ISCTE ⬡ IUL

Instituto Universitário de Lisboa

School of Business

The impact of procurement practices in the municipality auditing market

Ana Isabel Calado da Silva Pinto

A thesis submitted in partial fulfillment of the requirements for the

Degree of Doctor in Accounting

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Resumo:

Os procedimentos de contratação pública utilizados para a auditoria externa nos municípios são um meio para garantir que, por via desta auditoria, haja qualidade na prestação de contas. Os municípios têm um papel fundamental no setor público, assim, a sua monitorização é primordial na garantia do equilíbrio delicado entre a dívida pública e a economia local.

Nesta tese, motivada pela teoria da agência, investigo no contexto municipal, não apenas o cumprimento da legislação que obriga à contratação de auditoria externa, mas também a utilização de procedimentos de contratação pública na contratação de auditoria externa, os honorários de auditoria, e a perceção de qualidade de auditoria.

A introdução de auditoria externa, obrigatória nos municípios em 2007, resulta da utilização da base contabilística do acréscimo e da necessidade da administração central monitorar a sustentabilidade da dívida e saldos dos municípios. O cumprimento da legislação não é imediato e alguns fatores políticos podem explicar parcialmente o processo de adoção da norma legal.

Este estudo conclui que o critério de seleção baseado no preço mais baixo é utilizado pela maioria dos municípios, levantando dúvidas sobre a razoabilidade dos honorários de auditoria, e até da qualidade da auditoria. Este critério de seleção é influenciado, não apenas por outras componentes do procedimento de contratação, mas também por fatores políticos e a teoria da agência.

O modelo de honorários de auditoria é alargado no sentido de incluir aspetos dos procedimentos de contratação pública, simultaneamente com fatores políticos e a teoria da agência. A perceção de qualidade na auditoria também é estudada conjuntamente com aspetos da contratação pública e a teoria da agência. Os resultados confirmam uma associação negativa entre a perceção de qualidade de auditoria e a utilização do critério de seleção baseado no preço mais baixo.

Palavras - chave: administração local, competição política, critério de seleção do preço mais baixo, honorários de auditoria, perceção de qualidade na auditoria.

JEL Classification: M41; M42 Auditing.

Abstract

Audit services procurement is a means to an end as far as financial statements quality is concerned. Municipalities play an important role in the public sector and its monitoring is of utmost importance in terms of the delicate balance of public debt and local economics. In this dissertation, motivated by agency theory, I study, not only the external auditing abidance to the law, but also the determinants of audit services public procurement, the audit fees, and the perception of audit quality of Portuguese municipalities.

The introduction of external compulsory audits in municipalities in 2007 is a response to the application of accrual accounting in 2001, and the need for central government monitoring of municipalities' debt sustainability, and budget balances. The compliance is not immediate, and political factors are involved.

This study also concludes that public procurement with lowest price, or where price is the sole criterion, is used by the majority of municipalities raising reasonable doubts about audit fees, and audit quality. This selection criterion is affected not only by other aspects of the procurement process, but also by political competition and agency theory.

The audit fees model is extended to include public procurement features, along with political competition, and agency theory. The perceived audit quality is also studied against public procurement, and agency theory. The results confirm a negative association between the audit quality perception and the lowest price selection criterion.

Key words: local government, political competition, lowest price selection criterion, audit fees, perceived audit quality.

JEL Classification: M41; M42

Acknowledgement

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Abbreviations

AICPA – American Institute of Certified Public Accountants

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

AR - Assembleia da República (Assembly of the Republic)

CCRE - Council of European Municipalities and Regions

CIGAR - Comparative International Governmental Accounting Research Network

CLC – Certificação Legal de Contas (Opinion)

CPA - Certified Public Auditor or Accountant

DGAL - Direção Geral das Autarquias Locais (Local Government Directorate)

EC – European Commission

ECB – European Central Bank

EDP - Excessive Deficit Procedure

ESA - European system of national and regional accounts

EU - European Union

FAM – Fundo de Apoio Municipal (Municipal Support Fund)

GAO – General Accounting Office

GDP – Gross Domestic Product

IMF – International Monetary Fund

INTOSAI - International Organization of Supreme Audit Institutions

ISSAI - International Standards of Supreme Audit Institutions

MTO - Medium-term Objective

OCDE - Organization for Economic Co-operation and Development

OROC - Ordem dos Revisores Oficiais de Contas (Portuguese Institute of Statutory Auditors)

OTOC - Ordem dos Técnicos Oficiais de Contas (Certified Public Accountant Board)

PAEF - Programa de Ajustamento Económico e Financeiro (Financial and Economic Adjustment Program)

PAEL - Programa de Apoio à Economia Local (Local Economic Support Program)

ROC - Revisor Oficial de Contas (Certified Public Auditor)

SAI - Supreme Audit Institutions

VIF - Variance Inflation Factor

TC – Tribunal de Contas (Court of Auditors)

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1. Introduction

Municipalities and counties in local government play an important role in the public sector in most European countries (Johnsen *et al.*, 2001). Municipalities can support development projects directly in the territory and establish a full cooperation with national governments and European institutions concerning growth. According to the study "EU subnational governments – 2010 key figures" published online by the Council of European Municipalities and Regions (CCRE) there are 89,149 subnational governments (excluding regions) in the 27 Member States of the European Union (EU)[1].

The above mentioned study indicates that the public expenditure by the local sector alone represents, on average, 13.7% of EU's Gross Domestic Product (GDP) and 27.0% of its total public expenditure, with a value of 1,676.8 billion euro in 2010. Most municipalities pay special attention to infrastructure services for local welfare in different fields of activity (Obermann and Kostal, 2003). The study by CCRE (2010) notes that municipalities' main areas of expenditure are education (19.4%), social protection (18.7%) and general services (14.0%).

The local sector weight in the economy is quite large. According to CCRE (2010), the local sector debt of the EU 27 represents 6.8% of the GDP and 8.5% of the total public debt. In terms of capital investment, the local sector's investment represents 1.6% of the GDP and 61.7% of the total public capital expenditure, around 201.3 billion euro in 2010. These numbers are indicative of the importance of the local government sector not only in the public sector but also in the economy as a whole.

In May 2011, Portugal signed with the International Monetary Fund (IMF), the European Commission (EC), and the European Central Bank (ECB), named TROIKA, a "Memorandum of Understanding on Specific Economic Policy Conditionality"

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[1] At www.ccre.org. There is no updated version.

(Memorandum), which includes an adjusting program called Financial and Economic Adjustment Program [Programa de Ajustamento Económico e Financeiro (PAEF)][2]. The purpose of this Memorandum is to correct Portugal's macroeconomic and financial imbalances and achieve a structural change in the Portuguese economy, creating specific conditions required for achieving sustainable economic growth, a means generator of employment.[3] The Memorandum has specific points that target local governments, the most important of which are:

- Revise the value of buildings for taxation purposes – municipality tax;

- Revise municipalities 'money transfers[4];

- Compel municipalities to reduce the number of directors and chiefs[5];

- Prevent new public companies constitution, either centrally or locally;

- Change central and local companies' legislation.

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[2] The TROIKA term is commonly used to refer to the group composed of the European Union, European Central Bank, and International Monetary Fund, which have been responsible for the implementation of austerity measures to circumvent rising public debt and the signature of bail-out plans in Greece, Ireland, and Portugal.

[3] In its original wording: "Corrigir os desequilíbrios macroeconómicos e financeiros e proceder a uma alteração estrutural da economia portuguesa, criando as condições para um crescimento económico sustentado e gerador de emprego".

[4] In its original wording: "Reduzir, em pelo menos 175 milhões de euros, as transferências para as administrações local e regional, no âmbito do contributo deste subsector para a consolidação orçamental" – "Reduce by at least 175 million euros the value of transfers to the Local and Regional Administrations (…)".

[5] In its original wording: "Cada município tenha o dever de apresentar o respectivo plano para atingir o objectivo de redução dos seus cargos dirigentes e unidades administrativas num mínimo de 15% até final de 2012" – "Reduce the number of directors and chiefs by 15% by the end of 2012".

The auditing profession is a major player in the municipal governance system, along with citizen voters and state governments (Baber *et al.*, 2010), as a provider of information credibility and quality in financial statements (Watkins *et al.*, 2004).

The public administration needs auditing to assure compliance and credible financial indicators. The outsourcing of regular audits is mandatory as the state has no capacity to execute, in time, all necessary audits. Authors point out the importance of well conducted audit procurement as a way to assure audit quality. They also note that it involves a bit more than just competitive audit fees.

EU regulation demands that all acquisitions made by the public sector use a tendering process. The auditing market is no exception. Municipalities can choose a procurement process and then the procurement selection criteria. Thus, they can either pick their external auditor based solemnly on lower price or according to an economically advantageous proposal based upon technical factors which may or not include pricing considerations. The competitive bidding may lead tenders to use dumping prices or pressure audit time budget, thereby jeopardizing audit quality.

The number, diverse nature, and economic importance of municipalities, and in the Portuguese case, their recent adoption of both accrual accounting and external auditing, creates an opportunity to study not only the application of agency theory in the relationship between central administration and municipalities, but also the impact of public procurement in the auditing market and on the auditing quality as a whole. As Lowenson *et al.* (2007) states, the specific characteristics of the public sector have created an expert market in the auditing profession [6] [7].

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[6] Prior to the Decree – Law 54-A /99, 22nd January, municipality accounting was cash based.

[7] Prior to Law 2/2007, the External Auditing could only be performed by either the Court of Auditors ("Tribunal de Contas") or Finances General Inspector ("Inspecção Geral de Finanças", a Government body).

My study has several objectives. The first is to study the legal compliance of municipalities as far as external auditing is concerned. As the external auditing became compulsory in 2007, based upon certain criteria (municipality participation in companies and foundations), I seek to know (i) whether municipalities comply with the legislation, (ii) and if there are political factors involved in the legal compliance.

Contrary to central government, where the auditor is appointed by two or more ministers, in the municipalities the external auditor is hired under a procurement process with no special specifications. The procurement process is determined by the procurement process law. There are several procurement practices, and two selection criteria. The selection criterion can lay on the lowest price, or the most economically advantageous proposal. My second objective is to investigate whether the lowest price is generally used by municipalities, and the factors that may determine this choice of selection criterion. The factors under study are based on (i) the sophistication of the procurement process, (ii) the political competition, (iii) the citizen's interest, and (iv) determinants tackled in the agency theory known as audit risk, auditee size and complexity, and manager ownership[8].

The third objective is to study audit fees. The audit fees in municipalities have been thoroughly studied by several accounting researchers. In my study of audit fees I examine, not only the influence of central government transfers, political competition, and internal auditing, but also the impact of the public procurement process.

My fourth objective is to study perceived audit quality. Though audit quality is quite difficult to study, given its unobservable nature, I study the perceived audit quality. The reasoning is the following: if audit fees are driven downward by tender competition, then the auditor can maintain equilibrium only by reducing budgeted auditing hours. If the auditor reduces the budgeted hours, there is a possibility that its inspection may not

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[8] Manager ownership in municipalities is based upon the concept of independence from central government. The lower the level of central government transfers, with respect to total revenues, the greater the autonomy, and thus, the greater the weight of the manager ownership.

uncover errors in the municipalities' financial statements known to its financial directors or chiefs. Thus, the perceived audit quality is studied against (i) the public procurement process on one hand, and (ii) the audit fees on the other.

I adopt a positivistic and quantitative approach. I use agency theory as the basis for my study on information asymmetry in the relationship of both, central and local government, and auditee and auditor.

The collection of data uses different sources. I survey heads of financial divisions in 308 municipalities regarding local companies' participation (legal criterion for external auditing), municipality characteristics (population, number of employees), public procurement practices (number of tenders, procurement process, selection criteria, factors of the most advantageous proposal), opinion on external auditing, audit fees, auditor type, auditor's name, auditor tenure, and perception of auditor's expertise. The period of the study comprises five years, from 2007 to 2011. In 2007 the external auditing became compulsory. At the end of 2011 I initiate the survey design, and start the process of collecting data.

The design of the survey is checked with experienced professionals, as many questions are very technically driven. The survey is designed, e-mailed, and collected using the SurveyMonkey software tool. The respondents are invited to respond on-line to questions regarding the five year period. I send several repeating mails for non-respondents, and end up with 57 valid responses from municipalities.

Additionally, I also obtain financial accounts for the above mentioned period, and use public-access platforms to collect data regarding population, districts, political parties, and procurement. Furthermore, I ask the Portuguese Institute of Statutory Auditors for data regarding municipalities and certified public auditors for the five year period.

This study finds that compulsory external auditing, introduced in municipalities in 2007 due to legislation change, is responsible for external auditing in municipalities, though not every municipality abided by the law. Municipalities with the socialist party as President, converging with the central government leading political party, seem to abide by the law more than do other municipalities. There is a statistically significant

association between the socialist party and external auditing, reinforcing the need to take into consideration the political factor when studying the government sector.

The procurement process model extends prior research on the lowest price selection criterion, along with agency theory and political competition, by studying every aspect of the procurement process. The majority of municipalities tend to acquire auditing services based upon the lowest price selection criterion. I find that the lowest price selection criterion is used without regard to the citizen's interest or transfers dependency of the municipality, though a surprising statistically significant positive association with auditee complexity is found.

Neither the negative association with bids, nor the number of proposals received are statistically significant. Nevertheless, the use of lowest price as a selection criterion decreases with increased complexity, thus, sophistication of the public procurement process in terms of (i) increased mandates (number of years covered by the procurement process) or (ii) increased weight of factors besides price.

As in previous studies, the political competition influences the use of the lowest price as the selection criterion. I find a statistically significant negative association between the use of the lowest price as the selection criterion, and the increased weight of the governing socialist or social democratic political parties.

Audit fees in local government entities are extensively studied in accounting research. The introduction of public procurement process variables in the model empowers it. I find that the combination of bids and the weight of other factors besides price, using principal components analysis (representing a higher sophistication of the public procurement process), have a statistically significant negative association with audit fees. I also find that audit fees are positively associated with citizens interest. Internal auditing within the municipality reduces audit fees, as does political competition in socialist municipalities.

As perceived audit quality can be measured only through a survey, I ask respondents about audit quality attributes and use a principal component analysis variable as a dependent variable combined with auditor expertise and reputation. Though it is not possible to prove that superior audit quality is related to multi-criteria procurement

practices, I note a positive association between perceived audit quality and the more sophisticated procurement process. I also find a statistically significant positive association between perceived audit quality and audit fees. As the importance of audit fees grows as a public procurement selection criterion, so does perceived audit quality. The perceived audit quality is also positively associated with transfers dependency and the level of indebtedness. Surprisingly, the perceived audit quality is negatively associated with the auditee complexity and citizens interest.

This study contributes to the literature by examining audit services procurement within an emerging municipality, the Portuguese audit market, and tests procurement practices being developed under EU regulations. Regulators should be especially advised on two aspects: (i) non-compliance with the law and (ii) the extensive use of the lowest selection criterion in contracting external auditing, which may jeopardize the purpose of external auditing law enforcement.

This study extends prior research regarding procurement practices and audit fees, introducing more developed public procurement practices in the survey and regression models. The findings are of particular interest to academics in accounting research who can benefit from the survey design, and the extensive database necessary to fuel four different models in various aspects: (i) accounting for law compliance, (ii) political competition, (iii) financial data, (iv) auditing data, and (v) comprehensive information regarding the public procurement process.

This study is of interest to professionals working in auditing and especially those interested in municipalities. The results of this study may direct them in a public procurement processes and advise them against lowest price in situations of a diminished audit time budget along with audit monitoring risk (quality control).

As this study covers the period from 2007 to 2011, the effects of the Memorandum are not measured. However, my findings serve to understand the state of municipalities and the need for further intervention by public authorities in certain aspects of their life.

The remainder of this dissertation is organized as follows. Chapter 2 describes the institutional setting. Chapter 3 provides the literature review concerning agency theory,

public procurement, audit fees, and audit quality, formulating the underlying hypotheses throughout the text. Chapter 4 describes the accounting paradigms, data collection process and the statistical methods applied. Chapter 5 describes the results and Chapter 6 summarizes and concludes.

2. Institutional settings

2.1 Portuguese settings

Municipalities are the cornerstone of the state. They solve local problems and mediate between the individual level and the remoter organs of the state (Marxer and Pállinger, 2011). For Veiga and Veiga (2007) the responsibility for the wellbeing of the population lies on local governments.

Since 1976 the Portuguese Constitution recognizes three types of local governments in Portugal: municipalities, regions, and parishes ("freguesias"). When Law 73/2013, of 3rd September, entered into practice (January 2014), municipality associations and local communities were added to the definition of local governments.

Though local governments in Portugal can be traced back to medieval times, their legal existence was recognized only in the constitution in 1976. According to the Local Directorate Department webpage, there are 308 municipalities, on the continent and 30 in the two autonomous regions of the Madeira and Azores islands. There are also 3,091 parishes, of which 2,882 are in the continental area and 209 in the islands (DGAL, 2015)[9] [10].

According to CCRE (2010), Portugal has an average municipal size of 34,540 inhabitants against the EU27 average of 5,630 (the largest being Denmark with 56,590) and an average area (km^2) of 299 against the EU27 49 (the largest being Sweden with 1,552),

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[9] Information retrieved from the Local Government Directorate (Direcção Geral das Autarquias Locais – DGAL) at www.dgal.pt.

[10] One of the consequences of the Troika Memorandum was the reduction of the number of parishes. Until 2012 there were 4,259 parishes ("freguesias"), 4,050 on the continental area and 209 in the islands. The reduction was the result of major mergers of parishes spread across the country under new laws regarding their minimum accepted size.

and it does not differ substantially from EU27 local governments characteristics in terms of debt expenditure, revenues, debt, and budget balance.

Portuguese municipalities, like most European ones, promote economic and social development through an ever growing number of important activities. The activities comprise the provision of public utilities such as local roads, sidewalks and squares, water and energy supply, sewers, cemeteries, environment, health, sports centers, museums, and theaters, and waste collection.

Municipalities are also responsible for designing territory organization, and the provision of public housing, transportation, nursery schools, and social assistance. In many municipalities public transport, employment, security, and safety (some municipalities may have a Municipal Police with limited competencies) are excluded (CCRE, 2010). Since these services have a direct impact on people's lives, usually voters are very interested in the composition and performance of municipalities.

Municipalities can also perform central government functions based upon a specific contract called program–contract ("contrato-programa"), whose terms are described in Law 159/99, 14th September. Through these contracts central government functions are assigned to municipalities along with financial transfers and, in some specific cases, property and human resources. According to Veiga (2012), the scope of competencies and functions of local governments have increased over time. Effectively, year after year the budget law increases the municipalities' scope of intervention through program-contracts.

The Portuguese Constitution identifies the representative branches of municipalities, Town Council ("Câmara Municipal") and the Municipal Assembly ("Assembleia Municipal"). Municipal elections are held every 4 years. All members of the Town Council are elected directly and votes are transformed into mandates using the Hondt method (enabling different political parties and independent lists to have a seat in the

Town Council), and the Mayor is the first candidate on the list receiving most votes[11]. Mayors are subject to a two-term electoral mandate limit. The Municipal Assembly is somewhat different. Part of the Assembly is elected directly by voters, while the remaining members are the elected presidents of the parishes within the municipality. Depending on the number of the parishes and the political parties representing them, there may be a majority of one political party in the Town Council and another at the Assembly.

While the Town Council exerts executive power, the Municipal Assembly is the deliberative branch. According to Law 75/2013, 12th September, which determines the frame law for local government, the Town Council is responsible for the elaboration and implementation of the general framework for local policies, while the Municipal Assembly is responsible for the annual budget's approval, and a general appreciation of the final accounts (the Town Council is responsible for their approval). Though it can reject both documents, it cannot introduce any amendments to them[12].

The Mayor, as the president of the Town Council, plays an important role as executive power, not only assigning tasks to each member of the council (he/she has the power to withhold tasks from members from a different party, for instance) but also having managerial autonomy in some of his responsibilities regarding human resources, endorsement of contracts, authorization of licenses, payments, selecting new projects and its implementation dates.

According to CCRE (2010), the European municipality structure differs from one country to the other. In fact, in countries like Albania, Cyprus, Bulgaria, and France we find only the Town Council (sometimes with a different name) and the Mayor, both elected directly.

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[11] The Hondt method is used to elect candidates from political parties, based on the proportion of votes won by each party. The steps taken are as follows: (i) take the highest number of votes in the present table and award a seat to that party; (ii) calculate the new number of votes the party just awarded a seat has: (New number) = (Actual number of votes cast) / (Number of seats awarded to this party so far plus one); (iii) return to the start using the new number of votes for that party; (iv) repeat until all seats have been awarded.

[12] This matter remains unchanged from the previous local government law.

However, in countries like Germany, Belgium, Denmark, and Finland, we find one Municipal Council with deliberative powers, a Local Administrative Board (equivalent to a Town Council) and a Mayor, and these latter can be either elected or chosen by the Municipal Council. Another important difference lies in how the Town Council seats are assigned: in some countries we find the same party, in others a proportion of different parties.

The Local Finances Law 2/2002, 28th August (now abolished but valid until 2013) and Law 73/2013, 3rd September, grant financial autonomy to municipalities. Notwithstanding the existence of revenues from municipality taxes, goods, and services, collected directly (or through Central Government Taxes Authorities such as "Autoridade Tributária") by municipalities, the municipalities also participate in the partition of public resources, that is to say, central government direct and indirect taxes. The distribution of central government taxes takes the form of financial state transfers decided yearly in the central government budget[13]. Therefore, a certain amount of central government transfer dependency may occur in certain municipalities.

According to the latest study published on-line by the Local Government Directorate (2006), only 36% of revenues came from taxes, while 12% came from tariffs, property revenue, and a provision of goods and services, while transfers from both central government and European Union represented 42%. A more recent study by Certified Public Accountants Board (Ordem dos Técnicos Oficiais de Contas (OTOC)), a private organization of public interest of Certified Public Accountants, the Annual Financial Directory of Portuguese Municipalities, ("Anuário Financeiro dos Municípios Portugueses Municípios Portugueses", 2013) presents more actual data but reaches similar conclusions.

The Annual Financial Directory of Portuguese Municipalities, ("Anuário Financeiro dos Municípios Portugueses Municípios Portugueses", 2013) notes that on average, depending on their size, Portuguese municipalities receive most of their revenues from

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[13] The distribution lies on criteria published in the local finances law.

central government, the financial independence of 33.7% (considering the period from 2007 to 2013)[14]. Larger municipalities tend to be more independent from central government transfers, as the proportion of revenues from taxes and prices is larger than transfers[15]. Taxes and prices represent 62.4% of total revenue in these municipalities.

Municipalities differ in territorial size, population, revenues, activities, central government transfers dependency (portion of transfers on overall revenue), typology of urbanism (predominantly urban, median urban, and predominantly rural), political parties, among other aspects. Nevertheless, they share the same budgeting rules, indebtedness limits, borrowing policies, and control mechanisms, which are imposed by central government institutions.

The borrowing policies' controls can be summed up into three categories according to Cabasés *et al.* (2007): (i) policies affecting the debt load, which limit borrowing and control current financial load; (ii) policies affecting primary savings, which restrict borrowing to capital expenditure; and (iii) policies affecting the co-funding effort, which fix re-payment periods and reduce municipal co-funding.

In Portugal all these borrowing policies' controls take place according to Local Finances Law n. 2/2007, which was active throughout the period of the study. There are policies affecting the debt load like: (i) the indebtedness limit is 125% of specific revenues; (ii) indebtedness is calculated based upon the difference between liabilities and current assets plus shares in companies; (iii) short-term, and long and medium-term debt can only be

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[14] The total amount of revenues deducted from transfers and Financial Liabilities against the total amount of revenues ratio is compared to the indicator of financial independence, considered by the Annual Financial Directory of Portuguese Municipalities ("Anuário") as 50% (OTOC, 2013).

[15] The Annual Financial Directory of Portuguese Municipalities ("Anuário") classifies Municipalities' size as large, medium, and small, based upon their population. According to this Directory (OTOC, 2013), large municipalities have more than 100,000 inhabitants, medium municipalities have between 100,000 and 20,000 inhabitants, and small municipalities have fewer than 20,000 inhabitants. There are 23 large municipalities, 106 medium, and 179 small.

assumed if matched against a calculated percentage of the indebtedness limit and (iv) the Court of Auditors analyzes debt loans prior to contract.

There are policies affecting primary savings like: (i) borrowing for capital expenditure for some types of investment are exempted from the indebtedness calculation; (ii) loans for renegotiating debt can only be acquired under some restrictive conditions; (iii) short-term debt cannot be transformed into long-term debt. Finally, there are also policies affecting the co-funding effort (mixture of EU transfers and loans in investment projects), like loans having a time frame that differs in terms of purpose.

The TROIKA intervention had a direct impact not only on the budgeting system, but also on the presentation of financial data. In fact, as a consequence of TROIKA, several laws were changed, abolished, or enacted considering budgeting, financial execution, and presentation of accounts. In Table 1 I present a summary of changes in the most important financial laws divided in panel A Budget framework, debt, balances, and auditing, panel B Budget and expense execution rules, and panel C Revenues and balances application rules:

Table 1 Legislation changes in financial aspects

	Before [2007-2011 period]	After [2012-today]
Panel A	*Budget framework, debt, balances and auditing*	
	Law 2/2007 (abolished)	*Law 73/2013*
Indebtedness limit	This is 125% of specific revenues	This is the average value of revenues for a 36 month period
Debt calculation	Total Liabilities minus current assets (including shares in companies) but several administrative exceptions to the liability concept, including companies with losses, financial independent municipal services, and other entities.	Total debt (no exceptions) excluding provisions, extra-budgetary items and deferrals, including companies with losses, financial independent municipal services, and other entities.
Financial crisis (if indebtedness limit is surpassed generally)	Conjuncture crisis – surpassing the indebtedness limit (200%) => loan Structural crisis - surpassing the indebtedness limit (300%) => loan	Financial solvency – surpassing the limit => voluntary loan Financial solvency – surpassing the limit x (2.25 to 3) => compulsory loan or voluntarily recurring to the Municipal Supporting Fund ("Fundo de Apoio Municipal" – FAM)[16]

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[16] Municipal Support Fund (Fundo de Apoio Municipal (FAM)) was first created in Law 73/2013, 3rd September, for municipality financial solvency or rupture. The regulation law was enacted only in 2014 through Decree – Law n. 53/2014, 25th of August. The FAM is composed of several units representing 51%

	Before [2007-2011 period]	After [2012-today]
Panel A	*Budget framework, debt, balances and auditing*	
	Law 2/2007 (abolished)	*Law 73/2013*
Financial balance	Current revenues over current expenses	Financial rupture - – surpassing the limit x 3 – recurring to FAM is compulsory Current revenues over current expenses and average loan amortization
Budget framework	Annual budget and multi-year investment plan for the municipality and its financially independent municipal services, if in place	Annual and multi-year budget for the municipality, its financially independent municipal services, its local companies, or other entities under control, if in place
External Auditor	Subject to share participation	Subject to accounting under accrual

	Before [2007-2011 period]	After [2012-today]
Panel B	*Budget and expense execution rules*	
	Decree-Law 54-A/99, 22nd February *(still in place)*	*Law 8/2012, 21st February*
Acquire commitments	Budget ceiling	Budget ceiling and treasury ceiling within a three month window frame
Require goods or services	Send order	Send order accompanied by the internal identification number of the commitment
Making payments	Legal conformity	Legal conformity and conformity to Law 8/2012 procedures

	Before [2007-2011 period]	After [2012-today]
Panel C	*Revenues and balances application rules*	
	Decree-Law 54-A/99, 22nd February *(still in place)*	*Budget Law for 2015*
Estimated revenues	Taxation cannot be higher than a 24-month average of total revenues in the previous budget period.	Taxation cannot be higher than a 36 month average of total revenues in the previous budget period and capital revenues are limited to 85% of their execution on a 24 month average.
Application of execution balance surpluses	Not mentioned	Payment of arrears Payment Long and medium-term debt

The municipal financial system produces two kinds of information, accrual results and budgetary results, with no compulsory conciliation between the two. Differences between the accrual and budget results are due to three accounting principles (Montesinos and

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Central Government and 49% municipalities. The proportion of municipality units is calculated based upon municipalities' debt. Municipalities pay for their units in a 4 year period starting from 2015. Whenever a municipality, voluntary or compelled, recurs to FAM, it signs a contract committing itself to several procedures including raising taxation, lowering expenses and cutting down personnel expenses.

Brusca, 2009), accrual, matching, and prudence, and can be classified as investment gains and losses, capital transfers, depreciation and provision, and timing of recognition of current assets and liabilities. The application of accrual accounting started in 2001. Nevertheless, in the financial year of 2007, according to that year's Annual Financial Directory of Portuguese Municipalities ("Anuário Financeiro dos Municípios Portugueses"), there were still several mistakes in the application of accrual accounting by many municipalities. These include:

- Inexistence of common use assets – 1 municipality;
- Lack of liability deferrals – 18 municipalities;
- No depreciation – 12 municipalities;
- No provisions or assets adjustments – 281 municipalities;
- Lack of inventories – 92 municipalities;
- No accruals of expenses – 57 municipalities.

Cabasés *et al.* (2007) argue that the increase in the provision of goods and services (spending) without raising the taxes (revenue) needed to finance them, leaves a burden to future governments through borrowing (increase in liabilities). Their study points out that smaller municipalities tend to keep their borrowing situation within most mandatory limits. They also concluded that investments are determinant in municipal borrowing and councils that levy more taxes (more self-sufficient from central government transfers) tend to be more debt reliant. This suggests that municipalities with greater tax income success (meaning greater revenues derived from taxation) have access to more credit, which may lead to a positive association between municipal income and indebtedness.

In 2012 the commitment and arrears Law (Law 8/2012, 21st February) uncovered a global situation of treasury and solvency problems, not only within the central administration, but also within the local administration. In order to tackle and avoid the default of several municipalities, the government approved Decree-Law 3/2012, 31st August, which created the "Local Economic Support Program" (Programa de Apoio à Economia Local (PAEL)). This program establishes a transitory and exceptional possibility of municipalities

acquiring loans destined to pay arrears. The law envisages a total value of this line of credit of a billion euros.

The Decree-Law 3/2012, 31st August describes two separate regimens in the program:

- For municipalities in default, the loan has a 20 years' maturity and arrears are 100% eligible – according to the Local Government Directorate (DGAL, 2015) 53 municipalities adhered to this regimen;
- In the cases of other municipalities with arrears, the loan has a maturity of 14 years and covers 50-90% arrears on average - according to the Local Government Directorate (DGAL, 2015) 210 municipalities adhered to this regimen.

The framework of these regimens rests on a contract under which the municipality commits itself to several restructurings (covering taxes, personnel, transfers, etc.) with fines for non-compliances. The partial success of this program, with a short-term period of application, led to the creation of the Municipal Support Fund ("Fundo de Apoio Municipal" – FAM), first mentioned in the new local finance law, in order to keep permanent control over municipalities and a widespread intervention capacity.

The Local Government Directorate, (Direção Geral das Autarquias Locais (DGAL)) is the central government institution responsible for collecting and analyzing data concerning personnel, administration, fiscal data, assets, and financial issues of local governments, as well as proposing legislation amendments and accounting standards. Most of the data are collected on a monthly basis through available web programs, and its provision is mandatory and subject to heavy fines on public transfers. The new local financial law n. 73/2013 created a new entity, the Local Financial Council, responsible for assuring transparent information coming in and out of local and central administration, with several representatives of both public administrations.

The public sector is subject to several types of controls, according to the budget framework law ("lei de enquadramento orçamental", Law n. 91/2001, 20th of August with eight changes till 2014 and under revision): administrative, jurisdictional, and political (performed by the National Parliament ("Assembleia da República" (AR)).

The budget control is performed at three different moments in time: before, during and after the budget execution. The administrative control is exercised by several players, the institution itself, either in the role of the budget manager or its budgeting and accounting department, the supervisory institutions of the ministry, and by special inspection services within the public administration.

The administrative control of central government institutions (with assigned competencies to inspect local and regional governments) is ruled by the Decree-law 166/98, 25th of June, which defines three layers of control: self-control (under the responsibility of the public entity itself), sectarian control (under the responsibility of coordinators or sectarian inspections) and strategic control (under the coordination of Finance and Social Security Inspectors).

The agencies (usually with financial autonomy) have an additional control, considered as self-control (or Internal Auditing), performed by a Certified Public Auditor (Revisor Oficial de Contas (ROC)) with a five year mandate chosen by both the sectarian and the Finance Minister according to Law n. 3/2004, 15th of January[17]. The administrative control of both the regional and local governments have additional specific rules and laws.

The jurisdictional control of the whole public sector is under the responsibility of the Court of Auditors ("Tribunal de Contas" (TC)), which performs its financial and external control according to Law n. 98/97, 26th of August. Under this law the Court of Auditors issues regulations and instructions to the public sector, performs audits under an Annual activity plan (with its own auditors or under procurement contracts), and exerts jurisdictional authority uncovering financial responsibility under the form of sanctions or reimbursements to the state budget.

The Court of Auditors is the recipient of the individual accounts issued by agencies, municipalities, and regions, accompanied by the Opinion of a Certified Public

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[17] The Portuguese Universities are an exception to this five year mandate as they are subject to External Auditing performed by a ROC under a procurement process.

Accountant, when applicable, and issues an Opinion of the consolidated Public Accounts presented to the Parliament (AR).

Municipality accounts are homologated by the Court of Auditors and may be selected for financial and conformity auditing. Municipalities present their individual accounts to the Court of Auditors until the 30th of April of the following year and its consolidated accounts, if applicable, until the 30th of June, according with regulations on the subject[18].

Since the enactment of Law 2/2007, municipalities with either shares in local/municipal, or intermunicipal companies, or any kind of commercial company, and with a seat in a foundation, are also audited by an External Auditor[19]. There were 275 companies in 2012 and at least 155 municipalities with a share in local companies according to Table 2[20]:

Table 2 Number of companies and its municipalities

	Total	Local / Municipal Companies – with investment only one municipality						Local /intermunicipal Companies – with investment of two or more municipalities				
	N.	0	1	2	3	4	>4	0	1	2	3	4
Small	183	116	52	14	0	0	1	95	76	12	0	0
Medium	101	45	27	16	4	7	2	42	49	10	0	0
Large	24	4	5	4	3	3	5	16	5	3	0	0
Total municipalities	308	165	84	34	7	10	8	153	130	25	0	0
Total companies	275	255						20				

Source: Update of Annual Financial Directory of Portuguese Municipalities ("Atualização do Anuário Financeiro dos Municípios Portugueses – 2011 to 2012 - Setor Empresarial Local")

By the local finances law, a Certified Public Auditor in a municipality named as External Auditor is approved by the Municipal Assembly. The law does not specify the duration

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[18] The latter was only enforced with an amendment to the Court of Auditors Organic Law that took place in 2015.

[19] Since the enactment of Law 73/2013, external auditing relies on any entity within the local sector with accrual accounting.

[20] Update - Annual Financial Directory of Portuguese Municipalities ("Atualização do Anuário Financeiro dos Municípios Portugueses – 2011 to 2012 - Setor Empresarial Local) Local Companies' Sector (OTOC, 2013).

of the mandate or the fees associated with the External Auditing. Those specifications rest upon the public procurement procedures that restrict acquisitions to a three-year period.

The law lists several obligations on an annual basis for the External Auditor[21]:

- Analyze and verify books compliance and accounting posting along with supporting documents;
- Whistle-blowing to competent local authorities on irregularities, as well as revealing facts that may jeopardize the Multi-year Investment Plan;
- Confirm municipality's assets or any other assets given as a warranty;
- Communicate to the Municipal Assembly mid-year economic and financial position;
- Give an Opinion regarding budget execution, balance sheet, profit and loss Statement, notes to the accounts, required by law or any others required by the Municipal Assembly[22] [23];
- Give an opinion on any other situation required by law, namely, municipalities' recovering plans before their enactment by law (added by the new legislation, n. 4, Law 73/2013)[24].

