
The determinants of voluntary disclosure in Portuguese listed companies and
its impact on the cost of equity capital

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Abstract

The purpose of this study is to examine some factors influencing voluntary disclosure by Portuguese listed companies in their annual reports and the impact of such disclosure on the cost of equity capital. The determinants subject to analysis are the size of the board, the duality of the CEO, gender diversity in the board of directors and board independence. An index of voluntary disclosure is constructed for Portuguese listed companies, based on a checklist of items they disclose in their annual reports.

There are several studies produced in this area, but the Portuguese case is addressed in few of these, so this research intends to fill that gap in the knowledge.

From the multivariate analysis performed, we concluded that board size and CEO duality have a positive statistically significant relation with voluntary disclosure, while gender diversity in the board and board independence do not have a significant relationship with the same variable. As for cost of equity, no significant influence from voluntary disclosure was found.

Key-words: Voluntary disclosure; Financial disclosure; Corporate Governance; Cost of equity; Portugal

JEL-Codes: G20; G30; M41

Resumo

O propósito deste estudo é identificar quais os fatores que influenciam a quantidade de informação divulgada voluntariamente por uma empresa portuguesa cotada em bolsa no seu Relatório e Contas anual e qual o impacto da quantidade de informação divulgada voluntariamente no custo do Capital Próprio. Os determinantes sujeitos a análise serão a dimensão do órgão de administração, a dualidade do CEO, a diversidade de género no órgão de administração e a independência do órgão de administração. Para atingir uma conclusão sobre o primeiro tópico, será construído um índice de informação voluntária para as empresas portuguesas cotadas em bolsa, baseado numa *checklist* de itens que as mesmas divulgam nos seus relatórios financeiros e não financeiros.

Há vários estudos produzidos nesta área, mas o caso português é abordado em poucos destes, portanto, esta pesquisa pretende preencher essa lacuna no conhecimento.

Pela análise multivariada efetuada, concluímos que a dimensão do órgão de administração e a dualidade do CEO têm uma relação positiva e estatisticamente significativa com a divulgação voluntária de informação, enquanto que a diversidade de género e a independência do órgão de administração não possuem uma relação significativa com a mesma variável. Quanto ao custo do Capital Próprio, nenhuma influência significativa pela divulgação voluntária de informação foi encontrada.

Palavras-chave: Divulgação voluntária; Divulgação financeira; Governo das Sociedades; Custo do Capital Próprio; Portugal

Códigos JEL: G20; G30; M41

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Acronyms

CAPM – Capital Asset Pricing Model

CEO – Chief Executive Officer

CMVM – *Comissão do Mercado de Valores Mobiliários*

CVM – *Código dos Valores Mobiliários*

FASB – Financial Accounting Standards Board

GRI – Global Reporting Initiative

IAS – International Accounting Standards

SNC – *Sistema de Normalização Contabilística*

1. Introduction

In the last few decades, financial markets have been growing at a fast rate, becoming more accessible to everyone and even more globalized markets. Bearing this in mind, “demand for financial reporting and disclosure arises from information asymmetry and agency conflicts between managers and outside investors” (Healy & Palepu, 2001), which encourages companies to share more information with the public.

As Watson et al. (2002) states, voluntary reporting is defined as the kind of financial reporting that goes beyond what is mandatory by law, accounting standards or the Stock Exchange Commissions. In the Portuguese case, this regulatory entity is CMVM and, besides having to disclose the reports demanded, financial information also needs to oblige to certain conditions, defined in the IAS.

Despite having certain mandatory requirements, any additional information disclosed is produced with some intent and it is influenced by several factors. Voluntarily disclosed information can take several forms, such as sustainability information or financial ratios describing the current situation of the company, for example, and can be disclosed by way of different communication channels, such as the annual report, the sustainability report or press releases.

The motivation for this study is based on the growing importance of financial markets nowadays and the fact that there are several theories concerning the purpose of disclosing additional information. The main aim of the study is to understand the influence of some Corporate Governance practices on the amount of information that is disclosed. However, on an additional note, this study also proposes to examine the impact that voluntary disclosure has on the cost of equity capital. As such, the research questions that this study aims to address are:

RQ1: What factors influence the amount of voluntary disclosure in the annual reports of Portuguese listed companies?

RQ2: What is the impact of voluntary disclosure on the cost of equity capital?

To answer the first question, some hypotheses will be formulated concerning the relation between a series of factors and the amount of voluntary disclosure by companies. The determinants chosen to be a part of this study are: the size of the board, CEO duality, gender diversity in the board and board independence. To attribute a level of voluntary disclosure to each company, an index was built based on a checklist used to analyse the features of companies' annual reports.

The pertinence of this study derives from the fact that, as stated in paragraph 13 of the Conceptual Framework of the SNC (2009), financial statements do not provide all the information necessary to take rational investment decisions. As a consequence of the increase in the number of companies entering capital markets, several authors and organizations have been discussing the problem of voluntary disclosure from firms.

The study of the most relevant determinants of voluntary disclosure is useful for regulatory entities to understand, for example, if there is the need for specific regulations if firms are already disclosing that information voluntarily. Moreover, the study also benefits investors, since by knowing companies' characteristics, they can know if they are likely to find the information they desire in the annual report or if they must find alternative ways to obtain it, such as market analysts (Wang et al., 2008). Likewise, the analysis of the impact of the level of voluntary disclosure on the cost of capital is important for companies to decide what is the ideal level of information to disclose for it to not harm their position.

Additionally, the Portuguese case has not been object of many studies in this area, so we decided to focus on that specific case.

The report will be structured in the following way. The first chapter contains an analysis of relevant literature, including similar studies in the same topic. The second chapter presents the development of the hypotheses to be tested in the study. Thereafter follows a chapter describing the methodology employed to obtain the final conclusions, a chapter in which the results are presented and discussed. Finally, there is a chapter containing additional comments, mentioning limitations of the study and offering suggestions for further research.

2. Literature Review

In this chapter, relevant literature on the topic is reviewed, including studies in the same area and the conclusions obtained from these studies. First, we will start by contextualizing the subject of voluntary disclosure and how it has developed over time. In the following section, we will make a small approach to Corporate Governance, to understand where it comes from and what is its main objective. In section 2.3. the key theories existent around voluntary disclosure and Corporate Governance will be debated, including agency theory and signalling theory. After that, it will be presented a review of similar studies, including studies based on other countries, followed by a final section, where the literature reviewed will be critically analysed and discussed, giving basis to frame the hypothesis to be tested.

2.1. Contextualization of voluntary disclosure

As Teixeira dos Santos (2001) stated, the capital market is a relatively recent reality in Portugal, especially when compared to other developed countries. The idea of a Portuguese capital market appeared in the end of the 1960's, but no further actions were taken to develop it and the negotiations for the existence of a capital market in Portugal were suspended. It was in the late 1980's that the capital market entered a period of a newly established growth, but it is still a market with very archaic foundations and very fragile legal and supervisory systems.

Given the previously depicted situation, in 1991, a public regulatory entity with independent administration, named CMVM, was founded. CMVM would be responsible for the supervision and regulation of the Portuguese capital market and for the protection of investors. As such, the stage was set for a successful evolution of the Portuguese capital market, despite still being far behind other countries' capital markets.

2.1.1. Mandatory disclosure

As stated previously, in Portugal, the entity responsible for the supervision and regulation of the stock markets and every agent involved is CMVM. This organization published the CVM containing main current legislation about financial markets and is responsible for

updating the legislation on this topic. Since this study focuses on the voluntary disclosures made by listed companies, we first need to understand what information they are obliged to make public. As such, in article number 245 of the CVM, it is specified a list of required information to be kept public for at least 10 years after its initial publication, which includes the following aspects:

- ✓ The management report, annual financial statements, the Legal Accounts Certificate and other legal reporting documents demanded by law;
- ✓ Auditor's report;
- ✓ Declarations by each of the responsible people in the company, confirming that they believe the information previously mentioned was prepared according to the applicable accounting standards, giving a true image of the financial situation of the company and that the management report reflects the current situation of the company as well as the main risks and uncertainties they face.
- ✓ Besides the financial information mentioned, entities are also required to disclose information relative to their corporate governance, including a detailed report about the company's governance practices and an appreciation of the compliance with CMVM's corporate governance recommendations. The guidance for the publication of this report is given through the Corporate Governance code¹.

