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PAULO VICTOR GOMES NOVAES

ESSAYS ON LIFE CYCLE, VOLUNTARY DISCLOSURE AND THE COST OF CAPITAL OF BRAZILIAN COMPANIES

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À memória do meu pai, à minha mãe e aos meus irmãos, dedico.

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Stay hungry. Stay foolish.
(Steve Jobs)

Run, Forrest! Run!
(Cena do filme “Forrest Gump”)

ABSTRACT

This thesis investigates how life cycle stages impact on voluntary disclosure, cost of equity capital and also on the relationship between them. Using a sample of non-financial Brazilian listed firms covered by analysts between 2008 and 2014, and following the model by Gebhardt et al. (2001) to develop the Implied Cost of Capital (ICC) using I/B/E/S database, from Thomson Reuters®, I find that companies on average are benefitted by the reduction of the cost of capital via improvement in voluntary information level. Using Dickinson's (2001) life cycle measure, I find that voluntary disclosure level grows until reaching the maturity phase and then it declines. Moreover, the ICC significantly differs across life cycle stages. However, I do not find differences among growth, maturity and shake-out, although the level of the ICC fades out after leaving the initial stage and it increases again in decline stage. Finally, I find that the improvement of voluntary disclosure level in growth and maturity stages is better compensated with more reduction in cost of capital. The results for voluntary disclosure are shown to be robust using a series of sensitivity tests, however the expectation about cost of capital did not hold using different proxies.

Keywords: Voluntary disclosure. Cost of equity capital. Implied cost of capital. Firm life cycle.

RESUMO

Esta dissertação investiga como os estágios do ciclo de vida impactam no *disclosure* voluntário, no custo de capital próprio e também na relação entre eles. Utilizando uma amostra de empresas não-financeiras entre 2008 e 2014, e seguindo o modelo de Gebhardt et al. (2001) para desenvolver o Custo de Capital Implícito (ICC), usando a base de dados I/B/E/S, da Thomson Reuters®, encontra-se que, em média, as empresas são beneficiadas com a redução do custo de capital por meio da melhora no nível de evidenciação voluntária. Usando a métrica de ciclo de vida de Dickinson (2001), encontra-se que o nível de *disclosure* voluntário cresce até atingir o estágio de maturidade e então esse nível decresce. Ainda, o ICC se difere significativamente entre os estágios de ciclo de vida. Contudo, não são encontradas diferenças significativas entre os estágios de crescimento, maturidade e *shake-out*, embora o nível de ICC diminua depois de sair do estágio inicial e ele cresça novamente no estágio de declínio. Finalmente, encontra-se que a melhora no nível de *disclosure* voluntário nos estágios de crescimento e maturidade é mais bem compensada com uma redução maior no nível de custo de capital. Os resultados para o *disclosure* voluntário são robustos usando uma série de testes de sensibilidade, muito embora os resultados não tenham se mantido para o custo de capital usando *proxies* diferentes.

Palavras-chave: Disclosure voluntário. Custo de capital próprio. Custo de capital implícito. Ciclo de vida da empresa.

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SUMMARY

1. INTRODUCTION

There is a tension, in the capital market, concerning some investors about the way how resources are allocated in invested companies' projects. Thus, disclosing as much information as the firms can is important in order to decrease informational asymmetry between managers and equity holders (AKERLOF, 1970).

Disclosure is divided in two ways: mandatory and voluntary (VERRECCHIA, 2001). The existing literature shows that voluntary disclosure reduces cost of equity capital and increases liquidity (BOTOSAN, 1997; DIAMOND; VERRECCHIA, 1991; FRANCIS; NANDA; OLSSON, 2008).

Regarding to disclose exceeding the mandatory, companies use to act in an opportunistic way as a compensation system (HAIL; LEUZ, 2006). This system is commonly seen in companies with high environmental impact, for example, that seek to offset their degradations, reporting social information, trying to reduce the negative impact caused in the society, in general (GONÇALVES et al., 2013).

Verrecchia (2001) addresses the way how managers and/or the company exercise the discretionary capability about information they have already gotten. For the investor, the more information, the greater the sense of informational symmetry (SILVEIRA; BARROS, 2008), but for managers, the disclosure of information goes through a process of screening, that tend to the equilibrium between good and bad news (VERRECCHIA, 2001).

Although it belongs to this game of equilibrium, disclosure can be understood as a valued tool in the corporate world. It is important for suppliers of resources and, consequently, for managers who are going to be impacted by reverberations of news about firm value in the capital market. Then, mainly in countries with a poor legal system on investor protection, as Brazil, more disclosure means less information asymmetry in the market (LANZANA, 2004).

Regarding this relation, Botosan (1997, p. 324) states:

> Greater uncertainty exists regarding the "true" parameters when information is low. If estimation risk is non-diversifiable, investors require compensation for this additional element of risk.

This practice of requiring additional elements of risk (additional return) is confirmed by Dedman and Lennox (2009). When analyzing the British market they found evidence that managers are more likely to retain information about sales and costs, when they realized the presence of a strong rival in the market.

Then, considering the game existing in information disclosure - mandatory or not, and independently verifiable or not - the process of credibility achievement takes the market to have the capacity to cause a change in the company behavior, when it outstands wrong signals to their investors (STOCKEN, 2000).

About this relation between principal and agent (JENSEN; MECKLING, 1976), empirical results show that a reduction in informational asymmetry can lead to a decrease in the cost of equity capital (BOTOSAN, 1997; CHEYNEL, 2013; GONÇALVES et al., 2013; HAIL; LEUZ, 2006)

This paper uses the notion of implied cost of capital as “the intern rate of return that equates the present value of expected future cash flows to the current stock price” (GEBHARDT et al., 2001, p.140). Cheynel (2013) adds that cost of capital means the minimum return demanded by capital suppliers in a new project, and Brealey et al. (2011, p. 8) reinforce it by saying that:

> This minimum rate of return is called a *hurdle rate* or *cost of capital.* It is really an **opportunity cost of capital,** because it depends on the investment *opportunities* available to investors in financial markets. Whenever a corporation invests cash in a new project, its shareholders lose the opportunity to invest the cash on their own. Corporations increase value by accepting all investment projects that earn more than the opportunity cost of capital.

Cheynel (2013) emphasizes that the cost of capital captures the usefulness of financial disclosure to investors. However, the step of disclosure of information does not always occur as expected, because its veracity may not be verifiable. In the North American environment, for example, Stocken (2000) studies the credibility of financial reports with private information voluntarily published by managers. He mentions accounting

reports are useful to assess the truthfulness of that private information voluntarily revealed. Then, in a long term, it takes veracity.

Another sign of disclosure by companies is realized in trade volume (liquidity) and in stock price changes (BOTOSAN, 1997). It relies on the association-based disclosure theory, which generally addresses the way how the disclosure might cause changes on investors behaves, affecting prices and trade volume of companies' securities (VERRECCHIA, 2001). Then, an increase in stocks liquidity means greater interest for market analysts, and yet, it translates in less cost of equity capital (AERTS; CORMIER; MAGNAN, 2007; HEALY; PALEPU, 1988).

Akerlof (1970) maintains that the increase in disclosure levels is commonly used to mislead investors in negative earnings periods, through the overload of reports, intending to overshadow this situation before the investor's eyes. In an analogy with a specific industry, there are good and bad products, and the knowledge about their quality belong to sellers. Therefore, there are sellers willing to deal bad products for the price of good ones, and buyers willing to pay the offered price, because they do not know the real quality of the product, being dependent on the information reported to them. Thus, "the purchaser's problem, of course, is to identify quality" (AKERLOF, 1970, p. 495).

In the capital market, when investors do not feel safe, they basically underprice those shares (BOTOSAN, 1997). Therefore, empirical results have shown that the opposite will also happen. That is, higher level of disclosure results in lower cost of equity capital, considering that savers will have less incentive to underprice the offering for those shares, and then, requiring a lower cost of capital (CHEYNEL, 2013).

Botosan (1997) develops a metric of voluntary disclosure, which was regressed on the market beta, used as proxy for cost of equity capital. The results indicated a negative association for those companies that attract less attention of market analysts.

In Brazil, however, Alencar (2005) does not found any relation between voluntary disclosure and cost of capital. The study also uses the firm beta risk as a representation of the cost of capital, and the appointment of companies for a national transparency

awards as proxy for the level of disclosure. It is noteworthy that metrics used as proxies for both variables may have been the cause of the lack of statistical relation. As Petrova et al. (2012, p. 84) states, “as neither disclosure policy nor cost of equity capital can be directly observed and are highly subjective”.

Gonçalves et al. (2013) analyze reports of social responsibility of 83 listed companies in BM&FBovespa, in the period from 2005 to 2009. Regarding the level of social disclosure of those companies, the authors have developed an index comprising 13 indicators. The cost of equity capital was adjusted to the risk through Capital Asset Pricing Model (CAPM) and they test it in a panel data regression. Different from the study by Alencar (2005), their results show that there is a negative relation between cost of equity capital and the level of disclosure.

Several international studies (ALI BOUJELBENE; AFFES, 2013; CLARKSON et al., 2010; DHALIWAL et al., 2011; IATRIDIS, 2013; MAKHIJA; PATTON, 2004) and, recently, some national studies (ALENCAR, 2005; CALHAU, 2012; GONÇALVES et al., 2013) analyze this relation between higher level of disclosure of information and the cost of equity capital, but their results show it belong to an empirical situation.

A possible explanation for those controversial results of the literature bases on several companies economic and financial characteristics. Martins, Paulo and Albuquerque, (2013) and Verdi (2005) identify that some variables related to return, liquidity, volatility, size and cost of capital are factors positively associated to higher levels of informational asymmetry. It allows us to understand that disclosure of information is directly related to companies’ characteristics.

Jenkins and Kane (2004) affirm that investors assess companies based on reliable information about future profits. Their study investigates the value relevance of some Earnings Response Components. They identify different focuses and strategies between those analyzed companies, segregating the firms in their life cycle.

In this sense, Miller and Friesen (1980) study the patterns of the organization into a complex system and its process of adaptation. The authors comment on the few studies existent in this area, at that time. They relied on the contingency theory, but it presents

some potential problems, which involve, among other things, not considering the fact that “different structures were required in different environments” (MILLER; FRIESEN 1980, p. 269).

In this sense, Dickinson (2011) develops a model that identifies the life cycle stages, showing differences on the earnings margin, earnings persistence and asset turnover across these stages. This model is also used in Drake (2013), which finds an expected variation between life cycle stages on companies’ performance, measured by revenues, return on assets, cash flow and also earnings persistence.

For example, Black (1998) finds that, on average, sales are more value relevant than the net profit presented on Income Statement on growing firms. Aharony et al. (2006), in turn, find more relevance for cash flow, in this stage. Hence, the understanding that economic and financial information varies according to the stage which the company is at, and that, inside this information, there is often data related to company strategy, concurs with the understanding that the voluntary information’s level also tend to vary across life cycle stages.

Taking this into account investors attribute distinct importance for companies in different life cycle stages (AHARONY et al., 2006; BLACK, 1998; DICKINSON, 2011; DRAKE, 2013), the level of information reported to investors varies as per characteristics inherent to the company (HUANG; LI, 2014; LEUZ; SCHRAND, 2009; SHLEIFER, 2004).

Therefore, investors will expect additional returns, that is, the cost of equity capital also varies over corporate life cycle. This was recently found in the study by Hasan et al. (2015), on public companies in the Australian market. Using Dickinson’s (2011) life cycle measure, they find a higher cost of equity capital for introduction and decline stages than others.

Gathering these arguments, this thesis aims to assess the following research problem: **How do life cycle stages impact on voluntary disclosure, cost of equity capital and also on the relationship between them?**

This study uses a sample consisting of public non-financial Brazilian companies listed on the São Paulo Stock Exchange (BOVESPA), covered by analysts between 2008 and

2014, totaling 597 firm-year observations. This period deserves an attention due to two reasons: i) In 2008, Brazil started the IFRS adoption process; and ii) the impact of the Word financial crisis which lasted until 2009. It is noteworthy that the full adoption of International Standards was mandatory after 2010.

Therefore, this study contributes to the literature by providing evidence of the difference for both voluntary disclosure level and cost of equity capital across the corporate life cycle stages. Likewise, it further investigates the classical relationship between cost of capital and voluntary disclosure, controlling it for life cycle stages.

Although the expansion of the capital markets reached a large part of economies worldwide, the Brazilian environment distinguishes from other bigger ones due to its characteristic of ownership concentration, among other reasons (SILVEIRA; BARROS, 2008) and different idiosyncrasy (LIMA et al., 2015). Brazil is considered an emerging market. Then, this inherent characteristic is an example that different characteristics may better explain the relation between cost of equity capital and the level of disclosure. Perhaps this is the reason why it remains inconclusive, as an empirical situation. Hence, some studies have sought to identify characteristics that could explain this relation (FRANCIS et al., 2008; HAIL; LEUZ, 2006; HUANG; LI, 2014).

Hail e Leuz (2006) find that companies in developed countries, which require more transparency, tend to realize a lower cost of capital. On the other hand, Huang e Li (2014), recently found that companies in more competitive industries tend to raise the level of disclosure aiming to decrease the cost of capital.

Furthermore, this study is relevant for regulators, because, an amount of information that was voluntarily reported to stakeholders came to be legally required such as the Cash Flow Statement, suggesting that regardless of the stage which the company is in, managers are obligated to spend resources with this reporting. In this sense, Grossman and Hart (1980, p. 333) state that “to the extent that the government can costlessly enforce laws, it can force the lowest cost firms to make disclosures, and thus reduce the social transactions costs of disclosure”.

I consider that analysts also can enhance their forecast quality with the increasing in voluntary disclosure if they know that each life cycle stages leads to different disclosure properties. Notwithstanding, it is noteworthy that the several analytical models widely used in academy – specifically for cost of capital - have to be carefully interpreted so they do not convey the idea of representation of a reality of all idiosyncrasy that surrounds the market. Thus, even though this study uses alternative methods to enhance the robustness of the results, it must analyze exclusively companies comprised in the sample.

In this thesis, I follow Gebhardt et al. (2001) and Hail and Leuz (2006) to calculate the implied cost of capital - ICC, based on Residual Income Model (OHLSON, 1995). For voluntary disclosure level, I use an update of Rodrigues's (2014) indexes. Firstly, the results of linear regressions confirm the expected negative relation between these variables.

I then test for ICC differences and voluntary disclosure levels differences across firm life cycle through t-tests (mean test) before testing them into linear regressions. Then I test for the indexes of voluntary disclosure on ICC after controlling for firm life cycle, size, market-to-book, leverage and beta.

The main results show that growing and mature firms present the higher level of voluntary disclosure than companies in other stages. Yet, I found the level of the ICC decreases after leaving the initial stage and it increases again in decline stage. Finally, I document the improvement of voluntary disclosure in growth and maturity stages is better compensated via more reduction in cost of capital.

The paper is organized in 5 sections, as follows: *i)* it contextualizes the subjects addressed in my study. *ii)* it reviews studies on the cost of equity capital, voluntary disclosure and life cycle theory to be able to develop testable hypotheses; *iii)* section three focuses on the research design, data sources and sample selection; i*v)* the fourth section documents the results of the study; and *v)* it concludes and rises some limitation of the study, bringing up some issues for future research.

2 THEORETICAL BACKGROUND AND HYPOTHESES DEVELOPMENT

2.1 COST OF CAPITAL AND VOLUNTARY DISCLOSURE

Mueller (1972) states that companies have to penetrate the existing entry barriers, like the "uncertainty" that surrounds new investments. Then, to survive and to grow up, they try to reduce this uncertainty through an efficient resource structure (MILLER; FRIESEN, 1980; PENROSE, 1996).

One of the ways of reducing this uncertainty is by means of an efficient structure, which tends to reduce the cost of capital. Cheynel (2013, p. 988) highlights the cost of capital as "a metric that captures how well financial disclosure achieves its primary function of providing value-relevant information to users of financial statements".

There is no concern about the best proxy for estimating the cost of capital. Scholars such as Botosan (1997), Gonçalves et al. (2013), Lopes and Alencar (2010) would rather use the Capital Asset Pricing Model (CAPM), while other studies use alternative methods to capture the cost of capital (GEBHARDT et al., 2001; HAIL; LEUZ, 2006; MENDES-DA-SILVA et al., 2014).

The CAPM of Sharpe (1964) and Lintner (1965) is the most commonly used method to estimate the cost of capital. It relies on the assumption of the efficient market (FAMA; FRENCH, 1997), where the expected rate of return on stock *i* (R_e) is a function of a risk free rate (R_f) plus a risk factor (β) that multiplies the risk premia, that is, the difference between the value-weighted market portfolio (realized) return and that risk free rate $\left(E[R_m] - R_f\right)$. The risk factor ($\beta$), also considered as factor loading, represents the ratio between the covariance of R_i and R_m and the variance of R_m, so that it means the sensitivity of the firm return to a variation in the market return.

Specifically, the CAPM relies on several assumptions related, among others, to the market perfect competition; no transaction costs, neither taxes; normal distribution of realized returns; and the equal expectations of investors over assets homogeneity for future horizons, returns and variances.