In conclusion, the external auditor verifies not only the budget but also the accrual result. This means that the external auditor is not only compelled to perform financial auditing according to International Auditing Standards, but also conformity and specialty audits,

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[21] Before 2013 - n. 3, article 48, Law 2/2007; after 2014 – n. 3 and n. 4, article 77, Law 73/2013, no changes apart from n. 4.

[22] The Opinion is called "Certificação Legal de Contas" (CLC) and has an international format according to International Auditing Standards.

[23] The article in question does not identify what law is at stake, but currently the municipality accrual accounting is performed according to Decree Law 54-A/99, 22nd of February.

[24] The reference to the law is general, and does not intend to specify the laws that may be involved.

in some cases tailor-made according to circumstances. For the latter case the Opinion also includes budget information, though it is unclear whether this is the most appropriate document for the rest of the obligations.

Effectively, compliance auditing's framework can be found in the International Standards of Supreme Audit Institutions (ISSAI) that state the basic prerequisites for the proper functioning and professional conduct of Supreme Audit Institutions (SAI) and the fundamental principles in auditing of public entities (INTOSAI, 2015)[25]. As a matter of fact, the International Organization of Supreme Audit Institutions (INTOSAI) operates as an umbrella organization for the external government audit community.

The Decree-law 487/99, 16th of November, (under revision in 2015) characterizes the Certified Public Auditor, and states that auditing and related services can be performed only by a Certified Public Auditor. The Certified Public Auditor can act either on his own or representing a Society of Certified Public Auditors.

There are 1,311 Certified Public Auditors in Portugal and 225 auditing companies. Most Certified Public Auditors practice as partners of an auditing company (585), but 210 Certified Public Auditors work on an individual basis and 113 work under contract for other Certified Public Auditors or auditing companies (OROC, 2013)[26]. The above mentioned Decree-law adopts International Auditing Standards.

The Certified Public Auditor in the Public Administration can either be appointed by both the sectarian and Finance Ministers on a five year mandate with fixed fee as far as Central Government Agencies are concerned, with the exception of Universities, or chosen by the Municipal Assembly under the proposition of the Town Council after a public procurement process, and with no specific mandate (it can last only three years according to the procurement law) and fees under a competitive bidding.

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[25] Information available on http://www.intosai.org.

[26] Information from the latest published accounts, 2013, of the Portuguese Institute of Statutory Auditors, "Ordem dos Revisores Oficiais de Contas" (OROC) available at www.oroc.pt.

2.2 Municipality organization and accounting

Municipalities and parishes in local government play an important role in the public sector service in most European countries (Johnsen *et al.*, 2001), especially by providing infrastructure services for local welfare in different fields of activity (Obermann and Kostal, 2003). Largely self-administered and with (relative) free choice of organizational forms, they assume many central public functions due to an increasing decentralization of services such as education, social services, and health, among others.

In Portugal, as the Constitution grants local and state governments autonomy from central government, there is one financial law for each subsector of the general government responsible for public administration.[27]

Notwithstanding the fact that there are three major laws concerning fiscal, budget, financial, accounting, and auditing, the enforcement of European Union rules (mostly in Directives) regarding government balances, budget deficits, public debt, monitoring and control, and sanctions are covered only by the budget framework law, Law n. 91/2001, 20th August. The historical budget framework law's main purpose was to establish the ruling regarding central government budget.

The EU Directives changed the budget framework law´s purpose and introduced other EU principles and rules, applicable not only to central government but also to local and state (regional) governments. One of the consequences was the addition and modification of many articles in the other two local and state governments' financial laws, in order to

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[27] According to the European system of national and regional accounts (ESA, 1995), in force during the period of the study (in 2014, EU adopted ESA 2010), an economy is divided into units for national accounts purposes. The units and groupings of units used in national accounts, are defined with reference to the kind of economic analysis for which they are intended, and not in terms of the types of unit usually employed in statistical inquiries. The Public administration called General government comprises Central Government, State government, Local government, and Social Security funds.

comply with the budget framework law, as far as EU principles and rules. Table 3 shows a summary of some of these principles and rules:

Table 3 Fiscal public administration laws

All subsectors of General government	Public administration and it subsectors		
	Central government (or Central administration) and Social Security funds (or Social Security)	Local government (or Local administration)	State government (or Regional administration)
Law 91/2001, 20th August, including the 5th to the 8th change, the latter by Law 41/2014, 10th July, to accommodate the Six Pack[28]	Law 2/2007, 15th January (abolished) and Law 73/2013, 3rd September	Organic law n. 1/2007, 19th February (abolished) and Organic Law n. 2/2013, 2nd September
Deficit and public debt European rules Budget principles Public administration structural balance Public administration level of indebtedness	Public entities balances Multi-year planning Programs Budget: dates, formats Budget changes Budget execution	Local Government framework Fundamental principles Budget rules Formula for central Governments transfers Local revenues: local Taxes and prices regulations	Fundamental principles Financial Surveillance Council Budget rules Central government surveillance of conformity: dates, format, and sanctions Accounting

[28] The six-pack entered into force on 13 December 2011 and includes five Regulations and one Directive (hence the name "six-pack"). It is applicable to 27 Member States with some specific rules for euro-area Member States, especially regarding financial sanctions. It covers not only fiscal surveillance, but also macroeconomic surveillance under the new Macroeconomic Imbalance Procedure. In the fiscal field, the six-pack strengthens the Stability and Growth Pact (SGP). According to the SGP Member States' budgetary balance shall converge toward the country-specific medium-term objective (MTO) - so-called preventive arm - and the general government deficit must not exceed 3% of GDP and public debt must not exceed 60% of GDP (or at least diminish sufficiently toward the 60% threshold). The six-pack reinforces both the preventive and corrective arm of the Pact, i.e. the Excessive Deficit Procedure (EDP), which applies to Member States that have breached either the deficit or the debt criterion. The six-pack ensures stricter application of the fiscal rules by defining quantitatively what a "significant deviation" from the MTO or the adjustment path toward it means in the context of the preventive arm. Moreover, the six-pack operationalizes the debt criterion, so that an EDP may also be launched on the basis of a debt ratio above 60% of GDP, which would not diminish toward the Treaty reference value at a satisfactory pace (and not only on the basis of a deficit above 3% of GDP, which has been the case so far). This information is available at http://ec.europa.eu/economy_finance/articles/governance/2012-03-14_six_pack_en.htm.

All subsectors of General government	Public administration and it subsectors		
	Central government (or Central administration) and Social Security funds (or Social Security)	Local government (or Local administration)	State government (or Regional administration)
Law 91/2001, 20th August, including the 5th to the 8th change, the latter by Law 41/2014, 10th July, to accommodate the Six Pack[28]	Law 2/2007, 15th January (abolished) and Law 73/2013, 3rd September	Organic law n. 1/2007, 19th February (abolished) and Organic Law n. 2/2013, 2nd September
Transfers to local and regional administration Public Fiscal Council Financial responsibility	National control system Accounting: dates, formats, framework External Auditing (Court of Auditors)	Loans Concept of balance Indebtedness level and calculations Central government surveillance of conformity: dates, format, and sanctions Relation with companies (new) Multi-year Programming (new) Local Coordination Council (new) Budget: dates Budget formats (new) Accounting Auditing	Regional revenues: taxes Public debt Commitments State transfers Local and regional administration relationship

The deficit and public debt rules stated in the Six Pack and covered by the budget framework law are monitored and controlled by the presentation of accounts using the European system of national and regional accounts (ESA, 1995). ESA defines the accounting rules so that the economies of the EU Member States can be described in quantitative terms in a consistent, reliable, and comparable manner. Regional and Local accounts that are consistent with national accounts are essential for the attribution of European Funds.

As in so many countries around the world, municipalities in Portugal adopt accrual accounting. They have done so for the last 14 years. The change from cash based accounting has raised questions concerning assets management decisions, and related accrual accounting information, from both public sector practitioners to local state regulators (Pilcher and Dean, 2009). In fact, full accrual accounting systems put an emphasis on matching costs with revenues, in pursuit of the most exact measure of profit.

Though municipalities do not aim to achieve profits, nor to maximize the financial value of assets, or pay dividends, they must operate and maintain shared public resources for all citizens, even those assets that are not available for sale, or without any cash generating purpose, as long as they are available for the use of the community (Carnegie, 2005). The management of these particular assets/resources poses a challenge: to achieve a balance between economic, social, and financial responsibilities.

Central government and local state regulators in Europe are especially concerned with local government sustainability, balance, and indebtedness, in order to comply with the overall public administration budgetary balance, converging toward the country-specific medium-term objective (MTO). The Excessive Deficit Procedure (EDP), which applies to Portugal, is a surveillance process derived mostly from financial indicators based upon "true and fair" financial statements (Dollery and Case, 2006), but also budget and financial regulations conformity.

The abolished local finance law, enforced until 2013 for municipalities, introduced a surveillance method based upon indebtedness ratios, calculated using both accrual and budget accounting data. The new local finance law (Law 73/2013) enhanced the procedure. Accrual accounting and indicators based on it led to the need of credible financial information. This led to the need of external auditing in municipalities, which is a common procedure in other countries (Redmayne and Laswad, 2013).

There are two different periods as far as external auditing is concerned. A first phase, from 2007 to 2013, in which only municipalities with shares in local companies had to hire an external auditor. A second phase, from 2013 on, in which all municipalities have to hire an external auditor.

The Portuguese regulators' major concern in the first phase was, perhaps, to avoid under-budgeting in the municipality and create indirect debt through companies. The changes in regulations after 2011 prove that this was not enough to prevent overspending, as can be stated in the Annual Financial Directory of Portuguese Municipalities ("Anuário" - 2007 - 2013).

Portuguese municipalities have limits to the level of indebtedness. There are fierce penalizations based upon real restriction on central government transfers. Much pressure is put upon Municipalities (and their subsidiaries) to present short and long-term debt, and assets (including accruals), within certain intervals as compared to revenues of previous years.

This means that municipality accounting has many purposes, beyond limiting indebtedness. According to Zimmerman (1977), the use of fund accounting provides information regarding the public agent's compliance with some of these rules (budgets, formal legislative procedures, etc.) and this is also influenced, though not determined, by political competition (Baber *et al.*, 1987; Deis and Giroux, 1992; Ward *et al.*, 1994). Thus, there is a strong need for credible information.

3. Literature review

3.1 Framework

In order to establish the theoretical framework for my study objectives, I divide the literature review into four sections, each concerning my four objectives. Section 2 addresses agency theory and establishes the relationship between central government and municipalities. Additionally, Section 2 explains the information asymmetry and the need for external auditing. Section 3 reviews the public procurement process. Section 4 presents the audit fees theme. Section 5 approaches the audit quality, and introduces perceived audit quality.

3.2 Agency theory applied to municipalities

The roots of agency theory roots can be traced to the 1960s, when economists started exploring risk sharing (Eisenhardt, 1989). From risk sharing to different goals, and different division of labor among agents (individuals or groups), is a small step.

This theory seeks to explain how the apparent chaos of conflicting objectives is organized and brought to an equilibrium so as to maximize firms' results (Jensen and Meckling, 1976). Management is not common work, it demands decision making, according to Fama (1980). The municipalities' executive power (Town Council) is elected by the people and has its own political agenda, which might be in direct conflict with maintaining imbalances and debt levels (if not under monitoring). This is because, as Jensen and Meckling (1976, p.308) explain, "it is generally impossible for the principal or the agent at zero cost to ensure that the agent will make optimal decisions from the principal's viewpoint".

The agency theory presents two parties: one that delegates work, and is interested in knowing how/if the work is performed (information) to profit from it, (called the principal party), and the other, who performs the work and receives payment (called the agent) (Ross, 1973; Jensen and Meckling, 1976). This relationship leads to the existence of contract(s) between the parties and the need for information exchange.

It is not the formal nature of the contract that is important, as the contract is a mere allegory for the relationship (Eisenhardt, 1989). The two parties engaging in the contract have different goals, leading to outcomes that may be in conflict, and different attitudes toward risk. Agency theory seeks to align the different goals and attitudes toward risk. The main issue is how the principal can confirm the agent's behavior and obtain a contract that is of utmost efficiency, taking into consideration personal aspects such as self-interest, bounded rationality and risk aversion, organizations, and information (Eisenhardt, 1989). Figure 1 summarizes:

Figure 1 Agency Theory
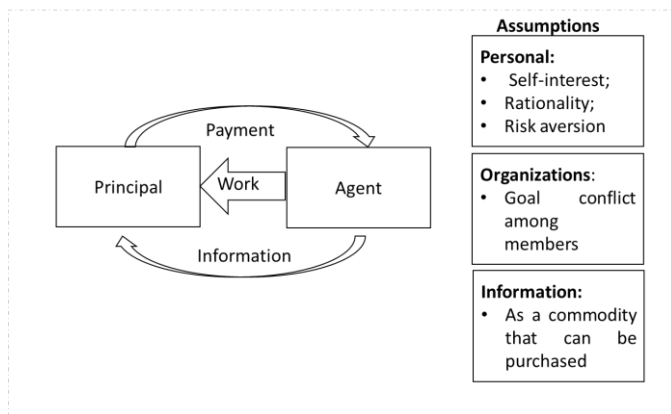
Many central government functions have been delegated to Municipalities, either by legislation or by actual contracts. Municipalities share with central governments the responsibility for maintaining a structural balance, deficit, and keep public debt within European limits, i.e., the Six Pack responsibilities. Nevertheless, it is the central government that responds to the EU, as there is no single voice among the

municipalities[29]. Also, as mentioned above, Portuguese municipalities are heavily dependant on central government transfers, contrary to what happens in other countries, such as Sweden (Blank *et al.*, 2009).

The central government has limited direct action when it comes to Municipalities, since they are constitutionally autonomous (have their own local finance law), though it can use sanctions (Fama, 1980). These sanctions refer to either lack of information, leading to transfers cuts, or not fulfilling financial indicators of level of indebtedness or balance, leading to involuntary loans, and recurring to Municipal Support Fund (Fundo de Apoio Municipal (FAM)). There is no reward system, as it would jeopardize fundamental principles, constitutionally and legally based.

Because it is difficult for the principal to accompany the agent's behavior (information asymmetry), he/she has two options: (i) invest in financial information systems or (ii) establish a contract with the expected outcomes of the agent's behavior (Eisenhardt, 1989)[30]. Both options are implemented in Portugal. There is a major platform run by the Local Government Directorate with data retrieved from municipalities on a monthly basis, including budgets, financial issues, personnel, indebtedness, and others. There is a monitoring Council (only since 2014) and there are legally binding performance indicators (which changed dramatically in 2014). The 2011 crisis and the strong adherence to PAEL by municipalities in 2012 (according to the Local Government

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[29] Even though the National Portuguese Municipalities Association ("Associação Nacional de Municípios Portugueses" (ANMP)) is a formal and compulsory lobby for many issues concerning the relationship with Central Government, it has no governing power within the municipality. This reinforces Jensen's (1983, p. 334) statement that "usually no single person on a committee has the power to choose the outcome, and the choices that result from committee processes seldom resemble anything like reasoned choice of a single individual. The voting paradox examined at length in the political science literature is an example of this point".

[30] The information systems comprise budgeting systems, reporting procedures, boards of directors, among others.

Directorate webpage, 263 municipalities adhered to the Program) shows there are additional instruments in need.

According to Jensen and Meckling (1976) monitoring has a potential for reducing agency costs. As accounting is an important component of the structure of an organization (Jensen, 1983), the information systems for monitoring municipalities are very accounting based.

The compulsory nature of the implementation of the accrual in Portuguese municipalities in 2001 confirms Watts and Zimmerman's (1979) statement that it is up for the Government regulation to create incentives on proposed accounting procedures. This happened in 1999 and it is being repeated in 2015, as Portugal is preparing legislation regarding the adoption of International Public Sector Accounting Standards (IPSAS) for 2016[31].

The implementation of accrual (legislation in 1999, implementation in 2001) is followed by the compulsory external audits in 2007. The external auditor is elected/chosen by the Municipality Assembly, but is selected by the Town Council, based upon a procurement process. The presence of external auditing is presented by many authors as a monitoring instrument that reduces agency costs (Jensen and Meckling, 1976; Watts and Zimmerman, 1979)[32]. Agency theory is also applicable to municipalities, as defended by Jensen and Payne (2005).

In Watts and Zimmerman's (1979) opinion, the existence of voluntary, though costly, auditing in previous centuries is consistent with quality assurance instruments developed by auditors. In their opinion, auditors have created mechanisms that increase the probability of the auditor identifying errors, and thus, reinforcing its independence. It can

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[31] In July 2015 the proposed legislation awaited the President of the Republic's approval.

[32] Agency costs are defined as a function of the amount of debt outstanding and the relative share of equity owned by the agent (Watts and Zimmerman, 1979). Though the latter is of no significance to municipalities, the first is very important.

be inferred that auditors would be working in an efficient market. Recent developments find that this is not quite so.

Empirical research on audit quality either analyzes its relationship with demand drivers (client's perspective) or between audit quality and supply drivers (auditor's perspective), according to Watkins *et al.* (2004). On the demand side, within the public sector the majority of studies use municipalities (Blank *et al.*, 2009; Nikkinen and Sahlström, 2004). In fact, it is possible to associate agency theory with the relationship between the municipality and the auditor, as both municipalities and auditors have distinguishing characteristics.

The distinguishing characteristics of municipalities can influence, not only reporting quality, but also factors inducing agency costs like indebtedness, loans, conformity, and sustainability. All these factors contribute to the need for auditors. One cannot forget that auditing services are compulsory because they are imposed by central government laws (and there are no records of voluntary annual financial audits before) but municipalities are decentralized, and independent from central government. This autonomy and independence is reflected in the auditing selection regulation, as the auditor is chosen by a procurement process conducted by the municipality itself.

Nevertheless, this autonomy, though protected constitutionally, will depend on financial autonomy. The higher the amount of central government transfers, defined in the state budget as transfers to municipalities (described in Section 2.1 Portuguese settings), the lower the financial autonomy (OTOC, 2007). The Town Council of a municipality, highly dependent on central government, is expected to have a lower degree of manager ownership. The concept of manager ownership is explained by Jensen and Meckling (1976) as having control over the firm. For these authors as manager ownership descends it is more likely that the manager will be less inclined to develop effort in creative activities, or enhancing monitoring and control over himself.

Tagesson *et al.* (2015) give considerable importance to political competition such as change in the political party, the existence of minorities, type of political party, etc. in the auditing municipality market, indicating that the weight of the political party may

influence external auditing. Other authors, such as Baber *et al.* (1987), Deis and Giroux (1992), and Ward *et al.* (1994), confirm that though the political competition cannot be seen as a determinant, it may influence the external auditing process.

According to Jensen and Payne (2005), Baber *et al.* (1987), Ward *et al.* (1994) and Tagesson *et al.* (2015), the population's interest in municipal strategies may be of importance. Along with interest there may come civil intervention in the municipality affairs, with consequences for the municipality's decisions.

The above discussion regarding agency theory, intertwined with the Portuguese setting section, allows me to formulate my first objective: to study the legal compliance of municipalities. As the external auditing becomes compulsory in 2007, based upon certain criteria, I seek to know (i) whether municipalities comply with the recent adopted legislation, and (ii) if there are political factors involved in legal compliance.

The objectives lead to the formulation of the following hypotheses:

H1a: External auditing emerges from the legal binding law.

H1b: External auditing is positively influenced by political competition.

3.3. Public procurement

The public sector shares some acquisition goals with individuals and private companies, such as the integrity of the procurement process, the value for money purpose with the typical constraints of efficiency, and risk avoidance (Schooner *et al.*, 2008). But there is an enormous difference: public procurement is made with the taxpayers' money. Therefore, the need for transparency and accountability is further enhanced.

The provision of goods and services in Portuguese municipalities is either (i) acquired by the municipality itself, (ii) outsourced to companies within the municipal group, (iii) achieved via cooperation with associations, or (iv) by any form of public procurement in a private partnership model. Municipalities are not entirely free in the choice of the

procedure. Beyond a certain threshold, which may differ in terms of contract nature or entity, a competitive tendering may be compulsory.

During the period covered in this study two different public procurement laws for audit services are applied. Until 2008 the Decree-law 197/99 was in force and in 2008 Decree -law 18/2008 adapted to EU Regulation, and came into force.[33] As a Municipality can contract for one, two, or three-year periods of auditing, though in 2007 and 2008 the Decree-law 197/99 was the only one applicable, in 2009 either one of the two laws could be applied depending on the year (or month) the procurement process started. In 2010, Decree - law 18/2008 was compulsory for all acquisitions.

In general, according to Nielsen and Hansen (2001), the European Union can use five different kinds of procurement procedures: (i) Open procedure, in which all interested suppliers may submit tenders; (ii) Restricted procedure: only invited suppliers may present tenders; (iii) Accelerated procedures: restricted to special cases; (iv) Negotiated procedures; (v) Qualification procedure. The negotiated and accelerated procedures in the Portuguese legislation can occur only under very special circumstances, and are not applied to services such as auditing.

All procurement procedures include not only the assignment but also a specification of requirements needed, the tender dossier[34]. The evaluation of admitted tenders is objective and based on requirements. The complexity of the procurement selection resides in the number of tenders and the selection criteria.

The procedure for external auditor according to law can be classified as an open, restricted, or qualification procedure, as seen in the following table:

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[33] Until that date, there were several laws regarding public procurement. Goods and services could be acquired under Law 197/99. As the study comprises year 2007 to 2010, the two laws were taken into consideration.

[34] In its original wording: "caderno de encargos".

Table 4 Classification of public procurement practices

	Decree-law 197/1997	Decree-law 18/2008
Open procedure	Public bid ("Concurso público")	Public bid ("Concurso público")
Restricted procedure:	Direct award ("Ajuste directo") – only one	Simplified direct award ("Ajuste directo simplificado") – only one
	Direct award ("Consulta prévia") – more than one	Direct Award ("Ajuste directo") – one or more than one
	Open direct award ("Concurso limitado sem apresentação de candidaturas") – more than one	
Qualification Procedure	Limited bidding by pre-qualification ("Concurso limitado por prévia qualificação")	Limited bidding by pre-qualification ("Concurso limitado por prévia qualificação")

These rules and practices seek to restrict the possibility for some potential suppliers to take part in a tendering procedure and distort price in one or another direction (e.g. by imposing disproportionate qualities selection). The number of tenders in the bidding process is considered a common factor to increase competition. The procurement procedure may also differ depending on the perceived value of the audit and years of mandate (with audit fees consideration).

The selection criterion rests on one of two published award criteria: (i) Lowest price; or (ii) Most economically advantageous tender: where other criteria besides price are given emphasis. Using the most economically advantageous criterion, the requirements are transformed into factors (expertise, price, reputation, among others, depending on the goods or services being procured). The evaluation of admitted tenders is then objectively based on these factors. The requirements must be presented with factors, its prioritization, and scores. The analysis of the tenders is made by prioritizing, scoring and weighting all factors to arrive at the evaluation of the tenders. The tender that best meets the requirements (best scored) is awarded the contract.

In Sweden 72% of municipalities choose audit firms with the lowest bid, according to Tagesson *et al.* (2015). This study advances an explanation for this situation: perhaps municipalities do it to avoid the risk of violating the Swedish Public Procurement Act, as using criteria is subjective and difficult to evaluate, while price is simple to evaluate and objective. In fact, using agency theory in an assessment of procurement law, Yukins

(2010), concludes that no matter how much monitoring or bonding between principal and agent, there is always residual deviation by the agent from the principal's end.

Trying to explain non-compliance to EU tendering directives and public procurement, Gelderman *et al.* (2004) find that 83% of Netherlands' municipalities do not comply with public procurement law. The emerging factors for non-compliance, statistically significant in their study, are: (i) Purchaser's familiarity with the rules – supporting Tagesson *et al.'s* (2015) explanation – negative effect; and (ii) Organizational incentives (e.g. exhaust budget to avoid future reductions) – negative effect.

While studying construction contracts under a public procurement process, Bajari and Tadelis (2001) conclude that in a complex procurement it is better to use cost-plus contracts than to use fixed price ones, which is against budget restrictions (the municipalities' case). In Levaggi's opinion (1999), it is factual that a binding budget leads the contractor to the easiest solution to avoid the complexities of implementing procurement contracts. This opinion is in line with Tagesson *et al.'s* (2015) findings regarding the municipalities' use of the lowest price as a selection criterion for auditing services.

Obermann and Kostal (2003) conclude that the effectiveness of competition depends on the size and structure of a city and the provider's structure for the specific services. One can therefore expect that both the size of the auditing company supplying the auditing service and the size and complexity of the municipality will play a part in the public procedure type and award criteria. Tagesson *et al.* (2015) give considerable importance to determinants such as change in the political party, the existence of minorities, type of political party, tax base (municipality GDP per capita), and net operation cost (measure of audit complexity).

Jensen and Payne (2005) point out the importance of audit procurement and note that it involves a bit more than competitive bidding. They identify several features that should be taken into consideration, including solicitation procedures, technical factors, multi-year contracts, and written agreements, and suggest that organizations with greater agency costs are likely to have developed audit-procurement practices and that such

practices lead to engaging contracts with auditors with higher levels of industry expertise – which is suggestive of higher audit quality. Tagesson *et al.* (2015) find indications of excessive concentration of Big Four, with very few tenders and low-balling by two Big Four. They suggest that this may have an influence on audit quality[35].

Chong *et al.* (2009) state that contracting-out audits by Auditor-General Office in public sector audits performed in Australia requires potential contractors to compete through a tender bidding process. This process is very selective in terms of quality (types of expertise, audit methodology, audit plan) and price (tender fees, total budgeted audit hours, and a segregation of hours by rank). Using a questionnaire, Jensen and Payne (2005) also find evidence that municipal managers view audit procurement as a mechanism for regulating audit quality and audit fees, and incorporate it as part of their overall control systems. Thus, well developed procurement mechanisms help identify and hire preferred quality auditors at an appropriate cost. If the purchaser of the auditor's services is more conscious of price than quality, auditors will be tempted to compete on the basis of price and to make necessary adjustments in the extent of work performed and, as a consequence, may lower the audit quality.

In fact, a study by GAO (1987) concludes that there is a relationship between the way the governments procure audit services and the quality of resulting audits. The results of their study state that compliance with to auditing standards is better achieved in an effective procurement process. They recommend that the factors in the procurement process include competition, solicitation, technical evaluation, and a written agreement.

They also conclude, as the literature review confirms, that 58 percent of the governments reviewed did not meet all four criteria. They show that if the criteria are met the incidence of unacceptable quality audits falls from 46 percent to 17 percent. The main

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[35] The Big Four are the four largest international professional services networks: Deloitte, PricewaterhouseCoopers, Ernst & Young and KPMG. The Big Four are the result of the Big Six, after the merger of Coopers & Lybrand with Price Waterhouse, and with Arthur Andersen's integration in Ernst & Young, Deloitte & Touche and PricewaterhouseCoopers.

recommendation of the study is for public entities to carefully assess procurement practices and take actions to utilize the procurement framework recommended by the GAO (1987).

In an effort to promote the importance of quality governmental audits and the value of such audits to purchasers of governmental audit services, the AICPA (2014) lists several attributes that are key to the audit procurement process and choosing the appropriate auditor:

- Experience with similar entities;
- Experience with the type of audit
- Auditor related to laws, rules programs issued by authorities.
- Technical expertise;
- The engagement team.

Well-developed procurement provides relevant information to managers, identifies qualified providers, and aligns organizational needs with the goods or services being purchased (Gansler, 2002). It may also be useful in maximizing value.

The above discussion regarding public procurement allows me to formulate my second objective: investigate whether the lowest price is generally used by municipalities, and the factors that may determine this choice of selection criterion. Contrary to central government, where the auditor is appointed by two or more ministers, in the municipalities the external auditor is hired under a procurement process with no special specifications.

The procurement process is determined by the procurement process law. There are several procurement practices and two selection criteria. The selection criteria can rest on the lowest price or on the most economically advantageous proposal. Having the literature review in mind, I seek to know the importance of certain factors in which the selection criteria are based: (i) the sophistication of the procurement process, (ii) the political competition, (iii) the citizens' interest, and (iv) determinants tackled in the agency theory known as audit risk, auditee size and complexity, and manager ownership.

The objectives lead to the formulation of the following hypotheses:

H2a: There is a negative association between the lowest price selection criterion and public procurement sophistication;

H2b: There is a negative association between the lowest price selection criterion and political competition;

H2c: There is a negative association between the lowest price selection criterion and citizens' interest;

H2d: There is a negative association between the lowest price selection criterion and (i) audit risk, complexity and size, and (ii) a positive association with manager ownership.

3.4. Audit fees

According to Blank *et al.* (2009), using the audit fees determinants model of Simunic (1980), in municipalities the audit fees can be analyzed in the light of production costs attributed to the organization under audit. The production costs include the number of hours spent. For these authors, the audit fees can also be analyzed in the light of market costs attributed to the auditor firm, that is, reputation price on top of the fee.

Using agency theory as an instrument for explaining audit fees, in a seven country study concerning the private sector, Nikkinen and Sahlström (2004) find that the determinants of auditing fees are quite independent from the environment. Other authors, such as Simunic (1980), Palmose, (1986), and Deis and Giroux (1992) find evidence of a monopoly rent by large strong brand audit firms, but Lowenson *et al.* (2007) find evidence of initial engagements discounts (which may jeopardize auditor independence).

Though authors like Jensen and Payne (2005) believe that price competition can be seen as an opportunity for auditors to gain competitive advantage an earn market share, low-balling (or price cutting) can give the incumbent auditor an expected payoff from retaining the client, which may reduce auditor's independence and affect the quality of financial reporting, as Magee and Mei-Chiun (1990) state. AICPA (2014) and GAO (1987) found a link between an emphasis on audit fees and substandard audits.

Simunic (1980) was the first to address the association between audit quality and audit fees in a public company context, whereas Rubin (1988) was the first to address audit fees in a municipal environment. Since then, several studies have investigated audit quality, audit fees, and agency costs problems either in a private or public sector context, but very few have studied the public procurement process connected to those themes. Stressing that audit fees are essential to appraise the competitiveness of the audit market, procurement, and independence, Hay *et al.* (2006) evaluated and summarized a large body of research on audit fees (as a dependent variable) and found nine studies involving municipalities in New Zealand and the United States, in a total of 147 studies comprising 22 countries with sample size from 32 to 6,198. In all these studies audit quality was included as an explanatory variable.

However, auditing has other more direct consequences, as Baber *et al.* (2010) finds, using data from 4,244 municipalities in Australia. These are related to debt interest following qualified opinions (with proposed adjustments). Rubin (1988) points out that similarly to what happens in private sector firms, many local governments (including municipalities) contract with independent auditors to perform financial statement audits. Using a framework adopted from Simunic (1980) – municipal audit pricing model – this author concludes that the municipal audit market is competitive.

The public sector differs substantially from the private sector in terms of accounting procedures because it is more conformity driven, there are different stakeholders, and there is political competition. Nevertheless, it poses similarities in terms of audit risk, auditee size and complexity, and auditing as a whole.

As for political competition, authors such as Baber *et al.* (1987), Blank *et al.* (2009), and Nikkinen and Sahlström (2004) agree that the municipality market adds political competition as an explicit consideration of the principal. As Blank *et al.* (2009) explain, political competition creates an incentive for the client of the audit. In Portugal the Town Council takes into consideration the audit's impact on central government when deciding on audit costs and audit firms. Within the agency theory, the principal is the central government. In Blank *et al.* (2009), the principal is not central government, but the (voting) citizen. The country context of Blank *et al.*'s study may present a fundamental difference. In Sweden government grants are 13% of total revenues (Blank *et al.*, 2009), whereas in Portugal the mean amount reaches 66.3%.

Considering agency theory, size, complexity and risk on the municipality side, and size on the audit firm, are factors commonly mentioned by the majority of accounting researchers. The measures of municipality size range from population (Jensen and Payne, 2005; Blank *et al.*, 2009; Nikinnen *et al.*, 2004), total revenues (Lowensohn *et al.*, 2007; Ward *et al.*, 1994), to total assets (Simunic, 1980; Nikkinen and Sahlström, 2004).

The measures of auditee complexity range from exposure to foreign trade, with sales abroad against total sales, in the private sector (Nikkinen and Sahlström, 2004), net operating expenses (Blank *et al.*, 2009; Tagesson *et al.*, 2015), to inventory percentage, fixed assets percentage, and proximity to urban centers (Cohen and Leventis, 2013). In Portugal, errors in inventory since the implementation of accrual accounting, the consideration of commonwealth assets (not for sale), and municipalities' small size makes net operating expenses a better proxy for auditee complexity.

The audit risk proxy varies greatly in the literature. Measures used include the nature of audit opinion in the public sector (Cohen and Leventis, 2013), the debt to equity ratio in the private sector, and the return on investments and the price to book value in the private sector (Nikkinen and Sahlström, 2004). In Portugal, indebtedness (debt over average revenues) is the municipalities' legal measure of risk, stated in the local finance laws, as the institutional settings describes.

Agency costs in the municipality literature appear under tax base, on the presumption that the level of economic input enhances citizes' interest (Jensen and Payne, 2005; Blank *et al.*, 2009), volume of taxes paid by citizens, and tax rate (Blank *et al.*, 2009), and political central-based environment measured by the dependence on central government transfers (Blank *et al.*, 2009), the latter enhancing central government control ("management ownership") over municipalities[36]. The Annual Financial Directory of Portuguese Municipalities ("Anuário") from 2007 to 2013 (OTOC, 2007-2013) develops the concept of municipality effective autonomy based upon independence from central government transfers.

According to Cohen and Leventis (2013), Blank *et al.* (2009), Pilcher *et al.* (2013), and Abbott *et al.* (2012), there is an association between internal auditing and external auditing, though communication issues between the two parties need to be overcome (Pilcher *et al.*, 2013). In fact, according to Abbott *et al.* (2012: 108), "the amount of internal audit assistance provided (whether by in-house or outsourced internal auditors) is negatively and significantly associated with audit fees".

The above discussion regarding audit prices and aspects of agency theory, along with the public procurement features, allows me to formulate my third objective: to study audit fees. The study of audit fees is broadened so as to include the impact of the public procurement process, notwithstanding the importance of political competition, central government transfers, and or internal auditing.

The objectives lead me to the formulation of the following hypotheses:

H3a: Sophisticated audit procurement is associated with higher audit fees.

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[36] Though Black et al. (2009) refer to this indicator, they do not use it as an independent or control variable in their study.

H3b: Municipality dependence upon transfers is associated with lower audit fees.

H3c: Municipality political competition is associated with higher audit fees.

H3d: Internal auditing reduces audit fees.

3.5. Audit quality

According to Copley *et al.* (1994), auditing is a differentiated product. Auditing gives financial statements credibility, contributes to municipalities' control, and provides availability for consulting services. Belkaoui (2004) finds evidence that a country with a high level of audit quality exhibits superior government performance. He acknowledges that auditing is responsible for quality and credible accounting information. For him the accounting information is essential to the cultural, political, and economic dimension of municipalities.

The challenge with studies encompassing audit quality is "the unobservable nature of audit quality" (Watkins *et al.*, 2004: 160). Though audit quality can be defined as compliance with professional standards for reporting and work field (Copley and Doucet, 1993), or in terms of probability of material errors in financial statements (DeAngelo, 1981; Simunic, 1980), or even as the probability that the auditor will both detect and report material breaches in the accounting system (Defond, 1992), there is a lack of suitable audit quality measures.

Proxies for audit quality have included auditor's size (Palmrose, 1988; Simunic, 1980; Lennox, 1999), Big Six/Big Four indicator variables (Craswell *et al.*, 1995; Hackenbrack *et al.*, 2000; Cahan *et al.*, 2011; Hackenbrack *et al.*, 2000), reporting quality (O´Keefe *et al.*, 1994), and industry specialization (Craswell *et al.*, 1995; Chong *et al.*, 2009; Cahan *et al.*, 2011; Hackenbrack *et al.*, 2000), among others. In Hay *et al.* (2006) at least 25 attributes of auditor quality are identified.