As stated in the article number 5 of the CVM, these mandatory publications should be made available through means of communication with vast diffusion power, so that information can be accessible to everyone with interest in receiving that information.

In addition to that, from the *Diretiva* n° 2014/95/UE of the European Parliament and of the Council of 22 October 2014, transposed to the internal legal system by the *Decreto-Lei* n° 89/2017, large companies or parent companies of a large group with the title of Public Interest companies and that hold on average more than 500 employees should disclose annually a non-financial statement with information relative to environmental, social and human resources issues. Despite this obligation to disclose non-financial information, companies do not have a clear guide of what information to disclose in relation to these subjects, so we can consider that what they choose to disclose is of their own choice.

¹ The current legislation on this topic is present in *Regulamento* n° 4/2013 on the CMVM website.

From this requirement, companies may feel somewhat lost in discovering what information could be useful to disclose to its stakeholders. Bearing that in mind, some companies follow the Global Reporting Initiative (GRI) guidelines, which consist in a set of global standards for sustainability reporting.

Global Reporting Initiative

The GRI was founded in the United States of America in 1997 and it was initially a framework for environmental reporting. As it evolved through the years, it established itself as a credited reference and in 2016 GRI launched its global standards for sustainability reporting, including items about economic, environmental and social aspects of the company. This framework is relevant for this study, since the check-list produced to measure the level of voluntary disclosure will be built based on these standards.

2.1.2. The role of voluntary disclosure

Naturally, producing more information comprises associated costs and it can potentially become a competitive disadvantage, but it also has several advantages that need to be considered when analysing the cost-benefit trade-off of voluntary disclosure.

In the capital market, there is a permanent challenge to do the perfect match between savers and companies (Healy & Palepu, 2001). Savers wish to allocate their savings, while companies seek to capture savings. According to Healy and Palepu (2001), there are at least two reasons for this difficulty in matching savers with companies. First, savers face an information problem since managers hold much more information about the company's value and they have incentives to inflate that value. If all information is held privately and savers cannot differentiate the quality of investments, they will assume the same value for all companies, thus undervaluing some companies and overvaluing others (Healy & Palepu, 2001). Second, after savers invest in a company, managers are encouraged to expropriate savers' investments, creating an agency problem (Healy & Palepu, 2001). The main role of disclosure of voluntary information is in solving these two issues, while reducing information barriers between the company and its stakeholders.

Moreover, there are also other advantages associated with voluntary disclosure. FASB² issued a report on Voluntary Disclosures (2001), in which the following benefits of voluntary disclosure are presented:

- ✓ Investors can take more informed and confident decisions;
- ✓ Credibility in a company is improved;
- ✓ Reduced risk of lawsuits claiming insufficient information disclosure.

This report also states that a lower cost of capital is one of the advantages of voluntary disclosure of information. This statement will be tested in the following section since this constitutes one of the research questions this study aims to address.

2.2. Corporate governance and voluntary disclosure

The concept of Corporate Governance was born in the United States, after the 1929 crisis, when the need for stricter guidance in terms of efficient management practices became clear. The notion quickly became a worldwide theme adopted by several countries. In Portugal, the first set of Corporate Governance recommendations was published by CMVM in 1999. These principles are not supposed to be mandatory rules, but instead are suggestions to help companies achieve the best performance they can. These recommendations are updated regularly³ and CMVM produces a yearly report, where they evaluate the compliance by listed firms of the Corporate Governance recommendations.

Good corporate governance practices are a set of rules and mechanisms that promote the optimization of a firm's performance, by prosecuting what is in the best interest of every stakeholder of a company and organizing the decision process and the supervision of societies (Moreira et al., 2004). These rules are considered to avoid chasing individual interests and possible conflicts of interests that may arise.

As mentioned above, companies must disclose information related to corporate governance in their annual reports. This information allows the reinforcement of the confidence and security in markets and promotes investment since Corporate Governance

² The FASB is the American organization responsible for creating standards of financial reporting

³ The current recommendations on Corporate Governance were published in 2013 and are available in the CMVM website, at <http://www.cmvm.pt/>.

presents itself as a differentiative factor in the competition in the stock market. According to Moreira et al. (2004), Corporate Governance promotes the necessary alignment of interests between shareholders and managers.

CMVM's recommendations follow a logic of *comply or explain*, i.e., companies must disclose if they are complying with the recommended practise or explain why they do not follow that practise, since it may be the case that it is simply not applicable to that company. The failure in doing one of these things may lead investors to perceive this as a weakness and decide not to invest.

Given the importance of Corporate Governance mechanisms to determine what kind of disclosure practises a firm adopts, one of the intentions of this study is to understand the impact of some of these mechanisms in the amount of information disclosed voluntarily.

2.3. Theoretical framework

From the literature reviewed, it is widely considered that the agency theory developed by Jensen and Meckling (1976) is the basis for Corporate Governance (Christopher, 2010). On the other hand, we have signalling theory as a response to the information asymmetry problem (Spence, 1973). Both these theories have been widely used to explain the motivations to the disclosure of information.

2.3.1. Agency Theory

As defined by Jensen and Meckling (1976), agency theory is based upon the premise that an agency relationship is a contract between two parts (principal and agent), where the principal hires the agent to perform a service as their representative. The authors argue that if both parties pursue their best interests, a conflict may arise and that is where agency costs appear, i.e., costs the principal incurs in from monitoring and controlling the agent, including costs with auditors, for example and other costs associated with the resolution of problems between both parties. As such, in the case of a company, where managers act as the agent and shareholders represent the principal, managers are encouraged to disclose more information to convince shareholders that they are managing the company the best

way (Watson et al., 2002). In theory, the more agency conflicts exist, the more information will be disclosed to minimize agency costs (Watson et al., 2002).

The Corporate Governance determinants of voluntary disclosure subject to analysis can be perceived as mechanisms to minimize agency costs (Eng & Mak, 2003). For example, independent members on the board, a small-sized board and the segregation of the roles of the CEO and the chairman contribute to the reduction of agency conflicts and will lead to higher disclosure of information (Ali, 2014).

2.3.2. Signalling Theory

According to Connelly et al. (2011), signalling theory arises from the problem of information asymmetry. One example of this theory in practice was shown by Spence (1973), who applied this theory to labour economics by demonstrating that a job candidate can reduce the information asymmetry and distinguish himself from the rest of the candidates by signalling his abilities through a higher education. This theory can also be applied to corporate governance since CEOs choose to disclose more information and quality financial statements to signal the quality of the company to the public (Watson et al., 2002). Signalling theory postulates that better performing companies will disclose more information to signal their quality to the market. As such, it can explain one of the motives for companies to disclose more information.

2.4. Similar studies

In this section we will present the most relevant studies on the determinants of the amount of voluntary disclosure and the relation between voluntary disclosure and the cost of equity capital.

Wang et al. (2008) analysed the relation between certain determinants and the extent of voluntary disclosure. These determinants included: the proportion of state ownership; the proportion of foreign ownership; the return on equity; the type of auditor (Big Four or smaller entities); size of a company, measured by market value; and leverage. Besides this test, they also performed a test to examine the impact of voluntary disclosure in the cost of debt capital. The results showed that all the variables had a positive relation with voluntary

disclosure, except for leverage. As for the impact of voluntary disclosure on the cost of debt, no relation was found between these two variables.

Chau and Gray (2010) studied the influence of the proportion of family ownership, the independence of the chairman and the independence of non-executive directors on voluntary disclosure. To make sure that the relation found was due to the variables in study and not because of other variables, they established a series of control variables: return on equity; firm size; liquidity; leverage; type of auditor; firm growth; listing status; and industry type. They concluded that the higher the percentage of family ownership, the lower was the voluntary disclosure. The results show as well that having an independent chairman has a significant positive relation with the amount of voluntary disclosure.