Furthermore, according to Fama and French (1997, p. 154) there are some potential problems with using realized (ex-post) returns, mainly related to imprecise factor

loadings and imprecise factor risk premiums $\left(E[R_m] - R_f\right)$. Although the choice of model is mentioned as important, there is no consensus about which one is the best. These uncertainties "imply imprecise estimates of the cost of capital".

Gebhardt et al. (2001) provides an alternative approach to estimating the cost of equity capital to understand the market's perception about the risk related with the firm valuation and how it varies across firms, according to their characteristics. The authors use the Residual Income Valuation (RIV), proposed by Ohlson and they state that

> "if the market tends to consistently assign higher (or lower) discount rate to certain firms and industries, such relation should be exploited in deriving a cost-of-capital estimate of valuation in investment purposes" (GEBHARDT et al., 2001, p.2)

This approach differs from others as it relies on expected (ex-ante) return instead of the average realized return - as used in CAPM - and it assumes the Clean Surplus Relation, according to Ohlson (1995), to use accounting (public) data, so that it avoids the using of market data, even though it is true it relies on earnings forecasts - information provided by market analysts. RIV is a model that estimates the current book value of a share and forecasted earnings per share of a finite horizon plus a terminal value to derive a series of future residuals earnings.

Hail and Leuz (2006), in turn, use four metrics based on accounting numbers. It should be noted that one of them is also based on Ohlson's RIV model. Therefore, to reach conclusive results, they argue it is necessary to nearly exhaust the use of much available metrics of cost of capital. They also use the average of the four ones in robustness tests.

Regardless of metrics, the existing literature consistently documents a relation between greater disclosure and a reduction in the cost of equity capital. However, a great start on that relation was stated by the FASB (Financial Accounting Standard Board), followed by other setters worldwide, including the Committee of Accounting Releases (Comitê de Pronunciamentos Contábeis – CPC) in Brazil, as follows:

> The benefits of financial reporting information should justify the costs of providing and using it. The benefits of financial reporting information include better investment, credit, and similar resource allocation decisions, which in turn result in more efficient functioning of the capital markets and lower costs of capital for the economy as a whole (FASB, 2006, p. 35)

Nevertheless, this study focuses on voluntary disclosure, which does not necessarily belong to the statement above. Since the study of Botosan (1997), the accounting literature was filled by many studies on these subjects, because the notion that an increased disclosure cause a decrease in the cost of capital remains an empirical situation (ALI BOUJELBENE; AFFES, 2013; CALHAU, 2012; CLARKSON et al., 2010; DHALIWAL et al., 2011; DIAMOND; VERRECCHIA, 1991; GONÇALVES et al., 2013; IATRIDIS, 2013; LOPES; DE ALENCAR, 2010; VERRECCHIA, 2001).

Verrecchia (2001) affirms that the disclosure of information goes through a process of screening, that tend to the equilibrium between good news, that maximize the market value of the firm; and bad news, that invariably cause the reduction of the firm value capitalization. Hence, according to Grossman and Hart (1980), companies must have positive reasons to voluntarily disclose their private information.

In the United States, Botosan (1997) regress a self-developed index of voluntary disclosure against the market beta, used as proxy for cost of equity capital. Results indicated a negative and significant association for companies that attract less attention of market analysts. By the way, for those more covered companies, the relation did not hold. Thenceforth, these results have motivated studies in different environment and with different control of companies' characteristics.

Still on American market, Cheynel (2013) recently said that managers always put a few idiosyncrasies into financial contracts, which can affect the expected cash flow for investors considering this kind of behavior is not as clear as it should be. Then, investors tend to rationally price the firm observing public voluntary disclosures. He finds differences in costs of equity capital between disclosing and non-disclosing firms, measured by disclosure frictions, which is related to information asymmetry and equity risk premium.

In France, using a sample of wide held companies controlled by human, structural and relational capital categories, Ali Boujelbene and Affes (2013) also confirm the theory that predicts a lower cost of capital given a higher level of disclosure. However, they focused on a specific kind of voluntary disclosure.

In this sense, Clarkson et al. (2010) study the impact of voluntary environmental disclosure on the cost of equity capital and firm value, using a sample of firms from the five most polluting industries in the U.S. However, they do not find significant relation between the developed environmental disclosure index and the cost of equity capital, even though investors use environmental data to assess firm risks and unbooked future environmental liabilities.

Continuing on non-financial information, Dhaliwal et al. (2011), focus on corporate social responsibility (CSR) activities, and they find that the initiation on voluntary disclosure of CSR leads to a reduction of the cost of equity capital. Yet, they find that initiating firms are more likely to appreciate this benefit than others.

In the Swiss market, Petrova et al. (2012) reinforce the idea that more corporate voluntary information disclosed attracts more long-term investors. Yet, it influences positively the market value capitalization of a firm. Using the Residual Income Value (RIV) to estimate the cost of equity, their results signalize a negative association with the voluntary corporate disclosure. Their findings are robust even when controlled for firm characteristics such as size, risks, leverage and also for the accounting policy, through the aggressiveness or conservatism level. However, regardless of the variables used, verifying the results in different environment is important (HAIL; LEUZ, 2006).

Under this scenario, Mendes-da-Silva, Onusic and Bergmann (2014) examine the same issues seen in Petrova et al. (2012), and they find that, even using four proxies much for level of disclosure via web (e-disclosure) as for cost of capital, there was no significant relation for any metrics. Controlling for accounting policy, they find a quite higher level of cost of capital for one of the four metrics. Yet, results show that companies listed on the highest different level of Corporate Governance, as mentioned above, are more likely to perceive a decrease in the cost of equity capital.

Assuming that the level of disclosure indicates an information asymmetry reduction, Calhau (2012) examines whether the information asymmetry is negatively associated with the cost of equity capital, but results did not allow him to affirm it. It should be noted that, in this situation, asymmetry was represented by the probability of informed trading (PIN).

Yet, using the same metric to capture information asymmetry, Martins et al. (2013) relating to asymmetry on listed companies in Bovespa, identified that, in the biennium 2010/2011, variables related to return, liquidity, volatility, size and cost of capital were factors associated to bigger informational asymmetry. And it allows the understanding that disclosure of information is related to characteristics of companies.

Alencar (2005) finds no evidence of a negative relation between voluntary disclosure and cost of capital, among 222 common and preferred shares of non-financial wide held Brazilian companies. However, the author prefers to use cross-sectional data not to discard an expressive number of observations. To this end, she selected only data from financial reports in December, 2003 and also the Beta in the end of April, 2004.

Lopes and Alencar (2010) use only the 50 most liquid shares of Alencar's (2005) sample and, as a proxy for voluntary disclosure level, they developed a Brazilian Corporate Disclosure Index for the same set of shares for the years of 1998, 2000, 2002, 2004, and 2005. At this time, they find evidences according to the expectation, reinforcing the notion that in a low-level disclosure environment, an increase in the disclosure level shifts the risk down.

This research design starts following the illustration 1:

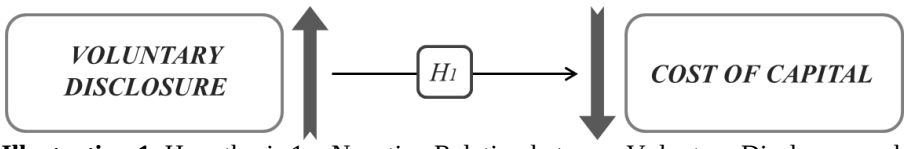

Illustration 1: Hypothesis 1 – Negative Relation between Voluntary Disclosure and Cost of Capital

Therefore, this study tests the following hypothesis:

H_1: The level of voluntary disclosure is *negatively* and significantly associated with the cost of capital.

2.2 FIRM LIFE CYCLE

There has been a recent interest in the awareness about the impact of the firm life cycle in the finance literature. Hasan et al. (2015, p. 48) state that "The firm life cycle has

important implications in management and business strategy". The firm theory assumes that, during its life, a company interacts with many others interested parties to reach its goals (MILLER; FRIESEN, 1980). In this sense, Dickinson (2011) argues that the life of a firm is influenced by internal (as strategy choices and financial resources) and external environments (as macroeconomic factors).

Taking into account the internal environment, Mueller (1972) considers the uncertainty as the most inherent problem of an introducing firm, for example. Then, it is an entrepreneurs' responsibility to take decisions to rapidly quit this stage. He argues that reaching the growth stage is more important than profitability for a while. It involves "information, intuition, courage or luck to make correct investment decisions in the face of uncertainty" (MUELLER, 1972, p. 200). Therefore, it seems to be plausible that the expansion key relies on the ability to process useful information.

It is notable that market competition is totally into this subject, because for a one-product firm, for example, all of the differentials developed for that product may go away after rivals just copy the success recipe, if it is possible. To this end, firms tend to engage in a mix of products, seeking to reach a diversification in a way to downshift the risk, as in the Markowitz's (1952) portfolio selection.

Dedman and Lennox (2009) find evidence that managers are more likely to retain information when they realize the presence of a strong rival in the market. Then, the level of private information varies over inherent characteristics of a firm. Yet, companies resort to an arrangement of resources to expand it and to be attractive to new entrants, in the capital markets, and also via financial suppliers, pursuing a low interest rate (HUANG; LI, 2014).

In this sense, managers have to show financial situation as well as they can to reach these goals, and it includes private information. Then, it seems to be considerable to study the influence of life cycle on the voluntary disclosure level.

2.3 LIFE CYCLE AND VOLUNTARY DISCLOSURE

Verdi (2005) examines the number of analysts as a proxy for the amount of public information and he maintains that more analysts' coverage entails less information asymmetry. It is possible to presume that coverage is also associated with more disclosure of information. Hasan et al. (2015) argue that growing companies have incentives to shift up the level of private information through voluntary disclosure to attract the attention of market analysts. Huang and Li (2014) also suggest that market pressures motivate firms to improve their disclosure level up to the following stage until reaching the steady state phase (maturity).

Verdi (2005, p. 8) states that "analysts are an important source of information for investors; they issue forecasts, reports about individual companies, and stock recommendations". Hasan et al. (2015) explain that market analysts tend to be attracted by growth firms because this kind of company carries potential benefits of a future success and it interests to long-term investor that, in turn, will need the analysts' knowledge. Furthermore, according to Jenkins and Kane (2004) and Mueller (1972), firms in introducing and growing stages are characterized by the need of capital expenditure and then, they use to focus on sales growth.

On the other hand, Dickinson (2011) argues that mature firms are characterized by the necessity to maintain their levels of sales and focus, instead, on profitability. Hasan et al. (2015) also comment that mature firms use to appreciate superior advantages compared with initials stages. Once the company is already known in the market, in this phase, it tends to be more closely covered by analysts and investors.

Recently, Lima et al. (2015) investigate the effects of life cycle stages on earnings quality measured by conservatism, earnings management and earnings persistence on Brazilian public companies. The results show, for example, growing firms realize more earnings persistence than declining ones, and also mature firms present more earnings persistence than the others. It denotes companies try to improve their levels of earnings quality in a pursuit of investors, including the attempt through the increasing of the voluntary disclosure level (FRANCIS; NANDA; OLSSON, 2008).

Illustration 2 represents the development of the hypothesis 2 on the research design:

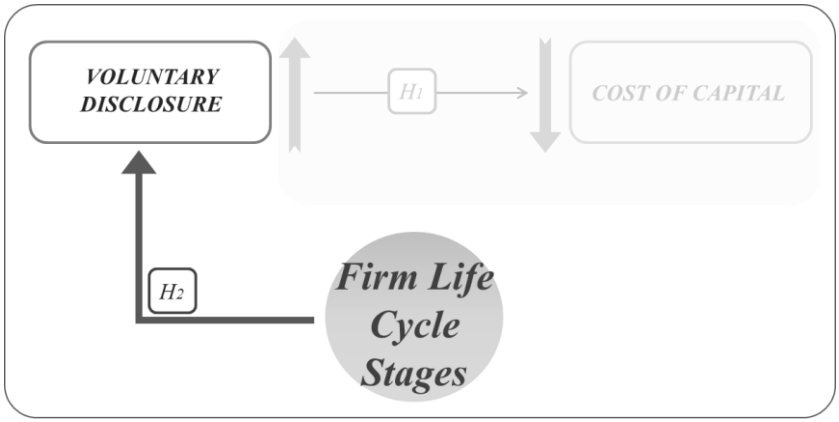

Illustration 2: Hypothesis 2– The voluntary disclosure level grows until reaching the mature stage of the firm life cycle and then it declines

Hence, taking account the cost of information, companies out of growth and maturity stages – understood as the most comfortable stages - might not be interested in spending resources with voluntary information. Hence, it is plausible to expect that:

H_2: The voluntary disclosure level grows until reaching the mature stage of the firm life cycle and then it is expected to decline.

The expectation about shake-out and decline is implicit, since I expect the voluntary disclosure index in maturity to be higher than in the others. The understanding relies on an expected variation of voluntary disclosure level across the stages, even though the main metric used to capture these stages assumes a non-linear progression of the firm life cycle through time (this issue is better discussed in 3.2.2).

2.4 LIFE CYCLE AND COST OF CAPITAL

Based on the growth theory, Berger and Udell (1998, p. 613) argue that "firms are viewed through a financial growth cycle paradigm in which different capital structures are optimal at different points in the cycle". In this sense, Mueller (1972) states that the cost of equity capital decreases significantly for the first stages of intensive growth in the extent of the initial uncertainty are mitigated.

Hasan et al. (2015, p. 47) comment that "investment and financing decisions and operating performance of the firm are greatly influenced by the change in the firm's organizational capabilities (life cycle stages)". Their study uses a sample of Australian

listed firms from 1990 to 2012 and it finds significant differences in cost of equity capital over the firm life cycle stages. They posit that firms possess and allocate resources to achieve superior advantage over others.

The illustration 3 represents the development of the hypothesis 3 in the research design:

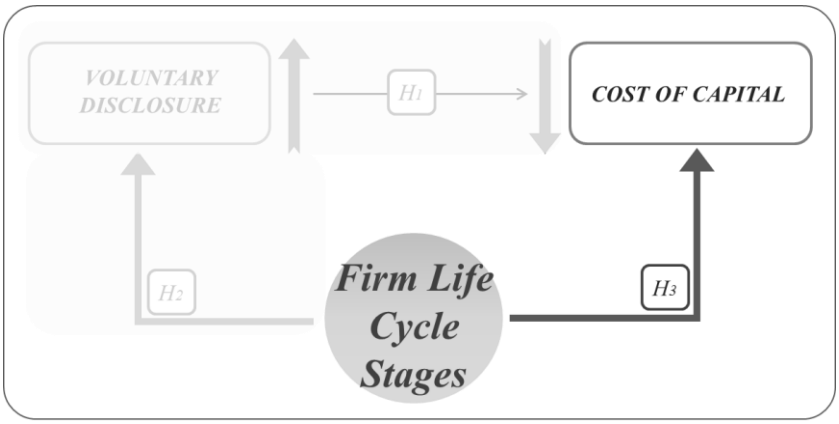

Illustration 3 - Hypothesis 3– The cost of capital decreases until reaching the mature stage of the firm life cycle and then it increases.

The expectation about the other stages is implicit again, since it is expected a fading from introduction to maturity and then another increase. The understanding relies on an attempt to an optimal level of cost of capital once the firm achieves the mature phase when the firm realizes its best structure.

Hence, once growing companies try to differentiate it among other firms through an optimal resource structure, and also considering that mature firms tend to keep it at a steady state phase of profitability (DICKINSON, 2011), it is expected that:

***H3*: The cost of capital decreases until reaching the mature stage of the firm life cycle and then it increases.**

2.5 LIFE CYCLE, VOLUNTARY DISCLOSURE AND COST OF CAPITAL

Few studies control the relation between disclosure and cost of capital through different arguments. Armstrong et al. (2011) find that when the competition level is low, companies with high information asymmetry realize low cost of capital. Instead, controlling for high level of competition, there is no difference in the cost of capital compared with the other group.

Francis et al. (2008) extend Botosan's (1997) study, investigating the relation between voluntary disclosure and cost of capital controlling for earnings quality. They build an index for disclosure with a sample of 677 American firms in the period between 1991 and 2001. For earnings quality, they test accruals quality, earnings variability and the absolute value of discretionary accruals. Cost of equity capital is mainly obtained by deriving the Value Line data.

They find that earnings quality weakens the classical (and proved) negative relation between voluntary disclosure and cost of capital, denoting that, on average, for a higher information quality firm, a higher level of disclosure does not lead to a reduction in the cost of capital. The argument is that, in this situation, cost of capital is not driven by disclosure choices, but rather by better earnings quality, once the conditioning variable maintains it significant and positive. High quality of accounting information, together the control variables into the regression, tends to explain the variation in the cost of capital better than voluntary disclosure.