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Most literature uses the Big Four as a measure for audit quality (Blank *et al.*, 2009; Nikkinen and Sahlström, 2004; Defond, 1992; Ward *et al.*, 1994) but Cohen and Leventies (2013) use second-tier international firms and local firms, as the Big Four have no representation in the Greek municipality market. Additionally, Lowenson *et al.* (2007) apply perceived quality using a seven-point Likert scale collected in a survey as a proxy for audit quality, and Defond (1992) uses a principal component analysis with four attributes: auditor size, Big Four, expertise (number of clients per audit firm versus total clients in that industry), and independence.

Beattie and Fearnley (1998) find that increased competition through tendering may result in audit fee discounting, low-balling, and opinion-shopping. For these authors one of the most cited reasons for audit change are fees. They also find that the selection of a new auditor is based upon audit fees. Using behavioral analysis Suhayati (2012) confirms the existence of an association between competitive biddings and price reduction, the latter leading to audit time budget pressure with consequences of poor audit quality.

The relationship presented by Suhayati (2012) is as follows:

Figure 2 Audit Fee / Audit Quality connection
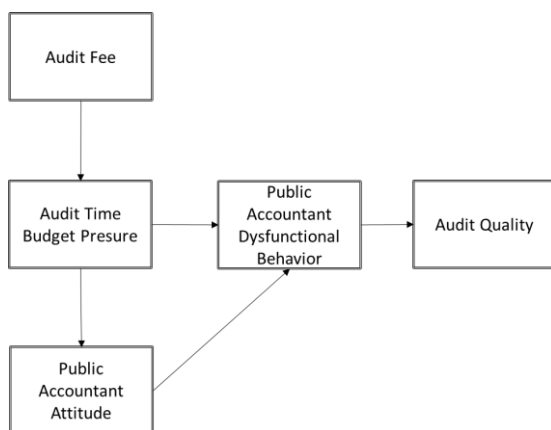
Source: Suhayati (2012)

In a positive, and quantitative approach to audit quality Deis and Giroux (1992) also find that though audit quality is difficult to measure there is an association between audit hours

and audit quality. They use a proxy for audit quality that stems from a list of 19 deficiencies, all coded and with assigned weight, in the governmental sector, and schools in Texas.

For Blank *et al.* (2009), municipalities are under a more permissive regulation environment, and it is thus more likely that litigation with auditors will be less frequent. This situation may lead to the establishment of a lower ceiling for audit fees, notwithstanding the fact that the procurement process, and lowest price selection criterion, tend to decrease audit fees.

Though the presence of an initial discount on the fee may indicate impairment of auditor independence (Lowenson *et al.*, 2007), high fees can also be interpreted as a premium paid to reinforce a relationship between auditee and auditor (Copley and Doucet, 1993; Blank *et al.*, 2009), which may jeopardize audit quality. For DeAngelo (1981) and Francis and Wilson (1988), given that larger audit firms have more clients, they have rents that may serve as collateral, which may reaward them with greater audit independence and (thus) audit quality. For this reason, the size of the audit firm is generally used as a proxy for audit quality.

Lennox (1999) presents a reputation and deep pockets hypothesis, suggesting that reputation is unable to explain the superior accuracy of larger auditors as much as deep pockets[37]. He also states that bigger firms' capacity to deal with litigation and support criticism enables them to present more accurate reports. Lennox (1999) analyzes United Kingdom publicly quoted companies' audits subject to detailed regulation and credible sanctions. Blank *et al.* (2009:3) points out that regulation of municipal audit is considered

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[37] Deep pockets means extensive financial wealth or resources, which is associated with bigger firms. Wealth allows them to be more prepared for litigation. The study conducted by Lennox (1999) analyzes criticism and litigation and concludes that larger auditors exert more effort than smaller firms in issuing accurate reports because they are more likely to be sued. As they are more likely to be sued they charge higher fees.

"a softer style of regulation without corresponding demand for professionalism and independence" and, most important, "(…) not accompanied by credible sanctions".

Though Baber *et al.* (2010) finds that the municipal governance system is a determinant of municipal financial reporting quality, that comprises auditors, citizen voters, and state governments, the fact is, as Carslaw *et al.* (1991) conclude, that private sector audits are primarily directed to equity and debtholders, whereas the government audit is directed to the true and fair image of financial statements and compliance with state and local laws and regulations. This is aligned with what I discussed in the Portuguese Settings section and hypothesis (H1a).

Thus, there is a differentiation factor in government audits, which demands a different perspective. This idea does not contradict Johnsen *et al.* (2004) who view auditing and monitoring as processes for providing information. Neither does contradict that this information is of utmost importance in organizational control. What has to be put in perspective is that the most important provider of information credibility and quality in financial statements is the audit quality (which includes not only audit monitoring strength but also reputation), as stated by Watkins *et al.* (2004).

For Copley *et al.* (1994) and Palmrose (1988) the auditor's brand name is a provider of credibility and is usually associated with the Big Four. However, Lowensohn *et al.* (2007), taking into consideration the local government market, find no uniformity in the association between Big Four and audit quality. This may confirm that non-Big Four firms provide high quality service in the public sector. Jensen and Payne's study (2005) on Florida's municipalities also finds a reduced presence of Big Four.

Ward *et al.* (1994) incorporate additional variables in the Rubin (1988) municipal audit fee model concerning municipal accounting and auditing environment. The authors find no evidence to support a significant relationship between audit qualifications and audit fees. Nevertheless, Lowensohn *et al.* (2007) find a positive relationship between auditor specialization and perceived audit quality, though they find no evidence of a positive relationship between audits' specialization and auditing fees. This leads the authors to conclude that public sector specifics have created an expert market in the auditing

profession not explained exclusively by audit fees. Besides Lowensohn *et al.* (2007), other authors in accounting research have used perceptions collected from surveys as dependent variables. Audit independence, for instance, is studied by Pany and Reckers (1980), Swanger and Chewing (2001), and Hodge (2003).

Lowensohn *et al.* (2007) use perceived audit quality instead of a proxy for audit quality because as pointed out in the beginning of the section, audit quality cannot be observed (Watkins *et al.*, 2004)[38] [39]. This fact leads authors to study audit quality components such as reputation (DeAngelo, 1981) as audit quality proxies, though one thing is perceived competence and independence, and the other is actual reality. For Watkins *et al.* (2004) the proof of whether competence and independence are real resides in auditing monitoring.

In their audit quality model Craswell *et al.* (1995) also studied an association with the Opinion, i.e. whether it was qualified or not. Given that in the municipality audit market several material errors were pointed out in the Annual Financial Directory of Portuguese Municipalities ("Anuário") in 2007 (OTOC, 2007), it may be important to link the qualified / non-qualified opinion with errors found in the financial statements.

Jensen and Payne (2005) defend that agency costs may provide a drive for enhanced procurement practices. The size of municipalities, its level of financial debt, and taxes autonomy may lead to the choice of more sophisticated procurement practices, enhancing audit fees and audit quality.

The above discussion regarding audit quality and perceived audit quality, along with aspects of agency theory, and public procurement features, allows me to establish my

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[38] As I mention throughout this section, audit quality is seldom associated with the Big Four along with auditor's firm size (highly correlated to the first, as studies also find).

[39] In a sample of 302 finance directors from governmental institutions in Australia, Samelson et al. (2006) find that perceived audit quality is specifically associated with industry expertise, responsiveness to client needs, professional care, fieldwork, and professional skepticism. Furthermore, in the governmental market perceived audit quality is not associated with the Big Four.

fourth objective: to study perceived audit quality. The main concern regarding the study of perceived audit quality lies in the possibility that the lowest price selection criterion may induce low-balling. The low-balling may affect the auditor's performance, reflected in his Opinion. That is to say, he may not identify errors in the municipalities' financial statements known to its financial directors or chiefs. Thus, the perceived audit quality is studied against the (i) public procurement process, (ii) and the audit fees.

The objectives lead me to the formulation of the following hypotheses:

H4a: Public procurement based solely upon lowest price is negatively associated with perceived audit quality in municipalities.

H4b: Perceived audit quality is positively associated with higher audit fees.

4. Methodology

4.1 Methodological approach

The research process is conditioned by three main factors (Chua, 1986): (i) Researcher's assumptions, which influence the systematization of the problem under study and its interest; (ii) Belief in the way to acquire knowledge, which influences what data may be needed; and (iii) Methodology suitable for the collection of data, which has direct consequences on data analysis and the results.

Many accounting researchers (Chua, 1986; Bhimani, 2002) studying research factors have concluded that it is possible to categorize them in paradigms. These paradigms can be divided into two dimensions with opposite positions, thus creating four quadrants, related to the social sciences' dimension and the society's approach dimension. As far as the social sciences' dimension is concerned, there are two positions, objectivity versus subjectivity, whereas on the society approach dimension the positions range from radical change to regulation. Figure 3 presents the four quadrants:

Figure 3 Quadrants of accounting research paradigm
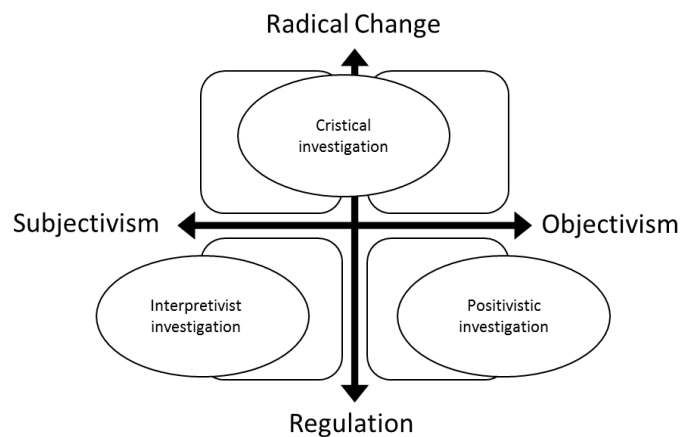
Source: Hopper and Powell (1985; p. 432, adapted)

The paradigms give place to three accounting investigation approaches: (i) Positivist investigation; (ii) Interpretivist investigation; and (iii) Critical investigation.

When reality is clearly known (or so it seems) and people behave deterministically (or are thought to behave so), knowledge can be obtained through observation. In this case scientific methodologies (known as quantitative methodologies) are applicable. This type of investigation is called positivistic investigation. There are situations in which this is not so, leading to a qualitative approach. Thus, the qualitative approach is applicable to circumstances where the knowledge about reality can only be obtained through interpretation (Belkaoui, 2000). Case studies are an example of qualitative research studies - in-depth studies that produce detailed descriptions of the phenomenon and events.

The positivist approach has been predominant in accounting research. According to Chua (1986: 611) positivism makes the ontological assumption that "empirical reality is objective and external to the subject". The epistemological corollary is that it can be studied through objective categories, and verified by empirical scientific methods. Agency theory is mostly used in this approach when trying to explain accounting functioning. Through this approach the first step is the problem definition, followed by literature review and hypotheses formulation. In this corollary, the population is defined along with samples, data collection and their analysis ending with results, limitations and future research (Chua, 1986). Though subject to some criticism, its advantage is to permit a clear and objective perspective of the problem at hand.

An alternative approach to positivism can be found in the interpretivist, and critical methodology. The interpretivist methodology focuses on understanding the social nature of accounting practice, making use of qualitative methodologies in an interactive process involving an empirical study in which reality is contextualized through the eyes of its actors. As far as critical methodology is concerned, the major difference lies in the approach that is made, predisposing an interaction between the researcher and the object of study.

This study's objectives are in line with the epistemological corollary that the population at hand can be studied through objective categories, and verified by empirical scientific methods, so a positivistic approach is used, making use of quantitative methodologies (Moreira, 2002). Regarding the data collection method, two different methods are used: survey for the data that are not publicly available, and databases extraction for publicly available data. As procurement and auditing concepts are harmonized, it is not necessary to make use of interviews. This made mass distribution of the survey possible.

4.2 Data collection

The data analyzed in this study start in 2007, as given that is the year when external auditing became compulsory, and end in 2011, when the survey design begins. The General-Directorate of Local Administration (Direção-Geral das Autarquias Locais, DGAL) publishes (in a web platform) municipality consolidated financial information[40]. It is possible to request the most updated financial information. The year 2011 was not available at DGAL's website when the survey was launched, so I sent a request to DGAL, which responded positively. The data missing from the DGAL website platform are partially recovered using the financial statements published on-line by each municipality[41] [42].

From the population of 308 municipalities in the five year period of this study (1,540 observations, 308*5years), some observations are lost due to missing data on some of the

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[40] Information retrieved from the Local Government Directorate at www.dgal.pt.

[41] Municipalities Amadora (2007 to 2009), Amarante (2007), Bragança (2008), Celorico da Beira (2008), Mesão Frio (2008), Pedrógão Grande (2007), Santa Cruz (2007), and Vila Nova de Cerveira (2007).

[42] Municipalities are compelled by the local finance law to publish on-line the last two years of financial statements. It was possible to download data concerning three of the eight municipalities missing, Amarante, Bragança, and Celorico da Beira.

variables required. These include information concerning revenues, expenses, assets, community assets, debt, accruals, provisions, asset reductions, transfers, and operational results. The final number of 303 municipalities (1,515 observations for the five years) is used in the descriptive analysis.

Information regarding municipality characteristics, population, land area, districts (geographical organization), and political party organizations, is obtained through PORDATA, a database of contemporary Portugal organized and developed by the Francisco Manuel dos Santos Foundation, created in 2009. The reported statistics derive from official and certified sources[43].

As the identification of municipalities with or without external auditor is not publicly available, a formal request to the Portuguese Institute of Statutory Auditors ("Ordem dos Revisores Oficiais de Contas (OROC)) was made in order to acquire information of municipalities with an external auditor within the 2007 to 2011 period. The request was approved, and thus I also analyze information regarding the situation of all municipalities as far as external auditing is concerned.

Information regarding the most common errors in financial statements and which municipalities own shares (capital participation) in local companies is obtained through the Annual Financial Directory of Portuguese Municipalities ("Anuário Financeiro dos Municípios Portugueses") for the 2007 to 2011 period.

The data concerning capital participation, auditor's opinion, financial and auditing related issues, procurement issues, selection criteria, the number of tenders, and the factors used when the most economically advantageous tender selection criterion is used, public procurement law applied, internal auditing, auditor selection process, type of auditor, and fees, are obtained via a survey directed to financial managers in municipalities. The questions in the survey follow Hackenbrack *et al.'s* (2000) and Jensen and Payne's (2005) studies on audit fees and audit quality.

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[43] Information retrieved from http://www.pordata.pt/.

Appendix 1 provides the survey in English. The survey uses a platform (Survey Monkey), and the link to the questionnaire is sent by e-mail for each of the 308 municipalities[44]. The survey is designed in 2011, subject to professional criticism of several fields, corrected and launched in 2012. Throughout 2012 the survey is repeated three times. The respondents are invited to respond to the questionnaire on-line. While most of the answers are obtained in this way, some municipalities sent a pdf of the written questionnaire via e-mail[45]. I use some municipality associations to re-send the questionnaire. Some responses are obtained by e-mail using these connections.

The on-line design of the questionnaire makes it possible to skip questions that are of no interest, and facilitates the respondent's task of presenting information for each of the five years covered by the study[46]. The complex design of the questionnaire compels me to ask several professionals in the field to respond to the questionnaire, and point out any mistakes. The respondents are asked to respond to both technical and judgmental information regarding the 2007 to 2011 period. The responses to some questions can be double-checked through different public sources, and permit veracity testing.

The municipal officials, especially directors and chiefs, abide by an ethics code of conduct of the Organization for Economic Co-operation and Development (OECD). Their

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[44] The survey is launched at the same time that financial statement data are being collected.

[45] Multiple requests were sent to maximize the response rate. The municipalities responding to the survey are somewhat larger than municipalities not responding.

[46] Some examples, (i) if asked if there is an internal audit office, a "no" answer skips the question about its hierarchy; (ii) after answering about local companies' participation, the respondent is asked if external auditing services are contracted within the 2007 to 2011 period. If not, the questionnaire ends for this respondent; (iii) if the respondent says the municipality used the lowest selection price criterion in any of the years, for those specific years, the respondent is not invited to answer about criteria selection factors using the most economical proposal; (iv) if the respondent indicates a bid as the public procurement process, the question about the number of tenders invited is skipped, and the respondent is driven to answer how many proposals it obtained, and etc.

responses commit them personally, and their municipality, to whatever results, subject to possible litigation[47].

There are 64 respondents. However, only 57 of them are complete, i.e., with all information required. The remaining 57 municipalities represent 285 observations (57*5 years). The percentage of respondents is 18.8%, considering 57 valid responses in a population of 303 municipalities in the 2007-2011 period. The existence of non-respondents may be responsible for biased results, if the municipalities which did not respond to the survey have heterogeneous or dispersed characteristics (Stede *et al.*, 2005). To tackle the biased results possibility, I perform a two-factor analysis based upon geographical territorial coverage (district), and political party.

Concerning districts' representation, I find that only three out of 20 districts (Beja, Bragança, and Guarda), including the islands of the Autonomous Regions of Azores and Madeira, are not represented in the survey, as shown in Table 5. This suggests that geographic representation is not an issue that can lead to biased results:

Table 5 Geographical representation of the survey (by district):

Districts	Respondents	Population	% of the population
Aveiro	3	19	16%
Beja	0	14	0%
Braga	5	14	36%
Bragança	0	12	0%
Castelo Branco	1	11	9%
Coimbra	3	17	18%
Évora	1	14	7%
Faro	5	16	31%
Guarda	0	14	0%
Leiria	5	15	33%
Lisboa	5	15	33%
Portalegre	2	15	13%
Porto	4	18	22%
Santarém	6	21	29%

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[47] Some principles are of special interest to the survey - the collaboration and good faith principle, for instance.

Districts	Respondents	Population	% of the population
Setúbal	3	13	23%
Viana do Castelo	3	9	33%
Vila Real	3	13	23%
Viseu	4	24	17%
Azores	3	19	16%
Madeira	1	10	10%
TOTAL	57	303	19%

Concerning political party representation, I find that only one out of seven political parties (CDS-PP) is not represented in the reponses to the survey as shown in Table 6. Thus, only 1.6% of the political parties (5/303) in municipalities are not represented. This suggests that the political party in the municipality chamber receiving the most votes is not an indicator that may lead to biased results.

Table 6 Political Party representation of the survey by years[48]:

Political party		2007	2008	2009	2010	2011
BE	Respondents	1	1	1	1	1
	Population	1	1	1	1	1
	%	100%	100%	100%	100%	100%
PCP-PEV	Respondents	3	3	3	2	2
	Population	32	32	32	28	28
	%	9%	9%	9%	7%	7%
PS	Respondents	23	23	23	31	31
	Population	108	108	108	129	129
	%	21%	21%	21%	24%	24%
Grupo de Cidadãos	Respondents	1	1	1	1	1
	Population	7	7	7	7	7
	%	14%	14%	14%	14%	14%
PPD-PSD	Respondents	24	24	24	17	17
	Population	134	134	134	115	115
	%	18%	18%	18%	15%	15%
Coligações	Respondents	5	5	5	5	5

[48] In 2009 there are local government elections, so the representation of political parties is presented by years to take into account changes in the political forces governing the municipality chamber.

Political party		2007	2008	2009	2010	2011
	Population	20	20	20	22	22
	%	25%	25%	25%	23%	23%
CDS-PP	Respondents	*0*	*0*	*0*	*0*	*0*
	Population	*1*	*1*	*1*	*1*	*1*
	%	*0*	*0*	*0*	*0*	*0*
Total	Respondents	57	57	57	57	57
	Population	303	303	303	303	303
	%	19%	19%	19%	19%	19%

This analysis allows me to conclude that the results of this dissertation may be generalizable to the entire population under study, though with extreme care because of size considerations[49].

A few other aspects are considered when it comes to data. First, general elections in local governments take place at the end of 2005 and again at the end of 2009. So as the financial year starts on the 1st of January and ends on the 31st of December, and the minimum audit mandate comprises one financial year, I take into account political changes in the municipality Town Council through a dummy variable that tracks changes in the political party. Second, I consider the change in public procurement legislation in 2008 in the data collection using a dummy variable. Finally, because municipalities, are compelled to publicize contracts concluded under direct award procedures (general regime), open procedures, restricted procedures, and negotiation and competitive dialogue procedure

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[49] Jensen and Payne's (2005) questionnaire has low percentage of answers, and the "size variable" t-test of the respondents versus non-respondents reveals that their respondents are somewhat greater than non-respondents. Their solution is to restrict the population under study to include only municipalities above 5,000 inhabitants. That is not an option in my case as I also wish to study law compliance with external auditing obligations, which is not dependent upon size.

under the Decree law 18/2008, on a certified electronic platform, I use this to confirm my survey data regarding price[50] [51].

In summary: for the purpose of descriptive analysis, all municipalities in the population are taken into consideration (303 municipalities in the five year period, 1,515 observations, 303*5). Nevertheless, the analysis concerning the hypotheses considers 57 municipalities and the number of observations is kept stable at 285 (57 municipalities in the five year period, 57*5).

4.3 Model specifications and related control variables

4.3. 1 Framework

In the literature review I establish four objectives and their hypotheses. In Section 3.2, regarding agency theory intertwined with the Portuguese setting section, I formulate my first objective: to study the legal compliance of municipalities. As the external auditing becomes compulsory in 2007, based upon certain criteria, I seek to know (i) whether municipalities comply with the recent adopted legislation, and (ii) if there are political factors involved in legal compliance.

The objectives lead to the formulation of the following hypotheses:

H1a: External auditing emerges from the legal binding law.

H1b: External auditing is positively influenced by political competition.

In Section 3.3., after discussing public procurement, I formulate my second objective: to investigate whether the lowest price is generally used by municipalities, and the factors

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[50] http://www.base.gov.pt/.

[51] The following information was downloaded from the website: contract objet, contract value, published data, contracting authority and contracted entity.

that may determine this choice of selection criterion. The selection criterion can be to choose the lowest price or the most economically advantageous proposal. I seek to know the importance of certain factors concerning the selection criterion: (i) the sophistication of the procurement process, (ii) the political competition, (iii) the citizens' interest, and (iv) determinants tackled in the agency theory known as audit risk, auditee size and complexity, and manager ownership.

The objectives lead to the formulation of the following hypotheses:

H2a: There is a negative association between the lowest price selection criterion and public procurement sophistication;

H2b: There is a negative association between the lowest price selection criterion and political competition;

H2c: There is a negative association between the lowest price selection criterion and citizen's interest;

H2d: There is a negative association between the lowest price selection criterion and (i) audit risk, complexity and size, and (ii) a positive association with manager ownership.

After presenting the literature review on audit fees in Section 3.4, I formulate my third objective: to study audit fees. The study of audit fees is broadened so as to include the impact of the public procurement process, notwithstanding the importance of political competition, central government transfers or internal auditing. The objective leads me to the formulation of the following hypotheses:

H3a: Sophisticated audit procurement is associated with higher audit fees.

H3b: Municipality dependence upon transfers is associated with lower audit fees.

H3c: Municipality political competition is associated with higher audit fees.

H3d: Internal auditing reduces audit fees.

In Section 3.5, both audit quality and perceived audit quality are presented. I establish my fourth objective, study perceived audit quality. The main concern regarding the study of

perceived audit quality lies in the possibility that the lowest price selection criterion may induce low-balling. The low-balling may affect the auditor's performance in identifying errors in the municipalities' financial statements known to its financial directors or chiefs. Thus, the perceived audit quality is studied against the (i) public procurement process, (ii) and the audit fees.

The objectives lead me to the formulation of the following hypotheses:

H4a: Public procurement based solely upon lowest price is negatively associated with perceived audit quality in municipalities.

H4b: Perceived audit quality is positively associated with higher audit fees.

The following sub-sections develop the four objectives and their hypotheses in models. Sub-section 4.3.2 presents the external auditing model. Sub-section 4.3.3 describes the public procurement determinants model. Sub-section 4.3.4 presents the audit fees model. Finally, sub-section 4.3.5 describes the perceived audit quality model.

4.3.2 External auditing model

In the "Agency theory applied to municipalities" Section 1 in Chapter 3, I express hypothesis 1 with two parts. The first part (H1a) states that "External auditing emerges from the legal binding law". The second part (H1b) states that "External auditing is positively influenced by political competition".

I test both hypotheses with one model. External auditing (Ext_Aud) is the dependent variable represented by a dummy where code 1 stands for municipalities with external auditing, and otherwise is 0. As the dependent variable is binary, to force the predicted values to be either 0 or 1, I use a logit regression (nonlinear regression).

I estimate the following logit model to assess how independent variables affect the probability that a municipality will abide by the law and adopt external auditing:

$$\text{Log } (p/(1-p)) = \beta_0 + \beta_1 ASSOC + \beta_2 FOUNDt + \beta_3 Local\_Comp + \beta_4 Local\_IComp +$$

$$\beta_5 Local\_PartComp + \beta_6 PolComp\_ComPLW + \beta_7 PolComp\_SDRW +$$

$$\beta_8 PolComp\_CoalRW + \beta_9 PolComp\_SocLW + \beta_{10} Net\_OpCosts +$$

$$\beta_{11} SIZE + \beta_{12} TAX + \beta_{13} Dkyear + \varepsilon \qquad\qquad (1)$$

In this model the dependent variable is the log-odds ratio, where p is the probability that Ext_Aud equals one, and Ext_Aud is a dummy variable that indicates whether a municipality has external auditing.

As mentioned in the Institutional settings in Chapter 2, municipalities with shares in companies and foundations are compelled to hire external auditing. Thus, in the survey I ask each municipality to answer whether there is a participation in the following entities, with: (i) Associations (ASSOC); (ii) Foundations (FOUNDt); (iii) Local companies (municipal ones) (Local_Comp); (iv) Local companies (intermunicipal ones) (Local_IComp); and (v) Commercial companies (Local_PartComp). For each participation I create a dummy variable coded as 1 when there is a participation, 0 otherwise. These are my first five explanatory independent variables.

As entities with participations in either legal form (companies or foundations) are compelled to hire auditing services, I expect a positive sign though with associations, either sign can be expected.

I take into consideration political competition as in Baber *et al.* (1987), Tagesson *et al.* (2015) Blank *et al.* (2009), Johnsen *et al.* (2004), and Cohen and Leventis (2013). There are different approaches to political competition. In some cases only two or three political parties (the most representative) are chosen (Tagesson *et al.*, 2015), in other cases the number of seats by each political party is used (Blank *et al.*, 2009). I choose Baber *et al.*'s (1987) and Johnsen *et al.*'s (2004) political party weight, but only with political parties

that are the most representative as in Tagesson *et al.* (2015), as this method avoids multicollinearity.

I introduce four variables in the model representing political competition with each political party: (i) Political Competition Communist Party Left Wing (PolComp_ComPLW) ("Partido Comunista"); (ii) Political Competition Social Democrats Right Wing (PolComp_SDRW) (PPD – PSD) ;(iii) Political Competition Coalition Right Wing – PolComp_CoalRW ("Coligação"); (iv) Political Competition Socialist Left Wing – PolComp_SocLW - ("Partido Socialista").

The variables are continuous and represent the weight for each political party in the municipality because as the literature review states, political competition increases as the opposition increases in weight (and the political party majority weight decreases), I expect to find a negative association.

The control variables used in the model are related to agency theory and seek to represent the municipality as principal and the auditor as an agent. The net operational cost (Net_OpCosts) is used as a proxy for audit complexity, as in Tagesson *et al.* (2015), and Blank *et al.* (2009). The Net_OpCosts variable includes the total amount of operational costs (excludes financial costs), collected from DGAL's platform. As did Tagesson *et al.* (2015) I expect to find a positive association.

I use a logarithm function for the total amount of revenues as a proxy for SIZE as Lowensohn *et al.* (2007) and Ward *et al.* (1994) do (also collected from DGAL platform). The size of the auditee is considered an important variable in studies regarding auditing. I expect an estimated positive coefficient for this variable.

Following Jensen and Payne (2005), Baber *et al.* (1987), Ward *et al.* (1994), and Tagesson *et al.* (2015), I also include tax base (TAX) in the model as a control variable. The populations' interest in municipal strategies can be explained by their economic input (Jensen and Payne, 2005), and along with interest, comes civil intervention in the municipality affairs. The variable has been measured in many different ways. I use Jensen and Payne's (2005) ratio of municipality taxation divided by population because data regarding municipality GDP are not available. I expect to find a positive association for

the estimated coefficient TAX representing an increasing probability of having external auditing.

As data in the sample can be considered to be a balanced panel with 57 cross-section units (the number of municipalities) and 5 years of observations (285 observation given 303*5 years), I expect to find a strong correlation among different time observations for each municipality, with negative consequences for the consistency for logit regressions. Thus, a set of dummy variables D_k^{year} is created and included in an extended model to control for time effects. To avoid the dummy variable ambush, no dummy variable is used for the year 2011.

In summary, the variables are thus presented in Table 7:

Table 7 Variables in the External Auditing Model

Variable	Expected sign
ASSOC = Associations. Indicator variable coded 1 for municipalities taking part in associations, otherwise 0.	+/-
FOUNDt = Foundations. Indicator variable coded 1 for municipalities taking part in foundations, otherwise 0.	+
Local_Comp = Local companies owned by one municipality. Indicator variable coded 1 for municipalities having shares in local companies, otherwise 0.	+
Local_IComp = Local companies owned by two or more municipalities. Indicator variable coded 1 for municipalities having shares in local companies, otherwise 0.	+
Local_PartComp = Commercial companies. Commercial companies owned by a municipality. Indicator variable coded 1 for municipalities having shares in commercial companies, otherwise 0.	+
PolComp_ComPLW = Political Competition Communist Party Left Wing (PC-PEV); PolComp_SDRW = Political Competition Social Democrats Right Wing (PPD-PSD); PolComp_CoalRW = Political Competition Coalition Right Wing (Coligação); PolComp_SocLW = Political Competition Socialist Left Wing (PS).	-
Net_OpCosts = Net Operating Costs Control, variable used as a proxy for audit complexity, includes the total amount of operational costs (excludes financial costs).	+
SIZE = Control variable used as a proxy for size, includes the total amount of revenues in a logarithm function.	+
TAX = Tax base, ratio of municipality taxation divided by population.	+
D_k^{year} = dummy variable is created and applied as a test for each model and has a value of 1 at year k and otherwise 0.	N/A

4.3.3 Public procurement determinants model

In the "Public Procurement" Section 2 in Chapter 3, I express four hypotheses: (H2a) "There is negative a association between the lowest price selection criterion and public procurement sophistication"; (H2b) "There is a negative association between the lowest price selection criterion and political competition"; (H2c) "There is a negative association between the lowest price selection criterion and citizens' interest"; (H2d) "There is a negative association between the lowest price selection criterion and (i) audit risk, complexity and size, and (ii) a positive association with manager ownership.".

The lowest audit fee offer (Low_AF_Of) is the dependent variable represented by a dummy where code 1 stands for external auditor's selection based upon the lowest price selection criterion in a public procurement process, and otherwise 0. As the dependent variable is binary, to force the predicted values to be either 0 or 1, I use a logit regression (nonlinear regression).

I estimate the following logit model to assess how independent variables affect the probability that a municipality will choose the lowest audit fee offer as a selection criterion in a public procurement process:

$$\text{Log } (p/(1-p)) = \beta_0 + \beta_1 \text{PubProc\_DirSel} + \beta_2 \text{AF\_Importance} + \beta_3 \text{Rotation} +$$
$$\beta_4 \text{PROP\_REC} + \beta_5 \text{PolComp\_ComPLW} + \beta_6 \text{PolComp\_SDRW} +$$
$$\beta_7 \text{PolComp\_CoalRW} + \beta_8 \text{PolComp\_SocLW} + \beta_9 \text{Net\_OpCosts} +$$
$$\beta_{10} \text{Size} + \beta_{11} \text{INDebt} + \beta_{12} \text{GRANT} + \beta_{13} \text{TAX} + \beta_{14} \text{Dkyear} \qquad (2)$$

In this model the dependent variable is the log-odds ratio, where p is the probability that Low_AF_Of equals one, and Low_AF_Of is a dummy variable that indicates whether a

municipality chooses the lowest audit fee offer as a selection criterion in a public procurement process.

The independent variables, as determinants of the lowest price selection criterion, are divided into four categories: (i) Public procurement variables: factor price importance, type of procurement process, and mandate; (ii) Number of proposals received; (iii) Political competition; and (iv) agency theory variables: complexity, size, risk, and manager ownership.

The public procurement variables stem from public procurement law. The chosen public procurement process is represented by a dummy variable that identifies a public procurement direct selection (PubProc_DirSel), with 1 for direct selection (a restrictive procedure) and 0 for a bid (a competitive procedure). A bid is a more complex, and sophisticated public procurement process. As direct selection diminishes competition, it is associated with the lowest price selection criterion, so I expect a negative association. Nevertheless, the sophistication of a bid, with competition among several tenders, can also be associated with the lowest price selection criterion, so a negative sign can also be expected.

There are two selection criteria in a public procurement process, lowest price and most economical proposal. The latter may also include price as a criterion. The level of price importance is represented by a categorical variable (from 1 to 5) representing audit fee importance (AF_Importance).

Level one is chosen when the importance of price is lower than 50%, level two when the importance of price is between 50 and 75%, level three when the importance of price is between 75 and 90%, level four when price is above 90% but not the only factor in consideration, and level five is chosen for price as the only factor. I expect to find a positive estimated coefficient for this variable.

The number of years included in the public procurement process can also affect the selection criterion, so a variable for mandate, referencing the auditor's rotation (Rotation) is used. The longer the number of years of the mandate, the stronger the relationship

between auditor and auditee. I expect a negative association because municipalities are expected to be more careful in the selection criteria with longer mandates.

The increasing number of proposals received increases sophistication levels of the procurement process. I expect to find a negative association with this variable. As the number of proposals increases, more tenders are involved, so the litigation risk inherent to the legal procedure increases. To avoid or reduce the litigation risk contractors are compelled to implement additional internal controls. These controls increase the sophistication of the procurement process.

The literature uses the Big Four as a variable in most studies, but the Portuguese municipality market is not expected to have extended external auditing by Big Four auditing companies. Thus, there is no consideration for auditor's issues in the model.

The lowest price offer represents a less complex, and with less litigation, public procurement selection criterion. Nevertheless, its simplicity may not take into account additional factors (in the auditors' procurement selection) that may interest the opposition. I expect increased political competition to alert municipalities to be more sophisticated in the preparation of public procurement process. As the literature review reveals that political competition increases as the opposition increases in weight (and the political party majority weight decreases), I expect a negative association. The political competition is represented by continuous variables PolComp_ComPLW, PolComp_SDRW, PolComp_CoalRW, and PolComp_SocLW, already defined in the previous section.

The agency theory variables cover several auditee features: size, complexity, risk, and agency costs. I expect complexity (Net_OpCosts) and SIZE to be negatively associated with selection based upon lowest price, as the municipality should assure, according to GAO (1987) and AICPA (2014), different selection factors besides price under these conditions.

I also take into consideration two variables that associate the municipality with central governments's decisions and represent proxies of agency risks – level of indebtedness and costs. The literature review finds different variables used for indebtedness. For

instance, Hackenbrack *et al.* (2000) use a debt to expenditure ratio, and Jensen and Payne (2005) and Baber *et al.* (1987) use debt per capita ratio. In Portugal the degree of indebtedness is a legally binding ratio of revenues over total debt. It is indicative of financial crisis above certain levels and is used for central government intervention.

In the model I use Portuguese law abiding level of indebtedness (INDebt) as a proxy for audit risk. Though municipalities with higher levels of indebtedness should procure with better care, I also find that it is possible that the lowest price selection criterion may be used to hide the municipalities' financial situation. In these circumstances I expect both associations, positive and negative, to occur.

The higher the ratio of central government transfers, the higher the dependence on central government decisions, and consequently a lower manager ownership. The latter brings the possibility for a lower preoccupation with auditing. I expect municipalities with a greater dependence on transfers (GRANT, a natural logarithm for central government transfers) to have a lowest price selection criterion, and I expect to find an estimated positive coefficient.

As in the previous model, I use TAX, tax base, as a control variable to serve as a proxy for the citizens' interest in municipalities activities. As I expect municipalities with more taxes per capita to have a greater citizens' intervention, a negative association with TAX is also expected. Nevertheless, I also expect that the coefficient of the variable GRANT to be greater than TAX. According to Pilcher and Dean (2009), political legislators are perceived to be more influential than taxpayers. These authors find evidence that financial information is not used by the public in terms of accountability.