Eng and Mak (2003) developed a study about the impact of the structure of ownership of the company and the composition of the board on the amount of voluntary information disclosed. The results show that the smaller the part of the company owned by management and the larger the part owned by the government, the higher is the level of voluntary disclosure. They also found that less leveraged firms have higher levels of disclosure.

Cheng and Courtenay (2006) studied the relation between characteristics of the board and voluntary disclosure. This effectiveness of the board is determined through three factors: composition, independence and size. The variables subject to investigation were the size of the board, the presence of independent members in the board and the duality of the CEO. For this study, the authors formulated four models. The conclusions implied that board independence has a positive relation with voluntary disclosure and this was the only variable that presented a significant statistical relationship with voluntary disclosure in all four models. Board size was positively related to voluntary disclosure in one of the models, but this relationship was statistically insignificant when control variables were included. As for the duality of the CEO, the relationship was always insignificant.

Allegrini and Greco (2013) analysed the relationship between governance practices and voluntary disclosure. From this research, they discovered that having an independent board and having a lead independent director are not related to the level of disclosure. On the contrary, board size and the meeting frequency of the board and the audit committee are positively associated with the level of disclosure, while CEO duality is negatively related.

Khelif et al. (2017) performed a different kind of research: they meta-analysed 69 empirical studies concerning the correlation between voluntary disclosure and ownership concentration and types of ownership. This type of study is supposed to summarize the results obtained from previous articles and it is produced due to the existent mixed conclusions regarding these topics. From this investigation, the authors concluded that institutional, foreign and state ownership have a positive relation with voluntary disclosure, while managerial ownership and ownership concentration have a negative relation.

Donnelly and Mulcahy (2008) studied the relation of voluntary disclosure and the following governance characteristics: board independence, CEO duality, institutional ownership and managerial ownership. This study concluded that an independent board and the existence of a person who concentrates the roles of CEO and chairman are factors that determine higher disclosure. As for managerial and institutional ownership, no significant relation with voluntary disclosure was found.

Table 1 presents a summary of the main findings in these similar studies. The variables defined as control variables were highlighted in grey.

Table 1. Similar studies

Study	Country	Size of sample	Dependent variable	Independent variables	Results
Wang et al. (2008)	China	110 Chinese listed firms	Voluntary disclosure	State ownership	Positive
				Foreign ownership	Positive
				Return on equity	Positive
				Type of auditor	Positive
				Size	Positive
				Leverage	No relation
				Cost of debt	No relation
Chau & Gray (2010)	Hong Kong	298 firms listed on the Main Board of the HKEx	Voluntary disclosure	Family shareholding	Negative
				Independent chairman	Positive
				Independent non-executive directors	Positive
				Return on equity	No relation
				Size	Positive
				Liquidity	No relation
				Leverage	No relation
				Type of auditor	Negative
				Firm growth	No relation
				Listing status	No relation
				Industry	No relation

Eng & Mak (2003)	Singapore	158 firms listed on the Stock Exchange of Singapore	Voluntary disclosure	Managerial Ownership	Negative
				Block holder Ownership	No relation
				Government Ownership	Positive
				Proportion of outside directors	Negative
				Size	Positive
				Leverage	Negative
				Industry	No relation
Cheng & Courtenay (2006)	Singapore	104 firms listed on the Stock Exchange of Singapore	Voluntary disclosure	Type of auditor	No relation
				Board independence	Positive
				Board size	No relation
				CEO duality	No relation
				Firm size	Positive
				Firm profitability	Positive
				Leverage	No relation
Allegrini & Greco (2013)	Italy	177 Italian firms listed on the Italian Stock Exchange	Voluntary disclosure	Government Ownership	No relation
				Block Ownership	Negative
				Board independence	No relation
				Board size	Positive
				CEO duality	Negative
				Lead independent director	No relation
				Board and audit committee meeting frequency	Positive
Khlif et al. (2017)	N/A	69 empirical studies	Voluntary disclosure	Firm size	Positive
				Leverage	No relation
				Listing status	No relation
				Firm profitability	No relation
				Ownership concentration	Negative
Donnelly & Mulcahy (2008)	Ireland	51 Irish firms listed on the Irish market	Voluntary disclosure	Institutional ownership	Positive
				Foreign ownership	Positive
				State ownership	Positive
				Managerial Ownership	Negative
				Board independence	Positive
				CEO duality	Positive
				Institutional ownership	No relation
				Managerial Ownership	No relation
				Firm size	Positive
				Board size	Positive

On the other hand, there are studies that concentrate specifically on the relation between cost of equity and voluntary disclosure, so we will review them separately. The summary of similar studies made on this subject is presented in **Table 2** below.

Mangena et al. (2016) investigated whether intellectual capital and financial disclosures influence the cost of equity of a firm. The results obtained propose that both intellectual capital and financial disclosure have a negative relation with the cost of equity. They also suggest that the effect of the disclosure of financial information on the cost of equity is inflated when combined with the disclosure of intellectual capital information.

In the study by Richardson and Welker (2001), they analysed the impact of financial and social disclosure in the cost of equity in a group of Canadian companies. Consistently with the results in previous studies, they found that the level of financial disclosure is negatively related to the cost of equity. However, they also discovered that social disclosure results in a positive influence on the cost of equity capital. The direction of this relationship should not be taken as a negative premise, since a higher level of social disclosure may be important to get the support of the other stakeholders, such as employees, clients, suppliers, and other interacting parts that are not the shareholders.

Botosan (1997) completed a research to find out what is the effect of the level of disclosure in the cost of equity capital. From the investigation performed, the author concluded that with higher amounts of disclosure, the cost of equity capital will be lower. Botosan (1997) also provided some evidence of the types of disclosure that are more important in the reduction of the cost of equity: forecast information, non-financial statistics and historical summary information.

Boujelbene and Affes (2013) analysed the relationship between intellectual capital disclosure and the cost of equity. This study distinguishes itself from others because it focuses on a specific type of disclosure. The hypothesis tested were the existence of a negative relation between cost of equity and intellectual capital disclosure (H1) and the three components of intellectual capital disclosure (Human capital (H2a), Structural capital (H2b) and Relational capital (H2c)). The results support hypothesis H1, H2a and H2b, while there is no significant support for hypothesis H2c.

Table 2. Similar studies on cost of equity

Study	Country	Size of sample	Dependent variable	Independent variables	Results
Mangena et al. (2016)	United Kingdom	522 firms listed in the London Stock Exchange	Cost of equity	Intellectual capital disclosure Financial disclosure	Negative Negative
Richardson & Welker (2001)	Canada	87 Canadian firms	Cost of equity	Financial disclosure Social disclosure	Negative Positive
Botosan (1997)	United States of America	122 American firms	Cost of equity	Level of disclosure	Negative
Boujelbene & Affes (2013)	France	102 French firms listed in the stock exchange	Cost of equity	Intellectual capital disclosure Human capital disclosure Structural capital disclosure Relational capital disclosure	Negative Negative Negative No relation

2.5. Development of hypotheses

From the literature reviewed and with the goal of answering the research questions framed previously, the next stage was to formulate a set of hypotheses relating voluntary disclosure with a series of determinants and the cost of equity to test if there is in fact a significant association between the variables or not.

2.5.1. Board size

Bearing in mind the inference we made earlier through agency theory, a larger-sized board has less communication capacity and more difficult decision-making processes. Hence, it is not easy for the members of the board to monitor activities and to coordinate between them, which will lead to less voluntary disclosure. According to agency theory, a smaller board will contribute to a higher level of disclosure, because its monitoring ability is higher and more effective than the one of a larger board.

Empirically, Cheng and Courtenay (2006) did not find significant relation between these two variables, while in the research done by Allegrini and Greco (2013) they came across a positive relation between the board size and voluntary disclosure. In conclusion, there is not an established relation between the size of the board and the amount of voluntary disclosure, and if there is, it is not clear what the direction of that relation is, so we will analyse this relation in this study. From the theoretical point of view, we can propose the following hypothesis:

H1: The size of the board is negatively related with the level of voluntary disclosure, *ceteris paribus*.