Huang and Li (2014) analyze the effect of competition on voluntary disclosure, and also how this relation varies across industry life cycle stages. The idea is that companies in more competitive industries can offset their disadvantages in market by increasing information given to market, aiming at more transparency to reduce risk, which tends to result in reduction of cost of capital and also in greater access to funding (LEUZ; SCHRAND, 2009; SHLEIFER, 2004).

According to Armstrong et al. (2012) and Hasan et al. (2015), introducing firms tend to initiate their activities with a higher information asymmetry, which denotes a less analyst coverage. In turn, it shifts the inherent risk up, enhancing the cost of capital. On the other hand, as firm grows, it tends to be recognized by the market, attracting attention of market analysts, which, in turn lead to a reduction of risk and, consequently, to a reduction of the cost of capital.

At this moment, the illustration 4 below concludes the development of the hypothesis 4 on the research design:

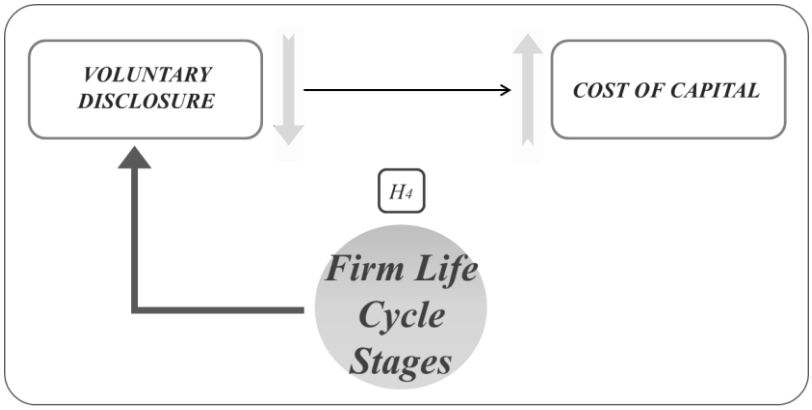

Illustration 4 - Hypothesis 4 – Relation between Cost of Capital and Voluntary Disclosure Controlled by Firm Life Cycle Stages.

Therefore, I investigate whether:

***H4*: Controlling for life cycle, the level of voluntary disclosure of firms in growing and mature stages will signalize more reduction in the cost of equity capital than in other stages.**

3 RESEARCH DESIGN

3.1 SAMPLE AND DATA

This study uses the Comdinheiro® database for economic and financial data of Brazilian public companies, and it uses I/B/E/S database, from Thomson Reuters® for analysts' information. The sample is drawn from the population of companies listed on the São Paulo Stock Exchange (BOVESPA), covered by analysts between 2008 and 2014, according to data selection process, as table 1 shows:

Table 1 - Sample Selection Process

STEPS OF DATA SELECTION	**NUM OBS**
Companies with shares traded in Bovespa, extracted from Comdinheiro®	2.751
(-) Companies dropped due not to report values for Cash Flows Statement	(150)
(-) Companies dropped due not to belong to the Voluntary Disclosure Index	(2.004)
Amount of Observation in Disclosure Sample (1st)	***597***
(-) Companies dropped due not to report values for Implied Cost of Capital Model	(61)
Amount of Observation in Cost of Capital Sample (2nd)	***536***

This period deserves attention because of two reasons: In 2008, Brazil started the IFRS adoption; and also because of the impact of the World financial crisis which lasted until 2009. It is noteworthy that the full adoption of International Standards was only required for Brazilian setters in 2010, also requiring the disclosure of Cash Flow Statement that was voluntary before 2010.

Furthermore, the first sample is reduced in 10.22% due to market information needed such as current stock price, payout ratio, book value of share and other information to the calculation of Gebhardt's (2001) model of Implied Cost of Capital (as explained in 3.2.1), then I build the second sample, even though the first one is already linked with analyst data because of the Voluntary Disclosure Index constraints.

3.2 VARIABLES DEFINITION

3.2.1 Implied Cost of Capital - *ICC*

The study proposes the use of the Implied Cost of Capital (*ICC*) as dependent variable, investigating whether and how voluntary disclosure is related with the ICC ($\boldsymbol{H_1}$) and also after controlling for corporate life cycle ($\boldsymbol{H_4}$). However, there is no concern about the best proxy for Cost of Capital.

Some authors would rather use the Capital Asset Pricing Model – CAPM (BOTOSAN, 1997; GONÇALVES et al., 2013; LOPES; DE ALENCAR, 2010), while other studies prefer to use alternative methods to capture the cost of capital (COSTI; SOARES, 2014; GEBHARDT et al., 2001; HAIL; LEUZ, 2006; MENDES-DA-SILVA; ONUSIC; BERGMANN, 2014). The main proxy in this study is based on accounting number, according to the previous authors, but, in sensitivity and robustness tests, I use some other proxies, since this study does not intend to indicate the best one.

I follow Gebhardt et al. (2001) and Hail and Leuz (2006) to calculate the implied cost of capital - ICC, based on Residual Income Model (OHLSON, 1995). The ICC is understood as the required rate of return to maintain a company's optimal capital structure. In investment decision, it is also the hurdle rate to screen the project. Then, it

calculates the rate the market uses to reach the current stock price, using the following equation:

$$V_t = bv_t + \sum_{\tau=1}^{\infty} E_t\left[\frac{x_{t+\tau} - r.bv_{t+\tau-1}}{(1+r)^{\tau}}\right] = bv_t + \sum_{\tau=1}^{\infty} E_t\left[\frac{(ROE_{t+\tau} - r)bv_{t+\tau-1}}{(1+r)^{\tau}}\right] \quad (1)$$

Where $\boldsymbol{bv_t}$ is the accounting book value of share on date t; $\boldsymbol{E_t}[.]$ represents the expected value operator conditioned on information available on date t; $\boldsymbol{x_t}$ is the accounting earning for period (t-1, t); $\boldsymbol{r}$ is the discount rate; $\boldsymbol{ROE_t}$ is the after-tax return on book value of equity for period (t-1, t).

According to Hail and Leuz (2006), the firm value is equal to the accounting book value plus an infinite sum of residual incomes discounted to present value at a discount rate $\boldsymbol{r}$. They argue that no reference to dividend is required, since this model assumes the Clean Surplus Relation (CSR), that is based on the dividend irrelevance theory (MILLER; MODIGLIANI, 1961).

Equation 1 demands a series of residual future earnings to measure the intrinsic value of the firm (V_t). Practitioners and researchers, however, according to Gode and Mohanram (2003), use a series of finite horizon of forecasted earnings plus a terminal value. Following Gebhardt et al. (2001) and Hail and Leuz (2006), I use a three-stage approach to calculate the intrinsic value in a finite horizon of twelve years plus the terminal value, as it follows:

The *first* step is to use of explicit earnings forecast for the next three years; the s*econd* derives earnings forecasts by linearly fading year t+3 return on equity (ROE) to the median market (industry) ROE by year t+3; *The third* calculates the intrinsic value of the firm by assuming the latest residual income as a perpetuity (terminal value). This leads to the following equation 2:

$$P_t = bv_t + \sum_{\tau=1}^{n}\left[\frac{\hat{x}_{t+\tau} - r_e.bv_{t+\tau-1}}{(1+r)^{\tau}}\right] + \sum_{t=n+1}^{\tau}\left[\frac{\hat{x}_{t+\tau} - r_e.bv_{t+\tau-1}}{(1+r)^{\tau}}\right] + \left[\frac{\hat{x}_{t+\tau+1} - r_e.bv_{t+\tau}}{r_e(1+r)^{\tau}}\right] \quad (2)$$

Where $\boldsymbol{P_t}$ is the median of stock price of the firm at data *t;* $\boldsymbol{\hat{x}_{t+\tau}}$ is the expected future accounting earnings for period (t+τ-1, t+τ), either explicitly forecasted, generated by a linear fading rate or assumed to be constant; $\boldsymbol{r_e}$ represents the estimate of the ex-ante cost of capital calculated as the internal rate of return to solve the equation; and expected future accounting book value of equity at date t+τ, where $bv_{t+\tau} = bv_{t+\tau+1} + \hat{x}_{t+\tau} - \hat{d}_{t+\tau}$ and $\hat{d}_{t+\tau}$ corresponds to the expected future net dividends for period (t+τ-1, t+τ), derived from the dividend payout ratio k times the earnings forecast $\hat{x}_{t+\tau}$.

Therefore, it calculates[1] the intrinsic rate of return in this residuals earnings flow plus the terminal value to reach the current stock price at the last work day of April, considering all accounting information had already been published by that time.

Hail and Leuz (2006) use forecasted earnings of two year ahead (FY1 and FY2) and the long term growth rate (LTG) to calculate the third year. But, consistently with the data available on I/B/E/S® database, from Thomson Reuters®, using of the forecasted three year ahead (FY3) directly as an input of the third year in the equation leads to a minor loss of data.

3.2.2 Voluntary Disclosure Index

I use a voluntary disclosure index developed by Rodrigues (2014), which was formally required and kindly provided by the author. Based on national and international literature[2], 38 attributes were collected in an amount of 1,406 annual reports, among foot notes and management reports, of a sample comprised of 703 observations of non-financial companies covered at least by one market analyst, between 2006 and 2013, which were properly tested and analyzed to be used as a proxy of full voluntary disclosure (*Discl*). Therefore, I update this index with information of 2014 for the same set of firms.

Therefore, the index information was divided into Economic and Financial Voluntary Disclosure (*EFDiscl*) - comprised of 25 items, and also Social and Environmental

[1] Appendix A shows an example of a calculation of one firm-year observation using the Solver.
[2] Attachment provides the theoretical background for the attributes of the voluntary disclosure index.

Voluntary Disclosure (*SEDiscl*), which, in turn, is comprised of 13 remaining items. The calculation is based on the frequency scaled by the total of the corresponding group.

3.2.3 Life Cycle Stages

The research design demands the investigation about whether there are differences on voluntary disclosure index over the firm life cycle stages. To this end, it must use a proxy on the definition of each stage. Some studies have proposed different ways to define the stage which the company is in. The study of Anthony and Ramesh (1992) was one of the first to propose a model which demonstrates the utility of life cycle theory in the explanation of market performance. Their model demands a set of financial information (Capital expenses; Sales growth; Payout dividend; and Age). After that, the firms are segregated in quintiles to perform the classification in *growth*, *maturity* and *stagnant* stages.

Dickinson (2011), in turn, uses the Cash Flow Statement patterns in the model allowing it to get five different stages (*Introduction, Growth, Maturity, Shake-Out* and *Decline*). The author states that "a benefit of the cash flow pattern proxy used in this paper, is that it uses the entire financial information set contained in operating, investing, and financing cash flows rather than a single metric to determine firm life cycle" (DICKINSON, 2011, p. 9).

Panel 1 presents the eight possible combinations of signals to identify the five life cycle stages:

Cash Flow	Intro	Growth	Mature	Shake-out			Decline	
From ***Operating*** Activities	-	+	+	-	+	+	-	-
From **Investing** Activities	-	-	-	-	+	+	+	+
From **Financing** Activities	+	+	-	-	+	-	+	-

Panel 1 - Combination of Cash Flows Signals
Source: Dickinson (2011)

One of the attributes in favor of using this model is the simplicity in operationalization, because it demands only information of a single and mandatory statement for those

companies included in the sample. There are other ways to measure life cycle stages, such as Anthony and Ramesh's (1992) method, however Hasan et al. (2015, p. 50) suggest in the 5th footnote that

> (1) This classification scheme requires at least 6 years of data availability for each firm, which reduces our sample size significantly, (2) the life cycle proxy in this procedure is 'ad hoc' and relies on portfolio sorts to classify the firm in different life cycle stages, and (3) Dickinson (2011) showed that life cycle classification based on Anthony and Ramesh's (1992) procedure leads to an erroneous classification of firm life cycle stages.

In this study, the sample also faces this problem. The mentioned metric demands an amount of observation bigger than it is available, considering the database is unbalanced. Then, I follow the suggestion by Hasan et al. (2015) in which Dickinson's model is more objective and it better fits this sample.

3.3.4 Control variables

Control variables are included in the model to reduce problems caused by omitted variables to isolate their effects of interest independent variable on dependent variables (FÁVERO et al., 2009). According to the literature, it uses the following variables:

- ***SIZE***, measured by the natural logarithm of total assets in the year-end. According to Agarwal and O'Hara (2007), bigger companies tend to appreciate less information asymmetry. Implicitly, it is due to more reporting of voluntary information, taking into account the complexity of contracts and the requirement for greater transparency with investors, and also more analysts' coverage. Yet, Fama and French (1992) find expected returns are negative associated with size, which is also found in Botosan (1997) and in Al-Hadi, Taylor and Hossain (2015). Then, bigger firms are also expected to realize lower level of ICC;

- ***MTB***, which means the Market-to-Book ratio, indicating the growth opportunity measured by the market. Martins, Paulo and Albuquerque (2013) posit that firms with lower MTB ratio are expected to present more information asymmetry. Then, it is plausible to expect the opposite, that is, higher MTB ratio is positively associated with higher level of voluntary disclosure. And consistent to the idea of capturing the market

expectation about the future of the company, MTB is also expected to be negatively associated with the implied cost of capital.

- ***LEVERAGE*** is measured by short and long term loans and financing divided by the total asset. According to Fama and French (1992), leveraged firms use to face more agency problems, incurring higher agency costs. Then, considering they intend to satisfy the investors with information about the cost of raising capital (LAN et al., 2013), it is expected to be positively associated with voluntary disclosure.

- ***BETA*** represents the inherent risk of the company. It is measured by the covariance between company and market 60 daily realized returns divided by the market return variance. According to Botosan (1997) and Leuz and Verrecchia (2007), for example, it is expected to be positively associated with the cost of capital and negatively associated to disclosure of information.

3.3.5 Econometric Issues

3.3.4.1 Linear Regression – Cost of Capital and Voluntary Disclosure

The first hypothesis (H_1) to be tested is that higher voluntary disclosure leads to a reduction of the implied cost of capital. Then, I regress the following model, including some control variables to mitigate some possible problems in this relationship. It is noteworthy that I regress three models changing β_1 for the specific indexes of voluntary disclosure (Economic and Financial – *EFDiscl* – and Social and Envionmental – *SEDiscl*):

$$ICC_i = \beta_0 + \beta_1 Discl_i^j + \beta_2 Size_i + \beta_3 MTB_i + \beta_4 Lev_i + \beta_6 Beta_i + \varepsilon_i \qquad (3)$$

Where: ICC_i is the Implied Cost of Capital, $Discl_i^j$ represents the three j variables of voluntary disclosure as mentioned above; $Size_i$ represents the size, measured by the natural logarithm of total asset in the year-end; MTB_i means the Market-to-Book ratio, which denotes the growth opportunity measured by the market; and $Beta_i$ represents

the inherent risk of the company. It is included to check the consistence of the estimated Implied Cost of Capital.

According to the arguments presented in 2.1, β_1 is expected to be significant and negative, denoting companies that engage in higher voluntary disclosure are benefitted by a reduction in the cost of capital.

3.3.4.2 t-test (Mean test) – Voluntary Disclosure across Firm Life Cycle

Before discussing regression issues for these variables, I examine through a t-test whether there are statistical differences among the voluntary disclosure indexes, testing all the life cycle stages combinations.

3.3.4.3 Linear Regression – Voluntary Disclosure and Firm Life Cycle

In order to assess the differences between the indexes across life cycle stages, I run the following regression model, including some control variables:

$$Discl_i^j = \beta_0 + \beta_1 Intro_i + \beta_2 Grow_i + \beta_3 Shake_i + \beta_4 Decl_i + \beta_5 Size_i + \beta_6 MTB_i + \beta_7 Lev_i + \beta_8 Beta_i + \varepsilon_i \quad (4)$$

Where $Discl_i^j$ represents the full voluntary$Discl_i^j$ represents the three j variables of voluntary disclosure as mentioned in 3.3.4.1 ; $Intro_i$ means the ith-company belonging to the *Introduction* stage; Mat_i for *Maturity* companies; $Shake_i$ for the stage of *Shake-out;* and $Decl_i$ for those companies into the *Decline* phase according to Dickinson (2011). The stage with higher number of observation (maturity) is the reference dummy variable (intercept).

Following the theoretical framework presented in 2.3 and considering that all dummy variables have to be interpreted in relation to the maturity stage, β_2 is expected to be significant and negative, denoting the level of voluntary disclosure increase from Growth to Maturity stage. Implicitly, it is also expected that the other stages present lower levels of voluntary disclosure.

3.3.4.4 Linear Regression – Implied Cost of Capital and Firm Life Cycle

To investigate whether the cost of capital varies across the life cycle stages (*H3*), I run the following regression model:

$$ICC_i = \beta_0 + \beta_1 Intro_i + \beta_2 Grow_i + \beta_3 Shake_i + \beta_4 Decl_i + \beta_5 Size_i + \beta_6 MTB_i + \beta_7 Lev_i + \beta_8 Beta_i + \varepsilon_i \quad (5)$$

According to the argument presented in 2.4 and considering that all dummy variables have to be interpreted in relation to the maturity stage that β_2 is expected to be significant and positive, denoting that firms realize lower cost of capital once they leave the initial phase and reach the maturity stage. Implicitly again, it is also expected that the other stages present higher levels of voluntary disclosure.