As data in the sample can be considered to be a balanced panel with 57 cross-section units (the number of municipalities) and 5 years of observations (285 observations given 303*5 years), I expect to find a strong correlation among different time observations for each municipality, with negative consequences for the consistency for logit regressions. Thus, a set of dummy variables $D_k{}^{year}$ is created and included in an extended model to control for time effects. To avoid the dummy variable ambush, no dummy variable is used for the year 2011.

In summary, the variables are presented in Table 8:

Table 8 Variables in the Determinants of Public Procurement Model

Variable	Expected sign
PubProc_DirSel = Public Procurement Direct Selection, defines the procurement process, a dummy variable 1 for direct selection and 0 for a public bid.	+/-
AF_Importance = Audit Fee level of Importance, a categorical variable from 1 to 5 depending on the weight of factor price in the procurement process.	+
PROP_REC = number of proposals received by tenders.	-
Rotation = number of years of the auditor mandate.	-
PolComp_ComPLW = Political Competition Communist Party Left Wing (PC-PEV); PolComp_SDRW = Political Competition Social Democrats Right Wing (PPD-PSD); PolComp_CoalRW = Political Competition Coalition Right Wing (Coligação); PolComp_SocLW = Political Competition Socialist Left Wing (PS).	-
Net_OpCosts = Net Operating Costs Control, variable used as a proxy for audit complexity, includes the total amount of operational costs (excludes financial costs).	-
SIZE = Control variable used as a proxy for size, includes the total amount of revenues in a logarithm function.	-
INDebt= Indebtedness, level of indebtedness, a proxy for audit risk.	+/-
GRANT = logarithm function of central government transfers as a proxy for agency costs related to manager ownership.	+
TAX = Tax base, ratio of municipality taxation divided by population.	-
Dk^{year} = dummy variable is created and applied as a test for each model and has a value of 1 at year k and otherwise 0.	N/A

4.3.4 Audit fees model

In the "Audit fees" Section 3 in Chapter 3, I express hypothesis 3 with four parts. The first part (H3a) states that "Sophisticated audit procurement is associated with higher audit fees". The second part (H3b) states that "Municipality dependence upon transfers is associated with lower audit fees". The third part (H3c) states that "Municipality political competition is associated with higher audit fees". The fourth part (H3d) states that "Internal auditing reduces audit fees".

I test all four hypotheses with one model. Audit fees (LogAF) is the dependent variable represented by the natural logarithm of audit fees. As the dependent variable is continuous, I use an OLS regression (linear regression).

I estimate the following OLS model to assess how independent variables affect audit fees:

$$LogAF = \beta_0 + \beta_1 \, Low\_AF\_Of + \beta_2 \, AF\_Importance + \beta_3 PubProc\_DirSel + \beta_4 Rotation$$
$$\beta_5 Auditor + \beta_6 GRANT + \beta_7 PolComp\_ComPLW + \beta_8 PolComp\_SDRW +$$
$$\beta_9 Pol\_CompCoalRW + \beta_{10} PolComp\_SocLW + \beta_{11} IAOFF + \beta_{12} Size +$$
$$\beta_{13} Net\_OpCosts + \beta_{14} INDebt + \beta_{15} TAX + \beta_{16} Dkyear + \varepsilon \tag{3}$$

The first four variables, Low_AF_Of, AF_Importance, PubProc_DirSel, and Rotation, intend to measure the level of public procurement sophistication. Audit procurement sophistication is associated with the choice of bids as a procurement process (when variable PubProc_DirSel equals 0), the most economical selection criteria in the analysis of tenders' offers (when variable Low_AF_Of equals 0), lowest level of price importance in the selection criteria (the closeness of variable AF_Importance to 1), and an increasing number of years in the procurement process (the higher the number of variable Rotation). The variables are explained in the previous section. I expect to find an estimated negative coefficient for Low_AF_Of and AF_Importance variables, but a positive sign PubProc_DirSel variable (the direct selection process increases price, whether a public bid invites more tenders and the price goes down). I expect to find an estimated positive coefficient of Rotation. The variable Auditor (whether the auditor is a company, 1, or an individual, 0) is also explained in the previous section. I expect a positive association with audit fees.

As I describe in the previous section, a higher ratio of central government transfers promotes a lower preoccupation with auditing, so I expect municipalities with a greater dependence on transfers (GRANT, a natural logarithm for central government transfers) to have lower audit fees.

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Political competition increases as the opposition increases in weight (and the political party majority weight decreases), so, as the weight of a majority increases, decreasing political competition, audit fees will decrease as well, so I expect the estimated coefficients to be negative as in Tagesson *et al.'s* (2015) model. The political competition is represented by continuous variables PolComp_ComPLW, PolComp_SDRW, PolComp_CoalRW, and PolComp_SocLW already presented in previous sections.

The existence of an internal audit office is recognized in the literature (Cohen and Leventis, 2013; Blank *et al.*, 2009; Pilcher *et al.*, 2013; and Abbott *et al.*, 2012) as having a negative effect on audit fees. To measure the impact of internal audit I use a dummy variable with an indicator 1 for municipalities with internal audit office (IAOFF) and 0 otherwise. I expect to find an estimated negative coefficient.

As control variables I use four variables already presented in previous models. I expect to find a positive association between: size (SIZE), complexity (Net_OpCosts), risk (INDebt), citizens' interest (TAX), and audit fees.

As data in the sample can be considered a balanced panel with 57 cross-section units (the number of municipalities) and 5 years of observations (285 observations given 303*5 years), I expect to find a strong correlation among different time observations for each municipality, with negative consequences for the consistency for logit regressions. Thus, a set of dummy variables D_k^{year} is created and included in an extended model to control for time effects. To avoid the dummy variable ambush, no dummy variable is used for the year 2011.

In summary, the variables are presented in Table 9:

Table 9 Variables in the Audit Fees Model

Variable	Expected sign
Low_AF_Of = Lowest Audit Fee Offer, indicator variable coded 1 for municipalities surveyed that declared choosing candidates based upon the lowest (audit fee) price, otherwise 0.	-
AF_Importance = Audit Fee level of Importance, a categorical variable from 1 to 5 depending on the weight of factor price in the procurement process.	-
PubProc_DirSel = Public Procurement Direct Selection, defines the procurement process, a dummy variable 1 for direct selection and 0 for a public bid.	+
Rotation = number of years of the auditor mandate.	+
Auditor = a dummy variable, 1 for a company and 0 individual auditor.	+
GRANT = logarithm function as a proxy for agency costs.	-
PolComp_ComPLW = Political Competition Communist Party Left Wing (PC-PEV); PolComp_SDRW = Political Competition Social Democrats Right Wing (PPD-PSD); PolComp_CoalRW = Political Competition Coalition Right Wing (Coligação); PolComp_SocLW = Political Competition Socialist Left Wing (PS).	-
IAOFF = Internal Audit Office, dummy variable for the internal function.	-
SIZE = Control variable used as a proxy for size, includes the total amount of revenues in a logarithm function.	+
Net_OpCosts = Net Operating Costs Control, variable used as a proxy for audit complexity, includes the total amount of operational costs (excludes financial costs).	+
INDebt= Indebtedness, level of indebtedness, a proxy for audit risk.	+
TAX = Tax base, ratio of municipality taxation divided by population.	+
Dk^{year} = dummy variable is created and applied as a test for each model and has a value of 1 at year k and otherwise 0.	N/A

4.3.5 Perceived audit quality model

In the "Audit quality" Section 4 in Chapter 3, I express two hypotheses. The first hypothesis (H4a) states that "Public procurement based solely upon lowest price is negatively associated with perceived audit quality in municipalities". The second hypothesis (H4b) states that "Perceived audit quality is positively associated with higher audit fees".

I test both hypotheses with one model and two related dependent variables. Both are perceived audit quality attributes in a five-point Likert scale collected from the survey: expertise (Expert), and reputation (Reput), adapted from the one used by Lowensohn *et*

al. (2007) in their perceived audit quality study[52]. Thus, as the dependent variable is an ordinal variable from 1 to 5 I use both an ordered logit, and an OLS regression (linear regression) [53].

I estimate the following ordered logit and OLS model to assess how independent variables affect the perceived audit quality measured by the two categorical dependent variables, Expert and Reputation:

$$\text{Expert} = \beta_0 + \beta_1 \text{ Low\_AF\_Of} + \beta_2 \text{ AF\_Importance} + \beta_3 \text{LogAF} + \beta_4 \text{CEOPIN} + $$
$$\beta_5 \text{Opinion} + \beta_6 \text{GRANT} + \beta_7 \text{Net\_OpCosts} + \beta_8 \text{ SIZE} + \beta_9 \text{INDebt} + \beta_{10} \text{TAX}$$
$$+ \beta_{11} D_k^{year} + \varepsilon \qquad\qquad (4.1)$$

$$\text{Reputation} = \beta_0 + \beta_1 \text{ Low\_AF\_Of} + \beta_2 \text{ AF\_Importance} + \beta_3 \text{LogAF} + \beta_4 \text{CEOPIN} + $$
$$\beta_5 \text{Opinion} + \beta_6 \text{GRANT} + \beta_7 \text{Net\_OpCosts} + \beta_8 \text{ SIZE} + \beta_{10} \text{INDebt} + \beta_{11} \text{TAX}$$
$$+ \beta_{12} D_k^{year} + \varepsilon \qquad\qquad (4.2)$$

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[52] Lowensohn et al. (2007) used a seven-point Likert scale to measure perceived audit quality. The perceived audit quality is used as the dependent variable with the purpose of testing whether there is a positive relationship between audit firm specialization and perceived audit quality. They use audit specialization as a proxy for auditor expertise. They do not test their model with public procurement or audit fees, though they also present an audit fees model in which audit fees are the dependent variable, and the audit firm specialization the independent variable.

[53] Samelson et al. (2006) use a perceived audit quality as a dependent variable also using a seven-point Likert-scale data, though the authors convert it to a three-point scale. They find that, though the Likert scale is ordinal, it cannot be assumed to be continuous or equal-interval, so they use ordinal regression for primary analysis, supplemented by ordinary least squares regression (OLS).

As the literature mentions, audit fees (LogAF), already presented in previous sections, are expected to have a positive influence on audit quality, so I expect an estimated positive coefficient with perceived audit quality.

I use a dummy variable to measure unqualified opinion against common errors, identified by the Annual Financial Directory of Portuguese Municipalities ("Anuário") (2007) (CEOPIN). This variable is an approximation of a proxy for negative results stemming from audit monitoring.

An audit monitoring is a quality control instrument, and can take the form of post audit (audit replica), or auditor's working papers examination. Finding errors in financial accounts not substantiated in the audit opinion, or finding errors in the auditor's working papers, are evidence of lack of quality[54]. Deis and Giroux (1992) use the results of audit monitoring as a proxy for audit quality in their governmental study (schools in Texas). In their study they have access to quality control reviews[55]. As I have no access to quality controls performed by the Portuguese Institute of Statutory Auditors, which are of a classified nature according to law, and the only observable variables are the common errors, I use CEOPIN, and I expect to find a negative association with perceived audit quality[56].

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[54] An unqualified opinion with needed, not reported, financial adjustments in the accounts is a type I error. Type II error is issuing a qualified opinion with no needed adjustments. This last type of error usually raises no questions. The type I error can be found in quality controls performed by public officials, quality controls performed by public interest institutions, or in a litigation suit. The latter usually goes public under the form of a financial scandal. As municipalities have applied accrual accounting since 2001, and only started being surveilled in 2007, common errors can be found in the accounts and are easy to identify. Whether an opinion is issued without any remarks but with common errors in the accounts is the purpose of the variable.

[55] Their quality variables stem from a list of 19 deficiencies all coded and with assigned weight. They also conclude that audit quality is difficult to measure but found an association between audit hours and audit quality.

[56] The Portuguese Institute of Statutory Auditors is responsible for surveilling the auditing profession, though in a different framework since 2008.

Though some sort of correlation might be expected between CEOPIN and the auditor's opinion, I also include a dummy variable for the auditor's opinion (Opinion) coded 1 for qualified opinion and 0, otherwise, as I also find in Craswell *et al.* (1995.

As control variables I use five variables already presented in previous models. As in the audit fees model, I expect to find a positive association between: central government dependence or manager ownership (GRANT), complexity (Net_OpCosts), size (SIZE), risk (INDebt), citizens' interest (TAX), and the perceived audit quality. I also expect that the coefficient of the variable GRANT is greater than TAX. According to Pilcher and Dean (2009), political legislators are perceived to be more influential than taxpayers. These authors find evidence that financial information is not used by the public in terms of accountability.

As data in the sample can be considered to be a balanced panel with 57 cross-section units (the number of municipalities) and 5 years of observations (285 observations given 303*5 years), I expect to find a strong correlation among different time observations for each municipality, with negative consequences for the consistency for logit regressions, reinforced by the judgmental nature of the perceived audit quality variables. As a consequence, a set of dummy variables D_k^{year} is created and included in an extended model to control for time effects. To avoid the dummy variable ambush, no dummy variable is used for the year 2011.

In summary, the variables are presented in Table 10:

Table 10 Variables in the perceived audit quality model

	Expected sign
Low_AF_Of = Lowest Audit Fee Offer, indicator variable coded 1 for municipalities surveyed that declared choosing candidates based upon the lowest (audit fee) price, otherwise 0	-
AF_Importance = Audit Fee level of Importance, a categorical variable from 1 to 5 depending on the weight of factor price in the procurement process.	-
LogAF = Logarithm Audit Fees - Audit fees in a logarithm function	+
CEOPIN= Combined Error Opinion - dummy variable for common errors in unqualified opinion.	-
Opinion, dummy variable, indicator variable coded 1 for municipalities with qualified opinion, otherwise 0.	
GRANT = logarithm function of total state transfers, used as a proxy for agency costs.	+
Net_OpCosts = Net Operating Costs – continuous variable used as a proxy for audit complexity, includes the total amount of operational costs (excludes financial costs).	+
SIZE= includes the total amount of revenues in a logarithm function, used as a proxy for size.	+
INDebt = level of Indebtedness, a ratio of debt over total revenues, used as a proxy for audit risk.	+
TAX = Tax base, ratio of municipality taxation divided by population.	+
Dk^{year} = dummy variable created and applied as a control panel test for each model with a value of 1 at year k and otherwise 0.	N/A

Appendix 2 provides a summary of all variables.

5. Findings and Discussions

5.1 Framework

To analyze the data the statistical software STATA 11 is used. The data analysis includes descriptive statistics, the correlation matrix, multivariate regression, principal components analysis, and robustness tests.

Descriptive statistics provide a variable by variable description in an organized form. I include the mean, median, standard deviation, minimum, and maximum. In addition to this when the dependent variables are dichotomous I apply univariate tests for the difference between means of specific groups.

The correlation among the variables is shown in a matrix which presents two sets of pairwise correlations: Pearson and Spearman, to consider a parametric and non-parametric view of the variables, respectively. This is necessary as a high degree of correlation among independent variables may cause problems of multicollinearity, and this may affect the regressions' estimates. In order to measure multicollinearity I calculate the variance inflation factor (VIF) of the independent variables. Principal components analysis is used to identify factors, as some variables related to the public procurement process and perceived audit quality, show a high level of correlation.

When categorical dependent variables are used, multivariate regressions are estimated using both ordered logits and the OLS regressions. For continuous variables with high fluctuation such as the proxy I use for size (total revenues), and for audit fees, a logarithm function is used.

The remaining sections of Chapter 5 are organized as follows: Section 5.2 presents the descriptive statistics and univariate test for each objective. Section 5.3 describes the results of the correlation matrixes. Finally, Section 5.4 enunciates the findings of the multivariate regressions for each model.

5.2 Descriptive statistics and univariate test

5.2.1 External Auditing

Compulsory external auditing is introduced by law enforcement in 2007. The compulsory nature of external auditing depends upon municipality participation in local municipal, local intermunicipal, commercial companies, and foundations (until 2013). Table 11 presents the number of municipalities with external auditing. I find that in 2007 almost a third of Portuguese municipalities have external auditing and in 2008 the number more than doubles, stabilizing in 2010[57]:

Table 11 Municipalities with an external auditor during the 2007-2011 period (N=1.515)

External Auditor	2007	%	2008	2009	2010	2011	Total	%
With no External Auditor	227	34%	142	130	122	122	743	49%
With External Auditor	76	66%	161	173	181	181	772	51%
Population	303	100%	303	303	303	303	1515	100%

Source: Portuguese Institute of Statutory Auditors

Table 12 crosses information regarding external auditing in municipalities and their participation in foundations, local municipal companies, local intermunicipal companies, and commercial companies. The participation in companies and foundations compels municipalities to hire external auditing. As can be observed in Table 12, there are several cases surveyed in which there is a participation in foundations (1 case), local municipal companies (28 cases), local intermunicipal companies (31 cases), and commercial companies (15 cases), without external auditing.

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[57] No names of external auditors by municipality are given by the Portuguese Institute of Statutory Auditors, nor information regarding the type of auditor (if the auditor is a society or an individual, a Big Four or a second tier multinational). The information is considered classified.

Table 12 Distribution of participation in entities, by external auditing (N= 285)

	With External auditing	Without external auditing	No participation
Association (ASSOC)	128	82	75
Foundation (FOUNDt)	33	1	251
Local Companies (Local_Comp)	141	28	116
Local Intermunicipal Companies (Local_IComp)	106	31	148
Local Participation Companies (Local_PartComp)	98	15	172

Municipalities' participation in foundations or companies is the general rule (51.3%) though the participation may differ. Table 13 presents the number of different types of participation by external auditing. The table also allows us to evaluate whether there are municipalities that hire external auditing voluntarily, that is, with no participation in companies to compel them. Confirming Table 12 results, there are situations where the municipality participates in more than one type of company or foundation, without any external auditing. As above stated, the law compels municipalities to hire external auditing, so the results suggest that there are municipalities that do not comply by the law. This result is quite interesting because, as participation in more than one type of company increases, there are really no excuses for any misinterpretation of the law. Another interesting result is that there are only four cases (associated with only one municipality) reporting having external auditing without any participation in any type of entity. The results are suggestive of lack of interest, on the part of municipalities, in hiring external auditing on a voluntary basis.

Table 13 Number of different types of entities, by external auditing (N= 285)

Participation by type of entity, excluding associations	With External auditing	%	Without external auditing	%	Total
Participation in one type	34	20.0%	44	38.3%	78
Participation in two types	71	41.8%	14	12.2%	85
Participation in three types	42	24.7%	1	0.9%	43
Participation in four types	19	11.2%	0	0.0%	19
Subtotal of participation	166	97.6%	59	51.3%	225
No participation	4	2.4%	56	48.7%	60
Total	170	100%	115	100%	285

In the Annual Financial Directory of Portuguese Municipalities ("Anuário") of 2007 more than 76 municipalities are reported as having participation in companies. Nevertheless, this publication does not identify the whole universe of companies. Thus, results of my survey suggest that some municipalities did not comply with the legislation immediately in 2007 and some did not do it as far as 2011.

To further conclude whether participation in companies or foundations is the only substantial difference between municipalities with external auditing and municipalities without external auditing, or if there are other statistically significant differences based upon other municipality characteristics, I perform a two-sample t-test for the equality of means for several variables. The variables considered are related to agency theory, as follows: size (SIZE), complexity (Net_OpCosts), transfers dependency (GRANT) and risk (INDebt), and political competition (major parties PolComp_ComPLW, PolComp_SDRW and PolComp_SocLW).

I apply the test to both the respondents of the survey and population, with or without external auditing. Table 14 indicates there are significant differences between the group with external auditing and the group without external auditing, both in the population, and in the respondents of the survey (suggesting consistency in the population and survey results). The results suggest that municipalities with external auditing differ in several characteristics regarding size, complexity, transfers dependency, risk, and political competition, with statisticall significance. Therefore, it is not only participation in companies or foundations that differentiates these municipalities.

Table 14 Results of t-statistics of agency theory variables, by external auditing variable from both the population and respondents from survey

	Survey T N=285	p-value		Population T N=1.515	p-value	
SIZE	-5.8701	0.0000	***	-11.1334		
Net Operating Costs (Net_OpCosts)	-3.0240	0.0027	***	-5.7182	0.0000	***
Dependence upon central government transfers (GRANT)	-5.5246	0.0000	***	-10.8951	0.0000	***
Indebtedeness (INDebt)	-2.0299	0.0433	**	-2.6946	0.0000	***
Weight of the communist party (PolComp_ComPLW)	-5.2519	0.0000	***	3.5947	0.0003	***
Weight of the social democratic party (PolComp_SDRW)	5.9412	0.0000	***	1.9292	0,0539	*
Weight of the socialist party (PolComp_SocLW)	-3.0288	0.0027	***	-2.5676	0.0103	**

Notes: *** p-value lower than 0.01; ** p-value lower than 0.05; * p-value lower than 0.10.

Except for variable PolComp_ComPLW, representing the weight of communist party, all variables present the same sign in the survey and in the population. Furthermore, municipalities with external auditing are bigger, riskier, costlier and more complex than municipalities without external auditing. This seems to reinforce the necessity of external auditing.

As shown in Table 15 panel A, the major political parties are the left wing socialist party (PolComp_SocLW – 43,1%) and the right wing socialist democratic party (PolComp_SDRW – 35,6%), followed at a distance by the communist party (PolComp_ComPLW – 9,4%) and a right wing coalition (PolComp_CoalRW -7,6%). All parties have a seat in at least one municipality as all present majorities (*Maximum* >0.5).

Table 15 Descriptive statistics for external auditing variables (N= 285)

Variables	Mean	Median	St. deviation	Minimum	Maximum
Panel A: Continuous variables					
Weight of the communist party (PolComp_ComPLW)	0.0939	0.0000	0.1947	0.0000	0.8000
Weight of the social democratic party (PolComp_SDRW)	0.3559	0.4000	0.2800	0.0000	1.0000
Weight of the coalition (PolComp_CoalRW)	0.0759	0.0000	0.1791	0.0000	0.8571
Weight of the socialist party (PolComp_SocLW)	0.4310	0.4286	0.1846	0.0000	1.0000
Net Operating costs (Net_OpCosts)	123.5866	2.2107	5,817.4635	1	240,141.2178
SIZE (Log Revenues)	16.6249	16.4767	0.8166	14.3222	20.3544
TAX (Tax Base)	172.5984	132.4450	144.0976	11.0265	1,323.5750
Panel B: Categorical variables					
External auditing (Ext_Aud)	0.5965	1	0.4915	0	1
Associations (ASSOC)	0.7368	1	0.4411	0	1
Foundations (FOUNDt)	0.1193	1	0.3247	0	1
Local companies (Local_Comp)	0.5930	1	0.4921	0	1
Intermunicipal local companies (Local_IComp)	0.4807	1	0.5005	0	1
Local participations (Local_PartComp)	0.3965	1	0.4900	0	1

5.2.2 Procurement Process

As shown in Table 16, 72.9% of municipalities assign external auditing to the firm that offers the lowest audit fee in the public procurement process (variable Low_AF_Of). Direct selection in a restricted procedure is the municipalities' choice with minor exceptions (variable PubProc_DirSel has a value of 97.6%). Big Four firms have less room to charge their "brand names" premium within the audit fees, and this may be an explanation for their lack of presence in the Portuguese (and other markets) municipality auditing market. Effectively, though the survey asked specifically if the auditor is a Big

Four, this option is not chosen. The type of auditor chosen by municipalities relies almost exclusively on companies (variable Auditor has a value of 88.2%)[58].

Table 16 Analysis of choice of auditor within the procurement process variables (N= 170)

	Dichotomous, Set = 1			Dichotomous, Set = 0		
	Description	Number	%	Description	Number	%
Lowest price (Low_AF_Of)	Lowest price selection	124	72.9%	Economic advantageous selection	46	27.1%
Direct selection in public procurement (PubProc_DirSel)	Direct selection	166	97.6%	Bid	44	2.4%
Type of Auditor (Auditor)	Company of auditors	150	88.2%	Individual auditor	20	11.8%

In Table 17 the relevance of price (audit fee) as a public procurement selection criteria, has a mean of 4.1 (measured by variable AF_Importance). The audit fee importance ranges from 1 to 5, where 1 represents a price weight below 50% and 5 represents a price weight of 100% (the latter being coincident with the lowest price selection criterion). This means that price is important, even when other factors used in the most advantageous economically selection criterion are used. The importance of the lowest price as a selection criterion is reflected by the median of 5 (measured by variable AF_Importance).

The number of years covered by the public procurement process ranges from 1 to 4 years (variable Rotation) but, on average, the auditor stays at least two years (variable Rotation with a mean of 2.3) and the procurement process tends to last for the maximum number of years permitted by the procurement process law (variable Rotation with a median of

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[58] In the survey, besides indicating whether the type of auditor is a Big Four, a company or an individual auditor, the respondents are also asked to give the names of the auditors. There are only two cases of second tier multinational firms being explicitly identified. These results cannot be extrapolated because respondents may not know the exact brand name (when applicable) of the auditor's company. The auditor's law in Portugal forbids local companies to adopt international brand names (with whom the local companies may be associated) unless the latter participate in the local companies' capital.

3). The number of proposals received in a tendering process (measured by variable PROP_REC) has a mean of 3.0471 which is almost coincident with the median of 3. Nevertheless the proposals may range from 1 to 12 tenders in a procurement process.

As far as indebtedness, a ratio of debt over revenues, most municipalities have a ratio lower than one (measured by variable INDebt with a mean of 0.7465 and a median of 0.6736) which places them in a financially secure position according to the local finance law. The dependence upon central government transfers uses the natural logarithm of central government transfers (measured by variable GRANT), and as in indebtedness, the mean and median are very close (15.8830 and 15.8013, respectively).

Table 17 Descriptive statistics for Procurement Process variables (N= 170)

Variables	Mean	Median	St. deviation	Minimum	Maximum
Lowest price (Low_AF_Of)	0.7294	1	0.4456	0	1
Direct selection in public procurement (PubProc_DirSel)	0.9765	1	0.1520	0	1
Audit fee level of importance (AF_Importance)	4.0765	5	1.4350	1	5
Number of years covered by the procurement process (Rotation)	2.3765	3	1.0712	1	4
Number of proposals received by tenders (PROP_REC)	3.0471	3	2.2684	1	12
Indebtedness (INDebt)	0.7465	0.6736	0.6609	-0.0461	6.1910
GRANT	15.8830	15.8013	0.5845	13.6506	18.2179

Notes: Rotation is measured in years; GRANT = dependence of central government transfers (natural logarithm of central government transfers).

Table 18 shows how the selection criteria interact with the procurement process. Either in a bid or direct selection (award), the lowest price is the choice of municipalities with almost the same weight, (measured by variable PubProc_DirSel with 98.7% and 95.7%, for the lowest price as selection criteria, and other selection criterion, respectively).

Table 18 Distribution of procurement process, by selection criteria (N= 285)

	Lowest price selection criterion	%	Other selection criteria	%	Subtotal	%	No external auditor
Public bid	2	1.3%	2	4.3%	4	2.4%	
Direct selection (award)	122	98.7%	44	95.7%	166	97.6%	
Total	124	100%	46	100%	170	100%	115
%	72.9%		27.1%		59.6%		40.4%

Notes: PubProc_DirSel (Public Procurement Direct Selection) is coded as 1 when the method is direct selection and as 0 when it is public bid. The variable Low_AF_Of (Lowest Audit Fee Offer) is coded as 1 when the criterion is the lowest price and 0 when most economic advantageous criterion is considered.

To understand what kind of factors may influence public procurement selection of external auditing besides price (when the most economically advantageous selection criterion is used), I list in the survey several different factors and ask respondents to identify the ones used in their procurement process. Table 19 reveals that although 39.1% of the respondents chose the option "Others", without specifying the procurement factors of their choice, results also show that respondents indicate specialization of the auditor (39.1%), detailed working program (23.9%), and recommendations report (21.7%). Neither compliance with standards or seniority of the team are chosen. To check if the respondents use more than one factor in the procurement process, I also analyze the number of factors used in each public procurement process. In 19 cases only one factor for the selection criterion is considered, besides price (41.3%), and two and four factors as selection criteria have the same weight (23.9%), with 11 cases each[59] [60].

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[59] To identify the factors in the survey I use factors from the literature review, bids published in journals, and ask professionals in the field to identify the most common factors.

[60] Though earlier studies (GAO, 1987; AICPA, 2014) indicate that compliance with standards or seniority of the team are important factors, the respondents do not identify them in their public procurement process.

Table 19 The other factors behind procurement process, other than price (N=46)

Factors	Other selection criteria	%	Repetition factors	Other selection criteria	%
Specialization	18	39.1%	One factor	19	41.3%
Compliance	0	0.0%	Two factors	11	23.9%
Team competence	0	0.0%	Three factors	5	10.9%
Detailed working program	11	23.9%	Four factors	11	23.9%
Detailed report	10	21.7%			
Other – not explained	18	39.1%			

Notes: dummy variables coded as 1 when factor is considered and 0 otherwise; .ESPEC_P = specialization in the field, NORM_P = Compliance with standards, COMP_P = Competence of the team of auditors, PROGR_,P = Detailed working program, and REL_P = Report including recommendations.

The audit fee weight is measured by variable AF_Importance. The variable is ordinal and ranges from one to five, where one means that price as factor weights less than 50% (thus, other factors weight more than 50%), and five means that the price weight is of 100% (thus, there are no other factors besides price, which is coincident with lowest price as the selection criterion). Table 20 shows that besides price weighting 100%, most of the price weight ranges from 50 to 75%, though there are cases where other factors may weight more than 50% (10 cases representing 5.9%):

Table 20 Audit fee level of importance (N= 170)

Price weight	Other selection criteria	%	Cumulative %
Lower than 50% (1)	10	5.9%	5.9%
From 50% to 75% (2)	33	19.4%	25.3%
From 75% to 90% (3)	3	5.3%	27.1%
Above 90% (4)	0	69.4%	27.1%
100% (5)	124	72.9%	96.5%

Given that in the overwhelming majority of public procurement processes, a direct selection (award) is chosen, I next use the survey's answers to establish how many entities are invited to the tender (Panel A of table 21), and how many proposals are received in the tender (Panel B of table 21), distributed by selection criteria. In Panel A of Table 21 I present findings that show that 60 observations (52+8) have only one tender. These

represent 42.6% of the observations with the lowest audit fee (price) selection criterion and 18.2% of the observations with other selection criteria. Panel B shows that procedures for which municipalities receive only one proposal by a tender increase from 42.6% to 47.6% in the lowest selection criterion procedure, including in the case of open procedure (bids).

Comparing the panel A and panel B results, it is possible to note that even when more than one tender is invited, compared with the invitations, the proposals received tend to be equal or lower in number. Besides lack of interest by tenders, this may be due to the fact that as all public procurement process are price based, that is, limited (enforced by the public procurement process law), tenders presenting prices above that threshold are immediately excluded from the procurement process.

Table 21 Distributions of invitations and proposals in direct award procedures (N= 170)

		Lowest price criterion	%	Other selection criteria	%
Panel A: Distribution of invitations in direct award procedures by selection criteria					
Only one tender		52	42.6%	8	18.2%
Three tenders		38	31.1%	8	18.2%
Four tenders		2	1.6%	0	0%
Five tenders		21	17.2%	16	36.4%
Seven tenders		9	7.4%	12	27.3%
	Total	122	100%	44	100%
Open procedure		2		2	
	Total	124		46	
Panel B: Distribution of the number of tenders making proposals by selection criteria					
Only one tender		59	47.6%	7	15.2%
Two tenders		3	2.4%	0	0%
Three tender		43	34.7%	17	37%
Four tenders		1	0.8%	0	0%
Five tenders		11	8.9%	3	6.5%
Seven tenders		5	4.0%	19	41.3%
Twelve tenders		2	1.6%	0	0%
	Total	124	100%	46	100%
	%	72.9%		27.1%	

Earlier literature suggests (e.g.: Cohen and Leventis, 2013; Black *et al.*, 2009) that there is a scarce representation of Big Four auditing firms in the municipality auditing market. The respondents to my survey do not identify any Big Four firm. The results presented in

Table 22 show that companies are the type of auditor overwhelmingly cchosen (represented by variable Auditor with a weight of 87.9%) but the presence of an individual auditor is higher when the lowest selection price criterion is chosen (12.1% versus 10.9%):

Table 22 Distribution of the type of auditor by selection criteria (N= 170)

	Lower price selection criterion	%	Other selection criteria	%
Auditor in a society	109	87.9%	41	89.1%
Auditor working as an individual	15	12.1%	5	10.9%
Total	124	100%	46	100%
%	72.9%		27.1%	

Earlier studies indicate that rotation may be important for auditor independence (e.g.: Deis and Giroux, 1992; Rubin, 1988; DeAngelo, 1981). In Portuguese public institutes from central government the minimum mandate for auditors is of five years and the maximum is of ten years. In municipalities, the local finance law does not define a minimum or maximum number of years of mandate. But, as the external auditor is hired under a public procurement process, the procurement law in force establishes three years as the limit for the tender (the previous procurement law permitted longer periods).

Table 23 shows that the number of years of the public procurement auditor's mandate is three years (measured by variable Rotation with a weight of 44.1%), which is the maximum number of years for a public procurement procedure. Nevertheless, when the lowest price criterion is chosen, there are more cases of mandates of just one year (38.7%) than of three years (34.7%). This reveals a high level of rotation in the procurement process, which may not be associated with a high rotation of the auditor's effective mandate. Though the procurement process may be annual, the same auditor may be selected year after year, especially in a direct selection (award) process in which only one auditor is invited.

Table 23 Distribution of the number of years of the mandate, by selection criteria (N= 170)

		Lowest price selection criterion	%	Other selection criteria	%	Total %
One year		48	38.7%	7	15.2%	32.4%
Two years		18	14.5%	0	0%	10.6%
Three years		43	34.7%	32	69.6%	44.1%
Four years		15	12.1%	7	15.2%	12.9%
	Total	124		46		170
%		72.9%		27.1%		100%

Earlier studies (e.g.: Tagesson *et al.*, 2015; Deis and Giroux, 1992, Ward *et al.*, 1994) identify political competition as an important feature when studying public sector entities. Table 24 identifies which political party has a seat in the Town Council, distributed by selection criteria. The purpose is to evaluate whether there are any differences in weight by political parties when it comes to selection criteria. The socialist party has the largest coverage in municipalities with 54.1% (measured by variable PolComp_SocLW with a weight of 50.8% and 63.0%, for the lowest price criterion and other selection criteria, respectively), and has the highest weight and the highest variation from one selection criterion to the other. Thus, proportionately, the socialist party is the party that most selects selection criteria other than price. The social democratic party, with a coverage of 24.1% (measured by variable PolComp_SDRW with a weight of 23.3% and 26.1%, for the lowest price criterion and other selection criteria, respectively) follows the socialist party.

Table 24 Distribution of the major political parties represented in the survey, by selection criteria (N= 285)

		Lowest price selection criterion	%	Other selection criteria	%	Total %
citizens party		5	4.0%	0	0.0%	2.9%
communist party		13	10.5%	0	0.0%	7.6%
social democratic party		29	23.3%	12	26.1%	24.1%
coalition		14	11.3%	5	10.9%	11.2%
socialist party		63	50.8%	29	63.0%	54.1%
	Total	124		46		170
%		72.9%		27.1%		100%

Notes: variables PCCVP = political competition citizen civil party (grupo de cidadãos); PolComp_ComPLW = political competition communist party left wing (pc-pev); PolComp_SDRW = political competition social democrats right wing (ppd-psd); PolComp_CoalRW = political competition coalition right wing (coligação); PolComp_SocLW = political competition socialist left wing (ps) were transformed into dummy variables, with 1 if the political party was President and 0, otherwise.

5.2.3 Audit Fees

Table 25 shows the descriptive statistics for audit fees, as well as the natural logarithm of fees. The audit fees in municipalities range from 2,000€ to 36,000€. Their median is 12,000€, which is very close to the mean.