2.5.2. CEO Duality

The duality of the CEO means that a company's CEO has cumulative functions as the chairman and the CEO. The chairman is, in other words, the President of the Board and the person responsible for defending shareholder's interests. On the other hand, the CEO's job is to promote the company's interests and present the best business results achievable to the board of administrators. In some companies, the CEO has this duality of functions,

which is not considered a good corporate governance practice, since it limits the Administration's efficient supervision of the work of the CEO (Tang, 2016).

When a company has CEO duality, the individual responsible for both roles has an incentive to cover bad information from shareholders (Ho & Wong, 2001) to avoid passing the idea that they are not performing their job the right way, contributing to the growth of information asymmetry.

Chau and Gray (2010) studied the relation between voluntary disclosure and the independence of the chairman⁴ and concluded that there was a positive relation between both variables. As such, there is not a clear consensus about the direction of the relationship, so, from this, results the following hypothesis:

H2: The duality of the CEO is negatively related with the level of voluntary disclosure, *ceteris paribus*.

2.5.3. Gender diversity in the board

The importance of having gender diversity in the board comes from the knowledge that men and women have, in general, different inherent social and cultural characteristics (Liao et al., 2015). Liao et al. (2015) discovered that there was a solid relation between the existence of gender diversity and the level of environmental disclosure.

As defended in previous literature, the presence of women in the board brings different points of view to the table, which increases the tendency to be more transparent, i.e., to disclose more information (Srinidhi et al., 2011). Likewise, behavioural studies about gender differences defend that women tend to act less corruptively and with more honesty, which implies less propensity to hide information and more readiness to disclose information (Branisa et al., 2013). One of the reasons for this reduction in information asymmetry is the fact that women engage in "a more trust-building leadership style", which implies the need to exchange more information (Srinidhi et al., 2011). Furthermore, research by Adams and Ferreira (2009) suggests that a board with female members tends to disclose more information because women have a tendency to enhance board monitoring,

⁴ Independence of the chairman means having no CEO duality, i.e., the CEO and the chairman are two different individuals.

when compared to men, which will lead to management sharing more information with the board. Following this, we can formulate the next hypothesis:

H3: The proportion of women in the board is positively related with the level of voluntary disclosure, *ceteris paribus*.

2.5.4. Board independence

Typically, the board of directors is composed of executive and non-executive members. Executive members are the ones who work in the management of the company as well, which means that they cannot be considered independent members. Non-executive members may or may not be considered independent, because, even if they do not participate in the management of the company, there are other factors influencing independence. The criteria to determine if a person can be considered independent or not are defined in recommendation 18.1. of the Corporate Governance code by CMVM (published in *Regulamento nº4/2013* on Corporate Governance).

The existence of independent members in the board promotes a more effective monitorization of management's activities (Hidalgo et al., 2011; Liao et al., 2015) and the delivery of more information to its investors, since these members do not have alternative motives that could make them want to avoid disclosing certain types of information. Hypothetically, if a non-independent member of the board is also a manager of the company and he needs to decide if he wants to disclose information that reflects poor conduct by the management team or not, he will most likely choose not to disclose it since his position/remuneration may depend on it, while an independent member will have an impartial opinion on it.

Previous studies found a positive relation between board independence and voluntary disclosure (Chau & Gray, 2010; Donnelly & Mulcahy, 2008), while Allegrini and Greco (2013) found no statistically significant relation between the same variables. On this note, we formed the succeeding hypothesis:

H4: The percentage of independent non-executive members in the board is positively related with the level of voluntary disclosure, *ceteris paribus*.

2.5.5. Cost of equity capital

The cost of equity of a company is the cost for the company to finance itself through equity at a given moment, i.e., the minimum remuneration shareholders require to hold shares from that company.

The association between voluntary disclosure and cost of equity capital is a possibility since, according to the *Signalling Theory*, the disclosure of private information can signal the quality of a company. As such, this can potentiate the demand of shares from that company, which will lead to an increase in the price of these shares and, consequently, to a reduction in the cost of equity.

In theory, there are two chains of thought about the effect of disclosure in the cost of capital. The first one defends that reducing information asymmetry through disclosure will increase the price of a share (Diamond & Verrecchia, 1991), which means it will reduce the cost of capital. Information asymmetry forces companies to issue shares at a discounted price because there are high transaction costs arising from the need to acquire private information to take informed decisions (Mangena et al., 2016). If a firm improves its disclosure, buyers will not need to look for information elsewhere at a high price, so the firm can raise their share price. The second theory asserts that with a higher level of disclosure, there will be lower information risk, so the required rate of return will be lower (Mangena et al., 2016), i.e., the cost of capital will be lower.

All in all, theoretically, there is an agreement that firms can decrease their cost of equity through the disclosure of information (Healy & Palepu, 2001), which is confirmed empirically by Lopes and Alencar (2008) and Botosan (1997). Mangena et al. (2016) studied the correlation between intellectual capital and financial disclosure and the cost of equity and found a negative correlation as well. However, Richardson and Welker (2001) discovered a statistically significant positive relationship between the cost of capital and social disclosure. From this, we can iterate the following hypothesis:

H5: The level of voluntary disclosure influences negatively the cost of equity capital, *ceteris paribus*.

3. Methodology

The aims of this study are to analyse some factors that influence voluntary disclosure and the influence of such disclosure on the cost of capital. As such, the first step is to find a way to measure the level of voluntary disclosure for each company. As mentioned before, the factors subject to analysis will be the size of the board, the duality of the CEO, gender diversity in the board and the independence of the board, and this information will be collected from companies' websites or from their annual reports.

With the objective of isolating the relations between voluntary disclosure and the variables in study, we will also include the following variables as control variables: firm size, leverage and profitability.

Additionally, we will also analyse if the amount of voluntary disclosure has any relation with the cost of equity capital. This analysis will be performed separately, as this variable is viewed theoretically as a consequence and not a determinant of voluntary disclosure, although the methodology used does not allow to differentiate this. However, the methodology applied will be similar, as we will also test if there is a relation between the variable and the voluntary disclosure index previously calculated, using control variables as well.

3.1. Sample

The sample chosen were the companies listed in the main Portuguese stock exchange market, Euronext Lisbon, as of 31st December 2017, which comprehends a total of 43 companies. From these 43 companies we had to remove two companies: *SDC Investimentos, S.A.* and *Sociedade Comercial Orey Antunes, S.A.* The first one because the company lost the quality of a public company in the beginning of 2018, so they did not disclose the information relative to the year 2017; the second one was excluded because as of the date of the analysis, they have not yet disclosed their annual report relative to 2017. The companies listed in the Euronext Access Lisbon and Euronext Growth were not included since these are companies with a facilitated access to the capital markets and are subject to

less strict rules in terms of disclosure. As such, we get the final sample of 41 Portuguese listed companies⁵.

From the evolution of technology and the constant demand for more information, there is a natural development towards disclosing more information nowadays than a few years back. As such, this study will focus on the information from a single year, 2017, to achieve the most updated conclusions.

3.2. Definition of the variables

3.2.1. Dependent variables

Voluntary Disclosure Index

As this research revolves around voluntary disclosure, the most important variable is the Voluntary Disclosure Index (VDI). This variable will be built using information disclosed by companies on their annual report and it is based on the GRI standards mentioned in the literature review and the indexes used in empirical studies by Chau and Gray (2010), Martins (2014), Mangena et al. (2016), Lopes and Alencar (2010), Botosan (1997), Eng and Mak (2003) and Wang et al. (2008). The usage of an unweighted index is defended by Wang et al. (2008), since different items have different importance levels to different stakeholders and we are not focusing the research on the point of view of a single type of user of the information, so we will assume that all items are equally important. The VDI is built in the following way:

1. Creation of a list of items that can be disclosed on the annual report;
2. Analysis of the annual report of each company, available in the CMVM website;
3. Attribution of a score to each item (this score will be 1 if the item is present or 0 if it is absent);
4. Scoring of any additional items not contemplated in the checklist, if they are considered as voluntary disclosure;
5. Obtaining an index, which will represent the amount of information disclosed by each company.