3.3.4.5 Linear Regression – Implied Cost of Capital, Voluntary Disclosure Controlling for Firm Life Cycle

To assess the main hypothesis of this study (*H4*), the Implied Cost of Capital is regressed against Voluntary Disclosure controlling for firm life cycle stages, as it follows:

$$ICC_i = \beta_0 + \sum_{j=1}^{5} \beta_j LC_i * Discl_i^j + \beta_6 Size_i + \beta_7 MTB_i + \beta_8 Lev_i + \beta_9 Beta_i + \varepsilon_i \quad (6)$$

To the best of my knowledge there is no previous study explicitly guiding the impact of life cycle on the relation between voluntary disclosure level and cost of capital. The arguments presented specifically in 2.5 convey the idea that β_2 and β_3 are expected to be the most negative and significant coefficient, which means that firms are more benefitted by disclosing voluntary information when they are in growing and mature stages.

4 RESULTS

4.1 DESCRIPTIVE ANALYSIS

The descriptive statistics are show on table 2 for the sample segregated by the five life cycle stages and also in general.

Table 2 - Descriptive statistics for all variables segregated for firm life cycle

Stage	Stats	ICC	Discl	Efdiscl	Sediscl	Size	MTB	Liquidity	Lev	Beta
Introduction	*N. Obs*	76	84	84	84	84	83	83	79	84
	Mean	0.1414	0.2043	0.2103	0.1822	15.0635	1.7017	0.6725	0.3490	0.5430
	SD	0.1404	0.0968	0.0750	0.1928	1.2109	1.3915	1.3558	0.1438	0.6663
	Min	0.0284	0.0411	0.0556	0.0000	11.5600	0.0000	0.0000	0.0590	0.0000
	Q1	0.0733	0.1233	0.1667	0.0000	14.3750	0.8600	0.0400	0.2639	0.0000
	Med	0.1098	0.1747	0.1944	0.1538	15.0400	1.3700	0.2000	0.3293	0.0350
	Q3	0.1572	0.2877	0.2500	0.3077	15.8500	2.0300	0.8300	0.4273	1.1100
	Max	1.0792	0.4316	0.3889	0.6923	19.4300	8.4000	8.4000	0.7339	1.9400
Growth	*N. Obs*	184	202	202	202	202	200	200	190	202
	Mean	0.1038	0.2852	0.2720	0.3142	15.7017	2.6554	0.9170	0.3689	0.6546
	SD	0.0632	0.1235	0.1022	0.2175	1.5628	3.0393	1.8193	0.1470	0.5228
	Min	0.0168	0.1028	0.1111	0.0000	12.2600	0.0000	0.0000	0.0512	0.0000
	Q1	0.0666	0.1850	0.1944	0.1538	14.5800	1.0250	0.0900	0.2515	0.0200
	Med	0.0925	0.2672	0.2639	0.3077	15.4150	1.7300	0.3550	0.3767	0.6400
	Q3	0.1322	0.3699	0.3333	0.4615	16.7100	2.8700	0.7550	0.4761	1.0900
	Max	0.5806	0.6165	0.5833	0.7692	20.4400	21.1800	15.1700	0.7372	2.0600
Maturity	*N. Obs*	243	262	262	262	262	256	256	243	262
	Mean	0.1093	0.2978	0.2795	0.3409	15.3483	3.9432	1.1098	0.2928	0.5888
	SD	0.0768	0.1186	0.0925	0.2212	1.5477	7.0163	3.3100	0.1507	0.6771
	Min	0.0091	0.0822	0.1111	0.0000	7.1700	0.0000	0.0000	0.0001	-0.0100
	Q1	0.0558	0.2055	0.1944	0.1538	14.1700	1.1450	0.1150	0.1848	0.0900
	Med	0.0987	0.3083	0.2778	0.3846	15.2450	1.8800	0.4300	0.2686	0.4950
	Q3	0.1452	0.3905	0.3333	0.4615	16.4400	4.0400	0.8100	0.3898	0.8500
	Max	0.6476	0.6165	0.5833	0.7692	19.4900	85.3400	42.8800	0.6889	7.5900
Shake-out	*N. Obs*	21	31	31	31	31	30	30	28	31
	Mean	0.1095	0.2287	0.2267	0.2283	15.3471	10.0593	0.8350	0.2601	0.5558
	SD	0.0529	0.0974	0.0766	0.1920	2.0876	45.4546	0.8371	0.1525	0.5678
	Min	0.0001	0.0617	0.0833	0.0000	12.3800	0.1800	0.0000	0.0010	0.0000
	Q1	0.0630	0.1439	0.1944	0.0769	13.9500	1.0600	0.0900	0.1264	0.0000
	Med	0.1216	0.2055	0.2222	0.1538	14.5200	1.5650	0.6050	0.3093	0.4100
	Q3	0.1436	0.3083	0.2778	0.4615	16.4800	2.7600	1.4000	0.3621	0.9400
	Max	0.2233	0.4521	0.4167	0.6154	20.2700	250.6600	2.8900	0.4937	1.9600
Decline	*N. Obs*	12	16	16	16	16	16	16	13	16
	Mean	0.1639	0.2043	0.2101	0.1827	15.5506	1.4463	1.0675	0.3323	0.9781
	SD	0.1156	0.0854	0.0582	0.2118	0.9079	0.9051	0.9168	0.0874	0.8720
	Min	0.0363	0.1028	0.1389	0.0000	12.6900	0.3000	0.2400	0.2044	0.0000
	Q1	0.0737	0.1336	0.1528	0.0000	15.2600	0.6950	0.3400	0.2486	0.0000

	Med	0.1204	0.1850	0.2222	0.1154	15.9300	1.3950	0.7900	0.3445	1.4700
	Q3	0.2363	0.2775	0.2500	0.3846	16.0500	1.9650	1.4450	0.4019	1.6900
	Max	0.3754	0.3494	0.3333	0.6923	16.5500	3.5300	3.5300	0.4831	2.2300
Total	*N. Obs*	536	595	595	595	595	585	585	553	595
	Mean	0.1132	0.2742	0.2626	0.2993	15.4335	3.4302	0.9666	0.3263	0.6134
	SD	0.0859	0.1206	0.0956	0.2216	1.5403	11.4300	2.4999	0.1517	0.6299
	Min	0.0001	0.0411	0.0556	0.0000	7.1700	0.0000	0.0000	0.0001	-0.0100
	Q1	0.0630	0.1644	0.1944	0.0769	14.4100	1.0400	0.0900	0.2248	0.0000
	Med	0.1012	0.2672	0.2500	0.3077	15.2800	1.7000	0.3700	0.3097	0.5200
	Q3	0.1411	0.3699	0.3333	0.4615	16.4000	2.9300	0.8300	0.4248	1.0100
	Max	1.0792	0.6165	0.5833	0.7692	20.4400	250.6600	42.8800	0.7372	7.5900

Notes: ***(i)*** $\boldsymbol{Size_i}$ represents the size, measured by the natural logarithm of total asset in the year-end; ***(ii)*** $\boldsymbol{MTB_i}$ means the Market-to-Book ratio, which denotes the growth opportunity measured by the market; ***(iii)*** $\boldsymbol{Lev_i}$ represents the leverage of the firm *i* the year-end; and ***(iv)*** $\boldsymbol{Beta_i}$ represents the inherent risk of the company. It is included to check the consistence of the estimated Implied Cost of Capital.

Regarding the distribution format, I compare the mean with the median and I observe, in the full sample, the inexistence of expressive differences for the interest variables, the *Implied Cost of Capital* and the *Indexes of Disclosure*, even when it is segregated into the stages, which indicates a symmetric distribution. Instead, *Market-to-Book* presents such differences across the stages. Going further, in Shake-Out stage, the variable *Market-to-Book* presents a mean of 10.05 and a median of 1.56, which denotes an asymmetry in their distribution.

It is also observable that the *Leverage* index mean decreases from Introduction to Mature and then it increases in *Shake-Out* and *Decline* stages, which signalizes that the assets of mature firms are less financed by liabilities than in other stages. Since this firm is already performing positive operational cash flow, it has reached the optimal structure of resource.

I observe, in total, a high standard deviation for the variable *Market-to-Book* (11.43), and it apparently denote a presence of outliers, which can disturb the coefficient significance into the regressions. Checking these issues in specifics groups, I observe the stage of *Shake-Out* is the one that drives the high variance of Market-to-Book, presenting a standard deviation of 45.45 for a mean of 10.05, that is, a variation coefficient ($\sigma/\bar{x}$) of 452%.

Illustration 1 shows the means and medians distribution of the voluntary disclosure indexes across the firm life cycle stages.

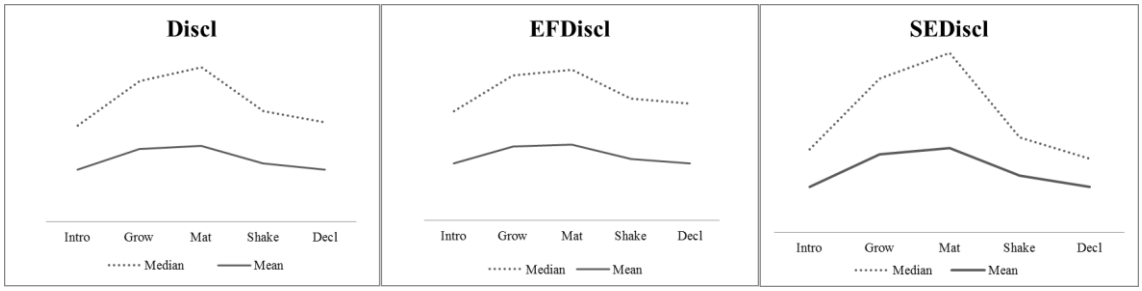

Illustration 1 – Means and medians of voluntary disclosure indexes across the stages
Notes:$\boldsymbol{Discl_i}$ represents the full voluntary disclosure index and also the two segregation of it (Economic and Financial Voluntary Disclosure - ***EFDisc*** and Social and Environment Voluntary Disclosure – ***SEDiscl***)

Before the appropriated regressions test the coefficient values for the indexes across the stages, the graphics show parabolic curves for all the three indexes of voluntary disclosure. However, I see that the graphic of full index (*Discl*) suggests the existence of non-linear differences between mean and median values in the stages of growth and maturity, compared with the other stages. Apparently, these differences are even more observable in *EFDiscl* and *SEDicl*. Moreover, in Social and Environment Disclosure Index, the values of mean and median are closer in initial and final stages.

I also compare the mean with the median for the variable Implied Cost of Capital – ICC. Illustration 2 shows these differences:

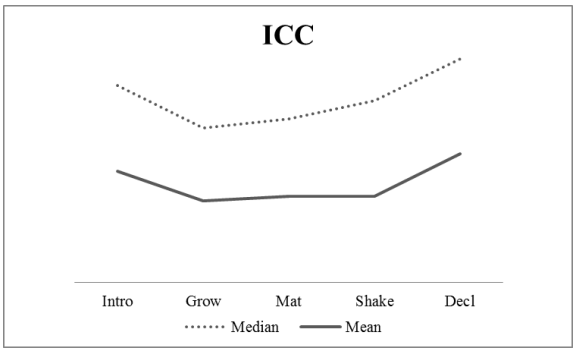

Illustration 2 - Means and medians of voluntary disclosure indexes across the stages

I notice that the differences between mean and median values of ICC are constant across the stages. Predictably, the stages of introduction and decline present higher levels of cost of capital than other stages. Yet, although graphic analysis works only as an initial

examination, it does not point at a convex curve. However, the number of observation for each stage may support the understanding of this analysis.

4.2 CROSS TABULATION

Table 3 presents the contingency of observation across the life cycle stages in each year of the sample:

Table 3 – Cross tabulation for number of observation across life cycle stages and across time

Year	Stage					Total
	Introduction	Growth	Maturity	Shake-Out	Decline	
2008	17	35	30	4	0	86
2009	12	28	39	4	3	86
2010	15	24	42	1	3	85
2011	12	33	33	3	5	86
2012	13	35	35	2	1	86
2013	9	28	36	9	3	85
2014	6	19	47	8	1	81
Total	**84**	**202**	**262**	**31**	**16**	**595**

The distribution of data across time and stages suggests that the number of observation in growth and maturity phases is greater than others, representing together 78% of the total (595). Significantly, this distribution is influenced by the metric used. Dickinson (2011, p. 10) arguments:

> "a firm is a portfolio of multiple products, each at potentially a different product life cycle stage. Substantial product innovations, expansion into new markets or structural change can cause firms to move across life cycle stages non-sequentially".

The illustration 1 shows four examples of this stages transition across time:

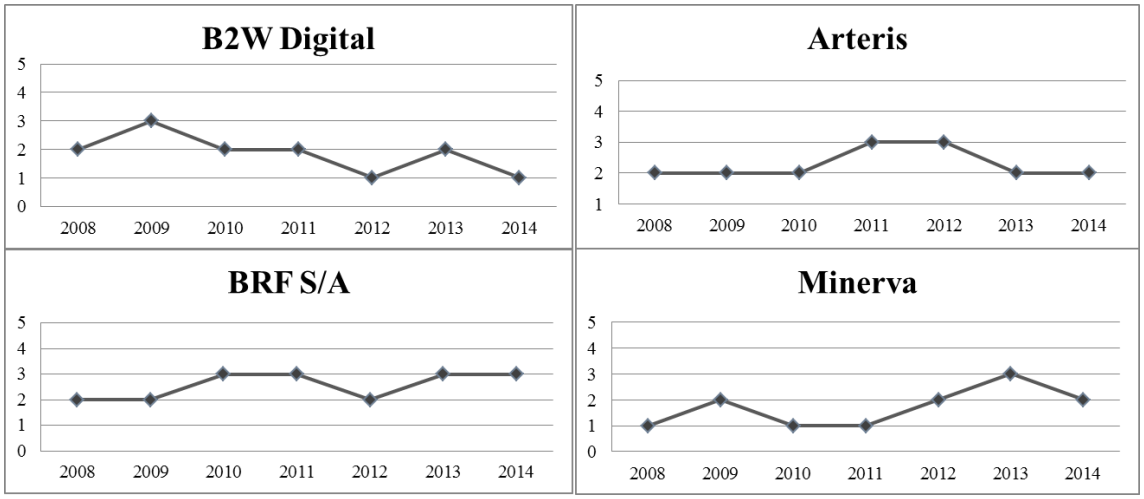

Illustration 5 – Examples of non-sequentially transition across time.
Notes: 1 – introduction; 2 – growth; 3 – maturity; 4 – shake-out; and 5 - decline

The illustration shows different companies from distinct industries that realize the change in life cycle stage classification across time. It also means there is not an obligation of a forward progression from introduction stage to the decline stage. For example, The Company Minerva is classified as introduction in 2008, in growing in 2009, and one year after, it is classified in the introduction stage again.

Taking into account the cash flows variations, Dickinson (2001) states several arguments may explain these changes, such as economic issues, political situation, a normal restructuring or other unclear situation, as for shake-out stage.

4.3 CORRELATION

Table 4 shows the Pearson-Spearman (below and above the diagonal, respectively) correlation matrix for the numeric variables used in the models. It first intends to show the issue of multicollinearity, a linear relation between independent variables. The coefficient varies in a range between -1 and 1, so that a coefficient close to the extremes indicates a strong (positive or negative) correlation, and a number close to zero denotes a weak or inexistent linear relationship. Gujarati (2006) considers a coefficient above 0.8 as a strong correlation.

Table 4 - Pearson-Spearman correlation matrix.

	ICC	Discl	Efdiscl	Sediscl	Size	MTB	Lev	Beta
ICC		**0.096**	**0.124**	0.051	**0.194**	**-0.640**	0.006	**0.167**

		**	***		***	***		***
Discl	-0.015		**0.932** ***	**0.917** ***	**0.555** ***	-0.061	0.027	**-0.151** ***
Efdiscl	0.013	**0.940** ***		**0.717** ***	**0.513** ***	**-0.106** **	0.015	**-0.114** **
Sediscl	-0.046	**0.913** ***	**0.718** ***		**0.517** ***	-0.007	0.038	**-0.170** ***
Size	**0.124** **	**0.553** ***	**0.526** ***	**0.498** ***		**-0.190** ***	0.042	0.077
MTB	**-0.09** **	-0.054	-0.048	-0.052	**-0.149** **		**0.106** **	**-0.238** ***
Lev	**0.081** *	**0.137** **	**0.122** **	**0.135** **	**0.123** **	**0.201** ***		**0.157** ***
Beta	**0.173** **	**-0.155** **	**-0.119** **	**-0.175** ***	**0.099** **	**-0.143** **	**0.09** *	

Notes: ***(i)*** $\boldsymbol{Size_i}$ represents the size, measured by the natural logarithm of total asset in the year-end; ***(ii)*** $\boldsymbol{MTB_i}$ means the Market-to-Book ratio, which denotes the growth opportunity measured by the market; ***(iii)*** $\boldsymbol{Lev_i}$ represents the leverage of the firm *i* the year-end; and ***(iv)*** $\boldsymbol{Beta_i}$ represents the inherent risk of the company. ***(v)*** *Pearson coefficient (ρ)* is below the diagonal, while *Spearman coefficient (rho)* is above it; and ***(vi)*** * significant at 10% level; ** significant at 5% level; and *** significant at 1% level.