There used to be a Portuguese rule fixing minimum fees according to the total amount of assets and business volume, and also establishing auditor's minimum floor. However, this was abolished by the gradual adoption of EU Directives[61]. The minimum value for fees that nevertheless has to be thoroughly justified to the Portuguese Institute of Statutory Auditors is 1,000€. Usually the justification ranges from entities' inactivity to entities' starting an activity. Though the rule does not legally apply today, it is still used, though

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[61] The EU Directives are against fixed prices and enhance free competition among businesses. When Portugal adheres to the European Community it gradually changes legislation regarding situations where prices are fixed. This happens with the auditing profession as well. Among other directives, Directive 2008/30/EC from the European Parliament and Council, of the 11th of March 2008, is one of the most important in this respect.

not explicitly, as a threshold in quality control by national authorities, as they are predisposed to believe that using minimum or less than minimum fees may be a sign of lower audit quality, and non-compliance with auditing standards[62]. As Table 25 shows, the minimum audit fee is very close to the once practiced minimum fee of 1.000€.

Table 25 Audit fees and the level of audit fees importance (N= 170)

Variables	Mean	Median	St. deviation	Minimum	Maximum
Audit fees	13,148.06	12,000.00	6,900.97	2,000.00	36,000.00
Audit fees (natural logarithm)	9.35	9.39	0.55	7.60	10.49

Notes: Audit fees in euros.

5.2.4 Perceived Audit quality

Taking into consideration the population and the most common errors reported in the Annual Financial Directory of Portuguese Municipalities ("Anuário") (2007) I create a dummy variable for each common error. The most common errors in the financial statements are (i) absence of debtors (debtors errors), (ii) absence of provisions (provisions errors), (iii) absence of profit deferrals (profit deferrals errors), (iv) absence of any inventory (inventory errors), (v) absence of expenses accrual (expenses accruals errors), and (vi) lack of annual depreciation (depreciation errors). The set of indicator variables (dummy variables) is coded as 1 when the amount of each asset, liability, or expense identified above is equal to or less than zero, and is coded 0 otherwise. Table 26 shows the number of observations subject to the most common errors, across two subsamples: municipalities with and without external auditing, and also presents the number observations in which no errors are reported by most common error. The absence of provisions is the most reported error (with 751 observations) followed by the absence of inventories (with 313 observations). There is almost no absence of debtors in financial accounts (the number of observations with no errors is 1,508 out of 1,515). The number

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[62] The quality control audits by the Portuguese Institute of Statutory Auditors follow a questionnaire in which the number of audit hours, fees, business volume, and total amount of assets are calculated.

of errors is lower in municipalities with external auditing for each type of common error, which may be suggestive of a higher quality in financial statements.

Table 26 Most common errors, by external auditing (N=1,515):

	Number of observations Municipalities from 2007 to 2011			
Common Errors	Ext_Aud = 1	Ext_Aud = 0	Total of errors	No errors
Debtors errors	1	6	7	1,508
Provisions errors	269	482	751	764
Profit deferrals	28	127	155	1,360
Inventory errors	132	181	313	1,202
Expenses accruals	28	127	155	1,360
Depreciation errors	13	27	40	1,475

Notes: Variable Ext_Aud = External Auditing

To find out if there are statistically significant differences in the incidence of common errors between the two groups identified in Table 26, I use a t-test on means to compare the two independent groups, with and without external auditing. The results, shown in Table 27, suggest that there is a statistically significant difference between the mean of municipalities subject to external audit, and municipalities with no external auditing. In fact, municipalities with external auditing present a statistically significantly lower incidence of the most common errors. This suggests that municipalities with external auditing may tend to have more quality in the financial statements.

Table 27 Results of t-statistics of common errors variables by external auditing variable (N=1,515)

	t-test	p-value	
Debtors errors	1.9465	0.0518	*
Provisions errors	12.2430	0.0000	***
Profit deferrals	8.8616.	0.0000	***
Inventory errors	3.5021	0.0005	***
Expenses accruals errors	8.8616	0.0000	***
Depreciation errors	2.3694.	0.0179	**

*** p-value lower than 0.01; ** p-value lower than 0.05; * p-value lower than 0.10.

I perform the same kind of analysis of common errors with the respondents of the survey, that is, the number of errors with and without external auditing, and t-test on means for

the two independent groups. Table 28 shows the results. The municipalities of the survey present the same kind of incidence of common errors as does the population.

As with the population, the absence of provisions in the survey is the most reported error (with 101 observations) followed by the absence of inventories (with 30 observations). There is almost no absence of debtors in financial accounts (the number of observations with errors is 1 out of 285). The number of common errors is also lower in municipalities with external auditing for each type of common error. The results of the t-test are also suggestive of a statistically significant difference between the means of the two subsamples, when it comes to common errors, so the same suggestion of higher quality of financial statements with external auditing remains:

Table 28 Most common errors in the survey (by external auditing) (N=285):

	With External Auditing	Without External Auditing	Total of errors	t-test	p-value	
Debtors errors	1	0	1	-0.8220	0.4118	
Provisions errors	28	73	101	9.2579	0.0000	***
Profit deferrals	4	17	21	4.0381	0.0001	***
Inventory errors	13	17	30	1.9316	0.0544	*
Expenses accruals	4	17	21	4.0381	0.0001	***
Depreciation errors	1	3	4	1.4226	0.1560	

*** p-value lower than 0.01; ** p-value lower than 0.05; * p-value lower than 0.10.

I cross common errors in municipalities with external auditing with the auditor's opinion. The results are shown in Table 29. The majority of the observations (74.7%) have a qualified opinion in their auditing report. The most common errors associated with qualified opinions are absence of provisions and inventories. The results of the survey identify 94 observations with qualified opinions in which no common errors take place. This is not surprising as there are several reasons for the issuance of a qualified opinion. One reason contributing to a qualified opinion is the auditor's limitation in scope, which has little to do with financial statement mistakes. Another reason may be adjustments needed in the accounts, besides common errors, which are not corrected by the municipality accountant. There are eight observations with common errors and an

unqualified opinion. This is not necessarily attributable to lack of audit quality, as it may be due to lack of materiality of the common error.

Table 29 Most common errors, by opinion in the survey (N=170)

Common errors	Qualified Opinion (127=>74.7%)	Unqualified Opinion (43 => 25.3%)	Total of errors
Debtors errors	1	0	1
Provisions errors	23	5	28
Profit deferrals	3	1	4
Inventory errors	12	1	13
Expenses accruals	3	1	4
Depreciation errors	0	1	1
Panel B: Opinion	Without common errors	With common errors	
Unqualified Opinion	35	8	43
Qualified Opinion	94	33	127

The respondents are asked in the survey to measure the degree of correspondence between the opinion issued by the auditor and financial statements quality. The majority of the respondents have the perception that the auditor's opinion reflects adequately (109 observations) or exactly (52 observations) the quality of financial statements, as shown in Table 30. Only five municipalities disagree with their qualified opinion.

Table 30 Municipality perception of auditor´s opinion (N=170)

Opinion/Municipality perception	1	2	3 (no opinion)	4	5	Total
Unqualified Opinion	0	1	0	23	19	43
Qualified Opinion	5	2	1	86	33	127
Total	5	3	1	109	52	170

The model for perceived audit quality has four variables not explained in the previous sections: (i) perceived level of the auditor's expertise (variable Expert), an ordinal variable on a five-point Likert scale, (ii) perceived level of the auditor's reputation (variable Reputation) an ordinal variable on a five-point Likert scale, (iii) combined errors with the auditor's opinion (CEOPIN), a dummy variable coded as 1 when there are

common errors in an unqualified opinion, and 0 otherwise, and (iv) the opinion itself (Opinion), a dummy variable coded as 1 when the opinion is qualified, and 0 otherwise.

Table 31 presents the descriptive statistics for variables in the perceived audit quality model. Both auditor's perceived expertise and reputation present the same median of 4, and the minimum and maximum of 1 and 5, respectively, though the expertise presents a higher mean (measured by variable Expert with a mean of 4.3860). The mean of common errors crossed with an unqualified opinion is very close to zero (measured by variable CEOPIN with a mean of 0.0053 and a median of 0 which is consistent with the number of observations under these circumstances presented in Table 29 (eight observations). The qualified opinion is the majority of observations (measured by variable Opinion with a mean of 0.7471 and a median of 1).

Table 31 Descriptive statistics for perceived audit quality variables (N= 170)

Variables	Mean	Median	St. deviation	Minimum	Maximum
Expert	4.3860	4	0.6701	3	5
Reputation	4.2105	4	0.6955	3	5
CEOPIN	0.0053	0	0.0725	0	1
Opinion	0.7471	1	0.4360	0	1

Notes: CEOPIN = Combined Error Opinion, coded as 1 when there are common errors in an unqualified opinion, 0 otherwise. Opinion is coded as 1 when the opinion is qualified, and 0 otherwise.

5.3 Correlation matrix

A correlation is a bivariate analysis between two variables. The Pearson correlation applies to continuous variables, and the Spearman correlation evaluates the monotonic relationship between two continuous or ordinal variables.

Table 32 shows the correlations between the external auditing variables. The upper triangle presents Spearmen correlations, while the lower triangle shows the Pearson correlations. The figures in bold are correlations which are statistically significant (at least 0.05 significance level).

As expected, there is a statistically significant correlation between having external auditing and shares in either Local companies (100% owned by one municipality), Intermunicipal companies (100% owned by more than two municipalities), or other companies. Variables Size (natural logarithm of revenues) and Net_OpCosts (proxy for complexity) present a correlation of 0.68, which is natural, as larger municipalities tend to be more complex. The two sets of correlations are quite similar, though the correlation with Spearman tends to be higher between variables TAX (tax base), Size, and Net_OpCosts.

There are signs of multicollinearity, as the Spearman correlation results show a correlation of 0.95 between Size and Net_OpCosts, and the Pearson correlation is 0.68 (both significant). This will have to be taken into consideration when estimating equation (1).

The correlation of external auditing (Ext_Aud), the dependent variable, with the independent variables of equation (1), are mostly consistent with the expected signs for these variables, as indicated in Table 7 of Section 4.3.2. There are only a few exceptions: the socialist and communist political parties present a statistically significant positive correlation, when a negative association is expected.

Table 32 Correlation Matrix of External Auditing Variables (N=285):

	1	2	3	4	5	6	7	8	9	10	11	12	13
Ext_Aud (1)	1	0.04	**0.28**	**0.59**	**0.35**	**0.45**	**0.34**	**-0.33**	**0,17**	**0.17**	**0.41**	**0.37**	**0.36**
ASSOC (2)	0.04	1	**0.22**	**-0.22**	0.10	**0.13**	0.09	-0.11	-0.02	0.05	-0.01	0.06	0.7
FOUNDt (3)	**0.28**	**0.22**	1	**0.19**	0.10	**0.34**	**0.20**	-0.07	0.02	-0,10	**0.26**	**0.28**	**0.19**
Local_Comp (4)	**0.59**	**-0.22**	**0.19**	1	**0.22**	**0.35**	**0.27**	**-0.14**	**0.17**	-0,04	**0.45**	**0.42**	**0.25**
Local_IComp (5)	**0.35**	0.10	0.10	**0.23**	1	0.10	**0.36**	-0.07	-0.03	**-0.17**	**0.27**	**0.27**	**0.19**
Local_PartComp (6)	**0.45**	**0.13**	**0.34**	**0.35**	0.10	1	**0.23**	**-0.23**	**0.34**	-0.07	**0.36**	**0.36**	**0.37**
PolComp_ComPLW (7)	**0.30**	**0.12**	0.11	**0.21**	**0.32**	0.10	1	**-0.50**	0.06	-0.04	**0.50**	**0.48**	**0.46**
PolComp_SDRW(8)	**-0.33**	**-0.12**	-0.0798	**-0.13**	-0.05	**-0.23**	**-0.48**	1	**-0.64**	**-0.40**	**-0.35**	-0.38	**-0.32**
PolComp_CoalRW (9)	0.14	-0.00	0.02	0.1652	-0.06	**0.31**	**-0.11**	**-0.54**	1	0.02	**0.28**	0.29	**0.14**
PolComp_SocLW (10)	**0.17**	**0.12**	-0.06	-0.09	**-0.16**	-0.07	**-0.14**	**-0.42**	0.01	1	-0.09	-0.06	0.03
Net_OpCosts (11)	**0.18**	**-0.18**	**0.13**	**0.26**	**0.25**	**0.29**	0.04	**-0.12**	**0.20**	-0.07	1	**0.95**	**0.70**
SIZE(12)	**0.33**	0.01	**0.28**	**0.42**	**0.30**	**0.38**	0.02	**0.128**	**0.24**	**-0.09**	**0.68**	1	**0.64**
TAX (13)	**0.13**	0.07	**0.23**	0.00	0.08	**0.26**	**0.12**	-0.04	0.03	**-0.08**	**0.42**	**0.48**	1

Notes: Ext_Aud = External Auditing; ASSOC = Association; FOUNDt = Foundation; Local_Comp = Local Company; Local_IComp => Local Intermunicipal Company; Local_PartComp = Local Participation Company; PolComp_ComPLW = Political Competition Communist Party Left Wing (PC-PEV; PCCVP; PolComp_SDRW = Political Competition Social Democrats Right Wing (PPD-PSD); PolComp_CoalRW = Political Competition Coalition Right Wing (Coligação); PolComp_SocLW = Political Competition Socialist Left Wing (PS); Net_OpCosts= Net Operating Cost; Size = Log Revenues; TAX = tax base.

Table 33 shows the correlations between the external auditing variables. The upper triangle presents Spearmen correlations, while the lower triangle shows the Pearson correlations. The figures in bold are correlations that are statistically significant (at least 0.05 significance level).

With the Pearson correlation it must be noted that there is a correlation of 0.79 between AF_Importance (Audi Fee Importance), and Low_AF_Off (Lowest Audit Fee Offer). The first measures the level of importance of audit fees in the selection criteria and the second represents the lowest price selection criterion itself. The Spearman correlation increases the value to 0.88. This will have to be taken into consideration when estimating equation (2).

Another correlation that mst be considered when estimating equation (2) is the one between Size and the dependence on central government transfers (GRANT). The value 0.88 is so high that it can be seen as indicative of multicollinearity. The Spearman correlation reinforces the correlation between GRANT and Size, but also GRANT and Net_OpCosts (a proxy for audit complexity), 0.93 and 0.90, respectively, and Net_OpCosts with Size, with 0.97.

Comparing the correlation matrix results with the expected signs for the independent variables (presented in Table 8 of Section 4.3.3) included in the public procurement model, I observe that most correlation signs are not statistically significant. Nevertheless, AF_Importance (the level of audit fee importance), Rotation (number of years of mandate), PolComp_SDRW (the social democrat political party), and TAX (the tax base) have statistically significant correlations with the dependent variable Low_AF_Of (lowest audit fee offer), with signs that are consistent with my expectations. Finally, PolComp_SocLW (the socialist political party) and GRANT (the central government transfers dependency) have statistically significant correlations with signs that are the opposite of the expected signs of the model.

Table 33 Correlation matrix of public procurement variables (N=170):

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Low_AF_Of (1)	1	0.08	**0.88**	**-0.27**	**-0.39**	**0.21**	-0.08	0.02	**-0.19**	-0.04	-0.06	-0.02	-0.14	0.12
PubProc_DirSel (2)	0.08	1	0.06	**-0.17**	**0.26**	**-0.17**	0.13	-0.10	0.12	**-0.21**	**-0.22**	0.03	**-0.19**	-0.15
AF_Importance(3)	**0.79**	0.06	1	-0.14	**-0.37**	**0.17**	0.06	**-0.18**	-0.08	-0.14	**-0.19**	-0.07	**-0.26**	0.07
Rotation (4)	**-0.27**	**-0.16**	-0.14	1	**0.27**	-0.05	0.10	**-0.16**	0.11	0.15	**0.17**	-0.00	**0.24**	-0.05
PROP_REC (5)	**-0.39**	**-0.44**	**-0.36**	**0.30**	1	0.04	0.04	**-0.19**	0.09	**0.26**	**0.32**	-0.14	**0.35**	0.11
PolComp_ComPLW (6)	**0.21**	-0.14	**0.19**	-0.09	0.08	1	-0.45	-0.05	**-0.16**	**0.54**	**0.52**	**-0.22**	**0.40**	**0.50**
PolComp_SDRW(7)	-0.07	0.13	0.07	0.09	0.07	**-0.48**	1	**-0.70**	**-0.21**	**-0.29**	**-0.30**	-0.06	**-0.22**	**-0.28**
PolComp_CoalRW (8)	0.03	-0.10	**-0.24**	**-0.19**	-0.03	-0.11	**-0.54**	1	-0.08	**0.20**	**0.22**	**0.20**	**0.18**	0.12
PolComp_SocLW(9)	**-0.22**	0.10	-0.06	0.09	**0.19**	**-0.14**	**-0.42**	0.01	1	**-0.31**	**-0.30**	**0.17**	**-0.24**	
Net_OpCosts (10)	-0.09	**-0.31**	-0.30	0.06	**0.21**	0.04	**-0.12**	0.12	**-0.07**	1	**0.97**	0.01	**0.90**	**0.66**
SIZE (11)	-0.06	**-0.26**	**-0.24**	0.14	**0.23**	0.22	**-0.12**	0.24	**-0.09**	0.68	1	-0.04	**0.93**	**0.60**
IND (12)	-0.4	0.02	-0.06	0.00	**-0.24**	0.11	0.04	0.08	-0.00	0.06	0.03	1	0.01	0.11
GRANT (13)	**-0.15**	**-0.21**	**-0.31**	0.23	0.27	-0.02	**-0.12**	0.23	-0.04	0.60	0.88	0.05	1	**0.39**
TAX (14)	0.12	-0.14	0.01	0.01	**0.09**	**0.12**	-0.04	0.03	**-0.08**	**0.42**	**0.48**	**-0.05**	**0.18**	1

Notes: Low_AF_Of = Lowest Audit Fee Offer; PubProc_DirSel = Public Procurement Direct Selection; AF_Importance = Audit Fee level of Importance; Rotation = measured in years; PROC_REC = number of proposals received; PolComp_ComPLW = Political Competition Communist Party Left Wing (PC-PEV; PolComp_SDRW = Political Competition Social Democrats Right Wing (PPD-PSD); PolComp_CoalRW = Political Competition Coalition Right Wing (Coligação); PolComp_SocLW = Political Competition Socialist Left Wing (PS); Net_OpCosts= Net Operating Cost; Size = Log Revenues; IND = level of indebtedness; GRANT = Central government transfer dependence; TAX = tax base.

Table 34 shows the correlations between the external auditing variables. The upper triangle presents the Spearmen correlations, while the lower triangle shows the Pearson correlations. The figures in bold are correlations that are statistically significant (at least 0.05 significance level).

As noted in the previous analysis, correlation between Size and the dependence on central government transfers (GRANT) is quite high, regardless of the type of correlation calculated. The Spearman correlation also reinforces the correlation between GRANT and Net_OpCosts (a proxy for audit complexity), with 0.90, and Net_OpCosts with Size, with 0.97.

Comparing the correlation matrix results with the expected signs (presented in Table 9 of Section 4.3.4) of the audit fees model, there is overwhelming consistency with two exceptions. Variables GRANT (dependence upon central government transfers), and political parties PolComp_ComPLW (communist party) and PolComp_CoalRW (coalition party) present positive signs where a negative sign is expected. The negative correlation between the lowest price selection criterion (variable Low_AF_Of) and audit fees (variable LogAF) reinforces Beattie and Fearnley's (1998) opinion that competition over price may lead to low-balling.

Table 34 Correlation matrix of audit fees variables (N=170):

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
LogAF (1)	1	**-0.28**	**-0.37**	**0.15**	0.08	0.06	**0.50**	0.42	**-0.34**	0.22	**-0.19**	-0.03	**0.56**	**0.53**	0.05	**0.38**
Low_AF_Of (2)	**-0.30**	1	**0.81**	0.08	**-0.27**	-0.2	-0.14	**0.21**	-0.08	0.03	**-0.19**	-0.04	-0.05	-0.03	-0.02	0.13
AF_Importance (3)	**-0.38**	**0.79**	1	0.06	-0.14	0.12	-0.26	**0.17**	0.06	**-0.18**	-0.08	-0.03	**-0.19**	**-0.14**	-0.07	0.07
PubProc_DirSel (4)	**-0.16**	0.80	0.06	1	**-0.17**	0.18	**-0.19**	**-0.17**	0.13	-0.10	0.12	-0.02	**-0.22**	**-0.21**	0.03	**-0.15**
Rotation (5)	**0.03**	**-0.27**	-0.14	**-0.16**	1	0.04	**0.25**	-0.04	0.11	**-0.16**	0.12	0.18	**0.17**	0.15	-0.00	-0.06
Auditor (6)	**0.21**	-0.02	-0.12	**0.18**	0.04	1	**0.23**	0.03	-0.00	0.05	0.00	-0.13	**0.18**	0.17	0.02	0.10
GRANT (7)	**0.50**	**-0.15**	**-0.30**	**-0.21**	0.24	**0.22**	1	**0.40**	**-0.21**	0.18	**-0.24**	0.02	**0.93**	**0.90**	0.01	**0.39**
PolComp_ComPLW (8)	**0.25**	**0.21**	**0.19**	-0.14	-0.09	-0.11	-0.03	1	**-0.45**	-0.04	**-0.17**	0.08	**0.52**	**0.54**	**-0.23**	**0.50**
PolComp_SDRW(9)	**-0.25**	-0.07	0.07	0.13	0.09	0.01	**-0.12**	**-0.48**	1	**-0.70**	**-0.22**	0.00	**-0.30**	**-0.29**	-0.06	**-0.28**
PolComp_CoalRW (10)	**0.18**	0.03	**-0.24**	-0.10	**-0.19**	0.02	**0.23**	**-0.11**	**-0.54**	1	-0.08	0.07	**0.22**	**0.20**	**0.19**	0.12
PolComp_SocLW(11)	**-0.17**	**-0.22**	-0.07	0.10	0.09	0.02	-0.04	**-0.14**	**-0.42**	0.01	1	**-0.18**	**-0.30**	**-0.31**	0.17	**-0.23**
IAOFF (12)	-0.05	-0.04	-0.04	-0.02	0.18	-0.13	0.06	0.01	-0.00	0.01	**-0.16**	1	0.10	**0.15**	-0.01	**0.33**
SIZE(13)	**0.52**	**0.52**	-0.06	**0.24**	**-0.26**	0.14	**0.88**	**-0.12**	0.24	0.24	**-0.09**	0.16	1	**0.97**	-0.03	**0.60**
Net_OpCosts (14)	**0.48**	-0.09	**-0.30**	0.06	0.12	**0.60**	**0.60**	0.04	**-0.12**	0.20	-0.07	0.25	0.68	1	0.01	**0.66**
INDebt (15)	0.02	-0.04	-0.06	0.02	0.00	-0.04	**0.05**	**-0.10**	0.05	0.08	-0.01	-0.00	0.04	**0.06**	1	-0.11
TAX (16)	**0.33**	0.12	0.01	-0.14	0.01	0.14	**0.18**	**0.12**	-0.04	0.03	**-0.09**	0.32	**0.48**	0.42	**-0.05**	1

Notes: LogAF = Logarithm Audit Fee; Low_AF_Of = Lowest Audit Fee Offer; AF_Importance = Audit Fee Importance; PubProc_DirSel = Public Procurement Direct Selection; Rotation = number of years of mandate; Auditor; GRANT; PolComp_ComPLW = Political Competition Communist Party Left Wing (PC-PEV; PolComp_SDRW = Political Competition Social Democrats Right Wing (PPD-PSD); PolComp_CoalRW = Political Competition Coalition Right Wing (Coligação); PolComp_SocLW = Political Competition Socialist Left Wing (PS); IAOFF = Internal Audit Office; Size = Log Revenues; Net_OpCosts= Net Operating Cost; INDebt= Indebtedness; TAX = Tax base.

Table 35 shows the correlations between the external auditing variables. The upper triangle presents the Spearmen correlations, while the lower triangle shows the Pearson correlations. The figures in bold are correlations that are statistically significant (at least 0.05 significance level).

Comparing the correlation matrix results with the expected signs (presented in Table 10 of Section 4.3.35) of the perceived audit quality model, there is consistency with all variables with statistically significant correlation results (Opinion, GRANT, Net_OpCosts, SIZE, INDebt, and TAX). The remaining variables, though consistent with the expected sign, do not present statistically significant correlation results.

Table 35 Correlation matrix of audit quality variables (N=170):

	1	2	3	4	5	6	7	8	9	10	11	12
Expert (1)	1	**0.17**	-0.05	-0.13	**0.16**	-0.08	**0.32**	**0.21**	**0.17**	**0.18**	**0.24**	**-0.18**
Reputation (2)	**0.47**	1	**-0.32**	**0.42**	**0.51**	0.06	-0.09	**0.38**	**0.38**	**0.38**	0.06	0.13
Low_AF_Of (3)	-0.04	**-0.31**	1	**0.81**	**-0.28**	-0.11	-0.02	-0.14	-0.04	-0.06	-0.02	0.13
PubProc_DirSel (4)	-0.14	**-0.41**	**0.79**	1	**-0.37**	-0.02	-0.11	**-0.26**	-0.14	**-0.19**	-0.07	0.07
LogAF (5)	0.14	**0.43**	**-0.29**	**0.38**	1	-0.07	**0.16**	**0.50**	**0.53**	**0.56**	0.02	**0.39**
CEOPIN(6)	-0.03	0.07	-0.11	-0.12	-0.04	1	**-0.38**	-0.05	-0.08	-0.08	-0.10	-0.07
Opinion (7)	**0.27**	-0.11	-0.02	-0.11	**0.20**	**-0.38**	1	-0.04	0.05	0.03	0.13	0.03
GRANT(8)	**0.21**	**0.28**	**-0.15**	**-0.30**	**0.50**	0.03	-0.04	1	**0.90**	0.93	0.01	**0.39**
Net_OpCosts (9)	0.00	**0. 25**	-0.09	**-0.30**	0.48	0.03	0.03	**0.60**	1	**0.97**	0.01	**0.66**
SIZE (10)	**0.17**	**0.22**	-0.06	**-0.24**	**0.52**	0.02	0.02	**0.88**	**0.70**	1	-0.04	**0.61**
INDebt (11)	**0.22**	0.05	-0.04	-0.06	-0.02	-0.07	**0.18**	0.05	0.06	0.04	1	-0.11
TAX (12)	-0.10	0.02	0.12	0.01	**0.33**	0.00	0.08	**0.18**	**0.42**	**0.48**	**-0.05**	1

Notes: Expert = Field specialization; Reputation = Credibility; Low_AF_Of = Lowest Audit Fee Offer; PubProc_DirSel = Public Procurement Direct Selection; LogAF = Logarithm Audit Fee; CEOPIN = Combined Error Opinion; Opinion = Qualified opinion; GRANT = Central government transfer dependence; Net_OpCosts= Net Operating Cost; Size = Log Revenues; INDebt= Indebtedness; TAX = Tax base.

5.4 Multivariate regression

5.4.1 External auditing multivariate regression

My first objective is to study the legal compliance of municipalities, as far as external auditing is concerned. In Section 3.2 I state the hypotheses: (H1a) "External auditing emerges from the legal binding law", and (H1b) "External auditing is positively influenced by political competition". In Section 4.3.2 I define the model and discuss the variables. Equation (1) is as follows:

$$\text{Log } (p/(1\text{-}p)) = \beta_0 + \beta_1 \text{ASSOC} + \beta_2 \text{FOUNDt} + \beta_3 \text{Local\_Comp} + \beta_4 \text{Local\_IComp} +$$
$$\beta_5 \text{Local\_PartComp} + \beta_6 \text{PolComp\_ComPLW} + \beta_7 \text{PolComp\_SDRW} +$$
$$\beta_8 \text{PolComp\_CoalRW} + \beta_9 \text{PolComp\_SocLW} + \beta_{10} \text{Net\_OpCosts} +$$
$$\beta_{11} \text{SIZE} + \beta_{12} \text{TAX} + \beta_{13} \text{Dkyear} + \varepsilon \qquad (1)$$

The purpose of this section is to present the estimation results of equation (1) and test the hypotheses. Table 36 presents the results of estimating equation (1). I include two sets of estimation results: the first excludes indicator variables for years, while the second includes them. This allows me to test whether my findings hold when I control for possible time effects. The percentage of correct predictions of the estimation of equation 1 is 89.47%, while the percentage of correct predictions of the extended model is 89.12%. This shows that the model has a good fit to the data.

Though the percentage of correct predictions is a good measure of how well the model predicts the dependent variable based on the independent variables, McIntosh and Dorfman (1992) also advise researchers to take into consideration which fraction of the zeros and the ones are correctly predicted. The fraction of zeros correctly predicted is 91.76%, dropping to 90.00% when indicator variables for years are introduced. The fraction of ones correctly predicted increases from 86.09% to 87.83% when indicator variables for years are introduced. Given these high percentages, my confidence in the model remains high.

I also present the McFadden R-square. The value rises from 57.97% to 62.62% when indicator variables for years are introduced. Contrary to OLS, pseudo R-square in logit do not correspond to the percentage of variance explained, so it does not have an interpretation similar to the one when running an OLS model and analyzing its R-square. The McFadden R-square of 57.97% indicates a 57.97 percent increase in the log-likelihood function (Hoetker, 2007), which is not be useful as a measure of model fit.

In Chapter 2, Institutional settings, I present the criterion for the compulsory hiring of external auditing. The criterion is having a participation in companies (local or Intermunicipal), and foundations. The law abiding independent variables are FOUNDt, Local_Comp, Local_IComp, and Local_PartComp, each representing, foundations, local companies, Intermunicipal local companies, and participations in companies, respectively. All the estimated coefficients for these variables have the expected sign, and statistical significance. These results suggest that the need to abide by the law is an important determinant of the hiring of external auditing in municipalities. Thus, the data are consistent with hypothesis H1a.

In Section 3.2 I define agency theory and introduce political competition in municipalities. Tagesson *et al.* (2015) pay considerable importance to political competition. Baber *et al.* (1987), Deis and Giroux (1992), and Ward *et al.* (1994), confirm that politics may influence the external auditing process. For the purpose of studying if political competition influences hiring external auditing, independent variables representing the weight of the most representative parties are defined. These are PolComp_ComPLW, PolComp_SDRW, PolComp_CoalRW, and PolComp_SocLW, which represent communist party, social democratic party, coalition, and socialist party, respectively. However, most of the estimated coefficients for these variables are not statistically significant. The exception is the coefficient of the socialist party (variable PolComp_SocLW). Thus, results indicate that external auditing is positively associated with municipalities where the socialist party has more weight, and that other political parties' weights are not explanatory variables for external auditing.

My expected sign for the coefficient is negative because I expect that the higher the weight held by the winning political party in the Town Council, the lower the opposition, and, thus the lower the political competition. As political competition is lower, I expect the pressure to hire an external auditor is also low. I find that where the socialist party has more weight (i.e., a lower opposition, and a lower political competition), there is a greater probability of external auditing, which is contrary to what I expect. Therefore, I reject hypothesis (H1b).

One reason for the socialist party weight's positive association with external auditing may be on the fact that from 2007 until 2011 the central government political party was led by the socialist party. Political reasons regarding the convergence of political parties in central and local government may therefore explain the positive association. Socialist municipalities would be "forced" to enforce external auditing if that were the leading point of a socialist central government. This political factor, municipal political party coincidence with central government political party, is not included in the model as a variable, though it might have explanatory power as results suggest. This may be an important factor to consider in future research regarding external auditing, considering that in 2014 we have a different political party in central government (coalition of both social democratic and social democratic center parties), and compulsory extended external auditing for all municipalities and some parishes.

In fact, in a study of the "Determinants of the assignment of EU funds to Portuguese municipalities", Veiga (2011) finds a positive relationship between the convergence of the same political party in central and local government, and funds attribution. This convergence might also be true with abiding by the rule of contracting external auditing.

Results regarding the control variables in Table 36 show that the estimates of auditee size (SIZE), auditee complexity (Net_OpCosts), and citizens' interest (TAX) are not statistically significant. This suggests that the factors usually included in order to consider agency theory, such as size, complexity, risk, manager ownership, etc., cannot explain external auditing as well as the need to abide by the law.

Table 36 Estimation results of equation (1) binding law in explaining external auditing - logit regression analysis on external auditing (N = 285)

Variable	Sign	Coefficient	z-stat	p-value		Coefficient	z-stat	p-value	
Constant		0.5775	0.09	0.93		2.6506	0.39	0.70	
ASSOC	+/-	-0.2434	-0.44	0.66		-0.1392	-0.24	0.813	
FOUNDt	+	5.1707	2.68	0.01	***	5.4272	2.40	0.016	**
Local_Comp	+	3.5835	5.87	0.00	***	4.0411	5.88	0.00	***
Local_IComp	+	2.6861	4.89	0.00	***	3.1390	4.98	0.00	***
Local_PartComp	+	2.2956	4.25	0.00	***	2.4643	4.30	0.00	***
PolComp_ComPLW	-	2.8877	1.06	0.29		3.3759	1.16	0.25	
PolComp_SDRW	-	-2.6454	-1.22	0.22		-2.3229	-1.00	0.32	
PolComp_CoalRW	-	0.2067	0.08	0.93		0.7908	0.30	0.76	
PolComp_SocLW	-	6.6383	3.20	0.00	***	7.9575	3.44	0.00	***
Net_OpCosts	+	40.8124	-0.36	0.72		171,688,929.0817	-0.14	0.89	
SIZE	+	-0.3429	-0.89	0.37		-0.5201	-1.27	0.20	
TAX	+	-0.0026	-1.25	0.21		-0.0018	-0.76	0.45	
Y2007						-2.4622	-3.28	0.00	***
Y2008						-0.4047	-0.57	0.57	
Y2009						-0.1644	-0.23	0.81	
Y2010						-0.1444	-0.20	0.84	
		McFadden Pseudo R^2		57.97%		McFadden Pseudo R^2		62.62%	
		Fraction of the zeros correctly predicted		91.76%		Fraction of the zeros correctly predicted		90.00%	
		Fraction of the ones correctly predicted		86.09%		Fraction of the ones correctly predicted		87.83%	
		Percentage of correct predictions		89.47%		Percentage of correct predictions		89.12%	

Notes: ASSOC = Association; FOUNDt = Foundation; Local_Comp = Local Company; Local_IComp = Local Intermunicipal Company; Local_PartComp = Local Participation Company; PolComp_ComPLW = Political Competition Communist Party Left Wing (PC-PEV); PolComp_SDRW = Political Competition Social Democrats Right Wing (PPD-PSD); PolComp_CoalRW = Political Competition Coalition Right Wing (Coligação); PolComp_SocLW = Political Competition Socialist Left Wing (PS); Net_OpCosts= Net Operating Cost; SIZE = Log Revenues; TAX = Tax base; Dkyear = dummy variables for years to control for time effects*** p-value lower than 0.01; ** p-value lower than 0.05; * p-value lower than 0.10.

5.4.2 Public procurement multivariate regression

My second objective is to investigate whether the lowest price is generally used as selection criterion by municipalities, and what factors determine municipalities' decisions regarding lowest price. In Section 3.3 I state the hypotheses: (H2a) "There is a negative association between the lowest price selection criterion and public procurement sophistication"; (H2b) "There is a negative association between the lowest price selection criterion and political competition"; (H2c) "There is a negative association between the lowest price selection criterion and citizens' interest"; (H2d) "There is a negative association between the lowest price selection criterion and (i) audit risk, complexity, and size, and (ii) a positive association with manager ownership". In Section 4.3.3 I define the model and discuss the variables. Equation 2 is as follows:

$$\text{Log}\,(p/(1\text{-}p)) = \beta_0 + \beta_1 \text{PubProc\_DirSel} + \beta_2 \text{AF\_Importance} + \beta_3 \text{Rotation} + \beta_4 \text{PROP\_REC}$$
$$+ \beta_5 \text{PolComp\_ComPLW} + \beta_6 \text{PolComp\_SDRW} + \beta_7 \text{PolComp\_CoalRW}$$
$$+ \beta_8 \text{PolComp\_SocLW} + \beta_9 \text{Net\_OpCosts} + \beta_{10} \text{Size} + \beta_{11} \text{INDebt} +$$
$$\beta_{12} \text{GRANT} + \beta_{13} \text{TAX} + \beta_{14} \text{Dkyear} \qquad (2)$$

The purpose of this section is to present the estimation results of equation (2) and test the hypotheses.