⁵ A list of all companies used in the research is available in Annex 1.

The VDI is the dependent variable, which will be compared with the independent variables to check for any possible relations, through a simple regression. This index (see **Table 3**) consists of a checklist with 45 items that were separated into 3 categories: Strategical information, Financial information and Non-financial information, which were subdivided as portrayed below.

Table 3. Voluntary disclosure index checklist

<u>1. Strategical information</u>	<u>3. Non-financial information</u>
<i>1.1. General information</i>	<i>3.1. Intellectual capital information</i>
1 Letter from CEO or chairman	22 Total number of employees
2 Brief company history	23 Total number of employees by gender
3 Business description	24 Total number of employees by age group
4 Main products or services	25 Total number of employees by educational level
5 Main markets	26 Justification for change in number of workers
6 Performance evolution by business unit/branch/segment	27 Hygiene, health and safety policies
7 Marketing and publicity projects	28 Retirement benefits
	29 Amount spent in training programs
	30 Nature of training (hours, type,...)
<i>1.2. Analytical information</i>	31 Use of technology
8 Description of current R&D projects	32 Employee productivity (absenteeism, hours missed,...)
9 Investment made in R&D - quantitative	
10 Competitive environment	<i>3.2. Environmental performance</i>
11 Evolution of the working capital	33 Use of recycled materials
12 Inflation evolution in the macroeconomic environment	34 Impact of activities on the environment
	35 Energy consumption
<i>1.3. Forecasting information</i>	36 Energetic efficiency initiatives
13 Sales/earnings forecast - qualitative	37 Environmental protection actions - quantitative
14 Sales/earnings forecast - quantitative	38 Environmental protection actions - qualitative
15 Future projects/products planned	39 Water consumption
<u>2. Financial information</u>	<i>3.3. Social responsibility</i>
<i>2.1. Share performance indicators</i>	40 Events to raise funds/Donatives given
16 Dividend pay-out policy	41 Community programs
17 Share price fluctuation	42 Policies about local suppliers
18 Number of shares transacted	
<i>2.2. Financial ratios</i>	<i>3.4. Economic performance</i>
19 Liquidity ratio	43 Government subsidies
20 Debt ratio	44 Economic value distributed
21 Profitability ratio	45 Economic value accumulated

Cost of equity capital

The cost of equity was calculated through the CAPM, which is a financial model that uses the volatility of the pricing of the share in relation to the volatility and risk of the market. The formula to calculate the cost of equity through CAPM is:

$$k_i = r_f + \beta_i(r_m - r_f)$$

Where:

k_i = cost of equity for asset i

r_f = risk-free rate

β_i = beta coefficient of asset i

r_m = market rate of return

The risk-free rate used was the profitability of a Portuguese government's 10-year Treasury bond rate on the 31st December 2017, as used in a similar study by Déjean and Martinez (2009)⁶. This rate was collected from *Banco de Portugal's* database (*BPStat*). The beta coefficient, which measures the non-diversifiable risk of a stock, was obtained from the *Eikon* database. The 1-year return rate of the PSI-20 Index was used as a proxy of the Portuguese capital market rate of return, since we consider that this index is a good representation of the whole market, and it was consulted on the *Bloomberg* website.

3.2.2. Independent variables

The independent variables in this study are the corporate governance factors that influence voluntary disclosure. These variables were collected through the information present in the companies' annual report.

CEO duality is a dummy variable that assumes the value of 1 if the company has a person who is simultaneously the CEO and the chairman of the board, and 0 if it does not. If the company had co-CEO's that were chairman and vice-president of the board, we considered that CEO duality was present, since they represented the authority in management and in representing shareholders. This type of measurement was also applied in the study by Cheng and Courtenay (2006).

Board size is the number of members in the board, as used by Allegrini and Greco (2013). Gender diversity in the board was measured through the ratio between the number of women in the board and the total number of members of the board, as measured in the

⁶ In this case, it was used the French state borrowing rate (10-year Treasury bonds).

study by Liao et al. (2015). Finally, to compute board independence, we applied a similar method as Donnelly and Mulcahy (2008) by gathering the percentage of independent members in the board.

3.2.3. Control variables

If control variables are not included, we could be misguidedly rejecting hypotheses that could be true. As such, drawing from previous research in this topic, we chose to control for factors that are most likely to constitute determinants of voluntary disclosure, which are those with consistent relationships with voluntary disclosure. Moreover, if the relation between control variables and the voluntary disclosure index follows the expected direction, it provides more credibility to the index used.

The variables chosen were firm size, leverage and profitability, based on studies by Wang et al. (2008), Chau and Gray (2010), Cheng and Courtenay (2006) and Allegrini and Grecco (2013). All the financial items necessary to the calculation or measuring of these variables were collected through companies' 2017 annual report. There is also strong evidence that the type of auditor (Big 4 or other) also has impact in the disclosure policies, but as almost all the companies are audited by one of the Big 4 firms, we decided not to include this as a control variable.

Initially, we will present each of the control variables used in the test for the determinants of voluntary disclosure.

Firm size

According to the agency theory, larger firms involve a larger number of agents, so a higher degree of voluntary disclosure will be required to reduce agency costs (Ousama & Fatima, 2010). Ousama and Fatima (2010) and Hidalgo et al. (2011) found that firm size is positively correlated with voluntary disclosure. We measured firm size through the natural logarithm of Total Assets, as in other similar studies by Inchausti (1997) and Hidalgo et al. (2011).

Leverage

As firms with higher leverage have higher agency costs, they tend to disclose more information to reduce these costs, by reducing information asymmetries (Inchausti, 1997). Higher leverage normally means higher risk for investors, so it is almost compulsory for companies to disclose more information, so it can reassure its shareholders and convince potential investors. On a different perspective, some authors defend that agency costs that arise from issuing debt are covered through “restrictive debt covenants in debt agreements rather than increased disclosure of information in annual reports” (Eng & Mak, 2003), so more debt does not necessarily imply more disclosure. Hassan (2009) concluded that a firm’s level of leverage and its level of voluntary disclosure are positively related, while Eng and Mak (2003) found a negative relation. It is not clear the signal of the relation, but it is highly implied that there is an impact of leverage in voluntary disclosure. Leverage is measured through the debt ratio, which is the ratio between the Total Debt and the Total Assets.

Profitability

As indicated by prior literature, the performance of a company in terms of profitability is widely proven to be a determinant of voluntary disclosure. Wang et al. (2008) defend that companies with higher levels of profitability are induced to disclose higher amounts of information, since they want to signal to the market how well they are performing and that their company is worth investing in. This variable is measured by the ratio between the Net Profit and the Total Revenue, which represents the Net Profit Margin.

In **Table 4** a summary of the variables of each type and the indicators used to measure each variable is presented.

Table 4. Variables and measurement

Type	Acronym	Variable	Measurement
Dependent/ Independent	VDI	Voluntary Disclosure Index	Index built based on the presence or absence of different types of disclosure
Independent	BSIZE	Board size	Number of members in the board of directors

Independent	CEOD	CEO Duality	Dummy variable (equal to 1 if the duality of the CEO happens; equal to 0 if not)
Independent	FEMALE	Gender diversity in the board	Percentage of female members in the board of directors
Independent	BINDEP	Board independence	Percentage of independent non-executive members in the board of directors
Dependent	COEQUITY	Cost of Equity Capital	Calculation of the cost of equity through the CAPM model
Control	FSIZE	Firm Size	Natural logarithm of Total Assets
Control	LEV	Leverage	Debt ratio (Total Debt/Total Assets)
Control	PROFIT	Profitability	Net Profit Margin (Net Income/Total Revenue)

On the other hand, we have the study of the impact of voluntary disclosure on the cost of equity, which will have its control variables as well. In this case, the control variables will only be profitability and leverage. As stated by Lopes and Alencar (2010) more leveraged firms and less profitable firms are most likely to have a higher cost of equity, i.e., its shareholders demand a higher return from holding that asset than they would demand if the company was less leveraged and more profitable. This happens because less profitable firms and more leveraged firms are associated with higher levels of risk (Boujelbene & Affes, 2013).