The three variables of disclosure are highly correlated, as expected, which means that when the specific indexes grow, the full one also grows. However, for the pair EFDiscl and SEDiscl, the coefficient is 0.718. More importantly, there was no linear relation above 0.8; neither between control variables and voluntary disclosure, nor between control variables and implied cost of capital.

Among the control variables, Beta is positively, but not strongly (0.173), correlated with ICC, which indicates both of them move to the same direction. Except for the market-to-book ratio, the other variables are significantly correlated with the indexes of voluntary disclosure. Importantly, the Spearman coefficients do not evidence the existence of multicollinearity between independent variables.

4.4 MODELS AND ECONOMETRICS ISSUES

For this first model, I run linear regressions for the three variables of voluntary disclosure, as follows: For each one, the first column shows the coefficients estimated by White's robustness method to correct the problem of heteroscedasticity; and the other column presents the same estimation including the control variables. For all models, the regressions are controlled by as year as industry dummies, but it is not tabulated.

The second part of regression tables presents some additional information, including the Variance Inflation Factor (VIF) testing the inexistence of multicollinearity (if VIF is lower than 10). Yet, all the tables present the F stat to verify the models are significant, which allows the interpretation of the coefficients.

4.4.1 Linear Regression – Implied Cost of Capital and Voluntary Disclosure

The first model analyzes the association between voluntary disclosure and cost of capital, using Gebhardt's model of Implied Cost of Capital and the updated Rodrigues's (2014) index of voluntary disclosure. Table 4 shows the outcomes of pooled regressions of ICC as dependent variable on voluntary disclosure indexes with coefficients estimated by the White's robustness controlled by time and industry dummies.

Table 4 – Pooled regressions of ICC on voluntary disclosure indexes

$$ICC_i = \boldsymbol{\beta_0} + \boldsymbol{\beta_1} Discl_i^j + \boldsymbol{\beta_2} Size_i + \boldsymbol{\beta_3} MTB_i + \boldsymbol{\beta_4} Lev_i + \boldsymbol{\beta_8} Beta_i + \varepsilon_i$$

Variables	Predicted Signal	Discl		EFDiscl		SEDiscl	
		(1)	(2)	(1)	(2)	(1)	(2)
Discl	-	**-0.114*** (-2.642)**	**-0.144*** (-2.974)**				
EFDiscl	-			**-0.119** (-2.097)**	**-0.139** (-2.217)**		
SEDiscl	-					**-0.0539*** (-2.849)**	**-0.0677*** (-3.350)**
Size	-		-0.000951 (-0.244)		-0.00241 (-0.612)		-0.00191 (-0.503)
MTB	-		-0.000410 (-0.893)		-0.000420 (-0.887)		-0.000451 (-0.977)
Lev	+		**0.0745* (1.926)**		**0.0717* (1.864)**		**0.0778** (2.008)**
Beta	+		**0.0173* (1.935)**		**0.0169* (1.903)**		**0.0165* (1.877)**
Constant		**0.228*** (11.21)**	0.0584 (1.187)	**0.230*** (10.33)**	0.0847* (1.719)	**0.214*** (11.42)**	0.222*** (4.591)
Observations		*536*	*515*	*536*	*515*	*536*	*515*
R-squared		*21.30%*	*24.70%*	*20.90%*	*24.10%*	*21.10%*	*24.60%*
Adj R-squared		*17.60%*	*20.40%*	*17.20%*	*19.80%*	*17.40%*	*20.30%*
Year dummy		*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Industry dummy		*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
F		*18.57****	*15.18****	*18.54****	*14.96****	*18.52****	*14.90****
VIF		*4.19*	*3.94*	*4.18*	*3.92*	*4.15*	*3.94*

Notes: (*i*) *Discl* represents the Full Voluntary *Disclosure;* (*ii*) *EFDiscl* – Economic and Financial Voluntary *Disclosure;* (*iii*) *SEDiscl* – Social and Environmental Voluntary *Disclosure*; (*iv*) $Size_i$ represents the size, measured by the natural logarithm of total asset in the year-end; *(v)* MTB_i means the Market-to-Book ratio, which denotes the growth opportunity measured by the market; *(vi)* Lev_i represents the leverage of the firm at the year-end; and *(vii)* $Beta_i$ represents the inherent risk of the company. It is

included to check the consistence of the estimated ICC - Implied Cost of Capital, *(viii)* * significant at 10% level; ** significant at 5% level; and *** significant at 1% level, and *(ix)* (1) represents the model without control variables and (2) is the model with control variables.

The results are in accordance with the theoretical expectation of a reduction in the cost of capital given an increase in voluntary disclosure level. For the three indexes, the coefficient is negative and significant at 1% (or 5%) level of alpha. It denotes that companies which engage in higher voluntary disclosure level are, on average, benefitted by a reduction in the cost of capital. It further supposes that it is worth spending by resources voluntarily reporting economic and financial as well as social and environmental information, once the market lowers the minimum return required.

Related to the control variables, the results of the three indexes indicate that size is not a parameter to explain a reduction in the cost of capital, since this coefficient is significantly positive. Also, the results reject the understanding the market benefits firms with greater growth opportunities. Likewise, Beta is also significant and positive, which supposes the higher the intrinsic risk of the firm, the higher is the implied cost of capital.

The F-stat confirms the coefficients of all models as being jointly not equal to zero, since the p-value of this stat is lower than 1% of alpha. It is noteworthy that the inclusion of control variables in all the three models doubles the R-squared (and Adjusted R-squared), which denotes, for example, that 24.7% of the variation of the implied cost of capital can be explained by full voluntary disclosure index and the control variables. Yet, the Variance of Inflation Factor shows that none of them presents the problem of multicollinearity, since this number is always lower than 5.

4.4.2 Univariate t-test – Voluntary Disclosure

I examine through mean t-tests whether there are statistical differences between the voluntary disclosure indexes, investigating all the life cycle stages combination, as shown in Table 5:

Table 5 – Univariate t-tests for the three variables of voluntary disclosure

Panel A - Full Voluntary Disclosure

	Intro	Grow	Mat	Shake	Decl
Intro					
Grow	**-0.03463** ***				
Mat	**-0.05212** ***	**-0.01749** ***			
Shake	**0.008622** ***	**0.04325** ***	**0.060739** ***		
Decl	**0.011894** ***	**0.046523** ***	**0.064012** ***	**0.003273** **	

Panel B - Economic and Financial Voluntary Disclosure

	Intro	Grow	Mat	Shake	Decl
Intro					
Grow	**-0.03192** ***				
Mat	**-0.04756** ***	**-0.01565** ***			
Shake	**0.009109** ***	**0.041025** ***	**0.056674** ***		
Decl	**0.012248** ***	**0.044164** ***	**0.059813** ***	**0.003139** **	

Panel C - Social and Environmental Voluntary Disclosure

	Intro	Grow	Mat	Shake	Decl
Intro					
Grow	**-0.04123** ***				
Mat	**-0.06335** ***	**-0.02213** ***			
Shake	**0.007047** ***	**0.048273** ***	**0.073958** ***		
Decl	**0.010603** ***	**0.051829** ***	**0.073958** ***	**0.003556** **	

Note: First line values refer to mean differences, and the second one presents the stars, that means: * for p<0.10; ** p<1.05; e p<0.01.

The results confirm the existence of differences among the means across the life cycle stages, which allow the continuity of the procedures in linear regressions.

4.4.3 Linear Regression – Voluntary Disclosure and Firm Life Cycle

4.4.3.1 Full Voluntary Disclosure and Firm Life Cycle

Table 6 below shows the results of linear regressions for the impact of the life cycle stages on the fully voluntary disclosure index. The stage with higher number of observations (maturity) is the reference dummy variable.

Table 6 - Linear regressions of Discl on firm life cycle stages,

$Discl_i = \beta_0 + \beta_1 Intro_i + \beta_2 Grow_i + \beta_3 Shake_i + \beta_4 Decl_i + \beta_5 Size_i + \beta_6 MTB_i + \beta_7 Lev_i + \beta_8 Beta_i + \varepsilon_i$

Variables	**Predicted Signal**	**Rob w/o CV**	**Rob w/ Control**	**Robust**	**FE**
Intro	-	**-0.0244***	**-0.0313*****	**-0.0902*****	**-0.0387*****
		(-1.926)	**(-2.682)**	**(-7.689)**	**(-3.280)**
Grow	-	0.00128	-0.0118	**-0.0325*****	**-0.0150***
		(0.154)	(-1.411)	**(-3.273)**	**(-1.874)**
Shake	-	-0.0149	**-0.0335****	**-0.0721*****	**-0.0296***
		(-0.882)	**(-2.235)**	**(-3.768)**	**(-1.811)**
Decl	-	-0.00705	**-0.0475****	**-0.116*****	**-0.0497****
		(-0.303)	**(-2.413)**	**(-5.599)**	**(-2.143)**
Size	+		**0.0334*****	**0.0465*****	**0.0266*****
			(9.700)	**(15.08)**	**(8.394)**
MTB	?		**0.000581*****	**0.000363*****	**0.000497***
			(3.194)	**(2.720)**	**(1.710)**
Lev	+		0.00926	**0.0515***	**0.0173**
			(0.349)	**(1.947)**	**(0.687)**
Beta	+		**0.0146****	-0.00800	**0.0151****
			(2.518)	(-0.918)	**(2.518)**
Constant		**0.108*****	**-0.235*****	**-0.424*****	**-0.137*****
		(11.64)	**(-4.939)**	**(-9.367)**	**(-2.791)**
Observations		595	543	543	543
R-squared		54.70%	63.80%	40.60%	18.20%
Adj R-squared		52.60%	61.60%	39.70%	14.30%
Year control		Yes	Yes	No	Yes
Industry control		Yes	Yes	No	Yes
F Stat		96.73***	58.70***	52.91***	14.43***
VIF		4.03	3.69	1.13	-
Num. Groups (Industries)		-	-	-	18

Notes: *(i)* I use White estimator with and without control variables, including also dummies of industries and year (columns 3 and 4) and without these dummies (column 5), and the last column shows the year and industry fixed effects approach. (*ii*) *Discl* – Voluntary *Disclosure*;; (*iii*) Standard errors in parentheses; *(iv)* $Intro_i$ means the ith-company belonging to the *Introduction* stage; *(v)* $Grow_i$ for Growing companies; *(vi)* $Shake_i$ for the stage of *Shake-out; (vii)* $Decl_i$ for those companies into the *Decline* phase; and *(viii)* * significant at 10% level; ** significant at 5% level; and *** significant at 1% level.

Considering that all life cycle stages have to be interpreted in relation to the maturity stage, the coefficients of *Introduction*, *Growth*, *Shake-Out* and *Decline* are lower than

the Maturity stage as in fixed effects approach as in pooled regression with White's correction (column 5). Then, the results suggest the hypothesis H_2 is confirmed.

Consistently with Mueller (1972), on average, companies increase the production of information until they achieve the stage of growth, and, when the firm is identified in the stages of shake-out and decline, this level decreases. However, the pooled with control for year and industry (column 4) shows the dummy of *Growth* is not significant, which signalizes there is not statistical difference between theses intercepts.

The results of the 5th column show that all the control variables are significant to explain the dependent variables, reporting positive associations for *Size*, *MTB* and *Leverage*, which supposes that, *ceteris paribus*, on average, bigger companies tend to voluntarily disclose more information, perhaps to have more resource to do so or to have more political costs and then to be more closely covered by setters, government and also analysts.

Companies with more growth opportunities (proxied by Market-to-book) tend to disclose more information voluntarily, probably to keep the expectation about their prospects. Likewise, Beta is significantly positive in columns 4 (robust with controls) and 6 (fixed effects), even though it is not significant in robust without controlling (column 5) for year and industry. It shows that companies with more intrinsic riskiness tend to disclose more voluntary information to downshift this uncertainty. Yet, as expected, the results suppose that companies more indebted report more voluntary information.

4.4.3.2 Economic and Financial Voluntary Disclosure and Firm Life Cycle

Table 7 reports the results variation of the former model to test the impact of firm life cycle on economic and financial voluntary disclosure. Again, maturity is the reference dummy variable.

Table 7 - Linear regressions of EFDiscl on firm life cycle stages

$$\boldsymbol{EFDiscl}_i = \boldsymbol{\beta_0} + \boldsymbol{\beta_1} Intro_i + \boldsymbol{\beta_2} Grow_i + \boldsymbol{\beta_3} Shake_i + \boldsymbol{\beta_4} Decl_i + \boldsymbol{\beta_5} Size_i + \boldsymbol{\beta_6} MTB_i + \boldsymbol{\beta_7} Lev_i + \boldsymbol{\beta_7} Beta_i + \varepsilon_i$$

Variables	Predicted Signal	Rob w/o CV	Rob w/ Control	Robust	FE
Intro	-	**-0.0192****	**-0.0196****	**-0.0612*****	**-0.0263*****
		(-1.973)	**(-2.106)**	**(-6.569)**	**(-2.732)**
Grow	-	0.00269	-0.00419	**-0.0205****	-0.00726
		(0.395)	(-0.598)	**(-2.497)**	(-1.112)
Shake	-	-0.0113	**-0.0218***	**-0.0517*****	-0.0178
		(-0.889)	**(-1.668)**	**(-2.937)**	(-1.336)
Decl	-	-0.00472	-0.0223	**-0.0758*****	-0.0238
		(-0.326)	(-1.451)	**(-4.498)**	(-1.260)
Size	+		**0.0230*****	**0.0364*****	**0.0178*****
			(7.863)	**(12.99)**	**(6.884)**
MTB	?		**0.000565*****	**0.000327*****	**0.000483****
			(4.336)	**(2.677)**	**(2.035)**
Lev	+		-0.0127	0.0217	-0.00385
			(-0.566)	(0.909)	(-0.187)
Beta	+		**0.0139*****	-0.00289	**0.0152*****
			(2.971)	(-0.361)	**(3.108)**
Constant		**0.148*****	-0.0417	**-0.286*****	-0.0134
		(18.52)	(-1.025)	**(-6.928)**	(-0.333)
Observations		595	543	543	543
R-squared		54.20%	62.30%	37.40%	15.00%
Adj R-squared		52.00%	60.00%	36.50%	10.90%
Year control		Yes	Yes	No	Yes
Industry control		Yes	Yes	No	Yes
F Stat		66.84***	59.82***	36.93***	11.41***
VIF		4.03	3.69	1.13	-
Number of industry		-	-	-	18

Notes: *(i)* I use White estimator with and without control variables, including also dummies of industries and year (columns 3 and 4) and without these dummies (column 5), and the last column shows the year and industry fixed effects approach. *(ii*) *EFDisc* – Economic and Financial Disclosure; *(iii*) Standard errors in parentheses; *(iv)* $Intro_i$ means the ith-company belonging to the *Introduction* stage; *(v)* $Grow_i$ for Growing companies; *(vi)* $Shake_i$ for the stage of *Shake-out; (vii)* $Decl_i$ for those companies into the *Decline* phase; and (*viii*) * significant at 10% level; ** significant at 5% level; and *** significant at 1% level.

Different from the full index, the results in the column 4 (robust with control) show there is not difference between the intercepts of the variable Growth, Maturity and Decline. However, the level of economic and financial voluntary disclosure in maturity is higher than in introduction and also higher than in shake-out. But the results shows there is not statistical difference between maturity and decline, which supposes companies in the last stage try to report more about this specific information to investors. Then, hypothesis H_2 cannot be confirmed for Economic and Financial Voluntary Disclosure Index.

Under fixed effects approach, the results demonstrate that, on average, firms increase the level of economic and financial voluntary information from introduction to growth, and maintain it in maturity phase. However, converse to the expectation, the level of information do not decrease for companies identified in shake-out and decline stage, which supposes a restructuring or rearrangement of the company. These results effort H_2 cannot be confirmed.

The significant F stat validates the models, allowing it to infer that all the coefficients are jointly different from zero. For pooled regressions (columns 3 up to 5), the VIF shows there is not multicollinearity, since the factors are under 10. The Adjusted R-squared increases by 8% (from 52% to 60%) after the inclusion of the control variables in pooled regression. Under industry fixed effects (last column), this determination coefficient explains 10.9% of the variation of the economic and financial voluntary disclosure index.

4.4.3.3 Social and Environmental Voluntary Disclosure and Firm Life Cycle

Table 8 presents the results of another variation of the last model testing the impact of firm life cycle stages on social and environmental voluntary disclosure index.