Taking into consideration the importance of the political competition variables, I decide to reanalyze each political party variable considered in the model. In fact, the correlation matrix indicates that there is a high and statistically significant negative correlation between the coalition and the communist party. Furthermore, according to Blank *et al.* (2009), one of the drawbacks of using political weight is that whenever there is a coalition, the results may be confusing. Because of this, I remove the Coalition party.

In order to estimate the variation inflation factors (VIF) of the variables I run an OLS version of equation model (2)[63] [64]. Table 37 presents the results of the VIF analysis with all variables, and without the coalition party. Though the literature does not establish a restricted limit, it suggests a cut-off of 10. According to Gujarati (2003), if the variables have VIF values greater than 10, they are considered to have multicollinearity problems. Even after removing the coalition party, both SIZE and GRANT variables present a VIF of 20.04 and 15.14, respectively, which are indicative of multicollinearity[65].

Table 37 Variation inflation factor – public procurement model (a)

Variable	VIF – all variables	VIF – without the coalition party
SIZE	20.04	20.04
GRANT	15.14	15.14
PolCom_SDRW	9.64	1.74
PolCom_CoalRW	7.88	----------
PolCom_ComPLW	4.99	1.63
PolCom_SocLW	4.35	1.64
NetOpCost	3.38	3.37
TAX	2.56	2.53
PROP_REC	1.73	1.70
AF_Importance	1.58	1.47
PubProc_DirSel	1.49	1.45
Rotation	1.41	1.31
INDebt	1.21	1.18
Mean VIF	5.80	4.43

Notes: Size = Log Revenues; GRANT = Central government transfer dependence; PolComp_SDRW = Political Competition Social Democrats Right Wing (PPD-PSD); PolComp_CoalRW = Political Competition Coalition Right Wing (Coligação); PolComp_ComPLW = Political Competition Communist Party Left Wing (PC-PEV); PolComp_SocLW = Political Competition Socialist Left Wing (PS); Net_OpCosts= Net Operating Cost; TAX = Tax base; PROC_REC = number of proposals received; Rotation = number of years of mandate; INDebt= Indebtedness.

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[63] The variation inflation analysis can be calculated only in OLS regressions, so I calculate the OLS with all the variables, and then run the VIF calculation.

[64] VIF shows how the variance of a variable is inflated by the presence of multicollinearity, i.e.,, the extent to which the independent variables are mutually correlated.

[65] The high correlation estimate by both Pearson, and Spearman, is also indicative of possible multicollinearity, and both present statistically significant correlation above 90%.

Because of these results, I remove the two problematic variables (SIZE and GRANT) and recalculate VIF. Table 38 presents the new results. In this new approach the mean VIF, as well as each variable's VIF are lower than 10. Thus, I will continue my analysis with this set of variables.

Table 38 Variation inflation factor – public procurement model (b)

Variable	VIF without coalition party, SIZE and GRANT
Net_OpCosts	1.97
PROP_REC	1.66
TAX	1.66
PolComp_SDRW	1.61
PolComp_ComPLW	1.50
AF_Importance	1.46
PubProc_DirSel	1.40
PolComp_SocLW	1.38
Rotation	1.16
INDebt	1.13
SIZE	----------
GRANT	----------
Mean VIF	1.49

Notes: Net_OpCosts= Net Operating Cost; TAX = Tax base; PolComp_SDRW = Political Competition Social Democrats Right Wing (PPD-PSD); PROC_REC = number of proposals received; PolComp_SocLW = Political Competition Socialist Left Wing (PS); PolComp_ComPLW = Political Competition Communist Party Left Wing (PC-PEV); AF_Importance = Audit Fee Importance; PubProc_DirSel = Public Procurement Direct Selection; Rotation = number of years of mandate; INDebt= Indebtedness.

Table 39 presents the results of equation (2) without the coalition party (represented by PolComp_CoalRW) SIZE, and GRANT. I include two sets of estimation results: the first excludes indicator variables for years, while the second includes them. The percentage of correct predictions is 95.88% in the base model and 96.47% when indicator variables for years are introduced. This indicates that the model has a good fit to the data. McIntosh and Dorfman (1992) also advise considering the fraction of the zeros correctly predicted and the ones correctly predicted. The fraction of zeros correctly predicted is 97.58% in the base model and 98.39% in the extended model. When indicator variables for years are introduced the fraction of ones correctly predicted is 93.48% in the base model and 91.30% in the extended model. Given these high percentages, my confidence in the model remains high.

I also present the McFadden R-square. The value rises from 79.65% to 81.38% when indicator variables for years are introduced. However, and contrary to what happens in OLS, the pseudo R-square in a logit model does not correspond to the percentage of variance explained. The McFadden R-square of 79.65% indicates a 79.65 percent increase in the log-likelihood function (Hoetker, 2007), which is not useful as a measure of model fit.

In Section 3.3 I present the literature review for public procurement and its characteristics. The first hypothesis (H2a) intends to establish whether there is a negative association between the lowest price selection criterion and public procurement sophistication. The procurement process variables are PubProc_DirSel, AF_Importance, Rotation, and PROP_REC, representing the direct selection public procurement process, the level of importance of price, number of years considered in the procurement processes, and the number of proposals received in the procurement process, respectively.

Results in Table 39 indicate that the estimated coefficients for these variables have the expected signs, but only those for AF_Importance and Rotation are statistically significant. The number of proposals received in the procurement process, variable PROP_REC, presents p-values close to 0.10 (0.12) when time effects are considered. The results indicate that the longer the number of years of a public procurement contract the greater is the probability that the lowest price selection criteria tends to be replaced for the most economical decision, which is an indication of sophistication in the procurement process. Moreover, as the level of audit fee importance goes down, the greater is the probability for the selection to be based on economic factors (that is, as price factor goes down), both signalling a more sophisticated procurement[66]. Finally, untabulated results show that when I run the logit regression without net operation costs, as in Tagesson *et al.* (2015), PROP_REC is also statistically significant, while the significance of the other

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[66] The correlation of variables of both audit fee importance and rotation are in line with the regression results. The audit fee importance variable has a Spearman correlation of 0.79 with a p-value lower than 0.5 and the rotation variable has a Spearman correlation of minus 0.27 with a p-value lower than 0.5.

variables remains unchanged. Overall, these results suggest that ultimately more sophisticated procurement processes are negatively associated with the lowest price criterion, which is consistent with hypothesis H2a.

The second hypothesis (H2b) aims to establish whether there is negative association between the lowest price selection criterion and political competition. The coefficients estimated for the independent variables concerning the two most representative political parties (PolComp_SDRW and PolComp_SocLW, social democratic party and socialist party, respectively) are statistically significant and with negative estimated coefficients, as expected. The estimated coefficient for the communist party is not statistically significant. Therefore, my findings are consistent with hypothesis (H2b), as political competition is associated with more sophisticated procurement practices.

Tagesson *et al.*'s (2015) study also includes political competition variables, though in a different format: (i) a change in government, (ii) minority government, (iii) Herfindhal index with the weight of each party's votes, and (iv) political governance by the classification of municipalities in three political groups. They conclude that though competition between the political parties does not influence municipalities' choice of the lowest price criterion, weak competition by municipalities governed by conservatives and liberals does, as the conservative and liberal governance merged variable is statistically significant. As a result, they only partially accept the hypothesis that strong political competition enhances criteria other than price. The country specific characteristics may explain these factors.

My third hypothesis (H2c) tests whether there is a negative association between the lowest price selection criterion and citizens' interest. The proxy for citizens' interest is variable TAX. Results included in Table 39 show that the estimated coefficient for this variable is not statistically significant, though the coefficient I estimate has the expected sign. Thus, hypothesis (H2c) is rejected, contrary to Tagesson *et al.*'s (2015) findings.[67]

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[67] Taking into consideration Tagesson et al.'s (2015) findings regarding possible collinearity between tax base and net operating costs, I run the model removing net operating costs. All coefficients and their p-

With my fourth hypothesis (H2d) I seek to test whether there is a negative association between the lowest price selection criterion and (i) audit risk, complexity and size, and a (ii) positive association with manager ownership. Given that SIZE is dropped from the model because of multicollinearity issues, I cannot test this variable using model 2[68]. Second, there is a positive association between the lowest price selection criterion (measured by Low_AF_Of) and the proxy for audit complexity (Net_OpCosts). In the results of Tagesson *et al.* (2015) the variable Net_OpCosts is not statistically significant in their first model, and they remove this variable from their subsequent models. Apparently, audit complexity does not serve as a deterrent for more simple procurement process in Portugal. This is something to be noted in practice. Finally, the proxy for audit risk (INDebt) is not statistically significant. As I weight all these results together, I must treject Hypothesis (H2d).

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values remain practically the same, and the model's percentage of correct predictions rises to 94.7%, except for the variable of the number of proposals received. This variable becomes statistically significant at a p-value lower than 0.05 and its coefficient remains negative at 0.4340. So, I continue to reject hypothesis (H2c), but with these results, hypothesis (H2a) conclusions are reinforced.

[68] I run a logit with just size and indicator variables for years. Though not tabulated, the results show a coefficient -0.1344 with a p-value of 0.42 and a McFadden R-square of 0.01, so I conclude that the variable may not be relevant.

Table 39 Estimation results of equation (2) agency theory in explaining lowest price offer - logit regression analysis on lowest price offer (N = 170)

Variable	Sign	Coefficient	z-stat	p-value		Coefficient	z-stat	p-value	
Constant		0.2862	0.07	0.95		-0.0342	-0.01	0.99	
PubProc_DirSel	+/-	3.8173	1.03	0.30		2.0543	0.54	0.59	
AF_Importance	+	3.0452	3.49	0.00	***	3.2642	0.00	0.00	***
Rotation	-	-1.4206	-2.10	0.04	**	-1.3174	-1.73	0.08	**
PROP_REC	-	-0.3035	-1.43	0.15		-0.3661	-1.56	0.12	
PolComp_ComPLW	-	5.4345	0.61	0.54		3.9783	0.45	0.65	
PolComp_SDRW	-	-8.6824	-2.22	0.03	**	-9.6042	2.28	0.02	**
PolComp_SocLW	-	-8.6825	-3.05	0.00	***	-12.1793	-2.95	0.00	***
Net_OpCosts	-	11.0324	1.85	0.07	*	9.2170	1.84	0.07	*
INDebt	+/-	-0.4333	-0.71	0.48		0.1246	0.15	0.89	
TAX	-	-0.0047	-1.27	0.20		-0.0051	-1.84	0.15	
Y2007						2.8639	1.39	0.16	
Y2008						1.6855	1.08	0.28	
Y2009						2.2407	1.50	0.13	
Y2010						0.4840	0.35	0.73	

McFadden Pseudo R^2	79.65%	McFadden Pseudo R^2	81.38%
Fraction of the zeros correctly predicted	97.58%	Fraction of the zeros correctly predicted	98.39%
Fraction of the ones correctly predicted	93.48%	Fraction of the ones correctly predicted	91.30%
Percentage of correct predictions	95.88%	Percentage of correct predictions	96.47%

Notes: PubProc_DirSel = Public Procurement Direct Selection; Low_AF_Of = Lowest Audit Fee Offer; AF_Importance = Audit Fee level of Importance; Rotation = measured in years; PROP_REC = number of proposals received; PolComp_ComPLW = Political Competition Communist Party Left Wing (PC-PEV); PolComp_SDRW = Political Competition Social Democrats Right Wing (PPD-PSD; PolComp_SocLW = Political Competition Socialist Left Wing (PS); Net_OpCosts= Net Operating Cost; IND = level of indebtedness; TAX = tax base; Dkyear = dummy variables for years to control for time effects*** p-value lower than 0.01; ** p-value lower than 0.05; * p-value lower than 0.10.

Though not tabulated, I also run the logit with equation (2), (i) removing the coalition party and SIZE, and (ii) removing the coalition party and GRANT. Compared to the results of Table 39, without SIZE (i) Rotation variable ceases to have statistical significance and the percentage of correct predictions is 96.47%, and without GRANT (ii) the results are quite similar to those ones presented in Table 39 and the percentage of correct predictions is 97.06%.

5.4.3 Audit fees multivariate regression

My third objective is to study audit fees while taking in consideration the procurement process. In Section 3.4 the hypotheses are stated: (H3a) "Sophisticated audit procurement is associated with higher audit fees; (H3b) "Municipality dependence upon transfers is associated with lower audit fees"; (H3c) "Municipality political competition is associated with higher audit fees", and (H3d) "Internal auditing reduces audit fees".

$$LogAF = \beta_0 + \beta_1 \, Low\_AF\_Of + \beta_2 \, AF\_Importance + \beta_3 PubProc\_DirSel + \beta_4 Rotation$$
$$\beta_5 Auditor + \beta_6 GRANT + \beta_7 PolComp\_ComPLW + \beta_8 PolComp\_SDRW +$$
$$\beta_9 Pol\_CompCoalRW + \beta_{10} PolComp\_SocLW + \beta_{11} IAOFF + \beta_{12} Size +$$
$$\beta_{13} Net\_OpCosts + \beta_{14} INDebt + \beta_{15} TAX + \beta_{16} Dkyear + \varepsilon \tag{3}$$

The purpose of this section is to present the estimation results of equation (3) and test the hypotheses.

Given that the variables Pol_CompCoalRW, SIZE and GRANT are removed on account of possible multicollinearity in the previous model, and the presence of high correlation estimates, I perform a variation inflation factor (VIF) analysis first (i) with all variables, second (ii) without the coalition party, third (iii) without the coalition party and either SIZE and GRANT. I present the three sets of VIF in Table 40. With all variables the variance inflation results for SIZE, and GRANT, are of 20.18 and 15.33, respectively. These results express multicollinearity as Gujarati (2003) indicates that VIF higher than

10 are indicative of multocollinearity. The results for the political parties are quite high too, though under 10. The results show that without the coalition party all political parties' VIF, drop to reasonable levels.

Table 40 Variation inflation factor – audit fees model

Variable	VIF	VIF without coalition party	VIF without coalition party, GRANT and SIZE
SIZE	20.18	20.18	--------
GRANT	15.33	15.33	--------
PolComp_SDRW	9.96	1.94	1.77
PolComp_CoalRW	8.04	----------	--------
PolComp_ComPLW	5.23	1.70	1.58
PolComp_SocLW	4.75	2.03	1.64
AF_Importance	4.07	3.88	3.86
Low_AF_Of	3.85	3.81	3.74
Net_OpCosts	3.73	3.72	2.10
TAX	2.69	2.67	1.80
IAOFF	1.50	1.47	1.40
Rotation	1.48	1.40	1.19
PubProc_DirSel	1.33	1.32	1.30
Auditor	1.26	1.25	1.21
INDebt	1.20	1.16	1.12
Mean VIF	*5.64*	*4.42*	*1.89*

Notes: Size = Log Revenues; GRANT = Central government transfer dependence; PolComp_SDRW = Political Competition Social Democrats Right Wing (PPD-PSD); PolComp_CoalRW = Political Competition Coalition Right Wing (Coligação); PolComp_ComPLW = Political Competition Communist Party Left Wing (PC-PEV); PolComp_SocLW = Political Competition Socialist Left Wing (PS); AF_Importance = Audit Fee Importance; Low_AF_Of = Lowest Audit Fee Offer; Net_OpCosts= Net Operating Cost; TAX = Tax base; IAOFF = Internal Audit Office; Rotation = number of years of mandate; PubProc_DirSel = Public Procurement Direct Selection; Auditor = Company of auditors; INDebt= Indebtedness.

Though the OLS regression coefficients, p-values, and control tests, with or without the coalition party, and with or without the SIZE or GRANT variables, remain practically the same (with moderate differences in the model's good fit), I decide to present three models. In the first model in panel A I maintain all variables, in the second model in panel B I remove the coalition party model, and in the third model in panel C I remove both the coalition party SIZE and GRANT. As it is, Table 41 presents the results of equation (3) in three panels. For each panel I include two sets of estimation results: the first excludes indicator variables for years, while the second includes them.

In panel A the R-square increases from 52.44% to 52.68% when indicator variables for years are introduced. Nevertheless, the adjusted R-square, a more robust measure, decreases from 47.80% to 46.69% when indicator variables for years are introduced. In panel B the R-square increases from 52.36% to 52.66% when indicator variables for years are introduced. Nevertheless, the adjusted R-square, decreases from 48.06% to 47.02% when indicator variables for years are introduced. In panel C the R-square increases from 52.14% to 52.51% when indicator variables for years are introduced. Nevertheless, the adjusted R-square, decreases from 48.06% to 47.20% when indicator variables for years are introduced.

There is only one difference between the three models. When removing the coalition party, and with or without indicator variables for years, the communist party (variable PolComp_ComPLW) becomes statistically significant, though with an unexpected (i.e. positive) sign. This is not in line with the two major parties, social democratic and socialist parties. This means that contrary to expected, in the communist party's municipalities their greater weight, and thus less opposition, are a specific situation in which audit fees are influenced positively.

Table 41 Estimation results of equation (3) agency theory in explaining audit fees – OLS regression analysis on audit fees (N = 170)

Panel A: all variables

Variable	Sign	Coefficient	t-stat	p-value		Coefficient	z-stat	p-value	
Constant		10.0036	8.21	0.00	***	9.9301	8.13	0.00	***
Low_AF_Of	-	-0.4766	-2.92	0.04	**	-0.4683	-2.94	0.00	***
AF_Importance	-	0.0046	0.09	0.93		0.0015	0.03	0.98	
PubProc_DirSel	+	0.2664	1.28	0.20		0.3225	1.42	0.16	
Rotation	+	0.0839	2.13	0.03	**	0.0873	2.25	0.03	**
Auditor	+	0.1791	1.13	0,26		0.1735	1.07	0.29	
GRANT	-	0.1031	0.61	0.55		0.0882	0.50	0.61	
PolComp_ComPLW	-	0.2954	1.19	0.24		0.3945	1.37	0.17	
PolComp_SDRW	-	-0.7882	-2.77	0.01	***	-0.6764	-2.02	0.05	**
PolComp_CoalRW	-	-0.2086	-0.56	0.58		-0.1101	-0.25	0.80	
PolComp_SocLW	-	-1.3514	-387	0.00	***	-1.2583	-3.34	0.00	***
IAOFF	-	-0.3386	-4.77	0.00	***	-0.3393	-4.75	0.00	***
SIZE	+	-0.1125	-0.80	0.42		-0.0992	-0.68	0.50	
Net_OpCosts	+	4,247.0238	3.70	0.00	***	4,247.0238	3.70	0.00	***
INDebt	+	0.0282	0.57	0.57		0.1140	0.18	0.86	
TAX	+	0.0007	3.25	0.00	***	0.0007	3.14	0.00	***
Y2007						-0.0812	-0.64	0.52	
Y2008						-0.0688	-0.69	.49	
Y2009						-0.0764	-0.77	0.44	
Y2010						-0.0318	-0.33	0.74	

	R^2 =52.44%		Adj. R^2 = 47.80%		R^2 =52.68%		Adj. R^2 = 46.69%	
	F- statistics: 11.32; prob. 0.00***				F- statistics: 8.78; prob. 0.00***			

Notes: Low_AF_Of = Lowest Audit Fee Offer; AF_Importance = Audit Fee level of Importance; PubProc_DirSel = Public Procurement Direct Selection; Rotation = measured in years; Auditor = Company of auditors; GRANT = Central government transfer dependence; PolComp_ComPLW = Political Competition Communist Party Left Wing (PC-PEV); PolComp_SDRW = Political Competition Social Democrats Right Wing (PPD-PSD); PolComp_CoalRW = Political Competition Coalition Right Wing (Coligação); PolComp_SocLW = Political Competition Socialist Left Wing (PS); IAOFF = Internal Audit Office; Size = Log Revenues; Net_OpCosts = Net Operating Cost; IND = level of indebtedness; TAX = tax base; Dkyear = dummy variables for years to control for time effects*** p-value lower than 0.01; ** p-value lower than 0.05; * p-value lower than 0.10.

Panel B: without coalition party

Variable	Sign	Coefficient	t-stat	p-value		Coefficient	z-stat	p-value	
Constant		9.8015	8.40	0.00	***	9.8292	8.55	0.00	***
Low_AF_Of	-	-0.4833	-3.08	0.00	***	-0.4709	-3.07	0.00	***
AF_Importance	-	0.0092	0.20	0.84		0.0035	0.08	0.94	
PubProc_DirSel	+	0.2751	1.37	0.17		0.3313	1.56	0.12	
Rotation	+	0.0878	2.27	0.02	**	0.0896	2.35	0.02	**
Auditor	+	0.1839	1.15	0.25		0.1751	1.07	0.29	
GRANT	-	0.1039	0.61	0.54		0.0860	0.50	0.62	
PolComp_ComPLW	-	0.4627	1.93	0.06	*	0.4834	1.96	0.05	*
PolComp_SDRW	-	-0.6098	-3.37	0.00	***	-0.5802	-3.24	0.00	***
PolComp_SocLW	-	-1.1980	-4.35	0.00	***	-1.1754	-4.34	0.00	***
IAOFF	-	-0.3329	-4.95	0.00	***	-0.3366	-4.97	0.00	***
SIZE	+	-0.1132	-0.80	0.42		-0.0974	-0.67	0.50	
Net_OpCosts	+	4,400.5144	3.71	0.00	***	2,400.5144	3.73	0.00	***
INDebt	+	0.0240	0.51	0.61		0.0072	0.13	0.90	
TAX	+	0.0007	3.34	0.00	***	0.0007	3.16	0.00	***
Y2007						-0.0893	-0.78	0.44	
Y2008						-0.0732	-0.78	0.44	
Y2009						-0.0807	-0.84	0.40	
Y2010						-0.0327	-0.34	0.73	

	$R^2 = 52.36\%$	Adj. $R^2 =$ 48.06%	$R^2 = 52.66\%$	Adj. $R^2 =$ 47.02%
	F- statistics:12.17; prob. 0.00***		F- statistics: 9.33 ; prob. 0.00***	

Notes: Low_AF_Of = Lowest Audit Fee Offer; AF_Importance = Audit Fee level of Importance; PubProc_DirSel = Public Procurement Direct Selection; Rotation = measured in years; Auditor = Company of auditors; GRANT = Central government transfer dependence; PolComp_ComPLW = Political Competition Communist Party Left Wing (PC-PEV); PolComp_SDRW = Political Competition Social Democrats Right Wing (PPD-PSD); PolComp_CoalRW = Political Competition Coalition Right Wing (Coligação); PolComp_SocLW = Political Competition Socialist Left Wing (PS); IAOFF = Internal Audit Office; Size = Log Revenues; Net_OpCosts = Net Operating Cost; IND = level of indebtedness; TAX = tax base; Dkyear = dummy variables for years to control for time effects*** p-value lower than 0.01; ** p-value lower than 0.05; * p-value lower than 0.10.

Panel C: without coalition party, SIZE and GRANT

Variable	Sign	Coefficient	t-stat	p-value		Coefficient	z-stat	p-value	
Constant		9.8250	8.43	0.00	***	9.8707	8.59	0.00	***
Low_AF_Of	-	-0.4741	-3.07	0.00	***	-0.4622	-3.04	0.00	***
AF_Importance	-	0.0063	0.14	0.89		0.0002	0.01	1.00	
PubProc_DirSel	+	0.2907	1.49	0.14		0.3503	1.70	0.09	*
Rotation	+	0.0921	2.43	0.02	**	0.0935	2.47	0.02	**
Auditor	+	0.1841	1.15	0.25		0.1727	1.05	0.29	
GRANT	-	-0.0187	-0.25	0.80		-0.0204	-0.28	0.78	
PolComp_ComPLW	-	0.4191	1.86	0.07	*	0.4460	1.95	0.05	*
PolComp_SDRW	-	-0.5813	-3.26	0.00	***	-0.5545	-3.08	0.00	***
PolComp_SocLW	-	-1.1212	-4.45	0.00	***	-1.1094	-4.42	0.00	***
IAOFF	-	-0.3310	-4.90	0.00	***	-0.3357	-4.93	0.00	***
Net_OpCosts	+	3,065.5502	3.71	0.00	***	3,180.4953	3.76	0.00	***
INDebt	+	0.0176	0.37	0.71		-0.0037	-0.06	0.95	
TAX	+	0.0006	2.45	0.02	**	0.0006	2.64	0.01	***
Y2007						-0.1068	-0.90	0.37	
Y2008						-0.0783	-0.82	0.41	
Y2009						-0.0795	-0.83	0.41	
Y2010						-0.0278	-0.29	0.77	
		R^2 = 52.14%%	Adj. R^2 =	48.06%		R^2 = 52.51%	Adj. R^2 =	47.20%	
		F- statistics: 12.17 ; prob. 0.00***				F- statistics: 9.89 ; prob. 0.00***			

Notes: Low_AF_Of = Lowest Audit Fee Offer; AF_Importance = Audit Fee level of Importance; PubProc_DirSel = Public Procurement Direct Selection; Rotation = measured in years; Auditor = Company of auditors; GRANT = Central government transfer dependence; PolComp_ComPLW = Political Competition Communist Party Left Wing (PC-PEV); PolComp_SDRW = Political Competition Social Democrats Right Wing (PPD-PSD); _SocLW = Political Competition Socialist Left Wing (PS); IAOFF = Internal Audit Office; Net_OpCosts = Net Operating Cost; IND = level of indebtedness; TAX = tax base; Dkyear = dummy variables for years to control for time effects*** p-value lower than 0.01; ** p-value lower than 0.05; * p-value lower than 0.1

The procurement variables in the audit fees model are practically the same as in the procurement process model. The main difference lies in the fact that the dependent variable in the procurement model, Low_AF_Of (Lowest audit fee offer), the dummy variable for the lowest price section criterion, is now an independent variable, in order to evaluate if the selection criterion based upon the lowest price offer interferes with the value of the audit fee. The results of the correlation matrix, in both Pearson and Spearman calculations, for the procurement variables show a high correlation (88%), with statistical significance between Low_AF_Of (Lowest Audit Fee Offer) and AF_Importance (Audit Fee level of Importance). The rest of the procurement variables, PubProc_DirSel (dummy variable for the direct selection public procurement process), Rotation (number of years of the procurement process), and Auditor (type of auditor) also show statistically significant correlation, though not so high, and not among every relationship.

Based on the correlation matrix of the procurement variables, and seeking a different method for dealing with the possible multicollinearity, I consider all five measures of procurement process at the same time, to learn more about the way that procurement process variables interact to provide an indication of its association, in different municipalities, with audit fees. As in Li (2010), I perform a principal component analysis of all variables. Table 42 provides information about this analysis. I have five principal components, but only two fulfil the Kaiser criterion, which states that the components with eigenvalues higher than one should be retained (Hair *et al.*, 2010)

Table 42 Principal Components Analysis (N=170)

Component	Eigenvalue	Difference	Proportion	Cumulative
Comp 1	1.91581	0.7043	0.3832	0.3832
Comp 2	1.21151	0.270086	0.2423	0.6255
Comp 3	0.941428	0.19946	0.1883	0.8138
Comp 4	0.741968	0.552692	0.1484	0.9621
Comp 5	0.189276		0.0379	1.0000

Table 43 shows the factor loadings and reveals that component 1 is determined mostly by Low_AF_Of (0.6691) and AF_Importance (0.6479). This variable reveals a combined audit fee global tendering importance and I name it Low_AF_Of xAF_Importance,

whereas component 2 is determined mostly by Auditor (0.6488) and PubProc_DirSel (0.6994). This last variable represents a combined tendering auditor selection and I name it AuditorxPubProc_DirSel. As expected, the factors contributing to criteria other than lowest price have a negative correlation with the lowest price criterion with statistical significance as shown in Table 43.

Table 43 Principal components analysis – identification of eigenvectors (N=170)

Variable	Component 1	Component 2	Unexplained
Auditor	-0.0843	0.6488	0.4764
Low_AF_Of	0.6691	-0.0417	0.1403
AF_Importance	0.6479	0.1543	0.1669
Rotation	-0.3237	-0.2536	0.7213
PubProc_DirSel	0.1436	0.6994	0.3678

Notes: Auditor = Company of auditors; Low_AF_Of = Lowest Audit Fee Offer; AF_Importance = Audit Fee level of Importance; Rotation is measured in years. PubProc_DirSel = Public Procurement Direct Selection.

The use of these combined components in the ordered logit regression enhances predictive power without changes in the other variables. The new model maintains audit fees (LogAF) as the dependent variable, while the first two variables, Low_AF_Of xAF_Importance and AuditorxPubProc_DirSel, measure the level of public procurement sophistication.

$$LogAF = \beta_0 + \beta_1 Low\_AF\_Of \ xAF\_Importance + \beta_2 AuditorxPubProc\_DirSel +$$
$$\beta_3 Rotation + \beta_4 GRANT + \beta_5 PolComp\_ComPLW + \beta_6 PolComp\_SDRW +$$
$$\beta_7 Pol\_CompCoalRW + \beta_8 PolComp\_SocLW + \beta_9 IAOFF + \beta_{10} Size +$$
$$\beta_{11} Net\_OpCosts + \beta_{12} INDebt + \beta_{13} TAX + \beta_{14} Dkyear + \varepsilon \qquad (3.1)$$

To maintain consistency with results of equation (3) I present three models. In the first model in panel A I maintain all variables, in the second model in panel B I remove the

coalition party model, and in the third model in panel C I remove both the coalition party, SIZE and GRANT. Table 44 presents the results of equation (3.1) in three panels. For each panel I include two sets of estimation results: the first excludes indicator variables for years, while the second includes them.

In panel A the R-square increases slightly when indicator variables for years are introduced, 51.43% to 51.64%. However, the opposite happens with the adjusted R-square from 47.39% to 46.23%, indicating that the increase in explanatory power is not enough to counterbalance the number of new variables. Compared to the model without principal component analysis, there are no differences in the p-values of the variables' coefficients, though the power of the overall model (R-square and adjusted R-square) decreases slightly.

In panel B the R-square increases slightly when indicator variables for years are introduced, 51.03% to 51.39%. However, the opposite happens with the adjusted R-square from 47.29% to 46.31%, indicating that the increase in explanatory power is not enough to counterbalance the number of new variables. Compared to the model without principal component analysis, there are also no differences in the p-values of the variables' coefficients, though the power of the overall model (R-square and adjusted R-square) decreases slightly.

In panel C the R-square increases slightly when indicator variables for years are introduced, 50.87% to 51.30%. However, the opposite happens with the adjusted R-square from 47.45% to 46.56%, indicating that the increase in explanatory power is not enough to counterbalance the number of new variables. Compared to the model without principal component analysis, there are also no differences in the p-values of the variables' coefficients, though the power of the overall model (R-square and adjusted R-square) decreases slightly.

As with equation (3), the only significant difference when removing the coalition party is that the communist party gains statistical significance. Also, as in equation (3) the coefficient sign is contrary to expected.

Several authors study audit fees in municipalities (e.g. Blank *et al.*, 2009; Jensen and Payne, 2005; Rubin, 1988). Most studies use agency theory variables, and explore the municipalities' and auditor's characteristics. Other studies introduce political competition or the auditor's opinion (e.g. Cohen and Leventis, 2013; Blank *et al.*, 2009). Very few studies include tendering in auditing models, and when they do, most use it in audit quality models (Jensen and Payne, 2005), or studying the procurement process as dependent variables (e.g. Tagesson *et al.*, 2015), not in audit fees. It is my expectation that putting together procurement, political competition, and agency theory variables, I may enhance the audit fee model.

My first hypothesis (H3a) states that "Sophisticated audit procurement is associated with higher audit fees". The procurement variables in the model are: Low_AF_Of xAF_Importance (combined audit fee global tendering importance), AuditorxPubProc_DirSel (combined tendering auditor selection), and Rotation (number of years of the procurement process). The results shown in Table 44, in panel A, B, or C, show that the estimated coefficients for procurement process variables have the expected signs and are statistically significant, except for the variable AuditorxPubProc_DirSel in both panel B and C. This means that there is no evidence that bids, though more complex in preparation, combined with the type of auditor, have a statistically significant influence on prices. Nevertheless, the other two variables' results are consistent with hypothesis (H3a).

My second hypothesis (H3b) states that "Municipality dependence upon transfers is associated with lower audit fees". The GRANT variable represents the dependence upon central government transfers. The results in Table 44 show that that coefficients estimated for GRANT are not statistically significant in any panel. This leads me to reject (H3b).

Ward *et al.* (1994) include political competition in their model, but do not find a statistically significant relationship between audit fees and measures of political competition. However, in Blank *et al.*'s (2009) audit fees model, the political competition

is introduced, and the variables are statistically significant[69]. In Baber *et al.* (1987) and Cohen and Leventies (2013), the audit fees model also includes political competition, but with a dummy variable for each party membership (in this case the expected sign is positive), which is not comparable to my audit fees model.

My third hypothesis is (H3c) states that "Municipality political competition is associated with higher audit fees". In panel A I use four political parties, and in panels B and C, I remove the coalition party and keep the social democratic, the communist and the socialist parties. The political competition variables use the weight of the most representative parties. In panels A, B, and C, I find a negative and statistically significant association between the dependent variable and the two biggest political parties (socialist democratic and socialist political parties). Nevertheless, in panels B and C, when the coalition party is removed the communist party's coefficient, which in panel A lacks statistical significance, gains a p-value of 0.02 with a positive sign, contrary to what is expected. The results suggest that political competition influences audit fees, but not in municipalities with the communist party. This is consistent with hypothesis (H3c).

My fourth hypothesis (H3d) states that "Internal auditing reduces audit fees". The variable IAOFF presents a negative estimated coefficient that is statistically significant. This is consistent with the findings of Pilsher *et al.* (2013), and Cohen and Leventis (2013). Thus, the hypothesis (H3d) is not rejected.

As for the control variables, the proxy for audit complexity (Net_OpCosts) and the proxy for citizens' interest (TAX) present statistically significant results, and all variables have positive signs, as expected[70]. The variable TAX is used by several authors but only Ward

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[69] Political competition is measured by the weight of the winning party, its expected sign is negative, and statistically significant.

[70] The study I find with net operating result, Tagesson et al. (2015), finds no statistical significance with this variable in their first model, removing the equivalent variable Net_OpCosts in subsequent models, on account of suspicion of collinearity with tax base. As a result I cannot compare my results with other authors on this aspect, though I find there is a positive association between audit complexity and audit fees.

et al. (1994) reports a similar ratio, based on property taxation paid by the citizen, with statistically significant results.

Table 44 Estimation results of equation (3.1) agency theory in explaining audit fees – OLS regression analysis on audit fees (N = 170)

Panel A: all variables

Variable	Sign	Coefficient	t-stat	p-value		Coefficient	z-stat	p-value	
Constant		9.4234	8.39	0.00	***	9.3626	8.36	0.00	***
Low_AF_Of xAF_Importance	-	-0.1150	-3.09	0.00	***	-0.1206	-3.17	0.00	***
AuditorxPubProc_DirSel	+	0.1204	0.72	0.47		0.1492	0.88	0.38	**
Rotation	+	0.0859	2.06	0.04	**	0.0885	2.13	0.04	**
GRANT	-	0.1445	0.87	0.38		0.1301	0.75	0.45	
PolComp_ComPLW	-	0.1674	0.72	0.47		0.2585	0.95	034	
PolComp_SDRW	-	-0.8393	-2.85	0.01	***	-0.7346	-2.22	0.03	**
PolComp_CoalRW	-	-0.4714	-1.23	0.22		-0.3865	-0.91	0.36	
PolComp_SocLW	-	-1.2935	-3.52	0.00	***	-1.2020	-3.59	0.00	***
IAOFF	-	-0.3255	-3.68	0.00	***	-0.3234	-3.08	0.00	***
SIZE	+	-0.0928	-0.65	0.52		-0.0782	-0.52	0.61	
Net_OpCosts	+	54.7169	2.69	0.01	***	38.4434	2.54	0.01	**
INDebt	+	0.0347	0.69	0.49		0.0182	0.29	0.77	
TAX	+	0.0008	3.84	0.00	***	0.0008	3.66	0.00	***
Y2007						-0.0772	-0.64	0.52	
Y2008						-0.0618	-0.65	0.52	
Y2009						-0.0637	-0.65	0.52	
Y2010						-0.0231	-0.23	0.82	

R^2 = 51.43%   Adj. R^2 = 47.39% R^2 =51.64%   Adj. R^2 = 46.23%
F- statistics: 12.71; prob. 0.00***   F- statistics:; prob. 0.00***

Notes: Low_AF_Of xAF_Importance = combined audit fee global tendering importance (Low_AF_Of = Lowest Audit Fee Offer, and AF_Importance = Audit Fee level of Importance); AuditorxPubProc_DirSel = combined tendering auditor selection (PubProc_DirSel = Public Procurement Direct Selection, and Auditor); Rotation = measured in years; GRANT = central government transfer dependence; PolComp_ComPLW = Political Competition Communist Party Left Wing (PC-PEV); PolComp_SDRW = Political Competition Social Democrats Right Wing (PPD-PSD); PolComp_CoalRW = Political Competition Coalition Right Wing (Coligação); PolComp_SocLW = Political Competition Socialist Left Wing (PS); IAOFF = Internal Audit Office; Size = Log Revenues; Net_OpCosts= Net Operating Cost; IND = level of indebtedness; TAX = tax base; Dkyear = dummy variables for years to control for time effects*** p-value lower than 0.01; ** p-value lower than 0.05; * p-value lower than 0.10.