4. Results and discussion

In this section, we will initially perform a descriptive analysis of each variable individually, followed by a bivariate analysis to ponder possible correlations between variables, and finally a multivariate regression analysis will be performed. These analysis were accomplished through *SPSS Statistics 25* and *EViews 10*. To conclude, we present a section for the discussion of the results obtained in comparison with the previously established hypothesis.

4.1. Descriptive analysis

The minimum score for VDI is 4%, while the maximum is 84%, as evidenced in **Table 5** as well, which shows that our sample takes a wide range of values. On average, companies disclose 51% of the checklist items on VDI. According to the data presented in Annex 2, *Corticeira Amorim*, *Banco Comercial Português* and *EDP – Energias de Portugal* are the companies with higher levels of disclosure, while *Imobiliária Construtora Grão-Pará*, *Sport Lisboa e Benfica* and *Pharol* have the lowest voluntary disclosure score.

As mentioned before, VDI was built based on the GRI standards, which some companies follow for support in discovering what information could give the best overview of the company. On an additional analysis we found that, in 2017, 37% of companies follow the GRI standards, as opposed to 22% of companies, in 2016. This upwards tendency indicates that GRI standards are gaining credibility in the capital markets, since more companies are incorporating these standards in their reports and, consequently, disclosing more information.

Table 5. Descriptive statistics of continuous variables

	N	Minimum	Maximum	Mean	Std. Deviation
VDI	41	0,04	0,84	0,51	0,21
FSIZE	41	16,59	24,70	20,06	1,79
LEV	41	0,21	221,01	54,10	39,96
PROFIT	41	-252,48	1,30	-6,21	39,47
BSIZE	41	3,00	21,00	8,98	4,85
FEMALE	41	0,00	0,43	0,13	0,13

BINDEP	41	0,00	0,78	0,19	0,23
COEQUITY	41	0,02	0,17	0,10	0,03

Key: VDI – Voluntary Disclosure Index; FSIZE – Firm Size; LEV – Leverage; PROFIT – Profitability; BSIZE – Board Size; FEMALE – Gender diversity in the board; BINDEP – Board Independence; COEQUITY – Cost of Equity Capital

On average, firms have 9 members in the board, 13% of its members are female and 19% of its members are independent. According to Deloitte Global Centre for Corporate Governance (2017), at the global level, women represent around 15% of the board, which places Portugal slightly below the global average. Despite being a very low average, a tendency to promote gender equality has been noted and everything points to an even larger growth in the future, mainly due to the imposition of gender quotes by *Lei n° 62/2017*⁷ from the Portuguese Parliament.

Regarding board independence, the minimum value is 0%, which corresponds to companies with no independent members. According to the CMVM recommendations on Corporate Governance, from 2013, companies should maintain an adequate proportion of independent members among the non-executive members of the board, to promote better supervision.

Concerning the control variables, debt ratio takes a very wide amplitude of values. The mean leverage is 54%, which means that firm's activity is slightly more supported through debt than equity. As for profitability, the average firm has a negative profitability due to an extremely severe outlier, *Pharol*. If we ignored that outlier to calculate the trimmed average, profitability would be better on average, but it would still assume a negative value.

As for the cost of equity capital, the minimum value is 2%, the maximum value is 17% and the average cost of equity equals 10%. According to Dobbs et al. (2016) from the McKinsey Global Institute, for the past 50 years, global cost of equity oscillates between 6% and 8%, which positions Portuguese average cost of equity above other countries'. This can be explained by the higher risk associated with holding Portuguese assets when

⁷ For listed companies, the minimum percentage of women in the board is of 20%, starting in the first elective General Assembly after January 1st, 2018 and of 33,3%, starting in the first elective General Assembly after January 1st, 2020.

compared to countries such as the United States or the United Kingdom, so the required rate of return associated with Portuguese assets will be higher.

Table 6. Descriptive statistics of dummy variable – CEO duality

Description	Value	Frequency	Percent	Cumulative Percent
Company does not have CEO duality	0	22	53,7	53,7
Company has CEO duality	1	19	46,3	100
Total		41	100	

As for the dummy variable present in the study, CEO duality, it can only assume one of two values: 0 or 1. The first case means that there is no CEO duality in 53,7% of companies, while the second case means that there is one person with the roles of CEO and chairman and it occurs in 46,3% of companies (**Table 6**).

The descriptive analysis allows us to get an idea of the distribution of the data, however, we need to analyse further to find out if there is significant correlation between variables and to conclude on our initial hypothesis.

4.2. Bivariate analysis

To understand the association between two variables, we need to perform a bivariate analysis, through one of the two main tests to study correlation: Pearson correlation test or Spearman correlation test. As Pearson correlation test only applies to variables that follow a Normal distribution, we studied each variable's normality before deciding which correlation test to perform. We performed a Kolmogorov-Smirnov test and concluded that for some variables the normality is rejected, i.e., we cannot assume that all variables follow a Normal distribution, so we decided to test correlation through the Spearman correlation test.

Spearman's coefficient varies between -1 and 1. If it assumes the null value, there is no correlation between the variables; if it assumes the value -1, there is a perfect negative correlation; and if it assumes the value 1 there is a perfect positive correlation.

We computed Spearman's coefficient and the respective analysis of significance of the correlations is represented in **Table 7** below.

Table 7. Spearman correlation coefficient for VDI and its predictors

	FSIZE	LEV	PROFIT	CEOD	BSIZE	FEMALE	BINDEP	VDI
FSIZE	1,00							
LEV	0,10	1,00						
PROFIT	0,24	-0,46**	1,00					
CEOD	-0,19	-0,21	0,13	1,00				
BSIZE	0,62**	0,08	-0,04	-0,47**	1,00			
FEMALE	0,24	-0,39*	0,32*	0,08	0,28	1,00		
BINDEP	0,37*	-0,04	0,01	-0,11	0,40**	0,05	1,00	
VDI	0,68**	0,12	0,44**	-0,06	0,52**	0,27	0,30	1,00

*. Correlation is significant at the 5% level (2-tailed).

**. Correlation is significant at the 1% level (2-tailed).

Key: FSIZE – Firm Size; LEV – Leverage; PROFIT – Profitability; CEOD – CEO Duality; BSIZE – Board Size; FEMALE – Gender diversity in the board; BINDEP – Board Independence; VDI – Voluntary Disclosure Index

With the results from the Spearman test, we can verify that voluntary disclosure is strongly and positively correlated, at a 1% significance level, with firm size, profitability and board size. This means that larger firms, with higher profitability and with a larger board have a tendency to disclose more information. The variables leverage, CEO duality, gender diversity in the board and board independence have no significant correlation with the voluntary disclosure index.

On the other hand, leverage is significantly negatively correlated (at 1% significance) with profitability, meaning that less leveraged companies tend to have higher profitability. Also, board size is significantly positively correlated with firm size and board independence, which means that larger companies have larger boards of directors and that larger boards of directors tend to have a higher percentage of independent members than smaller ones. Additionally, board size and CEO duality are significantly negatively correlated, which indicates that larger boards of directors tend to be associated with no CEO duality, i.e., a CEO that does not accumulate the functions of CEO and chairman.

The existence of statistically significant relations with voluntary disclosure in this bivariate analysis alone is not sufficient to make solid conclusions (Rao et al., 2012). Nonetheless, these correlations suggest that some relations will hold in a multivariate regression analysis, which will be the next step in the analysis.

As for the second part of the study, concerning the relation between cost of equity and the voluntary disclosure index, we performed a separate Spearman correlation test, which is shown below, in **Table 8**.

