municipalities compared to other countries' municipalities

Country	Avg. Population	PIB per capita ($)	Nº Municipalities	% Mun. <2000 inhab.	% Mun. >20000 inhab.	Mun. Expenses (% Public Expenses)	Mun. Investment (% Public Investment)	Mun. Revenue (% Public Revenue)
Alemanha	7 449	48 947	11 054	54%	6%	18,0%	33,1%	18,1%
Áustria	4 166	50 503	2 098	55%	1%	16,8%	27,6%	17,2%
Bélgica	19 177	46 607	589	1%	26%	13,3%	27,8%	14,3%
Dinamarca	58 459	49 021	98	1%	93%	65,0%	40,4%	66,1%
Eslováquia	1 854	30 460	2 930	85%	2%	15,8%	19,6%	18,1%
Eslovénia	9 739	32 730	212	12%	8%	18,2%	40,9%	19,4%
Espanha	5 720	36 318	8 124	72%	5%	13,7%	25,0%	16,9%
Estónia	16 657	29 741	79	5%	9%	23,1%	23,7%	23,6%
Finlândia	17 670	43 378	311	14%	18%	40,2%	54,3%	40,7%
França	1 885	41 364	35 357	86%	1%	19,8%	55,2%	21,3%
Grécia	33 181	26 746	325	7%	54%	7,1%	18,5%	7,7%
Holanda	44 816	50 540	380	1%	69%	31,7%	47,8%	31,6%
Hungria	3 088	26 701	3 178	76%	2%	12,9%	27,6%	14,1%
Irlanda	151 078	72 485	31	0%	100%	7,6%	15,3%	8,1%
Islândia	4 541	50 012	74	72%	4%	27,2%	35,0%	21,5%
Itália	7 617	38 370	7 960	44%	6%	28,9%	52,6%	31,0%
Luxemburgo	5 727	102 019	102	37%	3%	11,7%	35,8%	12,0%
Noruega	12 408	58 792	422	22%	13%	33,2%	41,6%	30,1%
Polónia	15 507	27 058	2 478	1%	14%	31,3%	35,7%	34,0%
Portugal	**33 524**	**30 606**	**308**	**2%**	**41%**	**12,6%**	**52,0%**	**14,2%**
Reino Unido	167 898	42 622	391	0%	100%	24,2%	34,8%	25,1%
República Checa	1 688	34 753	6 258	89%	1%	25,8%	41,2%	27,9%
Suécia	34 218	48 905	290	0%	42%	50,6%	50,3%	48,5%
Suíça	3 768	63 889	2 222	61%	2%	21,6%	31,4%	21,3%
Average	**27 576**	**45 107**	**3 553**	**33%**	**26%**	**23,8%**	**36,1%**	**24,3%**

Source: Fernandes et al. (2019).

Annex 5

Evolution of collected direct taxes between 2010 and 2019



Source: Fernandes et al., (2019)

Annex 6

Predictions and execution of revenue in Portuguese municipalities

Millions of Euros

	Mandate 10-13				Mandate 14-17				Mandate 18-21	
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Initial Predicted Revenue	s.i.	s.i.	s.i.	s.i.	s.i.	s.i.	s.i.	9.269,1	9.594,7	10.318,4
Corrected Predicted Revenue** (a)	12.995,1	12.595,6	11.674,3	10.855,5	9.323,9	8.784,0	8.802,2	9.276,5	9.486,9	10.017,5
Liquidated Revenue*** (b)	7.978,1	7.887,7	7.699,3	7.806,2	7.465,9	7.525,0	7.799,4	8.389,0	8.711,1	9.181,4
Revenue to collect in the beginning of the year (c)	651,3	713,5	789,2	777,6	750,1	858,2	809,2	834,7	738,4	693,6
Collected and Liquidated Revenue**** (d)	7.859,5	7.771,6	7.683,4	7.806,3	7.337,2	7.518,4	7.738,0	8.311,5	8.539,6	9.041,1
Diference between predicted revenue and collected revenue (a-d)	5.135,6	4.824,1	3.990,8	3.049,1	1.986,8	1.265,5	1.064,2	965,0	947,3	976,4
Diference between predicted revenue and liquidated revenue (a-b)	5.017,0	4.707,9	3.789,0	3.049,2	1.858,0	1.259,0	1.002,8	887,5	775,8	836,1
Revenue to collect at the end of the year (b+c)-d	770,0	829,7	805,1	777,5	878,8	864,8	870,6	912,2	909,9	833,9
Revenue collected/(liquidated revenue + revenue to collect at the end of the year (d/(b+c))	91,1%	90,4%	90,5%	90,9%	89,3%	89,7%	89,9%	90,1%	90,4%	91,6%
Liquidated revenue/Predicted revenue (b/a)	61,4%	62,6%	66,0%	71,9%	80,1%	85,7%	88,6%	90,4%	91,8%	91,7%
Execution degree of colected revenue (d/a)	60,5%	61,7%	65,8%	71,9%	78,7%	85,6%	87,9%	89,6%	90,0%	90,3%