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Panel B: without coalition party

Variable	Sign	Coefficient	t-stat	p-value		Coefficient	z-stat	p-value	
Constant		8.9959	8.46	0.00	***	9.0272	8.53	0.00	***
Low_AF_Of xAF_Importance	-	-0.1063	-3.10	0.00	***	-0.1156	-3.19	0.00	***
AuditorxPubProc_DirSel	+	0.0915	0.58	0.56		0.1354	0.81	0.42	
Rotation	+	0.0934	2.17	0.03	**	0.0952	2.21	0.03	**
GRANT	-	0.1498	0.90	0.37		0.1264	0.73	0.47	
PolComp_ComPLW	-	0.5370	2.32	0.02	**	0.5660	2.35	0.02	**
PolComp_SDRW	-	-0.4303	-2.23	0.03	**	-0.3911	-1.99	0.05	**
PolComp_SocLW	-	-0.9378	-3.45	0.00	**	-0.9017	-3.31	0.00	**
IAOFF	-	-0.3125	-3.74	0.00	**	-0.3127	-3.71	0.00	***
SIZE	+	-0.0966	-0.67	0.51		-0.0742	-0.49	0.62	
Net_OpCosts	+	51.6399	2.62	0.01	***	36.1973	2.46	0.02	**
INDebt	+	0.0254	0.53	0.60		0.0044	0.08	0.94	
TAX	+	0.0009	4.05	0.00	***	0.0009	3.74	0.00	***
Y2007						-0.1029	-0.89	0.37	
Y2008						-0.0756	-0.81	0.42	
Y2009						-0.0766	-0.79	0.43	
Y2010						-0.0246	-0.25	0.81	

R² = 51.03%   Adj. R² = 47.29% | R² =51.39%   Adj. R² = 46.31%
F- statistics:; prob. 0.00*** | F- statistics:; prob. 0.00***

Notes: Low_AF_Of xAF_Importance = combined audit fee global tendering importance (Low_AF_Of = Lowest Audit Fee Offer, and AF_Importance = Audit Fee level of Importance); AuditorxPubProc_DirSel = combined tendering auditor selection (PubProc_DirSel = Public Procurement Direct Selection, and Auditor); Rotation = measured in years; GRANT = central government transfer dependence; PolComp_ComPLW = Political Competition Communist Party Left Wing (PC-PEV); PolComp_SDRW = Political Competition Social Democrats Right Wing (PPD-PSD); PolComp_SocLW = Political Competition Socialist Left Wing (PS); IAOFF = Internal Audit Office; Size = Log Revenues; Net_OpCosts= Net Operating Cost; IND = level of indebtedness; TAX = tax base; Dkyear = dummy variables for years to control for time effects*** p-value lower than 0.01; ** p-value lower than 0.05; * p-value lower than 0.10.

Panel C: without coalition party and SIZE

Variable	Sign	Coefficient	t-stat	p-value		Coefficient	z-stat	p-value	
Constant		9.0018	8.47	0.00	***	9.0474	8.54	0.00	***
Low_AF_Of xAF_Importance	-	-0.1103	-3.26	0.00	***	-0.1192	-3.30	0.00	***
AuditorxPubProc_DirSel	+	0.1128	0.73	0.47		0.1542	0.92	0.36	
Rotation	+	0.0974	2.30	0.02	**	0.0983	3.32	0.02	**
GRANT	-	0.0463	0.73	0.47		0.0463	0.73	0.47	
PolComp_ComPLW	-	0.5042	2.30	0.02	**	0.5419	2.39	0.02	**
PolComp_SDRW	-	-0.4037	-2.15	0.03	**	-0.3694	-1.91	0.06	*
PolComp_SocLW	-	-0.8700	-3.64	0.00	***	-0.8493	-3.51	0.00	***
IAOFF	-	-0.3105	-3.73	0.00	***	-0.3112	-3.71	0.00	***
Net_OpCosts	+	28.3343	2.67	0.01	***	20.6610	2.53	0.01	**
INDebt	+	0.0201	0.41	0.68		-0.0035	-0.06	0.95	
TAX	+	0.0007	3.19	0.00	***	0.0008	3.33	0.00	***
Y2007						-0.1154	-0.97	0.33	
Y2008						-0.0788	-0.84	0.40	
Y2009						-0.0754	-0.78	0.44	
Y2010						-0.0203	-0.21	0.84	
		R^2 = 50.87%	Adj. R^2 =	47.45%		R^2 =51.30%	Adj. R^2 =	46.56%	
		F- statistics:; prob. 0.00***				F- statistics:; prob. 0.00***			

Notes: Low_AF_Of xAF_Importance = combined audit fee global tendering importance (Low_AF_Of = Lowest Audit Fee Offer, and AF_Importance = Audit Fee level of Importance); AuditorxPubProc_DirSel = combined tendering auditor selection (PubProc_DirSel = Public Procurement Direct Selection, and Auditor); Rotation = measured in years; GRANT = central government transfer dependence; PolComp_ComPLW = Political Competition Communist Party Left Wing (PC-PEV); PolComp_SDRW = Political Competition Social Democrats Right Wing (PPD-PSD); PolComp_SocLW = Political Competition Socialist Left Wing (PS); IAOFF = Internal Audit Office; Net_OpCosts= Net Operating Cost; IND = level of indebtedness; TAX = tax base; Dkyear = dummy variables for years to control for time effects*** p-value lower than 0.01; ** p-value lower than 0.05; * p-value lower than 0.10.

The White test for homoscedasticity presents a chi^2 of 167.92 and p-value of 0.14 for regression (3.1) in panel A, a chi^2 of 169.58 and p-value of 0.31 for regression (3.1) in panel B, and a chi^2 of 170.00 and p-value of 0.46 for regression (3.1) in panel C. The Breusch-Pagan/Cook-Weisberg test for heteroscedasticity presents a chi^2 of 18.03 for regression (3.1) in panel A, a chi^2 of 16.05 for regression (3.1) in panel B, and a chi^2 of 15.74 for regression (3.1) in panel C, all with a p-value of 0.00. Thus, the presence of heteroscedasticity is rejected.

Petersen (2009) indicates that in the presence of time effects, the White test may prove to be insufficient with standard errors, even considering indicator variables for years. I therefore run the Newey-West regression test. To be consistent with previous results, I again present three panels, A, with all variables, B, without the coalition party, and C, without the coalition party and SIZE. Results are presented in Table 45 and are consistent those in Table 44 for each panel[71]. This indicates that there is no problem with the initial results.

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[71] Including the communist party coefficient results, which in panel B and C become statistically significant with a (contrary to expected) positive sign.

Table 45 Estimation results of equation (3.1) agency theory in explaining audit fees –
OLS regression analysis on audit fees applying Newey-West standard errors (N = 170)

Variable	Sign	Coefficient	t-stat	p-value	
Panel A: with all variables					
Constant		9.3626	8.36	0.00	***
Low_AF_Of	-	-0.1206	-3.17	0.00	***
xAF_Importance					
AuditorxPubProc_DirSel	-	0.1492	0.88	0.38	
Rotation	+	0.0885	2.13	0.04	**
GRANT	-	0.1301	0.75	0.45	
PolComp_ComPLW	-	0.2585	0.95	0.34	
PolComp_SDRW	-	-0.7346	-2.22	0.03	**
PolComp_CoalRW	-	-0.3865	-0.91	0.36	
PolComp_SocLW	-	-1.2020	-3.08	0.00	***
IAOFF	-	-0.3234	-3.59	0.00	***
SIZE	+	-0.0782	-0.52	0.60	
Net_OpCosts	+	38.4433	2.54	0.01	**
INDebt	+	0.0182	0.29	0.77	
TAX	+	0.0008	3.66	0.00	***
Y2007		-0.0772	-0.64	0.52	
Y2008		-0.0618	-0.65	0.52	
Y2009		-0.0637	-0.65	0.52	
Y2010		-0.0231	-0.23	0.82	
F = 6.24	P-value=0.00				

Notes: Low_AF_Of xAF_Importance = combined audit fee global tendering importance (Low_AF_Of = Lowest Audit Fee Offer, and AF_Importance = Audit Fee level of Importance); AuditorxPubProc_DirSel = combined tendering auditor selection; Rotation = measured in years; GRANT = Central government transfer dependence; PolComp_ComPLW = Political Competition Communist Party Left Wing (PC-PEV); PolComp_SDRW = Political Competition Social Democrats Right Wing (PPD-PSD); PolComp_CoalRW = Political Competition Coalition Right Wing (Coligação); PolComp_SocLW = Political Competition Socialist Left Wing (PS); IAOFF = Internal Audit Office; Size = Log Revenues; Net_OpCosts= Net Operating Cost; INDebt = level of indebtedness; TAX = tax base; Dkyear = dummy variables for years to control for time effects*** p-value lower than 0.01; ** p-value lower than 0.05; * p-value lower than 0.10.

Variable	Sign	Coefficient	t-stat	p-value	
Panel B: without the coalition party					
Constant		9.0272	8.53	0.00	***
Low_AF_Of xAF_Importance	-	-0.1156	-3.19	0.00	***
AuditorxPubProc_DirSel	-	0.1354	0.81	0.42	
Rotation	+	0.0952	2.21	0.03	**
GRANT	-	0.1265	0.73	0.47	
PolComp_ComPLW	-	0.5660	2.35	0.02	**
PolComp_SDRW	-	-0.3911	-1.99	0.05	**
PolComp_SocLW	-	-0.9017	-3.31	0.00	***
IAOFF	-	-0.3127	-3.71	0.00	***
SIZE	+	-0.0744	-0.49	0.62	
Net_OpCosts	+	36.1973	2.46	0.02	**
INDebt	+	0.0044	0.08	0.94	
TAX	+	0.0009	3.74	0.00	***
Y2007		-0.1029	-0.89	0.37	
Y2008		-0.0756	-0.81	0.42	
Y2009		-0.0766	-0.79	0.43	
Y2010		-0.0246	-0.25	0.81	
F = 6.91	P-value=0.00				

Notes: Low_AF_Of xAF_Importance = combined audit fee global tendering importance (Low_AF_Of = Lowest Audit Fee Offer, and AF_Importance = Audit Fee level of Importance); AuditorxPubProc_DirSel = combined tendering auditor selection; Rotation = measured in years; GRANT = Central government transfer dependence; PolComp_ComPLW = Political Competition Communist Party Left Wing (PC-PEV); PolComp_SDRW = Political Competition Social Democrats Right Wing (PPD-PSD); PolComp_SocLW = Political Competition Socialist Left Wing (PS); IAOFF = Internal Audit Office; Size = Log Revenues; Net_OpCosts= Net Operating Cost; INDebt = level of indebtedness; TAX = tax base; Dkyear = dummy variables for years to control for time effects*** p-value lower than 0.01; ** p-value lower than 0.05; * p-value lower than 0.10.

Variable	Sign	Coefficient	t-stat	p-value	
Panel C: without the coalition party and SIZE					
Constant		9.0474	8.54	0.00	***
Low_AF_Of	-	-0.1192	-3.30	0.00	***
xAF_Importance					
AuditorxPubProc_DirSel	-	0.1542	0.92	0.36	
Rotation	+	0.0983	2.32	0.02	**
GRANT	-	0.0463	0.73	0.47	
PolComp_ComPLW	-	0.5419	2.39	0.02	**
PolComp_SDRW	-	-0.3694	-1.91	0.06	*
PolComp_SocLW	-	-0.8493	-3.51	0.00	**
IAOFF	-	-0.3112	-3.71	0.00	**
Net_OpCosts	+	20.6610	2.53	0.01	**
INDebt	+	-0.0035	-0.06	0.95	
TAX	+	0.0008	3.33	0.00	***
Y2007		-0.1154	-0.97	0.33	
Y2008		-0.0788	-0.84	0.40	
Y2009		-0.0754	-0.78	0.44	
Y2010		-0.0203	-0.21	0.84	
F = .49	P-value=0.00				

Notes: Low_AF_Of xAF_Importance = combined audit fee global tendering importance (Low_AF_Of = Lowest Audit Fee Offer, and AF_Importance = Audit Fee level of Importance); AuditorxPubProc_DirSel = combined tendering auditor selection; Rotation = measured in years; GRANT = Central government transfer dependence; PolComp_ComPLW = Political Competition Communist Party Left Wing (PC-PEV); PolComp_SDRW = Political Competition Social Democrats Right Wing (PPD-PSD); PolComp_SocLW = Political Competition Socialist Left Wing (PS); IAOFF = Internal Audit Office; Net_OpCosts= Net Operating Cost; INDebt = level of indebtedness; TAX = tax base; Dkyear = dummy variables for years to control for time effects*** p-value lower than 0.01; ** p-value lower than 0.05; * p-value lower than 0.10.

Petersen (2009) also notes that the Newey-West standard errors test, although superior to the White standard errors test, may still have a small bias when used with panel data. To take this into consideration, and given the fact that the model already controls for possible time effects, I next estimate my model using cluster errors, in which the variable for clustering is the municipality. To be consistent with previous results, I again present three panels, A, with all variables, B, without the coalition party, and C, without the coalition party and SIZE. The results are shown in Table 46.

In panel A, with all variables, many lose statistical significance. The only variables that have significant estimated coefficients are: (i) the combined audit fee global tendering importance (Low_AF_Of xAF_Importance), (ii) the value of the internal audit office (IAOFF), and (iii) the citizens' interest (TAX). This leads me to conclude that there might be standard errors concerning the data among municipalities.

In both panel B and panel C, I take in consideration possible multicollinearity affects, and I remove variables PolComp_CoalRW from both panels. Additionally, in panel C I also remove SIZE. The results indicate that once the multicollinearity issues are taken into consideration, there is another variable that is statistically significant, PolComp_SocLW. The results indicate that audit fees decrease as factors other than price are included in the procurement process. However, the other features of the procurement process are not associated in a statistically significant manner with audit fees. Therefore, the findings of the first proxy are consistent with (H3a), "Sophisticated audit procurement is associated with higher audit fees".

As the results of the GRANT variable (represents the dependence upon central government transfers) remain the same, the second hypothesis (H3b), "Municipality dependence upon transfers is associated with lower audit fees", is rejected once more.

As for political competition, the results show that the weight of the socialist party in the Town Council is negatively associated with the audit fees charged, suggesting that political competition in socialist municipalities is positively associated with higher audit fees (H3c), "Municipality political competition is associated with higher audit fees". The findings regarding IAOFF remain, confirming that internal auditing reduces audit fees (H3d), "Internal auditing reduces audit fees".

Table 46 Estimation results of equation (3.1) agency theory in explaining audit fees –
OLS regression analysis on audit fees applying cluster standard errors (N = 170)

Panel A: with all variables					
Variable	Sign	Coefficient	t-stat	p-value	
Constant		9.3626	4.65	0.000	***
Low_AF_Of xAF_Importance	-	-0.1206	-1.98	0.06	*
AuditorxPubProc_DirSel	-	0.1492	0.57	0.57	
Rotation	+	0.0885	1.14	0.26	
GRANT	-	0.1301	0.46	0.65	
PolComp_ComPLW	-	0.2585	0.61	0.55	
PolComp_SDRW	-	-0.7346	-1.29	0.21	
PolComp_CoalRW	-	-0.3865	-0.56	0.58	
PolComp_SocLW	-	-1.2020	-1.65	0.11	
IAOFF	-	-0.3234	-1.74	0.09	*
SIZE	+	-0.0782	-0.32	0.75	
Net_OpCosts	+	1.50e-09	1.48	0.15	
INDebt	+	0.0182	0.24	0.81	
TAX	+	0.0008	2.26	0.03	**
Y2007		-0.0772	-0.68	0.50	
Y2008		-0.0618	-0.86	0.39	
Y2009		-0.0637	-0.82	0.42	
Y2010		-0.0231	-0.40	0.69	
	R^2 = 51.64%		Adj. R^2 = 46.23%		

Notes: Low_AF_Of xAF_Importance = combined audit fee global tendering importance (Low_AF_Of = Lowest Audit Fee Offer, and AF_Importance = Audit Fee level of Importance); AuditorxPubProc_DirSel = combined tendering auditor selection (PubProc_DirSel = Public Procurement Direct Selection, and Auditor); Rotation = measured in years; PolComp_ComPLW = Political Competition Communist Party Left Wing (PC-PEV); PolComp_SDRW = Political Competition Social Democrats Right Wing (PPD-PSD); PolComp_CoalRW = Political Competition Coalition Right Wing (Coligação); PolComp_SocLW = Political Competition Socialist Left Wing (PS); Net_OpCosts= Net Operating Cost; Size = Log Revenues; IND = level of indebtedness; GRANT = central government transfer dependence; TAX = tax base; Dkyear = dummy variables for years to control for time effects*** p-value lower than 0.01; ** p-value lower than 0.05; * p-value lower than 0.10.

Panel B: without the coalition party					
Variable	Sign	Coefficient	t-stat	p-value	
Constant		9.0272	5.22	0.000	***
Low_AF_Of xAF_Importance	-	-0.1156	-2.03	0.05	**
AuditorxPubProc_DirSel	-	0.1354	0.53	0.60	
Rotation	+	0.0952	1.15	0.26	
GRANT	-	0.1265	0.45	0.66	
PolComp_ComPLW	-	0.5660	1.35	0.19	
PolComp_SDRW	-	-0.3911	-1.64	0.11	
PolComp_SocLW	-	-0.9017	-2.17	0.04	**
IAOFF	-	-0.3127	-1.80	0.08	*
SIZE	+	-0.0742	-0.30	0.76	
Net_OpCosts	+	36.1973	1.47	0.15	
INDebt	+	0.0044	0.06	0.95	
TAX	+	0.0009	2.35	0.02	**
Y2007		-0.1029	-0.90	0.38	
Y2008		-0.0756	-1.16	0.30	
Y2009		-0.0766	-0.96	0.34	
Y2010		-0.0246	-0.42	0.68	
	R^2 = 51.39%		Adj. R^2 = 46.31%		

Notes: Low_AF_Of xAF_Importance = combined audit fee global tendering importance; AuditorxPubProc_DirSel = combined tendering auditor selection; Rotation = measured in years; GRANT = Central government transfer dependence; PolComp_ComPLW = Political Competition Communist Party Left Wing (PC-PEV); PolComp_SDRW = Political Competition Social Democrats Right Wing (PPD-PSD); PolComp_SocLW = Political Competition Socialist Left Wing (PS); IAOFF = Internal Audit Office; Net_OpCosts= Net Operating Cost; INDebt = level of indebtedness; TAX = tax base; Dkyear = dummy variables for years to control for time effects*** p-value lower than 0.01; ** p-value lower than 0.05; * p-value lower than 0.10.

Panel C: without the coalition party and SIZE					
Variable	Sign	Coefficient	t-stat	p-value	
Constant		9.0474	5.21	0.00	***
Low_AF_Of xAF_Importance	-	-0.1192	-2.04	0.05	**
AuditorxPubProc_DirSel	-	0.1542	0.60	0.55	
Rotation	+	0.0983	1.21	0.24	
GRANT	-	0.0463	0.43	0.67	
PolComp_ComPLW	-	0.5419	1.37	0.18	
PolComp_SDRW	-	-0.3694	-1.51	0.14	
PolComp_SocLW	-	-0.8491	-2.31	0.03	**
IAOFF	-	-0.3115	-1.79	0.08	*
Net_OpCosts	-	0.0484	1.53	0.13	
INDebt	+	-0.0035	-0.04	0.97	
TAX	+	0.0008	1.79	0.08	*
Y2007	+	-0.1154	-0.85	0.40	
Y2008	+	-0.0788	-1.07	0.29	
Y2009		-0.0754	-0.98	0.34	
Y2010		-0.0203	-0.38	0.71	
	$R^2 =$ 51.64%		Adj. $R^2 =$ 46.23%		

Notes: Low_AF_Of xAF_Importance = combined audit fee global tendering importance; AuditorxPubProc_DirSel = combined tendering auditor selection; Rotation = measured in years; GRANT = Central government transfer dependence; PolComp_ComPLW = Political Competition Communist Party Left Wing (PC-PEV); PolComp_SDRW = Political Competition Social Democrats Right Wing (PPD-PSD); PolComp_SocLW = Political Competition Socialist Left Wing (PS); IAOFF = Internal Audit Office; Net_OpCosts= Net Operating Cost; INDebt = level of indebtedness; TAX = tax base; Dkyear = dummy variables for years to control for time effects*** p-value lower than 0.01; ** p-value lower than 0.05; * p-value lower than 0.10.

5.4.4 Perceived audit quality multivariate regression

My fourth objective is to study audit quality. As audit quality is difficult to measure directly, I study perceived audit quality. In Section 3.5 I state the hypotheses: (H4a) "Public procurement based solely upon lowest price is negatively associated with perceived audit quality in municipalities", and (H4b) "Perceived audit quality is positively associated with higher audit fees". In Section 4.3.5, I define the model and discuss the variables. Equations (4.1) and (4.2) are as follows:

$$\text{Expert} = \beta_0 + \beta_1 \text{ Low\_AF\_Of} + \beta_2 \text{ AF\_Importance} + \beta_3 \text{LogAF} + \beta_4 \text{CEOPIN} +$$
$$\beta_5 \text{Opinion} + \beta_6 \text{GRANT} + \beta_7 \text{Net\_OpCosts} + \beta_8 \text{ SIZE} + \beta_9 \text{INDebt} + \beta_{10} \text{TAX}$$
$$+ \beta_{11} D_k^{year} + \varepsilon \qquad\qquad (4.1)$$

$$\text{Reputation} = \beta_0 + \beta_1 \text{ Low\_AF\_Of} + \beta_2 \text{ AF\_Importance} + \beta_3 \text{LogAF} + \beta_4 \text{CEOPIN} +$$
$$\beta_5 \text{Opinion} + \beta_6 \text{GRANT} + \beta_7 \text{Net\_OpCosts} + \beta_8 \text{ SIZE} + \beta_{10} \text{INDebt} + \beta_{11} \text{TAX}$$
$$+ \beta_{12} D_k^{year} + \varepsilon \qquad\qquad (4.2)$$

The purpose of this section is to present the estimation results of equation (4.1) and (4.2) and answer the hypotheses. I use two different regressions (OLS and ordered logit), two different sets to include the time effects (dummy years), and two different dependent variables (Expert and Reputation). I present the results of the Expert dependent variable in Table 48, panel A and panel B, for OLS and ordered logit regression, respectively.

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Each panel includes two sets of estimation results: the first excludes indicator variables for years, while the second includes them.

One of the disadvantages of using a survey to check for perceived audit quality, in a five year period, is the risk that respondents maintain the same response across years. The inclusion of indicator variables for different years helps to control for this possibility.

Table 48 presents the results of equation (4.1). The test of hypothesis (H4a) "Public procurement based solely upon lowest price is negatively associated with perceived audit quality in municipalities" is based on two variables: the lowest price selection criterion (Low_AF_Of) and the importance of price in the procurement process (AF_Importance).

In panel A I have an unexpected finding. Perceived audit quality results show a statistically significant positive association with the lowest selection criterion. This suggests that the respondents believe the lowest selection criterion to be in line with having an expert by their side. They may be right if in the public procurement process they use a direct selection, inviting just one or two tenders whom they chose and know to be knowledgeable. The coefficient of the variable AF_Importance has the expected sign and is statistically significant. This is consistent with my hypothesis (4a), in what concerning audit fee importance.

The test of the second hypothesis (H4b) "Perceived audit quality is positively associated with higher audit fees" is based on the variable representing audit fees (LogAF). The estimated coefficient for this variable has the expected positive sign, but it isnot statistically significant. Thus, these results do not support the hypothesis.

Another surprising result is the proxy for audit complexity. The respondents perceive that audit quality decreases as the audit complexity increases. According to international auditing standards, the greater the complexity the more control and substantive tests are applied, and thus, additional auditing hours, and more specialized team, so this should not be so. However, taking into consideration the audit fees competition and the auditor's budget time constraint, this may well be a possible consequence. The proxy for citizens' interest is in line with audit complexity, and probably for the same reasons.

The variables SIZE and CEOPIN are not statistically significant. The remaining variables, Opinion and INDebt, have the expected signs and are statistically significant. For the respondents a qualified opinion probably means more audit work. A qualified opinion needs more substantive tests, implies additional work in calculating the adequate adjustments, and compels auditors to justify the qualification in explanatory written reports. This increased audit work is naturally associated with increased perception of audit quality. The proxy for audit risk, INDebt, is positively associated with perceived audit quality, as expected, with a statistically significant coefficient. This means that more indebted municipalities need more audit work in the verification of debt (through substantive testing), thus presenting a perception of more caution in the auditor's opinion.

The findings in panel B are consistent with those discussed above. In hypothesis (H4a) the p-value of variable AF_Importance shows less explanatory power (from a p-value of 0.00 to 0.03, without the indicator variables for years, and 0.08, with indicator variables for years). The considerations made in panel A are the same in panel B for variable Low_AF_Of, meaning, again a surprising result. Nevertheless, as these findings are very similar to those of panel A, there is an indication of robustness of results.

As for hypothesis (4b), I find that the results change once I take into consideration the indicator variables for years and panel A (OLS), and panel B (ordinal) present different results. The audit fees variable (Log_AF) has statistical significance and its coefficient has the positive (expected) sign in the panel B ordinal regression, and only when time effect variables are taken into consideration.

The results, statistically significant positive association of audit fees, are in line with most accounting researchers studying the relationship between audit quality and audit fees (e.g. Copley *et al.*, 1994 and Palmrose, 1988), contrary to Lowensohn *et al.* (2007), with (i) a municipality auditing market of Big Four, and non- Big Four, and (ii) Big Four's premium fees, that is led to conclude that Big Four higher fees are not associated with perceived audit quality. As I have (i) a statistically significant positive estimate of audit fees with perceived audit quality, (ii) but no Big Four to control upon, I cannot reject the hypotheses.

Continuing the comparison of the results of the OLS and the ordered logit regression, I find that most variables maintain their level of significance, with the exception of GRANT, as this variable in the ordered logit model loses statistical significance.

Table 47 Estimation results of equation (4.1) procurement and agency theory in explaining perceived audit quality – OLS and ordered logit regression analysis on perceived audit quality (N = 170)

Panel A: OLS regression analysis on perceived audit quality

Variable	Sign	Coefficient	t-stat	p-value		Coefficient	t-stat	p-value	
Constant		-3.3076	-2.15	0.03	**	0.5457	3.07	0.00	***
Low_AF_Of	-	0.3636	3.29	0.00	***	0.3632	3.46	0.00	***
AF_Importance	-	-0.1015	-3.80	0.00	***	-0.0832	-3.49	0.00	***
LogAF	+	0.0942	0.91	0.37		0.1350	1.31	0.19	
CEOPIN	-	0.2066	1.13	0.26		0.1203	0.68	0.50	
Opinion	+	0.4051	4.03	0.00	***	0.3404	3.28	0.00	***
GRANT	+	0.2591	1.39	0.18		0.4114	2.17	0.03	**
Net_OpCosts	+	-27,217.2035	-4.11	0.00	***	-25,253.0070	-4.00	0.00	***
SIZE	+	0.1621	1.03	0.31		0.0429	0.27	0.79	
INDebt	+	0.2387	4.32	0.00	***	0.3973	5.65	0.00	***
TAX	+	-0.0014	-2.88	0.01	***	-0.0013	-2.67	0.01	***
Y2007						0.1678	1.34	0.18	
Y2008						0.0025	0.02	0.98	
Y2009						-0.0208	-0.17	0.86	
Y2010						-4.4028	-2.90	0.00	***
Adj. R^2 = 31.63%	R^2 =	35.67%				Adj.R^2 =35.89%	R^2 = 41.20%		

Notes: Low_AF_Of = Lowest audit fee offer; AF_Importance= audit fee importance; LogAF = Logarithm Audit Fee; CEOPIN = Combined Error Opinion; Opinion = Qualified opinion; GRANT = Central government transfer dependence; Net_OpCosts= Net Operating Cost; Size = Log Revenues; INDebt= Indebtedness. *** p-value lower than 0.01; ** p-value lower than 0.05; * p-value lower than 0.10.

Panel B: *Ordered logit regression analysis on perceived audit quality*

Variable	Sign	Coefficient	z	p-value		Coefficient	z	p-value	
Low_AF_Of	-	2.5409	2.48	0.01	**	2.5728	2.38	0.03	**
AF_Importance	-	-0.81700	-2.20	0.03	**	-0.70226	-1.80	0.08	*
LogAF	+	0.4457	1.12	0.26		0.79711	1.84	0.07	*
CEOPIN	-	0.83990	1.07	0.28		0.41049	0.51	0.61	
Opinion	+	1.5120	3.49	0.00	***	1.1394	2.47	0.01	**
GRANT	+	0.81360	0.91	0.36		1.1592	1.21	0.23	
Net_OpCosts	+	-15.6226	-3.40	0.00	***	-42.9497	-3.59	0.00	***
SIZE	+	0.62370	0.88	0.38		0.4285	0.56	0.58	
INDebt	+	1.14430	3.32	0.00	***	2.5662	4.09	0.00	***
TAX	+	-0.00510	-3.15	0.00	***	-0.0050	-2.89	0.00	***
Y2007						2.7583	3.31	0.00	***
Y2008						0.5092	0.89	0.37	
Y2009						-0.0613	-0.11	0.91	
Y2010						-0.1059	-0.19	0.85	
		Pseudo R^2 = 24.89%	Wald chi^2 =	66.44%***		Pseudo R^2 =30.20%	Wald chi^2 =	85.19%***	

Notes: Low_AF_Of = Lowest audit fee offer; AF_Importance= audit fee importance; LogAF = Logarithm Audit Fee; CEOPIN = Combined Error Opinion; Opinion = Qualified opinion; GRANT = Central government transfer dependence; Net_OpCosts= Net Operating Cost; Size = Log Revenues; INDebt= Indebtedness. *** p-value lower than 0.01; ** p-value lower than 0.05; * p-value lower than 0.10.

As the variable SIZE is removed from previous models on account of multicollinearity and the high correlation estimate of both Pearson and Spearman correlation matrix, I run the variation inflation factor. The variance inflation results for SIZE and GRANT are 15.14 and 12.65, respectively. These results show multicollinearity. The consequence of these results is that the presence of both SIZE and GRANT may have to be re-considered.

I do not present the results of the Reputation dependent variable, as the ordered logit regression indicates the confluence of standard errors. The correlation matrix indicates that some independent variables are correlated with the Reputation. This may be the reason for the problem with the ordered logit regression.

Given the (i) contradicting results of the equation (4.1), between OLS and ordered regressions, (ii) reinforced by the correlation matrix results concerning perceived audit quality variables, I follow Defond (1992) and use a principal component analysis for a dependent variable.

I consider two measures of perceived quality audit (Expert and Reputation) and Auditor and CEOPIN, at the same time, to learn more about the way that perceived audit quality variables interact, allowing to consider the effects of all variables, and interpreting their joint impact. As in Li (2010), I perform a principal component analysis of the four variables. Table 49 provides information about this analysis. I have two principal components solutions, fulfilling the Kaiser criterion, which states that the components with eigenvalue higher than one should be retained (Hair *et al.*, 2010). I use the two components with Eigenvalues above 1.

Table 48 Principal Components Analysis (N=170)

Component	Eigenvalue	Difference	Proportion	Cumulative
Comp 1	1.26046	0.217741	0.3151	0.3151
Comp 2	1.04272	0.051392	0.2607	0.5758
Comp 3	0.99133	0.285846	0.2478	0.8236
Comp 4	0.70548	-	0.1764	1.0000

Notes: Number of components: 2, Trace: 4, Rho: 0.5758

Table 50 shows the factor loadings of the two components. Component 1 is determined mostly by Expert and Reputation, which have loadings of 0.7103 and 0.6547, respectively. This variable is labelled ExpertxReputation as it reveals a combined perceived audit quality of both characteristics the literature reveals to be important. Lowensohn *et al.* (2007) find a positive relationship between auditor specialization and perceived audit quality, and Lennox (1999), and DeAngelo (1981), among others, present a reputation as an important feature of audit quality.

Table 49 Principal components analysis – identification of eigenvectors (N=170)

Variable	Component 1	Component 2	Unexplained
Auditor	-0.2573	0.3064	0.8187
Expert	0.7103	-0.1849	0.3284
Reputation	0.6547	0.3542	0.3289
CEOPIN	-0.0252	0.8640	0.2208

Notes: Auditor = Company of auditors; Expert = Field specialization; Reputation = Credibility; CEOPIN = Combined Error Opinion.

In the audit fees model the public procurement process variables Low_AF_Of and AF_Importance are combined by principal component analysis. Instead of using the variables separately in the perceived audit quality model, my first independent variable, Low_AF_Of x AF_Importance (combined audit fee global tendering importance), intends to measure the level of public procurement sophistication. The use of these combined components in an ordered logit regression enhances the predictive power without changes in the other variables. The new model in by equation (4.3) introduces a new dependent variable (ExpertxReputation).

$$\text{ExpertxReputation} = \beta_0 + \beta_1 \text{Low\_AF\_Of x AF\_Importance} + \beta_2 \text{LogAF} + \beta_3 \text{CEOPIN} +$$

$$\beta_4 \text{Opinion} + \beta_5 \text{GRANT} + \beta_6 \text{Net\_OpCosts} + \beta_7 \text{SIZE} + \beta_8 \text{INDebt} + \beta_9 \text{TAX} +$$

$$\beta_{10} D_k^{year} + \varepsilon \tag{4.3}$$

I present the results of the ExpertxReputation dependent variable in Table 51, panels A and B, for OLS and ordered logit regression, respectively. Both panels include two sets of estimation results: the first one excludes indicator variables for years, while the second includes them.

In panel A, the results of equation (4.3) are somewhat similar to equation (4.1), and the hypothesis (H4a) "Public procurement based solely upon lowest price is negatively associated with perceived audit quality in municipalities" is not rejected, because Low_AF_Of x AF_Importance has the expected negative sign, and it is statistically significant. Nevertheless, as in equation (4.1), the estimated coefficient is marginally significant (the p-value is 0.07) when indicator variables for years are introduced[72]. The comparison with literature is not possible as the procurement process is rarely studied by the accounting profession, given the unavailability of procurement data.

As for hypothesis (H4b) "Perceived audit quality is positively associated with higher audit fees", my results are consistent with the hypothesis, as variable LogAF (audit fees) has a coefficient positively associated with perceived audit quality and is statistically significant. This may be due to the fact that my perceived audit quality includes both expertise and reputation. Other studies, such as Jensen and Payne (2005) have concluded that expertise is one of the reasons for choosing an auditor.