Table 8. Spearman correlation coefficient for Cost of Equity and its predictors

	LEV	PROFIT	VDI	COEQUITY
LEV	1,00			
PROFIT	-0,46**	1,00		
VDI	0,12	0,44**	1,00	
COEQUITY	0,10	-0,24	0,14	1,00

** . Correlation is significant at the 1% level (2-tailed).

Key: LEV – Leverage; PROFIT – Profitability; VDI – Voluntary Disclosure Index; COEQUITY – Cost of Equity Capital

From this second Spearman correlation test, we conclude that none of the variables in this study are significantly correlated with the cost of equity. Both significant correlations found in this second test were already evidenced in the analysis of the previous test. From the conclusions on this second test, we can expect that we will not find strong evidences to support the hypothesis of voluntary disclosure having influence on the cost of equity capital (H5). However, we will perform further investigation through regression analysis in the next section to be sure of this conclusion.

4.3. Regression analysis

In line with other similar studies (Allegrini & Greco, 2013; Hidalgo et al., 2011), we applied the OLS⁸ estimates, a multivariate linear regression, to test the hypothesis we previously formulated. In the first place, we estimated the following model:

⁸ Ordinary Least Squares

Model 1:

$$\text{VDI}_i = \beta_0 + \beta_1 \text{FSIZE}_i + \beta_2 \text{LEV}_i + \beta_3 \text{PROFIT}_i + \beta_4 \text{CEODUAL}_i + \beta_5 \text{BSIZE}_i \\ + \beta_6 \text{FEMALE}_i + \beta_7 \text{BINDEP}_i + \varepsilon_i$$

Where: i = firm 1 through n ($n = 41$); VDI = voluntary disclosure index; FSIZE = firm size, measured through the natural logarithm of total assets; LEV = leverage, measured through debt ratio; PROFIT = profitability, measured through net profit margin; CEODUAL = CEO duality, equal to 1 if there is CEO duality, equal to 0 if not; BSIZE = number of people in the board; FEMALE = proportion of women in the board; BINDEP = proportion of independent members in the board; β = estimation parameters; ε = error term.

Table 9 presents the output obtained through the linear regression.

Table 9. Regression Analysis – Model 1

	Coefficient	Std. Error	t-Statistic	p-value
Constant	-0,457	0,397	-1,152	0,258
FSIZE	0,040	0,023	1,787	0,083
LEV	0,001	0,001	-1,300	0,203
PROFIT	0,002	0,001	2,955	0,006
CEODUAL	0,110	0,058	1,883	0,069
BSIZE	0,018	0,009	1,890	0,068
FEMALE	-0,065	0,218	-0,300	0,766
BINDEP	0,101	0,117	0,861	0,396

This first model has an adjusted R^2 of 48%, which means that this model explains 48% of the variance in VDI. In this first model, we included all the variables present in the study. From this model, we can conclude that only profitability (PROFIT) has a statistically significant relation, at a 1% level, with the voluntary disclosure index (VDI). Due to the weak conclusions we can iterate from this model, we decided to remove the control variable firm size (FSIZE), since this variable presents a significant correlation with other variables, which can indicate a certain degree of multicollinearity. Model number 2 is represented below and its results are depicted in **Table 10**.

Model 2:

$$\text{VDI}_i = \beta_0 + \beta_1 \text{LEV}_i + \beta_2 \text{PROFIT}_i + \beta_3 \text{CEODUAL}_i + \beta_4 \text{BSIZE}_i + \beta_5 \text{FEMALE}_i + \beta_6 \text{BINDEP}_i + \varepsilon_i$$

Where: i = firm 1 through n ($n = 41$); VDI = voluntary disclosure index; LEV = leverage, measured through debt ratio; PROFIT = profitability, measured through net profit margin; CEODUAL = CEO duality, equal to 1 if there is CEO duality, equal to 0 if not; BSIZE = number of people in the board; FEMALE = proportion of women in the board; BINDEP = proportion of independent members in the board; β = estimation parameters; ε = error term.

Table 10. Regression Analysis – Model 2

	Coefficient	Std. Error	t-Statistic	p-value
Constant	0,237	0,085	2,780	0,009
LEV	-0,001	0,001	-1,641	0,110
PROFIT	0,003	0,001	3,635	0,001
CEODUAL	0,139	0,058	2,401	0,022
BSIZE	0,030	0,006	4,747	0,000
FEMALE	-0,078	0,225	-0,348	0,730
BINDEP	0,142	0,119	1,198	0,239

This model's adjusted R^2 is equal to 45%, which means Model 2 explains 45% of the variance in VDI. This model is statistically significant at a 1% level ($p\text{-value} = 0,0001$), which means that we can say with 99% confidence that our variables contribute significantly to explain the voluntary disclosure index (VDI). From the results obtained, we can conclude that profitability (PROFIT) and board size (BSIZE) are statistically significantly related, at a 1% level, with the voluntary disclosure index (VDI). We can also add that CEO duality's (CEODUAL) relation with VDI is statistically significant at a 5% level of significance.

For the second part of the investigation, we wanted to analyse the impact of voluntary disclosure in the cost of equity, so we built Model 3, as represented below.

Model 3:

$$\text{COEQUITY}_i = \beta_0 + \beta_1 \text{LEV}_i + \beta_2 \text{PROFIT}_i + \beta_3 \text{VDI}_i + \varepsilon_i$$

Where: i = firm 1 through n ($n = 41$); CEOQUITY = cost of equity capital; LEV = leverage, measured through debt ratio; PROFIT = profitability, measured through net profit margin; VDI = voluntary disclosure index; β = estimation parameters; ε = error term.

The results obtained for the formulated regression are represented in **Table 11**.

Table 11. Regression Analysis – Model 3

	Coefficient	Std. Error	t-Statistic	p-value
Constant	0,059	0,017	3,489	0,001
LEV	0,000	0,000	1,283	0,208
PROFIT	-0,000	0,000	-2,332	0,025
VDI	0,049	0,025	1,926	0,062

This model's adjusted R^2 is equal to 10%, i.e., Model 3 explains 10% of the variance in the cost of equity (COEQUITY), which indicates that the model is not a good fit for the data collected. Moreover, this model is not statistically significant, since its p-value is 8%, so we cannot deduce that our variables contribute significantly to explain the dependent variable, cost of equity. From the results obtained, we can conclude that only profitability (PROFIT) is statistically significantly related, at a 5% significance level, with the cost of equity (COEQUITY).

In the next chapter, we will discuss the results obtained and reach the final conclusions on this study.

4.4. Discussion of results

With the goal of answering the research questions initially proposed, we formulated a set of hypotheses about corporate governance, voluntary disclosure and cost of equity in chapter 2.5, which we will now analyse based on the results obtained from the multivariate regression.

As for hypothesis 1, board size is negatively related with voluntary disclosure, so it is not confirmed by the results obtained, since the direction of the relation obtained is contrary to the one supported by agency theory. A positive statistically significant association between board size and voluntary disclosure was also supported by the findings of Allegrini and Greco (2013). This conclusion against agency theory can be explained by the fact that a larger board will contribute to disclose more information due to its higher monitoring ability due to the presence of more people to do so (Cheng & Courtenay, 2006).

In relation to hypothesis 2, it is also not confirmed by our findings, since the signal of the relation is different than the one expected. Contrary to most previous studies and theoretical belief from agency theory, we can assume that CEO duality has a positive statistically significant relation with the level of voluntary disclosure, i.e., companies where the CEO and the chairman are the same person tend to disclose more information. However, in the studies by Hidalgo et al. (2011) and Martins (2014), CEO duality has a positive relation with voluntary disclosure as well. This different than expected result can be explained by the fact that CEOs act in shareholders' best interests to gain prestige and showcase that they are performing well, so this concentration of roles allows for better communication and better disclosure, since CEO duality will not promote the covering of relevant information (Hidalgo et al., 2011).