*The values presented in this table, for predicted, liquidated and collected revenue, do not include the previous management balance.

**Amounts of predicted revenue encompassing all the modifications and budget reviews done this economic year.

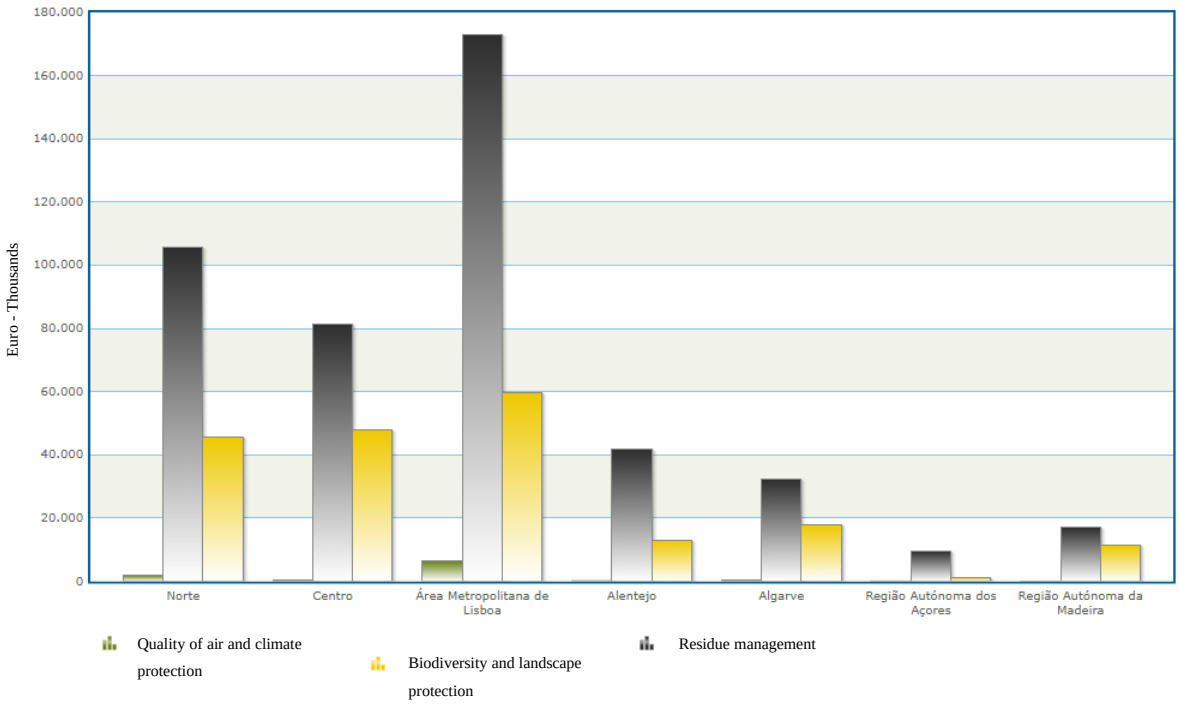
***Amounts deducted of nullified liquidations.

****Corresponding to the amount of gross collected revenue deducted of the refunds done in the respective economic year.

Source: Fernandes et al. (2019).

Annex 7

Expenses of municipalities in environmental activities by factor



Source: www.pordata.pt.