There are different results reported in the literature, however. My results are contrary to Samelson *et al.* (2006), with (i) a municipality auditing market of Big Four and non-Big Four, and (ii) Big Four's premium fees, leading them to conclude that Big Four higher fees are not associated with perceived audit quality. I have (i) a statistically significant positive estimate of audit fees with perceived audit quality, (ii) but no Big Four to control

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[72] Low_AF_Of xAF_Importance is the combined PCA variable and stands for less sophistication in the public procurement process, and an increasing importance of price as a selection criterion or factor.

upon. In their perceived audit quality study, Lowensohn *et al.'s* (2007) results are consistent with Samelson's *et al.* (2006).

As for control variables, the proxy for audit risk (INDebt) has the expected sign, and is statistically significant. Lowensohn *et al.* (2007) find a positive association between bigger (and they suppose, riskier) municipalities and Big Four, and consequently higher fees, but not a direct association between riskier municipalities and perceived audit quality. The citizens' interest (TAX), and auditee complexity (Net_OpCosts) present a surprising result, but the coefficient of TAX is quite low. The perceived audit quality models in the accounting research do not take TAX into consideration, so the result cannot be compared with other studies.

In panel B I present the results of the ordered logit regression results, which are consistent with the results of the OLS estimation.

Table 50 Estimation results of equation (4.3) procurement and agency theory in explaining perceived audit quality – OLS and ordered logit regression analysis on perceived audit quality (N = 170)

Panel A: *OLS regression analysis on perceived audit quality*

Variable	Sign	Coefficient	t-stat	p-value		Coefficient	t-stat	p-value	
Constant		-31.3251	-3.04	0.00	***	-35.7702	-3.44	0.00	***
Low_AF_Of xAF_Importance	-	-0.3374	-2.07	0.04	**	-0.2938	-1.81	0.07	*
LogAF	+	1.5385	2.34	0.02	**	1.7292	2.49	0.01	**
CEOPIN	-	0.6111	0.61	0.54		0.2645	0.26	0.79	
Opinion	+	0.7538	1.14	0.25		0.4424	0.63	0.52	
GRANT	+	0.8356	0.54	0.59		1.4586	0.91	0.36	
Net_OpCosts	+	-1.5938	-2.22	0.03	**	-1.4775	-2.20	0.03	**
SIZE	+	1.4367	1.16	0.25		0.9343	0.73	0.47	
INDebt	+	0.8141	1.41	0.16		1.5240	1.94	0.05	**
TAX	+	-0.0070	-2.57	0.01	**	-0.0066	-2.36	0.02	**
Y2007						2.5166	1.88	0.02	**
Y2008						0.8197	0.91	0.37	
Y2009						0.1290	0.14	0.89	
Y2010						0.0858	0.10	0.92	
		R^2 = 29.73%	F= 13.31***	Adj. R^2 = 25.77%		R^2 =32.27%	F= 9.74***	Adj. R^2 = 26.63%	

Notes: Low_AF_Of xAF_Importance = combined audit fee global tendering importance; LogAF = Logarithm Audit Fee; CEOPIN = Combined Error Opinion; Opinion = Qualified opinion; GRANT = central government transfer dependence; Net_OpCosts= Net Operating Cost; Size = Log Revenues; INDebt= Indebtedness; TAX = Tax base. *** p-value lower than 0.01; ** p-value lower than 0.05; * p-value lower than 0.10.

Panel B: *Ordered logit regression analysis on perceived audit quality*

Variable	Sign	Coefficient	z	p-value		Coefficient	z	p-value	
Low_AF_Of xAF_Importance	-	-0.2045	-2.52	0.01	**	-0.1814	-1.73	0.08	*
LogAF	+	0.6054	1.82	0.07	*	0.7971	1.93	0.05	*
CEOPIN	-	0.4099	0.58	0.56		0.1085	0.20	0.84	
Opinion	+	0.3905	1.06	0.29		0.1505	0.36	0.72	
GRANT	+	0.2040	0.29	0.78		0.4173	0.49	0.62	
Net_OpCosts	+	-23,762,680.0138	-2.12	0.03	**	-50,080,931.8346	-2.30	0.02	**
SIZE	+	0.9455	1.64	0.10		0.8024	1.09	0.28	
INDebt	+	0.4991	1.93	0.05	*	0.9880	1.65	0.09	*
TAX	+	0.0032	-2.42	0.02	**	-0.0032	-2.10	0.04	**
Y2007						1.4295	1.78	0.08	*
Y2008						0.4663	1.02	0.31	
Y2009						0.1437	0.33	0.74	
Y2010						0.1324	0.32	0.75	
		LR chi^2 = 58.41%***				LR chi^2 = 60.52%***			
		Pseudo R^2 = 12.88%	Wald chi^2 =	N/A		Pseudo R^2 = 12.88%	Wald chi^2 =	90.43%***	

Notes: Low_AF_Of xAF_Importance = combined audit fee global tendering importance; LogAF = Logarithm Audit Fee; CEOPIN = Combined Error Opinion; Opinion = Qualified opinion; GRANT = central government transfer dependence; Net_OpCosts= Net Operating Cost; Size = Log Revenues; INDebt= Indebtedness; TAX = Tax base. *** p-value lower than 0.01; ** p-value lower than 0.05; * p-value lower than 0.10.

To be consistent with previous models I remove the variable SIZE on account of possible multicollinearity. I run the ordered logit regression again, including indicator variables for years, without SIZE. An interesting consequence is that most variables obtain better p-values than previously, though Wald chi^2 decreases to 82.62%.

The control variable GRANT, a proxy for manager ownership and representing the municipalities' dependence upon central government transfers, becomes statistically significant with the positive expected sign. This result leads me to conclude that the greater the dependence on central government transfers, the higher the perceived audit quality, aligned with similar proxies applied within the private sector (this proxy, to my knowledge, has not been used in other studies). I find that my previous conclusions on hypotheses (H4a) and (H4b) gain explanatory power and neither of the hypotheses are rejected.

Table 51 Estimation results of equation (4.3) procurement and agency theory in explaining perceived audit quality –ordered logit regression analysis on perceived audit quality without SIZE (N = 170)

Variable	Sign	Coefficient	z	p-value	
Low_AF_Of xAF_Importance	-	-0.1599	-2.00	0.05	**
LogAF	+	0.7957	2.29	0.02	**
CEOPIN	-	0.0329	0.05	0.96	
Opinion	+	0.1899	0.49	0.62	
GRANT	+	1.3190	4.23	0.00	***
Net_OpCosts	+	-14,343,703.7587	-1.99	0.05	**
SIZE	+	---------	-------	-------	
INDebt	+	0.9720	2.94	0.00	***
TAX	+	-0.0022	-1.91	0.06	*
Y2007		1.4742	2.37	0.02	**
Y2008		0.46604	1.02	0.31	
Y2009		0.0983	0.22	0.83	
Y2010		0.0635	0.15	0.88	
LR chi^2 = 58.41% ***					
Pseudo R^2 = 12.88%			Wald chi^2 =	82.62% ***	

Notes: Low_AF_Of x AF_Importance = combined audit fee global tendering importance; LogAF = Logarithm Audit Fee; CEOPIN = Combined Error Opinion; Opinion = Qualified opinion; GRANT = central government transfer dependence; Net_OpCosts= Net Operating Cost; Size = Log Revenues; INDebt= Indebtedness. *** p-value lower than 0.01; ** p-value lower than 0.05; * p-value lower than 0.10.

6. Summary and Conclusion

Issues relating to audit quality and audit fees have been at the center of many scholarly and regulatory debates all around the world. Earlier studies are either predominantly based in litigation environments, or voluntary auditing contexts, or lacking the public procurement emphasis. This dissertation examines four issues, (i) compulsory external auditing, (ii) auditing public procurement, (iii) audit fees, and (iv) perceived audit quality, in the context of the Portuguese municipalities between the fiscal years 2007 and 2011.

My first objective is to study municipalities' legal compliance with compulsory external auditing. The criteria for compulsory external auditing are based on municipality participation in companies and foundations. Through the survey I ask respondents to identify if any of the criteria are applicable. I also study if political competition has an influence on law compliance as far as external auditing.

Though in the first year of compulsory external auditing half of the municipalities do not comply, the results suggest that the ones that comply have shares in local and intermunicipal, foundations, or other participations in companies. The law is responsible for external auditing in municipalities, which is consistent with my first hypothesis (H1a) "External auditing emerges from the legal binding law". Nevertheless, the results also suggests that there is no voluntary external auditing, despite size, complexity, or risk. The lack of compliance with the law is suggestive of a certain level of non-compliance by municipalities. Earlier literature suggests that this may be attributed to the lack of sanctions for non-compliance. As the local government presents itself as an important subsector of the public administration for the EU Six Pack, this situation should be brought to the attention of regulators.

I reject the hypothesis (H1b) that political competition influences positively external auditing. Neither of the political competition variables, represented by the weight of each political party, are statistically significant. Surprisingly, the socialist party weight presents a statistically significant positive association with external auditing. In the period of the study the central government had as the leading party the socialist party. Therefore I find that there is an association in law compliance by municipalities whose president is

from the socialist party. This might be explained by the political convergence with central government.

In my second objective I study the use of the lowest price selection criterion and its determinants. The results suggest that an overwhelming percentage of municipalities applies the lowest price as a selection criterion in a public procurement process. The use of the lowest price as the selection criterion is independent of auditee risks or citizens' interest.

My hypothesis (H2a) that "There is a negative association between the lowest price selection criterion and public procurement sophistication" is consistent with the regression results, as variables representing the procurement sophistication have statistical significance and their coefficients have the expected negative sign.

Consistent with agency theory and with prior evidence regarding political competition, the results of the study indicate that as opposition increases, so does the procurement use of the most economically advantageous proposal as a selection criterion. Though studying the association between audit fees and political competition in municipalities is not new, the study of political competition impact on procurement is quite recent, and there are too few published studies. So, the second hypothesis of the second line of investigation also cannot be rejected.

I reject the third and fourth hypotheses of my second objective. Contrary to Tagesson *et al.* (2015), I do not find evidence that as citizens' interest rises (the proxy is tax base, a ratio of taxation divided by population), the lowest price selection criterion decreases, as stated in hypothesis (H2c). The proxy for citizens' interest has no statistical significance. Neither do I find an association between the lowest price selection criterion and (i) audit risk, complexity, and size and (ii) a positive association with manager ownership, hypothesis (H2d). Surprisingly, I find a positive association with auditee complexity (having net operating costs as a proxy).

In my third objective, the study of audit fees, my model is enhanced by (i) not only the introduction of procurement process, but also (ii) the controls for both time and firm effects. I present four hypotheses related to audit fees, audit procurement sophistication

(H3a), municipality dependence upon central government transfers (H3b), political competition (H3c), and internal auditing (H3d).

For the sophistication of the procurement process I use three independent variables, two of them the result of principal component analysis. After the control for firm effects, using cluster analysis, only the one variable, combined audit fee global tendering importance (the result of principal component analysis) remains with the negative statistically significant expected coefficient. Thus, thought I cannot reject that there is a negative association between audit fees and the procurement sophistication process (H3a), my findings must be interpreted with caution, as they are partial.

The hypothesis regarding municipality dependence upon central government transfers (H3b) is rejected, as no statistical significance is attributed to the dependence upon transfers. The negative association between audit fees and political competition hypothesis (H3c) is not rejected in the first round of regression and tests, but when introducing the control for firm effects, using cluster analysis, the statistical significance of the social democratic party is lost, and only the socialist party remains with an expected statistically significant negative coefficient. The hypothesis is therefore partially fulfilled, which is in line with the literature.

Confirming literature, the study also suggests that audit fees are negatively associated with internal audit office, consistent with hypothesis (H3d). Though most of the control variables have no statistical significance, I find a positive statistically significant association between audit fees and citizens' interest (inferred by their tax base).

The Big Four presence is not detected in the study. Other authors also point out their scarce presence in municipalities. There are many possible explanations. One is that the specialization needed for these audits, compliance and financial, demand many hours of additional audit work. Along with possible public entities' budget pressures, and, as the study suggests, lowest price selection criterion in public procurement process, this situation may serve as a deterrent for Big Four's usual premium fees.

The typical association made between audit fees and Big Four presence or (perceived) audit quality and Big Four is not possible to make. Nevertheless, it is suggested that audit

fees may be positively associated with certified public auditors working within a company and not as individuals, though there is no statistically significant evidence for this.

The perceived audit quality model, my fourth objective, raises several suggestions. The most important one is that the results indicate that the lowest price as the sole public procurement process criterion, actually diminishes the perceived audit quality, consistent with my hypothesis (H4a). This is a very important conclusion and a major contribution in the name of public interest for regulators as a whole. The study also suggests, though literature reports contradictory results, that perceived audit quality is positively associated with audit fees, consistent with hypothesis (H4b). The level of indebtedness and central government dependence are also positively associated with perceived audit quality. This is a very important conclusion for municipalities, regulators, and the profession as a whole, because it may confirm the importance attributed (within the law) to auditing, starting in 2007, and reinforced (also in the law) in 2014.

The findings of this dissertation should be of potential interest to policy makers, municipalities, auditors, and academics, especially on issues relating to public procurement practice and perceived audit quality. Policy makers may use the findings regarding procurement practices and audit fees to consider the benefits of applying different practices in terms of public procurement regarding audit. Auditors may be warned against some public procurement process in light of recent developments in auditing monitoring control.

Municipalities may find it interesting that external auditing enhances municipality accounts and promotes better transparency, and the auditors may use the findings to integrate the study on how the municipality market perceives higher audit quality as determinants in its practice.

Finally, the study's findings may be of interest to academics, particularly with regard to designing public procurement measures, since this approach is enhanced by changes in legislation regarding external auditing. The new local finance law extended, in 2014, the compulsory external auditing to all local sector entities with accrual accounting.

This dissertation is subject to several limitations. First, the number of respondents for this investigation is a limitation of this study. It is not possible to exclude the possibility of bias resulting from to the number of respondents of the survey. The major characteristic identified that may draw a difference between respondents and non-respondents is the size of the municipalities, measured either as the number of inhabitants or the overall amount of revenue. The respondents are municipalities with a higher population, on average, and with more revenue related to taxation (and revenues as a whole).

A second possible limitation of this study reside in the design of the survey itself, which may have been responsible for a lower answer rate. Besides asking questions related to delicate issues (in a strong political environment), the survey addresses a five year period. Respondents are asked to reply regarding several topics for each of the five years in question. As far as formal data, such as procurement process evidence and auditing information, it is my conviction that the formal nature of municipalities, and consequently the compliance with and adherence by public officials to the administrative procedure code ("Código do Procedimento Administrativo") are strong incentives for accurate answers. Nevertheless, it is possible that on judgemental questions, such as giving an opinion about several subjects, public officials may be inclined to answer the same for each year. This limitation has the potential to prejudice the fourth model of this study, no despite the robustness control test applied to it.

A third limitation of this study is that the actual text content of the auditor's opinion is not available in any database. It is possible through the survey to be acquainted with the adjustments and limitations in the opinion of the external auditor. Nevertheless, it would be very interesting to analyze whether there was any limitation or adjustment concerning debt information or revenues in a comprehensive way.

A fourth limitation is the unavailability of data concerning local GDP, a more interesting measure of citizens' interest. As local GDP is not available, this measure of agency costs is tested by applying municipality taxation divided by population.

There are several ways to extend the investigations reported in this dissertation. It is very difficult to obtain survey data in Portugal so I leave my database as an instrument for

future studies. This database can be used as it is or extended, repeating the survey and extending the number of years in it. Extending financial data brings opportunities for further study if accounts quality increases in 2007 and 2014 with the reinforced external auditing, using the several models available.

There are many variables that remain to be studied in the database that can be extended, or even maintained with new approaches, some that have never been analyzed in the literature: (i) if the auditor's mandate in the public procurement process is the effective mandate of the auditor, (ii) if not, how many years the same auditor stays in the municipality, (iii) are changes in auditor associated with low-balling.

Another line of investigation could be comparing local administration accounts with or without external auditor in terms of abnormal accruals, something that the literature review already reveals to be important in the private sector, or, comparing central administration accounts of public institutes and agencies with municipalities, in Portugal or across Europe.

The period of the study is previous to the TROIKA intervention. It would be most interesting to study the impact of the TROIKA intervention in terms of accounting quality, accrual indicators, and audit quality, and if there are any changes in the procurement process due to that.

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Legislation

Municipality legislation:

Law 159/1999, 14th September – Delegation in Local Government.

Law 169/1999, 18th September – Local Government (abolished).

Law 53 -F/2006, 29th December – Local Companies (abolished).

Law 2/2007, 25th January – Local Finances (abolished).

Law 50/2012, 31st August – Local Companies (replaces Law 53-F).

Law 73/2013, 3rd September – Local Finances (replaces Law 2/2007).

Law 75/2013, 12th September – Local Government (replaces Law 169/1999).

Public Procurement legislation:

Decree-Law 197/1999, 8th July – Public Procurement (abolished partialy).

Decree-Law 18/2008, 29th January – Public Procurement.

Certified Public Accountant legislation:

Decree-law 487/1999, 16th of November – Certified Public Auditor.

Other legislation:

Law n. 98/1997, 26th of August – Court of Auditors Organic Law.

Law 8/2012, 21st February – Commitment and Arrears Law.

Appendices

Appendix A Survey

Municipality of: _____

Number of workers of the municipality: _____ (reference year 2011)

Number of km² of the municipality:_____

Place a cross in the correct answer, except for questions 12 and 17.

1. The municipality was subject to External Auditing in any of the years from 2007
   to 2011?

Yes	No

   Select the years comprising the External Auditing:

	2007	2008	2009	2010	2011
External Auditor					

2. The municipality has a quota on any of these entities (you can pick more than one
   in each year):

	2007	2008	2009	2010	2011
Associations					
Foundations					
Municipality companies					
Intermunicipality companies					

	2007	2008	2009	2010	2011
Central government owned companies					
Others					

3. The municipality has Internal Auditing?

Yes	No

4. The Internal Auditing is conducted by?

Subcontractor	Department within the municipality

5. The Internal Auditing responds directly to the President?

Yes	No

6. On a scale from 1 to 5 where 1 is "not useful" and 5 is "very useful, indicate the degree of usefulness of the External Auditing in general for municipalities:

	1	2	3	4	5
Degree of usefulness of the External Auditing - general					

7. There are many concurring factors for audit quality. On a scale from 1 to 5 where 1 is "not important" and 5 is "very important, indicate the degree of importance of each factor for audit quality in your municipality, by year:

	1	2	3	4	5
Auditor Specialization					
Auditor Reputation					
Compliance to standards					
Seniority of the team					
Detailed working program					
Recommendations within the report					
Number of years of mandate					

8. Indicate whether you had external auditing in each year:

	2007	2008	2009	2010	2011
External auditing					

9. On a scale from 1 to 5 where 1 is "not useful" and 5 is "very useful, indicate the degree of usefulness of the External Auditing in your municipality:

	1	2	3	4	5
Degree of usefulness of the External Auditing					

10. Indicate for each year in which the municipality was subject to External Auditing, the sentence that best illustrates your perspective about the External Auditor's Opinion on the fair value (quality) of your municipality accounts:

	2007	2008	2009	2010	2011
Reflected exactly with a highest level of trust the fair value of Municipality accounts					
Reflected correctly with a sufficient level of trust the fair value of Municipality accounts					
Don't have an opinion					
Reflected enough with a sufficient level of trust the fair value of Municipality accounts					
Didn't reflect with sufficient level of trust the fair value of Municipality accounts					

11. The External Auditor's opinion issued was:

	2007	2008	2009	2010	2011
No emphasis or modifications					
With emphasis but no modifications					
With modifications					
Opinion Excuse					
Impossible to Issue an Opinion					
Adverse Opinion					

	2007	2008	2009	2010	2011
Not issued					

12. The public procurement procedure was:

	2007	2008	2009	2010	2011
Direct selection – one tender (DL 197/99)					
Direct selection with more than one tender (DL 197/99)					
Open procedure without the presentation of tenders (DL 197/99)					
Open procedure limited to previous qualification (DL 197/99)					
Open procedure - Bid (DL 197/99)					
Simplified direct selection (DL 18/2008)					
Direct selection (DL 18/2008)					
Open procedure limited to previous qualification (DL 18/2008)					
Open procedure - Bid (DL 18/2008)					

13. If you chose "direct selection" or "Direct selection with more than one tender" or "Open procedure limited to previous qualification" indicate the number of proposals requested:

	2007	2008	2009	2010	2011
One					
Up to 3					
Up to 5					
More than 5					

14. The number of proposals received was:

	2007	2008	2009	2010	2011
Number of proposals					

15. The External Auditing period was:

	2007	2008	2009	2010	2011
Annual					
Bi-annual					
Tri-annual					
More than 3 years					

16. The choice criterion for the procurement contract was:

	2007	2008	2009	2010	2011
The most economically advantageous proposal					
Lowest price					

17. The criteria for the most economically advantageous proposal were weghted:

	2007	2008	2009	2010	2011
Superior to 90%					
Between 75% and 90%					
Between 50% and 75%					
Less than 50%					

18. The criteria used for the most economically advantageous proposal were:

	2007	2008	2009	2010	2011
Experience in auditing					
Expertise in the public / local sector					
Work plan					
Lag of time consumption					
Size of the team					
Multidisciplinary team					
Other_____					

19. The price contracted was (annually in thousands excluding VAT):

	2007	2008	2009	2010	2011
Value excluding VAT					

20. The External Auditor contracted was:

	2007	2008	2009	2010	2011
Individual (CPA)					
Company					
BIG FOUR					
Don't know					

Statistical Data

Place a cross in the correct answer:

	Masculine	Feminine
Gender		

	President	Chamber	Director or Chief	Technician
Office				

Age:_____

Appendix B Variable definition

PORDATA – Municipality general characteristics

Pop	Population measured by the number of inhabitants of a certain municipality considering the last census – one possible measure of Size
km^2	Land covered by the municipality measured by the number of kilometers – one possible measure of Size
District: Aveiro to Viseu in Continental Portugal, Autonomous Regions of Madeira and Azores	Geographical territorial coverage (district). Indicator variable coded 1 for municipalities within the district identified, otherwise 0
PCELW	Political Competition Extreme Left Wing – the weight expressed in a continuous number of "Bloco de Esquerda (BE)" in the Town Council – a proxy for political Competition.
PCERW	Political Competition Extreme Right Wing – the weight expressed in a continuous number of conservative social democratic party "CDS PP" in the Town Council – a proxy for political Competition.
PolComp_ComPLW	Political Competition Communist Party Left Wing – the weight expressed in a continuous number of the communist party "PCP-PEV" in the Town Council – a proxy for political Competition.

PORDATA – Municipality general characteristics

PolComp_CivRW	Political Competition Citizen civil Party – the weight expressed in a continuous number of parties constituted by citizens "Grupo de Cidadãos" in the Town Council – a proxy for political Competition.
PolComp_SDRW	Political Competition Social Democrats Right Wing - the weight expressed in a continuous number of the social democratic party "PPD-PSD" in the Town Council – a proxy for political Competition.
PolComp_CoalRW	Political Competition Coalition Right Wing - the weight expressed in a continuous number of the Coalition in the Town Council – a proxy for political Competition.
PolComp_SocLW	Political Competition Socialist Left Wing - the weight expressed in a continuous number of the socialist party "PS" in the Town Council – a proxy for political Competition.
PCR	Political Competition Residual - the weight expressed in a continuous number of other parties in the Town Council – a proxy for political Competition.
Political Party as President: CH_PS, CH_PSD, etc	Political party as majority of municipality Chamber. Indicator variable coded 1 for municipalities with the political party as President, otherwise 0

PORDATA – Municipality general characteristics

Change	There were local administration elections in 2005 and 2009. Change stands for a change in the political party as President of the local chamber. Indicator variable coded 1 for municipalities that changed the political party as President, otherwise 0

DGAL and Municipalities website – Budget and financial data Budget data – Cash revenues and Payments	
Pay_Person	Payments of personnel – stated in euros.
Pay_Goods_Serv	Payments of goods and services – stated in euros.
Pay_Loans_Cost	Payment of interest and other financial costs – stated in euros.
Pay_Invest	Payment of Investments – stated in euros.
Pay_transfers	Payment of transfers and other subsidies to third entities – stated in euros.
Pay_loans	Payment of amortization of loans – stated in euros.
Pay_Others	Other payments – stated in euros.
Pay_Total	Total amount of payments – stated in euros.
Rev_Taxes	Revenues received from taxation – stated in euros.
Rev_Sales_Ser	Revenues received from sales and rendering of services – stated in euros.

DGAL and Municipalities website – Budget and financial data Budget data – Cash revenues and Payments	
Rev_Transf_State_M	Revenues received from transfers and subsidies from Central Administration regarding Local Finance Law– stated in euros.
Rev_Transf_State_Other	Revenues received from transfers and subsidies from central administration institutions – stated in euros.
Rev_Transf_EU	Revenues received from transfers and subsidies from the European Union – stated in euros.
Rev_Transf_Other	Revenues received form transfers and subsidies from other sources – stated in euros.
Rev_Total_Transfers	Total amount of revenues from transfers and subsidies received – stated in euros.
Rev_Loans	Amount received based on debt – stated in euros.
Rev_Others	Other revenues received – stated in euros.
Rev_total	Total amount of revenues – stated in euros.
State_tranf	Total amount of transfers originated at Central Government level
INDebt	Indebtedness is a ratio of debt (total debt in the balance sheet) over revenues used by local financial law to calculate the level of indebtedness – a proxy for agency costs

DGAL and Municipalities website – Budget and financial data Budget data – Cash revenues and Payments	
GRANT	Natural logarithm of Total amount of transfers originated at Central Government level – proxy for agency costs
SIZE	Size is measured as logarithm of total revenues - a proxy for Size.

DGAL and Municipalities website – Budget and financial data Budget data – Balance sheet data Assets and liabilities – stated in euros.	
Com_Inv	Community Investments – stated in euros.
Int_Assets	Intangible assets– stated in euros.
Tang_Assets	Tangible assets – stated in euros.
Fin_Inv	Financial Instruments – stated in euros.
Assets_Total	Total of Assets – stated in euros. One of the measures of Size
Invent	Inventories – stated in euros.
Debtors	Debtors – stated in euros.
Cash_equiv	Cash equivalents – stated in euros.
Cash	Cash – money on hand and deposits – stated in euros.

DGAL and Municipalities website – Budget and financial data Budget data – Balance sheet data Assets and liabilities – stated in euros.	
Assets_Deferrals	Total amount of assets deferrals comprising revenue accruals and deferred costs – stated in euros.
Reserves	Reserves – including reserves from assets transfers to the municipality – stated in euros.
Retained_earn	Retained earnings – stated in euros.
Profit_loss	Profit or loss – stated in euros.
Funds_total	Total amount of Liquid Assets – stated in euros.
Provis	Provisions – stated in euros.
Loans_lt	Long-term Loans, debt in banking institutions – stated in euros.
Loans_st	Short-term Loans, debt in banking institutions – stated in euros.
Creditors_total	The total amount of debt – stated in euros.
Creditors_deferrals	Accrued costs– stated in euros.
Deferred_profits	Deferred revenue, part of the total of creditors' deferrals – stated in euros.
Deferrals_total	Total creditors' deferrals – stated in euros.
Log_Assets	Logarithm of total assets – a proxy for size.

DGAL and Municipalities website – Budget and financial data Budget data – Balance sheet data Assets and liabilities – stated in euros.	
ASSETC	Assets per capita – total amount of assets divided by the population – a proxy for size.

DGAL and Municipalities website – Budget and financial data Budget data – Profit and Loss Statement data – stated in euros	
Cost_goods	Cost of goods sold - stated in euros.
Services	Services and goods consumption - stated in euros.
Personnel	Costs of Personnel - stated in euros.
Transfers_cost	Transfers and subsidies made to third parties - stated in euros.
Deprec	Depreciation and amortization of intangible and tangible assets - stated in euros.
Provisions	Provisions
Other_Costs	Other operational costs - stated in euros.
Fin_costs	Financial costs including interest and other financial costs - stated in euros.
Extra_Cost	Extraordinary costs incurred and not belonging to the ordinary activities executed by municipalities - stated in euros.
Sales_Serv	Revenue from sales of goods and rendering of services - stated in euros.

DGAL and Municipalities website – Budget and financial data Budget data – Profit and Loss Statement data – stated in euros	
Taxation	Revenues from taxes - stated in euros.
Prod_var	Production variation
Entity_works	Works performed by the municipality itself raising new assets - stated in euros.
Supl_prof	Suplementary revenues
Transf_Prof	Transfers and subsidies received from third parties - stated in euros.
Supl_Prof	Residual revenue
Fin_Proft	Financial revenue - stated in euros.
Extra_Profit	Extraordinary revenue or earnings - stated in euros.
Operat_Res	Operational results, the difference between revenue and expenses, except for the ones related to financial or extraordinary items - stated in euros.
Fin_Resc	Financial results, the difference between financial revenue and expenses - stated in euros.
Curr_Res	Current results, the difference between revenue and expenses, except for those related to financial items - stated in euros.
Profit_Loss	Profit or loss - stated in euros.

DGAL and Municipalities website – Budget and financial data Budget data – Profit and Loss Statement data – stated in euros	
Net_OpCosts	Net operating costs = Cost_goods + Services + Personnel + Transfers_cost + Deprec + Provisions + Other_Costs - a proxy for auditing complexity

External Auditing (data from survey)	
Ext_Aud	External auditing in the municipality declared by year and municipality by OROC. Indicator variable coded 1 for municipalities having external auditing, otherwise 0
ASSOC	Associations. Indicator variable coded 1 for municipalities taking part in associations, otherwise 0
FOUNDt	Foundations. Indicator variable coded 1 for municipalities taking part in foundations, otherwise 0
Local_Comp	Local companies owned by one municipality. Indicator variable coded 1 for municipalities having shares in local companies, otherwise 0
Local_IComp	Local intermunicipal companies owned by two or more municipalities. Indicator variable coded 1 for municipalities having shares in local companies, otherwise 0

External Auditing (data from survey)	
Local_PartComp	Local Participation companies. Commercial companies owned by a municipality. Indicator variable coded 1 for municipalities having shares in commercial companies, otherwise 0
Part_Local_Comp	Participation in local companies is the sum of FOUNDt, Local_Comp, Local_IComp, and Local_PartComp.

External Auditing (data from OROC)

Ext_Aud	External auditing in the municipality declared by OROC. Indicator variable coded 1 for municipalities having external auditing, otherwise 0

Procurement variables (data from survey)	
Ext_Aud	External auditing in the municipality. Indicator variable coded 1 for municipalities surveyed that declared having external auditing, otherwise 0
IAOFF	Internal auditing Office. Indicator variable coded 1 for municipalities surveyed that declared having internal auditing, otherwise 0
Low_AF_Of	Criterion for choosing candidates. Indicator variable coded 1 for municipalities surveyed that declared choosing candidates based upon the lowest (audit fee) price, otherwise 0

Procurement variables (data from survey)	
NTI	Number of tenders invited - Number of entities invited to submit proposals of external auditing. Ordinal indicator
NTR	Number of tenders received - Number of entities that submitted proposals of external auditing. Ordinal indicator
Rotation	Number of years of the mandate of the procurement process. Indicator from 1 to 4 (maximum number of years possible)
PubProc_DirSel	Procurement process of direct selection – the procurement process chosen by the municipality. Indicator variable coded 1 for municipalities surveyed that declared having used a restricted procurement process – direct selection, otherwise 0 for a bidding process.
AF_Importance	Audit Fees Importance - the weight of the factor price used in the procurement process including when the municipality chose other factors to contribute (the most economically advantageous proposal). Indicator from 1 to 5, 1 being less than 50%, 2 being 50-75%, 3 being 75-90%, 4 being more than 90%, and 5 being 100%.
Audit Fee	Audit Fee - Price per year of the external auditing services. Ordinal indicator measured in euros.
Auditor	Big4 are not present in municipalities, therefore the auditor can be either a company of auditors or an individual auditor working with its team. Indicator variable coded 1 for municipalities surveyed that declared having a company of auditors, otherwise 0.

Procurement variables (data from survey)	
ESPEC_P	In the case of the most economically advantageous proposal, a factor of expertise of the external auditor. Indicator variable coded 1 for municipalities surveyed that declared having used expertise as a factor in the procurement process using the most economically advantageous proposal , otherwise 0.
NORM_P	In the case of the most economically advantageous proposal, a factor of Compliance to Standards of the external auditor. Indicator variable coded 1 for municipalities surveyed that declared having used expertise as a factor in the procurement process using the most economically advantageous proposal, otherwise 0.
COMP_P	In the case of the most economically advantageous proposal, a factor of Technical competence of the team of the external auditor. Indicator variable coded 1 for municipalities surveyed that declared having used expertise as a factor in the procurement process using the most economically advantageous proposal, otherwise 0.
PROGR_P	In the case of the most economically advantageous proposal, a factor of Working program adapted to the municipality of the external auditor. Indicator variable coded 1 for municipalities surveyed that declared having used expertise as a factor in the procurement process using the most economically advantageous proposal , otherwise 0.
REL_P	In the case of the most economically advantageous proposal, a factor of Reports with recommendations of the

Procurement variables (data from survey)	
	external auditor. Indicator variable coded 1 for municipalities surveyed that declared having used expertise as a factor in the procurement process using the most economically advantageous proposal , otherwise 0.
SUM_FACT_P	Sum of previous factors: ESPEC_P + NORM_P + COMP_P + PROGR_P + REL_P.
AuditorxPubProc_DirSel	Combined Tendering Auditor – a continuous principal component analysis – Auditor x PubProc_DirSel – Auditor versus Procurement process direct selection.
Low_AF_Of xAF_Importance	Combined Audit Fee Global Tendering Importance – a continuous principal component analysis – Low_AF_Of x AF_Importance – Lowest audit fee offer versus Audit fee importance.

Common errors variables Annual Financial Directory of Portuguese Municipalities ("Anuário")	
Debtors_Er	Indicator variable coded 1 for municipalities without any value of debtors, otherwise 0
Provisions_Err	Indicator variable coded 1 for municipalities without any value in provisions, otherwise 0
Deferrals_Total_Err1	Indicator variable coded 1 for municipalities without any value in deferrals in liabilities, otherwise 0
Invent_err	Indicator variable coded 1 for municipalities without any value in inventories, otherwise 0

Common errors variables Annual Financial Directory of Portuguese Municipalities ("Anuário")	
Acc_Exp_err	Indicator variable coded 1 for municipalities without any value in expenses accruals, otherwise 0
Depreciatio_err	Indicator variable coded 1 for municipalities without any value in depreciation of assets, otherwise 0

Audit quality variables (data from survey)	
Expert	Continuous variable from 1 to 5 with the degree of importance of auditor expertise in the respondent's perception.
Reputation	Continuous variable from 1 to 5 with the degree of importance of auditor reputation in the auditing field in the respondent's perception.
Norm_Aud	Continuous variable from 1 to 5 with the degree of importance of auditor compliance to standards in the respondent's perception.
Sen_Eq	Continuous variable from 1 to 5 with the degree of importance of auditor team seniority in the respondent's perception.
Progr_Trab	Continuous variable from 1 to 5 with the degree of importance of auditor detailed working program in the respondent's perception.
Recom	Continuous variable from 1 to 5 with the degree of importance of auditor recommendations within its report in the respondent's perception.

Audit quality variables (data from survey)	
Mandate	Continuous variable from 1 to 5 with the degree of importance of auditor number of years in mandate in the respondent's perception.
OCESR	Dummy variable. Indicator variable coded 1 for municipalities with unqualified opinion but with emphasis, otherwise 0
OCR	Dummy variable. Indicator variable coded 1 for municipalities with qualified opinion, otherwise 0
OCRCE	Dummy variable. Indicator variable coded 1 for municipalities with qualified opinion and emphasis, otherwise 0
OSESR	Dummy variable. Indicator variable coded 1 for municipalities with unqualified opinion and no emphasis, otherwise 0
Opinion	Dummy variable. Indicator variable coded 1 for municipalities with qualified opinion, otherwise 0
CEOPIN	Combined Error Opinion: dummy variable. Indicator variable coded 1 for municipalities with unqualified opinion and errors in financial statements, otherwise 0
ExpertxReputation	Combined Specialist: continuous variable as a result of principal component analysis of specific audit quality variables - ExpertxReputation.