Table 8 - Linear regressions of SEDiscl on firm life cycle stages

$$\boldsymbol{SEDiscl}_i = \boldsymbol{\beta_0} + \boldsymbol{\beta_1} Intro_i + \boldsymbol{\beta_2} Grow_i + \boldsymbol{\beta_3} Shake_i + \boldsymbol{\beta_4} Decl_i + \boldsymbol{\beta_5} Size_i + \boldsymbol{\beta_6} MTB_i + \boldsymbol{\beta_7} Lev_i + \boldsymbol{\beta_7} Beta_i + \varepsilon_i$$

Variables	Predicted Signal	Rob w/o CV	Rob w/ Control	Robust	FE
Intro	-	-0.0384 (-1.490)	**-0.0629***** **(-2.644)**	**-0.167***** **(-7.103)**	**-0.0719***** **(-3.001)**
Grow	-	-0.00267 (-0.162)	**-0.0326*** **(-1.954)**	**-0.0645***** **(-3.441)**	**-0.0360**** **(-2.215)**
Shake	-	-0.0247 (-0.684)	**-0.0650**** **(-2.205)**	**-0.127***** **(-3.953)**	**-0.0615*** **(-1.851)**
Decl	-	-0.0134 (-0.227)	**-0.116**** **(-2.551)**	**-0.230***** **(-5.393)**	**-0.120**** **(-2.547)**
Size	+		**0.0611***** **(8.782)**	**0.0699***** **(14.32)**	**0.0503***** **(7.808)**
MTB	?		**0.000610*** **(1.651)**	0.000456 (1.556)	0.000524 (0.887)
Lev	+		0.0698 (1.369)	**0.122**** **(2.420)**	0.0756 (1.474)
Beta	+		0.0160 (1.321)		0.0144 (1.182)

Constant	**-0.00404**	**-0.762*** **	**-0.757*** **	**-0.478*** **
	(-0.226)	**(-7.659)**	**(-10.21)**	**(-4.774)**
Observations	595	543	543	543
R-squared	43.90%	53.60%	32.70%	14.70%
Adj R-squared	41.20%	50.80%	31.80%	10.50%
Year control	Yes	Yes	No	Yes
Industry control	Yes	Yes	No	Yes
F Stat	147.8***	56.09***	56.68***	11.10***
VIF	4.03	3.69	1.1	-
Number of industry	-	-	-	18

Notes: *(i)* I use White estimator with and without control variables, including also dummies of industries and year (columns 3 and 4) and without these dummies (column 5), and the last column shows the year and industry fixed effects approach. (i*i*) *SEDisc* – Social and Environmental Disclosure; (*iii*) Standard errors in parentheses; *(iv)* $Intro_i$ means the ith-company belonging to the *Introduction* stage; *(v)* $Grow_i$ for Growing companies; *(vi)* $Shake_i$ for the stage of *Shake-out; (vii)* $Decl_i$ for those companies into the *Decline* phase; and (*viii*) * significant at 10% level; ** significant at 5% level; and *** significant at 1% level.

The results in columns 4, 5 and 6 show the life cycle stages impact on the voluntary reporting of social and environmental information. For this specific index, the results signalize firm in maturity stage tend to disclose more information and after reaching this stage, the level tend to decrease, which allows the acceptance of hypothesis H_2.

Importantly, the models are valid once the F stats are significant. The control variables are significant and positive for Size, Market-to-Book and Lev, indicating that bigger companies are more likely to report voluntary information about social and environment. Yet, under fixed effects approach, *ceteris paribus*, on average, one more unit of Leverage indicates an increasing of 12.2% in this index of disclosure.

4.4.4 Univariate t-test – Implied Cost of Capital and Firm Life Cycle

In order to investigate whether the cost of capital varies across the life cycle stages, the following step of the study examines through a mean difference t-test whether there are statistical differences between the Implied Cost of Capital across the life cycle stages. Table 10 presents the results:

Table 9 – T Test – Implied Cost of Capital and Firm Life Cycle

ICC	Intro	Grow	Mat	Shake	Decl
Intro					
Grow	**-0.01558**				

	***			
Mat	**-0.02949** ***	**-0.01391** ***		
Shake	**0.015765** ***	**0.031346** ***	**0.045251** ***	
Decl	**0.016386** ***	**0.031967** ***	**0.045872** ***	**0.000621**

Notes: * significant at 10% level; ** significant at 5% level; and *** significant at 1% level.

The results signalize statistical differences for the cost of capital among all the possible combination of life cycle stages, except for the test between shake-out and decline stages. It allows the continuity of the research design through linear regression.

4.4.5 Linear Regression – Implied Cost of Capital and Firm Life Cycle

Table 11 presents the result of linear regressions for the impact of the life cycle stages on implied cost of capital (ICC).

Table 10 - Linear regressions of ICC on firm life cycle stages

$$ICC_i = \boldsymbol{\beta_0} + \boldsymbol{\beta_1} Intro_i + \boldsymbol{\beta_2} Grow_i + \boldsymbol{\beta_3} Shake_i + \boldsymbol{\beta_4} Decl_i + \boldsymbol{\beta_5} Size_i + \boldsymbol{\beta_6} MTB_i + \boldsymbol{\beta_7} Lev_i + \boldsymbol{\beta_8} Beta_i + \varepsilon_i$$

Variables	**Predicted Signal**	**Rob w/o CV**	**Rob w/ Control**	**Robust**	**FE**
Intro	+	**0.0380*** **(1.958)**	**0.0335**** **(2.010)**	**0.0319**** **(2.103)**	**0.0369***** **(2.962)**
Grow	+	0.00180 (0.306)	-0.00238 (-0.367)	-0.0106 (-1.452)	-0.000508 (-0.0606)
Shake	+	0.00102 (0.0795)	0.0110 (0.804)	0.0110 (0.893)	0.0160 (0.839)
Decl	+	**0.0625*** **(1.893)**	**0.0551*** **(1.846)**	0.0473 (1.490)	**0.0522**** **(2.095)**
Size	-		-0.00557 (-1.549)	**0.00619*** **(1.834)**	-0.00546 (-1.495)
MTB	-		-0.000496 (-1.067)	-0.000445 (-0.749)	-0.000475 (-1.567)
Lev	+		**0.0651*** **(1.806)**	0.0312 (1.023)	**0.0654**** **(2.429)**
Beta	+		**0.0152*** **(1.790)**	0.00605 (0.879)	**0.0158**** **(2.210)**
Constant		**0.0410***** **(4.451)**	**0.0890*** **(1.916)**	0.00384 (0.0760)	0.163*** (2.917)
Observations		536	515	515	515
R-squared		22.30%	25.00%	5.20%	6.00%
Adj R-squared		18.20%	20.20%	3.71%	1.16%
Year control		Yes	Yes	No	Yes

Industry control	Yes	Yes	No	Yes
F Stat	15.04***	13.24***	3.220***	3.881***
VIF	3.8	3.65	1.12	-
Number of industry	-	-	-	18

Notes: *(i)* I use White estimator with and without control variables, including also dummies of industries and year (columns 3 and 4) and without these dummies (column 5), and the last column shows the year and industry fixed effects approach. (i*i*) *ICC* is the implied cost of capital; (*iii*) Standard errors in parentheses; *(iv)* $Intro_i$ means the ith-company belonging to the *Introduction* stage; *(v)* $Grow_i$ for Growing companies; *(vi)* $Shake_i$ for the stage of *Shake-out; (vii)* $Decl_i$ for those companies into the *Decline* phase; and (*viii*) * significant at 10% level; ** significant at 5% level; and *** significant at 1% level.

The significant F stats validate the models, and it means that all the coefficients are jointly different from zero. For pooled regressions (columns 3 up to 5), the VIF indicates there is no multicollinearity. The Adjusted R-squared increases from 18.20% up to 20.20% after the inclusion of the control variables in pooled regression. Under industry fixed effects (last column), this determination coefficient explains 1.16% of the variation of ICC.

Taking into account all dummy variables have to be interpreted in relation to the maturity stage, the coefficients of *Introduction* is lower than the *Maturity* stage, which in turn is not statistical different from *Growth and Decline* stages, which allows the hypothesis H_3 to be confirmed, since the results confirm initial and final stages present higher levels of implied cost of capital than the others.

Further, consistently with Mueller (1972), the uncertainty is surely seen as one of an introducing firm's problem, because the minimum rate of return required from investors is higher than that for mature firms. The results suppose that, on average, *ceteris paribus*, the level of ICC maintains it stable even when the company is identified as in shake-out phase, but it decreases for decline firms, when the uncertainty is higher than before, but lower than in introduction stage.

4.4.6 Linear Regression – Implied Cost of Capital, Voluntary Disclosure Controlling for Firm Life Cycle

To test the main hypothesis of this study, I regress the implied cost of capital on the three indexes of voluntary disclosure interacted with the dummy variables of corporate life cycle.

4.4.6.1 Independent Variable: Full Voluntary Disclosure controlled by Life Cycle

Firstly, table 12 shows the result of the regression of ICC on the full voluntary disclosure controlled by firm life cycle stages and on control variables. Columns 3 and 4 present the coefficients estimated by the Pooled regressions with White's correction with and without control variables, also including industries and year dummies, column 5 shows this test without these dummies and the 6th column brings up the results under year and industry fixed effects approach.

Table 11 – Linear regressions of ICC on full voluntary disclosure controlled by firm life cycle stages

$$ICC_i = \boldsymbol{\beta_0} + \sum_{j=1}^{5} \boldsymbol{\beta_j}\, LC_i * Discl_i + \boldsymbol{\beta_6} Size_i + \boldsymbol{\beta_7} MTB_i + \boldsymbol{\beta_8} Lev_i + \boldsymbol{\beta_9} Beta_i + \varepsilon_i$$

Variables	Predicted Signal	Rob w/o CV	Rob w/ Control	Robust	FE
Discl_intro	-	-0.0431 (-0.855)	-0.0769 (-1.354)	0.0162 (0.305)	-0.0748 (-1.142)
Discl_grow	-	**-0.104**** **(-2.363)**	**-0.134***** **(-2.639)**	-0.0729 (-1.575)	**-0.133***** **(-2.790)**
Discl_mat	-	**-0.136***** **(-2.916)**	**-0.154***** **(-3.117)**	-0.0561 (-1.430)	**-0.158***** **(-3.402)**
Discl_shake	-	**-0.143**** **(-1.982)**	**-0.129*** **(-1.748)**	-0.0216 (-0.323)	-0.125 (-1.315)
Discl_decl	-	0.000545 (0.00478)	-0.0444 (-0.411)	0.0343 (0.316)	-0.0625 (-0.511)
Size	-		-0.00143 (-0.369)	**0.00838**** **(2.180)**	-0.00195 (-0.502)
MTB	?		-0.000406 (-0.914)	-0.000448 (-0.732)	-0.000383 (-1.268)
Lev	+		**0.0642*** **(1.662)**	0.0294 (0.905)	**0.0647**** **(2.414)**
Beta	+		**0.0180**** **(2.019)**	0.00573 (0.807)	**0.0180**** **(2.526)**
Constant		**0.228***** **(11.44)**	0.0643 (1.313)	-0.0123 (-0.224)	**0.153***** **(2.671)**
Observations		536	515	515	515
R-squared		22.10%	25.20%	3.40%	6.30%
Adj R-squared		17.80%	20.20%	1.71%	1.32%
Year dummy		Yes	Yes	No	Yes
Industry dummy		Yes	Yes	No	Yes
F Stat		15.18***	13.22***	2.241***	3.654***
VIF		4.02	3.9	1.77	-
Number of industry		-	-	-	18

Notes: *(i)* I use White estimator with and without control variables, including also dummies of industries and year (columns 3 and 4) and without these dummies (column 5), and the last column shows the year and industry fixed effects approach. (*ii*) *ICC* is the implied cost of capital; (*iii*) Standard errors in parentheses; *(iv)* $Discl\_Intro_i$ means the full index of voluntary disclosure for ith-company belonging to

the *Introduction* stage; *(v)* $Discl\_Grow_i$ is the same for Growing companies; *(vi)* $Discl\_Shake_i$ for the stage of *Shake-out; (vii)* $Discl\_Decl_i$ for those companies into the *Decline* phase; and (*viii*) * significant at 10% level; ** significant at 5% level; and *** significant at 1% level.

Consistently with the expectation, columns 3, 4 and 6 reports *Discl_grow*, *Discl_mat* and *Discl_Shake* are negative and significant. Although shake-out dummy shows negative and significant coefficient, growing and mature firms are benefitted by more reduction of the cost of capital through an increase in the level of voluntary disclosure, which allows H_4 to be accepted.

It is worth mentioning that, *ceteris* paribus, on average, an increase in one unit of full voluntary disclosure for firms in growth stage explains a reduction of 13% in the Implied Cost of Capital, while for mature firms this reduction is 15%, which means that growing firms are more benefitted with reduction in the cost of capital through an improvement in voluntary reporting of information.

The result under industry fixed effects approach (column 6) shows leveraged firms face higher levels of cost of capital, aligned with the theory of Fama and French (1992) about more agency problems, incurring in higher agency costs, which results in higher riskiness under investor prism. Then, it is coherent to observe and interpret Beta as a positive and significant coefficient.

4.4.6.2 Independent Variable: Economic and Financial Voluntary Disclosure controlled by Life Cycle

Table 13 shows the results a variation of the former model to test the impact of economic and financial voluntary disclosure on cost of capital controlled by firm life cycle stages.

Table 12 - Linear regressions of ICC on economic and financial voluntary disclosure controlled by firm life cycle stages

$$ICC_i = \boldsymbol{\beta_0} + \sum_{j=1}^{5} \boldsymbol{\beta_j}\, LC_i * Discl_i + \boldsymbol{\beta_6} Size_i + \boldsymbol{\beta_7} MTB_i + \boldsymbol{\beta_8} Lev_i + \boldsymbol{\beta_9} Beta_i + \varepsilon_i$$

Variables	Predicted Signal	Rob w/o CV	Rob w/ Control	Robust	FE
EFDiscl_intro	-	-0.0467 (-0.779)	-0.0695 (-0.990)	0.0420 (0.681)	-0.0711 (-0.947)
EFDiscl_grow	-	**-0.110*** **(-1.934)**	**-0.130**** **(-2.019)**	-0.0585 (-1.004)	**-0.134**** **(-2.297)**

EFDiscl_mat	-	**-0.140****	**-0.150****	-0.0380	**-0.159*****
		(-2.324)	**(-2.350)**	(-0.742)	**(-2.757)**
EFDiscl_shake	-	**-0.153***	-0.125	0.000861	-0.121
		(-1.868)	(-1.438)	(0.0107)	(-1.194)
EFDiscl_decl	-	0.00451	-0.0260	0.0656	-0.0505
		(0.0356)	(-0.213)	(0.520)	(-0.409)
Size	-		-0.00284	**0.00716***	-0.00300
			(-0.728)	**(1.837)**	(-0.776)
MTB	?		-0.000415	-0.000462	-0.000392
			(-0.908)	(-0.751)	(-1.283)
Lev	+		0.0621	0.0283	**0.0625****
			(1.626)	(0.882)	**(2.324)**
Beta	+		**0.0177****	0.00633	**0.0179****
			(1.991)	(0.893)	**(2.502)**
Constant		**0.230*****	**0.0894***	0.000791	**0.168*****
		(10.55)	**(1.833)**	(0.0143)	**(2.935)**
Observations		536	515	515	515
R-squared		21.70%	24.60%	3.20%	5.60%
Adj R-squared		17.40%	19.60%	1.52%	0.60%
Year dummy		Yes	Yes	No	Yes
Industry dummy		Yes	Yes	No	Yes
F Stat		13.81***	15.86***	11.42***	8.76***
VIF		4.12	4.61	2.13	-
Number of industry		-	-	-	18

Notes: *(i)* I use White estimator with and without control variables, including also dummies of industries and year (columns 3 and 4) and without these dummies (column 5), and the last column shows the year and industry fixed effects approach. (*ii*) *ICC* is the implied cost of capital; (*iii*) Standard errors in parentheses; *(iv)* $EFDiscl\_Intro_i$ means the economic and financial index of voluntary disclosure for the ith-company belonging to the *Introduction* stage; *(v)* $EFDiscl\_Grow_i$ for Growing companies; *(vi)* $EFDiscl\_Shake_i$ for the stage of *Shake-out; (vii)* $EFDiscl\_Decl_i$ for those companies into the *Decline* phase; and (*viii*) * significant at 10% level; ** significant at 5% level; and *** significant at 1% level.

As in the former model, for the economic and financial voluntary disclosure index, all the models are valid, since they present significant F stats. The outcomes of the columns 5 and 6 indicate again that growing and mature firms are more benefitted than firms in other stages. Yet, the maturity stage presents the higher reduction (15%) while in growth stage the increase in EFDiscl represents a reduction of 13%. Hence, for this specific index of voluntary disclosure, the results allow the acceptance of the hypothesis H_4.

The outcome from the regression without control variables (column 3) shows the coefficient of the interaction of economic and financial voluntary information index with shake-out to be higher than the others, but the control variables act to isolate the effects in dependent variable and enhance the model, as a whole.

4.4.6.3 Independent Variable: Social and Environmental Voluntary Disclosure controlled by Life Cycle

Table 14 shows another variation of the former model, testing the impact of social and environmental voluntary disclosure controlled by firm life cycle stages on the implied cost of capital.