Contrary to the studies of Liao et al. (2015) and Tejedo-Romero et al. (2017), where a significant positive relationship between the presence of female members in the board and voluntary disclosure was found, we cannot conclude from our results that there is a statistically significant relation between voluntary disclosure and the number of women in the board of directors. Hypothesis 3 is not supported by our investigation. We can justify this with the fact that female presence in the board is so low in almost all companies that it has a small influence in the amount of disclosure; only a significant number of women in the board would actually affect the amount of disclosure (Post et al., 2011).

Hypothesis 4 is also not supported by our results, which means that we cannot affirm that there is a relation between voluntary disclosure and the number of independent non-executive members in the board. However, the signal obtained is consistent with the formulated hypothesis and the overall result is in line with findings by Allegrini and Greco (2013), where they also reached a positive but non-statistically significant relation.

Now for the second part of the research, hypothesis 5 was not supported by the results obtained, which means that we cannot state that voluntary disclosure influences the cost of equity. The positive relation we obtained is consistent with the results by Richardson and Welker (2001), but the relation we reached was not statistically significant at a 5% level. Nevertheless, this goes against main theoretical studies that defend that an increase in voluntary disclosure is related with a decrease in cost of equity, which can possibly be explained by the fact that the level of disclosure we are measuring does not distinguish between good and bad information. As such, if a company is disclosing more bad information, the risk for the capital invested raises and the required rate of return also grows, i.e., the cost of equity increases.

Concerning control variables, leverage (LEV) does not have a significant impact in explaining voluntary disclosure, which is acceptable since the opinion about this relationship from previous studies is not clear. As for profitability (PROFIT), we found a positive statistically significant relation with voluntary disclosure, which goes in hand with previous research by Wang et al. (2008). We can also see that this conclusion is aligned with *signalling theory*, since more profitable companies choose to signal their quality by disclosing more information.

5. Conclusion

The main goal from this study was to investigate the influence of corporate governance on voluntary disclosure and the influence of such disclosure on the cost of capital. To reach our conclusions, we first needed to measure voluntary disclosure, which we did by building a voluntary disclosure index composed of 45 items, combining several types of information.

From the analysis completed, we are now able to answer the research questions we initially formulated:

RQ1: What factors influence the amount of voluntary disclosure in the annual reports by a Portuguese listed company?

RQ2: What is the impact of voluntary disclosure on the cost of equity capital?

Regarding the first research question, we studied the influence of four corporate governance factors on voluntary disclosure: the size of the board (H1), CEO duality (H2), gender diversity in the board (H3) and board independence (H4). With the multivariate regression, we discovered that H1 and H2 had a statistically significant conclusion, but the hypothesis previously formulated were not supported since we did not obtain the same signal, while H3 and H4 had no statistically significant conclusion. In short, we can say that the size of the board of directors and CEO duality influences the amount of voluntary disclosure in the annual reports by a Portuguese listed company, but not in the way we previously expected.

Concerning the second research question, despite the strong theoretical evidence about the negative relationship between voluntary disclosure and cost of equity, our results for Portuguese companies indicated a positive relationship, but it was not a statistically significant one.

This research presents several limitations that could be influencing the results obtained. First, we are dealing with a very small sample (41 firms), since this is the number of firms present in the Portuguese capital market, which indicates that the conclusions obtained cannot be extrapolated to other countries. Another limitation present is the fact that the voluntary disclosure index is not a very objective and measurable variable, so the results have always a higher degree of error associated. The same applies to cost of equity, since

this is a subjective concept (there is no real remuneration for holding a certain asset), so it is not easily measurable, which is demonstrated by the variety of different models and theories created through the years to find the best way to estimate it. Third, only the quantity of information disclosed was measured and sometimes quantity does not mean quality. Having this in mind, a possible avenue for further studies is to incorporate quality of information as a dependent variable. To measure quality of information, one may be aware of the materiality matrix of information built by some companies, which incorporates opinions obtained with stakeholders regarding what types of subjects are more interesting to be disclosed and compare the information disclosed with the information pretended by its stakeholders. As voluntary disclosures by companies are having an upwards tendency through the years, another interesting point for future research is to understand if this tendency to disclose more information voluntarily is influencing the demand for financial analysts' services, since their role is to provide capital market investors with companies' private information.

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Annexes

Annex 1 – List of companies used in the study

Company
Altri, SGPS, S.A.
Banco BPI, S.A.
Banco Comercial Português, S.A.
Cofina - SGPS, S.A.
Compta - Equipamentos E Serviços De Informática, S.A.
Corticeira Amorim, SGPS, S.A.
CTT - Correios De Portugal, S.A.
EDP - Energias De Portugal, S.A.
Estoril-Sol, SGPS, S.A.
F. Ramada - Investimentos, SGPS, S.A.
Futebol Clube Do Porto - Futebol, SAD
Galp Energia, SGPS, S.A.
Glintt - Global Intelligent Technologies, S.A.
Grupo Média Capital - SGPS, S.A.
Ibersol - SGPS, S.A.
Imobiliária Construtora Grão-Pará, S.A.
Impresa - Sociedade Gestora De Participações Sociais, S.A.
Inapa - Investimentos, Participações E Gestão, S.A.
Jerónimo Martins - SGPS, S.A.
Lisgráfica - Impressão E Artes Gráficas, S.A.
Luz Saúde, S.A.
Martifer - SGPS, S.A.
Mota - Engil, SGPS, S.A.
NOS, SGPS, S.A.
Novabase - Sociedade Gestora De Participações Sociais, S.A.
Pharol - SGPS, S.A.
Reditus - Sociedade Gestora De Participações Sociais, S.A.
REN - Redes Energéticas Nacionais, SGPS, S.A.
SAG Gest - Soluções Automóvel Globais, SGPS, S.A.
Semapa - Sociedade De Investimento E Gestão, SGPS, S.A.

Annex 2 – VDI score for each company

Company	VDI
Corticeira Amorim, SGPS, S.A.	84%
Banco Comercial Português, S.A.	78%
EDP - Energias De Portugal, S.A.	78%
NOS, SGPS, S.A.	76%
REN - Redes Energéticas Nacionais, SGPS, S.A.	76%

Galp Energia, SGPS, S.A.	73%
Banco BPI, S.A.	71%
CTT - Correios De Portugal, S.A.	71%
Altri, SGPS, S.A.	69%
Martifer - S.G.P.S., S.A.	69%
Sonae - SGPS, S.A.	69%
Sonae Indústria, SGPS, S.A.	67%
Sporting Clube De Portugal - Futebol, SAD	67%
Mota - Engil, SGPS, S.A.	64%
Semapa - Sociedade De Investimento E Gestão, SGPS, S.A.	64%
Sumol+Compal, S.A.	64%
The Navigator Company, S.A.	64%
Jerónimo Martins - SGPS, S.A.	62%
Teixeira Duarte, S.A.	60%
Ibersol - SGPS, S.A.	56%
Luz Saúde, S.A.	53%
Cofina - SGPS, S.A.	51%
F.Ramada - Investimentos, SGPS, S.A.	51%
Sonae Capital, SGPS, S.A.	47%
Inapa - Investimentos, Participações E Gestão, S.A.	44%
Estoril-Sol, SGPS, S.A.	42%
Reditus - Sociedade Gestora De Participações Sociais, S.A.	42%
Sonaecom - S.G.P.S., S.A.	42%
Grupo Média Capital - SGPS, S.A.	38%
Toyota Caetano Portugal, S.A.	38%
Glintt - Global Intelligent Technologies, S.A.	36%
Impresa - Sociedade Gestora De Participações Sociais, S.A.	36%
Sag Gest - Soluções Automóvel Globais, SGPS, S.A.	36%
Novabase - Sociedade Gestora De Participações Sociais, S.A.	31%
Compta - Equipamentos E Serviços De Informática, S.A.	24%
Futebol Clube Do Porto - Futebol, SAD	22%
VAA - Vista Alegre Atlantis, SGPS, S.A.	18%
Lisgráfica - Impressão E Artes Gráficas, S.A.	16%
Pharol - SGPS, S.A.	16%
Sport Lisboa E Benfica - Futebol, SAD	16%
Imobiliária Construtora Grão-Pará, S.A.	4%