Table 13 - Linear regressions of ICC on social and voluntary disclosure controlled by firm life cycle stages

$$ICC_i = \boldsymbol{\beta_0} + \sum_{j=1}^{5} \boldsymbol{\beta_j}\, LC_i * SEDiscl_i + \boldsymbol{\beta_6} Size_i + \boldsymbol{\beta_7} MTB_i + \boldsymbol{\beta_8} Liq_i + \boldsymbol{\beta_9} Beta_i + \varepsilon_i$$

Variables	**Predicted Signal**	**Rob w/o CV**	**Rob w/ Control**	**Robust**	**FE**
SEDiscl_intro	-	0.00287	-0.0161	0.0133	-0.0130
		(0.0817)	(-0.465)	(0.386)	(-0.311)
SEDiscl_grow	-	**-0.0455****	**-0.0618*****	**-0.0498****	**-0.0608****
		(-2.228)	**(-2.725)**	**(-2.165)**	**(-2.371)**
SEDiscl_mat	-	**-0.0743*****	**-0.0825*****	**-0.0430****	**-0.0844*****
		(-3.372)	**(-3.662)**	**(-2.291)**	**(-3.507)**
SEDiscl_shake	-	-0.0457	-0.0373	-0.00813	-0.0395
		(-0.991)	(-0.803)	(-0.243)	(-0.525)
SEDiscl_decl	-	0.00981	-0.0147	0.0163	-0.0189
		(0.115)	(-0.188)	(0.218)	(-0.176)
Size	-		-0.00221	**0.00837****	-0.00259
			(-0.595)	**(2.312)**	(-0.682)
MTB	?		-0.000449	-0.000452	-0.000419
			(-1.006)	(-0.734)	(-1.407)
Lev	+		**0.0676***	0.0309	**0.0678****
			(1.719)	(0.940)	**(2.537)**
Beta	+		**0.0174***	0.00533	**0.0171****
			(1.964)	(0.737)	**(2.410)**
Constant		**0.214*****	0.0503	-0.0148	**0.145****
		(11.59)	(1.048)	(-0.274)	**(2.533)**
Observations		536	515	515	515
R-squared		22.00%	25.20%	3.50%	6.20%
Adj R-squared		17.70%	20.20%	1.75%	1.24%
Year dummy		Yes	Yes	No	Yes
Industry dummy		Yes	Yes	No	Yes
F Stat		16.13***	13.84***	2.567***	3.605***
VIF		3.8	3.68	1.27	-
Number of industry		-	-	-	18

Notes: *(i)* I use White estimator with and without control variables, including also dummies of industries and year (columns 3 and 4) and without these dummies (column 5), and the last column shows the year and industry fixed effects approach. (*ii*) *ICC* is the implied cost of capital; (*iii*) Standard errors in parentheses; *(iv)* $SEDiscl\_Intro_i$ means the index of social and environmental voluntary disclosure for the ith-company belonging to the *Introduction* stage; *(v)* $SEDiscl\_Grow_i$ for Growing companies; *(vi)* $SEDiscl\_Shake_i$ for the stage of *Shake-out; (vii)* $SEDiscl\_Decl_i$ for those companies into the *Decline* phase; and (*viii*) * significant at 10% level; ** significant at 5% level; and *** significant at 1% level.

This specific voluntary disclosure index behaves as the expectation, so that the results, through all the approaches, signalize that only for growing and mature firms, an increasing on the level of social and environmental voluntary disclosure leads to a reduction in the cost of capital. Hence, H_4 is also confirmed for this specific index of voluntary disclosure.

Again, greater reduction is observed in maturity stage, which represents, *ceteris paribus*, on average, an index 8% lower for industry fixed effect approach as in pooled one. On the other hand, for growing firms, the reduction is of 6% in fixed effects and pooled approaches. Moreover, the control variables behave as in full disclosure, but under fixed effects, *Size* did not work to explain the variation in ICC. The low level of VIFs indicates the inexistence of the problem of multicollinearity.

4.5 ROBUSTNESS AND SENSITIVITY TESTS

In order to reduce some outlier issues, I test quintile regression - which uses the median to calculate the error. Table 15 shows the results of the comparison between year and industry fixed effects and quintile regression:

Table 14 - Linear regressions of Voluntary Disclosure and of ICC on life cycle stages

Dependente Variables:		*Voluntary Disclosure*						*Cost of Capital*		
Variables	**Predicted Signal**	**Discl**		**EFDiscl**		**SEDiscl**		**Pred Signal**	**ICC**	
		(1)	**(2)**	**(1)**	**(2)**	**(1)**	**(2)**		**(1)**	**(2)**
Intro	-	**-0.0387*** **	**-0.0331** **	**-0.0263*** **	-0.0162	**-0.0719*** **	**-0.0686** **	+	**0.0369*** **	0.0113
		(-3.280)	**(-2.546)**	**(-2.732)**	(-1.239)	**(-3.001)**	**(-2.302)**		**(2.962)**	(1.115)
Grow	-	**-0.0150***	**-0.0244*** **	-0.00726	-0.00560	**-0.0360** **	**-0.0345***	+	-0.000508	-0.000317
		(-1.874)	**(-2.780)**	(-1.112)	(-0.636)	**(-2.215)**	**(-1.716)**		(-0.0606)	(-0.0468)
Shake	-	**-0.0296***	**-0.0403** **	-0.0178	-0.0202	**-0.0615***	**-0.0788***	+	0.0160	0.00277
		(-1.811)	**(-2.237)**	(-1.336)	(-1.114)	**(-1.851)**	**(-1.907)**		(0.839)	(0.178)
Decl	-	**-0.0497** **	**-0.0430***	-0.0238	-0.0164	**-0.120** **	**-0.190*** **	+	**0.0522** **	0.0142
		(-2.143)	**(-1.696)**	(-1.260)	(-0.643)	**(-2.547)**	**(-3.270)**		**(2.095)**	(0.704)
Size	+	**0.0266*** **	**0.0299*** **	**0.0178*** **	**0.0185*** **	**0.0503*** **	**0.0639*** **	-	-0.00546	0.000424
		(8.394)	**(7.768)**	**(6.884)**	**(4.775)**	**(7.808)**	**(7.227)**		(-1.495)	(0.133)
MTB	?	**0.000497***	0.000412	**0.000483** **	0.000446	0.000524	0.000428	?	-0.000475	**-0.00171*** **
		(1.710)	(1.297)	**(2.035)**	(1.399)	(0.887)	(0.588)		(-1.567)	**(-6.981)**
Lev	+	0.0173	**-0.0478***	-0.00385	-0.0212	0.0756	-0.00566	+	**0.0654** **	-0.0148
		(0.687)	**(-1.719)**	(-0.187)	(-0.760)	(1.474)	(-0.0888)		**(2.429)**	(-0.680)
Beta	+	**0.0151** **	**0.0115***	**0.0152*** **	0.00843	0.0144	0.00748	+	**0.0158** **	0.00933
		(2.518)	**(1.674)**	**(3.108)**	(1.227)	(1.182)	(0.477)		**(2.210)**	(1.529)
Constant		**-0.137*** **	-0.0739	-0.0134	0.0247	**-0.478*** **	**-0.459*** **		**0.163*** **	**0.103** **
		(-2.791)	(-1.295)	(-0.333)	(0.431)	**(-4.774)**	**(-3.512)**		**(2.917)**	**(2.187)**
Observations		543	543	543	543	543	543		515	515
R-squared		18.20%		15.00%		14.70%	-		6.00%	-
Pseudo R2		-	46.95%	-	43.94%		38.88%		-	20.20%
Year dummy		Yes	Yes	Yes	Yes	No	Yes		Yes	Yes
Industry dummy		Yes	Yes	Yes	Yes	No	Yes		Yes	Yes
F Stat		14.43***	.	11.41***	.	11.10***	-		3.881***	-
Num. Groups (Industries)		18	-	18	-	18	-		18	-

Notes: *(i)* For each dependent variable, I use industry fixed effects approach (1) and quintile regression (2) to estimate the coefficients. *(ii*) Discl means the full index of voluntary disclosure - first dependent variable; EFDiscl represents the index of economic and financial voluntary disclosure – second dependent variable; SEDiscl means the social and environmental voluntary disclosure index – third dependent variable; *ICC* is the implied cost of capital – fourth dependent variable; (*iii*) Standard errors are presented in parentheses; *(iv)* $Intro_i$ means the ith-company belonging to the *Introduction* stage; *(v)* $Grow_i$ for Growing companies; *(vi)* $Shake_i$ for the stage of *Shake-out; (vii)* $Decl_i$ for those companies into the *Decline* phase; and (*vii*) * significant at 10% level; ** significant at 5% level; and *** significant at 1% level.

Some differences in the coefficients in regressions through the median (quantile regression) are observed compared to fixed effects approach. For the indexes of voluntary disclosure, the only difference between the approaches is observable in economic and financial index (EFDiscl). The column (2) shows there is no any difference between the stages, with suppose the life cycle stages does not impact on economic and voluntary disclosure under this approach.

4.5.1 Matched Sample

4.5.1.1 Voluntary Disclosure

In order to mitigate some possible existing bias in the results, I extract a control group aiming to select a matched sample. To this end, I use the same parameters of the treatment group, considering companies with positive equity, with liquidity higher or equal to 0.001, based on the range of the total asset (minimum and maximum) of each year in each life cycle stage of the treatment group. Table 15 presents the contingency of observation across the life cycle stages in each year of the matched sample:

Table 15 - Cross tabulation for number of observation for non-covered companies across life cycle stages and across time

Year	Stage					Total
	Introduction	Growth	Maturity	Shake-Out	Decline	
2008	9	28	31	4	2	74
2009	6	27	34	6	5	78
2010	14	31	29	5	5	84
2011	12	32	34	7	3	88
2012	8	26	45	6	7	92
2013	9	27	42	11	4	93
2014	5	14	32	7	6	64
Total	63	185	247	46	32	573

As for the treatment group (covered companies), the distribution of data across time and stages suggests that the number of observation in growth and maturity phases is greater than others, representing together 75% of the total (573). Table 16 shows the mean and median of the interesting variables for non-covered companies.

Table 16 - Means and medians for the matched sample across the stages

Variable	Stats	Intro	Grow	Mat	Shake	Decl
Discl	Mean	0.2043	0.2852	0.2978	0.2287	0.2043
	Median	0.1747	0.2672	0.3083	0.2055	0.1850
EFDiscl	Mean	0.2103	0.2720	0.2795	0.2267	0.2101
	Median	0.1944	0.2639	0.2778	0.2222	0.2222
SEDiscl	Mean	0.1822	0.3142	0.3409	0.2283	0.1827
	Median	0.1538	0.3077	0.3846	0.1538	0.1154
ICC	Mean	0.1414	0.1038	0.1092	0.10955	0.1639
	Median	0.1098	0.0925	0.0987	0.1216	0.12035

I notice that the differences between mean and median values of both voluntary disclosure indexes and ICC are constant across the stages, except for the social and environmental voluntary disclosure. Predictably, the three indexes of voluntary disclosure present higher levels of median and mean in maturity than other stages. On the other hand, the stages of introduction and decline present higher levels of cost of capital than other stages.

Importantly, I investigate the results of the regression for life cycle stages on the indexes of voluntary disclosure for non-covered companies comparing them with the covered ones, as show in Table 17.

Table 17 - Linear regressions of Voluntary Disclosure on life cycle stages for matched sample

Variables	Discl		EFDiscl		SEDiscl	
	(1)	(2)	(1)	(2)	(1)	(2)
Intro	**-0.0387*** **	**-0.0416** **	**-0.0263*** **	**-0.0347* **	**-0.0719*** **	**-0.0548** **
	(-3.280)	**(-2.391)**	**(-2.732)**	**(-1.931)**	**(-3.001)**	**(-2.006)**
Grow	**-0.0150* **	-0.0147	-0.00726	-0.0136	**-0.0360** **	**-0.0169**
	(-1.874)	(-1.043)	(-1.112)	(-1.012)	**(-2.215)**	**(-0.835)**
Shake	**-0.0296* **	**-0.0930*** **	-0.0178	**-0.0828*** **	**-0.0615* **	**-0.111*** **
	(-1.811)	**(-4.492)**	(-1.336)	**(-4.022)**	**(-1.851)**	**(-4.137)**
Decl	**-0.0497** **	**-0.131*** **	-0.0238	**-0.135*** **	**-0.120** **	**-0.122*** **
	(-2.143)	**(-6.131)**	(-1.260)	**(-6.266)**	**(-2.547)**	**(-3.807)**
Size	**0.0266*** **	**0.0346*** **	**0.0178*** **	**0.0307*** **	**0.0503*** **	**0.0419*** **

	(8.394)	**(6.318)**	**(6.884)**	**(5.926)**	**(7.808)**	**(5.663)**
MTB	**0.000497***	5.71e-05	**0.000483****	1.46e-05	0.000524	0.000149
	(1.710)	(0.131)	**(2.035)**	(0.0313)	(0.887)	(0.269)
Lev	0.0173		-0.00385		0.0756	
	(0.687)		(-0.187)		(1.474)	
Beta	**0.0151****	0.00115	**0.0152*****	-0.00237	0.0144	0.00831
	(2.518)	(0.0860)	**(3.108)**	(-0.187)	(1.182)	(0.438)
Constant	**-0.137*****	-0.0983	-0.0134	0.0709	**-0.478*****	**-0.422*****
	(-2.791)	(-1.174)	(-0.333)	(0.893)	**(-4.774)**	**(-3.783)**
Observations	543	566	543	566	543	566
R^2	18.20%	37.20%	15.00%	26.20%	14.70%	45.90%
Adj R^2	14.30%	33.60%	10.90%	22.10%	10.50%	42.80%
F Stat	14.43***	17.04***	11.41***	14.57***	11.10***	27.21***

Notes: (i) For each dependent variable, I use industry fixed effects approach for covered companies (1) and non-covered companies (2) to estimate the coefficients. *(ii*) Discl means the full index of voluntary disclosure - first dependent variable; EFDiscl represents the index of economic and financial voluntary disclosure – second dependent variable; SEDiscl means the social and environmental voluntary disclosure index – third dependent variable;(*iii*) Standard errors are presented in parentheses; *(iv)* $Intro_i$ means the ith-company belonging to the *Introduction* stage; *(v)* $Grow_i$ for Growing companies; *(vi)* $Shake_i$ for the stage of *Shake-out; (vii)* $Decl_i$ for those companies into the *Decline* phase; and (*vii*) * significant at 10% level; ** significant at 5% level; and *** significant at 1% level.

The results confirm the life cycle stages impact on the voluntary reporting of information for non-covered companies. For the full index (Discl), the results signalize firm in maturity stage tend to disclose more information and after reaching this stage, the level tend to decrease, but there is no difference from maturity to growth stages.

On the other hand, the hypothesis of expected variation for economic and financial voluntary disclosure index could not be rejected when it is related to the matched non-covered sample, since this level decreases in shake-out and decline stages. For social and environmental voluntary disclosure level, the results hold for the non-covered sample.

4.5.1.2 Cost of Equity Capital

Alternatively, I use the variable ICC winsorized 2.5% in each tail. The results (appendix B) follow the year and industry fixed effects approach, with higher levels of cost of capital in initial and final stages, but without significant differences for growth and shake-out.

The Capital Asset Pricing Model, as mentioned, is the most commonly used method to estimate the cost of capital, but this model relies on several assumptions related to the

efficient market (FAMA; FRENCH, 1997). Antunes, Lamounier and Bressan (2006) examine the Brazilian market by assuming as benchmark[3] for market return the main Brazilian Market Index, the Ibovespa (IBOV), and the CDI (Internbank Deposit Ceritificate) as risk-free rate, both for the last 12 months. This assumption relies on the resolution of Central Bank of Brazil number nº 2,829/2001, which provides these variables as proxies for reference indexes.

I notice that the results did not hold for CAPM in substitution for ICC. However, further investigating, I observe a negative risk premia in 71.73% of the observations, which results in negative expected returns in 65.36% of the sample. Hence, to depart the assumptions issues, taking into account that a market return and risk-free rate are equal for all the observation in each year, I verified Beta and the Expected Return present perfect correlation for each year, I follow Botosan (1997) and Lopes and Alencar (2010) to use the Beta as a substitution for the CAPM. Table 18 shows the results for the comparison between the main sample (comprised by covered companies) and the full one, with covered and non-covered companies.

Table 18 - Linear regressions of Beta on life cycle stages

Variables	Covered Companies		Non-covered Companies		Full Sample	
	FE	**Rob**	**FE**	**Rob**	**FE**	**Rob**
Intro	**-0.210****	-0.0715	-0.0736	-0.107	**-0.140****	**-0.0960***
	(-2.300)	(-1.021)	(-1.096)	(-1.540)	**(-2.427)**	**(-1.873)**
Grow	**-0.111***	-0.057	0.0196	-0.0662	-0.0438	-0.0337
	(-1.901)	(-1.007)	(0.475)	(-1.447)	(-1.202)	(-0.961)
Shake	-0.0804	-0.136	-0.0310	0.0375	-0.064	-0.0381
	(-0.653)	(-1.502)	(-0.442)	(0.595)	(-0.934)	(-0.741)
Decl	0.000194	0.232	-0.0619	-0.00697	-0.0337	0.0288
	(0.00114)	(1.144)	(-0.692)	(-0.0902)	(-0.375)	(0.303)
Size	**0.215*****	**0.156*****	**0.0993*****	**0.0437*****	**0.149*****	**0.105*****
	(6.115)	**(4.701)**	**(4.808)**	**(2.793)**	**(7.489)**	**(6.627)**
MTB	-0.0031	4.30E-05	0.00318	**0.00337****	-0.00152	0.000268
	(-1.350)	(0.0569)	(1.136)	**(2.186)**	(-0.887)	(0.344)
Constant	**-2.630*****	**-1.799*****	**-1.068*****	**-0.883*****	**-1.694*****	**-1.313*****
	(-4.854)	**(-3.560)**	**(-3.558)**	**(-4.025)**	**(-5.694)**	**(-6.710)**

[3] The Capital Asset Pricing Model – CAPM, as mentioned, means the expected rate of return on stock *i* (R_e), which is a function of a risk free rate (R_f) plus a risk factor (β) that multiplies the risk premia, that is, the difference between the value-weighted market portfolio (realized) return and that risk free rate $\left(E[R_m] - R_f\right)$. The risk factor ($\beta$), also considered as factor loading, represents the ratio between the covariance of R_i and R_m and the variance of R_m, so that it means the sensitivity of the firm return to a variation in the market return.

Observations	585	585	566	566	1,151	1,151
R^2	8.40%	33.10%	5.30%	15.90%	6.10%	23.70%
Number of id	86	-	100	-	186	-
Year control	Yes	Yes	Yes	Yes	Yes	Yes
Industry control	Yes	Yes	Yes	Yes	Yes	Yes
F	7.559***	17.76***	4.333***	10.36***	10.34***	23.00***

Notes: *(i)* I use year and industry fixed effects approach (FE) pooled with White's correction to estimate the coefficients. *(ii*) Standard errors are presented in parentheses; *(iii)* $Intro_i$ means the ith-company belonging to the *Introduction* stage; *(iv)* $Grow_i$ for Growing companies; *(v)* $Shake_i$ for the stage of *Shake-out; (vi)* $Decl_i$ for those companies into the *Decline* phase; and (*vii*) * significant at 10% level; ** significant at 5% level; and *** significant at 1% level.

The results suggest that the using of Beta instead of ICC does not hold the impact of firm life cycle stages on the cost of capital measured by this proxy. For the treatment group (covered companies), the level of cost of capital is lower in introduction and growth stages, compared with maturity, but there is no difference among the other stages. For the matched sample, the stages does not exert any impact on beta, while when I use the full sample, I observe a negative coefficient for introduction, which denotes, the level of this proxy of cost of capital is lower in introduction compared with maturity.

These results are contrary to the expectation of lower risk (measured by beta) for mature companies. However, I cannot affirm that life cycle does not impact on cost of capital of non-covered companies, due not to use the same parameter for a properly comparison.

Yet, I regress the *Liquidity* instead of ICC to measure economic consequences shows (in appendix B) that only firms in shake-out present significant differences compared with maturity. It suggests that when firms are under this status of restricting and reorganization, the market reflects this uncertainty with liquidity higher than in stable level, as for mature firms. However, many exogenous characteristics and arguments impact on liquidity, and then it deserves special attention in future research investigations.

I also run a linear regression of the firm life cycle stages on the implied cost of capital and also on the voluntary disclosure indexes for firms with American Depositary Receipt (ADR), but the results (shown in appendix C) both for disclosure and cost of capital did not hold the expectation.

To double check the main hypothesis of this study (H_4), I test (in appendix D) the winsorized implied cost of capital on the interactions of voluntary disclosure variables with firm life cycle stages. The coefficients of growth and maturity hold it significant and negative, except for in the interaction of the economic and financial voluntary disclosure, which presents only the maturity to be negative and significant. It confirms the results that firms in these stages are more benefitted by the reduction of cost of capital through an improvement in reporting voluntary information.

5 CONCLUSION

This thesis analyzes whether the corporate life cycle stages can explain the relationship between voluntary disclosure and cost of equity capital. The theoretical perspective supports differences in focus, strategy, and resource structure over the life cycle of a firm. Then, I investigated it through different tests to allow the procedure of the main objective.

Using a sample of non-financial Brazilian listed firms covered by analysts between 2008 and 2014, and following the model by Gebhardt et al. (2001) to develop the Implied Cost of Capital using I/B/E/S database, from Thomson Reuters®, I firstly tested its classical relationship with voluntary disclosure. Different from the results of Alencar (2005), I found that the companies in the sample are on average benefitted by the reduction of the cost of capital when they improve the reporting of voluntary information. The findings are in accordance with the results of Ali Boujelbene and Affes (2013), Botosan (1997), Dhaliwal et al.(2011) and Petrova et al. (2012), for example.

The contribution of this thesis to accounting knowledge is as follows: First, I found that the levels of the three indexes of voluntary disclosure are significantly different among the life cycle stages, identified based on Dickinson's (2011) model. As expected, the voluntary disclosure levels increase as the firm grows and after, it fades in final stages.

This result is consistent with the arguments of Mueller (1972) about the increase in the structure and in useful information to leave the stage of introduction and achieve the status of growing firm. Significantly, the hypothesis of an expected variation of

economic and financial voluntary disclosure level could not be observed. The results showed only introduction stage faces a level of voluntary disclosure lower than maturity.

Second, I found the implied cost of capital significantly differs across life cycle stages. However, contrary to the expectation, the results report that maturity does not present the lowest level of cost of capital, since through different approaches, the regressions indicate there are not differences among growth, shake-out and maturity. However, consistently with Hasan et al.(2015), the level of the implied cost of capital fades out after leaving the initial stage and it increases again in the decline stage.

Third, the main hypothesis provide an investigation whether the improvement of voluntary disclosure in growth and maturity stages is better compensated via more reduction in cost of capital, and the results confirmed it even when it was submitted to robustness and sensitivity tests. These specific results further explain the first outcome, according to which, on average, better voluntary disclosure leads to lower cost of capital. Notably, it maintains it as an empirical situation, although it is considered as a classical theoretical relationship.

However, depending on the kind of information, this reduction is not realized for all stages, as presented on the regression for ICC on social and environmental voluntary disclosure index interacted with dummies of life cycle stages, whose results were significant and negative only for growing and mature firms.

Table 19 summarizes the research hypotheses tests of this study:

Table 19 – Summary of research hypotheses tests and findings

	Hypotheses	Predicted Signal	Observed Signal	Findings
H1	**The level of voluntary disclosure is negatively and significantly associated with the cost of capital.**			
	Full Voluntary Disclosure	-	-	Confirmed
	Economic and Financial Voluntary Disclosure	-	-	Confirmed
	Social and Environmental Voluntary Disclosure	-	-	Confirmed
H2	**The voluntary disclosure level grows until reaching the mature stage of the firm life cycle and then it declines.**			

	Full Voluntary Disclosure	-	-	Confirmed
	Economic and Financial Voluntary Disclosure	-	-	Not confirmed
	Social and Environmental Voluntary Disclosure	-	-	Confirmed
H3	**The cost of capital decreases until reaching the mature stage of the firm life cycle and then it increases**			
	Implied Cost of Capital	+	+	Confirmed
	Beta (in Robustness Test)	+	-	Not Confirmed
	Leverage (in Robustness Tests)	+	+	Partially confirmed
H4	**Controlling for life cycle, the level of voluntary disclosure of firms in growing and mature stages will signalize more reduction in the cost of equity capital than in other stages.**			
	Full Voluntary Disclosure	-	-	Confirmed
	Economic and Financial Voluntary Disclosure	-	-	Confirmed
	Social and Environmental Voluntary Disclosure	-	-	Confirmed

Despite the attempt to theoretically support the way I conduct this thesis, some potential problems may arise. I choose the Dickinson's (2001) model to classify the firms' life cycle stages, but the literature provide other proxies, such as Anthony and Ramesh (1992) and DeAngelo's, DeAngelo's and Stulz's (2006) metrics.

Hence, future studies can revisit these subjects to assess whether the results hold in different countries, with other proxies for cost of capital or of life cycle. Different theoretical arguments may also be used to explain the results. Moreover, controlling for the time each company remains in each stage can suggest other possibilities of methodology, such as survival analysis.

Different econometric discussions, such as hierarchical and multilevel regressions, can be combined with panel data to investigate the results in different levels. Moderation, mediation tests or the inclusion of instrumental variables can also better treat the variables association. Also, another proxy of voluntary disclosure can be developed to assess the maintenance of the results.

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ATTACHMENT - VOLUNTARY DISCLOSURE INDEX THEORETICAL BACKGROUND

DESCRIPTION		BACKGROUND
A – Economic and Financial Voluntary Disclosure		
1	Company narrative history	Ho and Taylor (2013); La Bruslerie and Gabteni (2010); Allegrini and Greco (2013); Nurunnabi and Hossain (2012); Eng and Mak (2003); Donnelly and Mulcahy (2008) and Murcia and Santos (2009)
2	Pronouncement of company vision and mission	Ho and Taylor (2013)
3	Discussion about competitive environment.	Botosan (1997); Gisbert and Navallas (2013); Donnelly and Mulcahy (2008); Eng and Mak (2003); Allegrini and Greco (2013); La Bruslerie and Gabteni (2010); Al-Shattarat, Haddad and Al-Hares (2010) and Ho and Taylor (2013)
4	Market-share	Botosan (1997); Lanzana (2004) and La Bruslerie and Gabteni (2010)
5	Mention of new markets the company intends to act in.	Lanzana (2004); Murcia and Santos (2009) and Donnelly and Mulcahy (2008)
6	Description of the key traded products and/or services .	Ho and Taylor (2013); La Bruslerie and Gabteni (2010); Eng and Mak (2003); Donnelly and Mulcahy (2008); Lanzana (2004); Botosan (1997) and Hail (2002)
7	Structural organization or company organogram	Ho and Taylor (2013); La Bruslerie and Gabteni (2010); Allegrini and Greco (2013); Hossain and Reaz (2007); Eng and Mak (2003); Donnelly and Mulcahy (2008); Murcia and Santos (2009); Lanzana (2004) and Hail (2002)
8	General discussion of the Macro Economic Scenario (Conflicts, interests, inflation etc.)	Murcia and Santos (2009); Gisbert and Navallas (2013); Allegrini and Greco (2013); La Bruslerie and Gabteni (2010); Al-Shattarat, Haddad and Al-Hares (2010) and Ho and Taylor (2013)
9	Company sales and/or operational revenues forecasts	Ho and Taylor (2013); Al-Shattarat, Haddad and Al-Hares (2010); Allegrini and Greco (2013); Eng and Mak (2003); Donnelly and Mulcahy (2008); Gisbert and Navallas (2013); Murcia and Santos (2009); Botosan (1997) and Hail (2002)
10	Forecast and/or discussion about company future cash flows	Al-Shattarat, Haddad and Al-Hares (2010); La Bruslerie and Gabteni (2010); Allegrini and Greco (2013); Eng and Mak (2003); Donnelly and Mulcahy (2008); Gisbert and Navallas (2013); Murcia and Santos (2009) and Botosan (1997)
11	Board of directors composition	Murcia and Santos (2009); Hossain and Reaz (2007); Yuen et al (2009) and Nurunnabi and Hossain (2012)
12	Academic or professional Directors' qualification	Murcia and Santos (2009); Hossain and Reaz (2007); Yuen et al (2009) and Nurunnabi and Hossain (2012)
13	Audit Committee/Fiscal board members composition	Nurunnabi and Hossain (2012) and Yuen et al (2009)

14	General discussion about strategy, goals and the objective of the company.	Ho and Taylor (2013); Al-Shattarat, Haddad and Al-Hares (2010); La Bruslerie and Gabteni (2010); Allegrini and Greco (2013); Nurunnabi and Hossain (2012); Hossain and Reaz (2007); Eng and Mak (2003); Donnelly and Mulcahy (2008); Gisbert and Navallas (2013); Murcia and Santos (2009); Lanzana (2004) and Botosan (1997)
15	Mention of performance indicators (EBITDA/ROE/ROA)	Ho and Taylor (2013); Allegrini and Greco (2013); Nurunnabi and Hossain (2012); Hossain and Reaz (2007); Eng and Mak (2003); Donnelly and Mulcahy (2008); Gisbert and Navallas (2013); Murcia and Santos (2009); Lanzana (2004) and Botosan (1997)
16	Mention of liquidity indicators (Current, Dry, Long Term, Short Term)	Ho and Taylor (2013); Al-Shattarat, Haddad and Al-Hares (2010); La Bruslerie and Gabteni (2010); Allegrini and Greco (2013); Hossain and Reaz (2007); Eng and Mak (2003); Donnelly and Mulcahy (2008) and Murcia and Santos (2009)
17	Information about relationship with main suppliers	Murcia and Santos (2009) and Yuen et al (2009)
18	Information about relationship with clients (for example, satisfaction,	Hail (2002); Murcia and Santos (2009); Gisbert and Navallas (2013); Yuen et al (2009); Allegrini and Greco (2013); Al-Shattarat, Haddad and Al-Hares (2010) and Ho and Taylor (2013)
19	Information about quantities produced/sold and/or services provided	Botosan (1997); Lanzana (2004); Murcia and Santos (2009); Gisbert and Navallas (2013); Allegrini and Greco (2013); Al-Shattarat, Haddad and Al-Hares (2010) and Ho and Taylor (2013)
20	Discussion about operation and/or financial performance	Botosan (1997); Donnelly and Mulcahy (2008); Eng and Mak (2003); Hossain and Reaz (2007); Nurunnabi and Hossain (2012); Al-Shattarat, Haddad and Al-Hares (2010) and Ho and Taylor (2013)
21	Comments about good corporate governance practices	Hail (2002); Lanzana (2004); Murcia and Santos (2009); Gisbert and Navallas (2013); Hossain and Reaz (2007) and Nurunnabi and Hossain (2012);
22	Comments about firm goods and services quality	Hail (2002); Murcia and Santos (2009); Yuen et al (2009) and Ho and Taylor (2013)
23	Comments about product and/or service price	Botosan (1997); Murcia and Santos (2009); Nurunnabi and Hossain (2012); Allegrini and Greco (2013) and Al-Shattarat, Haddad and Al-Hares (2010)
24	Relationship channel with investors (e-mail, phone, address, address, investor relationship manager name)	Murcia and Santos (2009); Yuen et al (2009) and Nurunnabi and Hossain (2012)
25	Discussion about past and/or future performance of stocks in capital market.	Hail (2002); Lanzana (2004); Gisbert and Navallas (2013); Allegrini and Greco (2013) and Ho and Taylor (2013)
B - Social and Environmental Voluntary Disclosure		
26	Corporate social responsibility compliance	Gisbert and Navallas (2013); Yuen et al (2009); Nurunnabi and Hossain (2012); Allegrini and Greco (2013); La Bruslerie and Gabteni (2010) and Ho and Taylor (2013)
27	Information about social programs and projects investments	Ho and Taylor (2013); La Bruslerie and Gabteni (2010) and Yuen et al (2009)

28	Number of employees	Ho and Taylor (2013); Al-Shattarat, Haddad and Al-Hares (2010); La Bruslerie and Gabteni (2010); Yuen et al (2009); Eng and Mak (2003); Donnelly and Mulcahy (2008); Gisbert and Navallas (2013) and Botosan (1997)
29	Evolution of workforce (last three years of more)	Al-Shattarat, Haddad and Al-Hares (2010)
30	Information about employees training and capacity	Hail (2002); Lanzana (2004); Gisbert and Navallas (2013); Yuen et al (2009); La Bruslerie and Gabteni (2010); Al-Shattarat, Haddad and Al-Hares (2010) and Ho and Taylor (2013)
31	Average compensation by employee or equivalent.	Gisbert and Navallas (2013); Donnelly and Mulcahy (2008); Eng and Mak (2003); Yuen et al (2009); Nurunnabi and Hossain (2012) and La Bruslerie and Gabteni (2010)
32	Information about company hiring and employee selection policies.	Gisbert and Navallas (2013); Yuen et al (2009) and Allegrini and Greco (2013)
33	Employees age group distribution	Gisbert and Navallas (2013) and Hossain and Reaz (2007)
34	Employees schooling	Hail (2002); Lanzana (2004); Gisbert and Navallas (2013); Yuen et al (2009); La Bruslerie and Gabteni (2010); Al-Shattarat, Haddad and Al-Hares (2010) and Ho and Taylor (2013)
35	Pronouncement about aspects of security policies of work and/or damages information.	Yuen et al (2009); Allegrini and Greco (2013); Al-Shattarat, Haddad and Al-Hares (2010) and Ho and Taylor (2013)
36	Information about employee welfare level (unions)	Hossain and Reaz (2007) and Ho and Taylor (2013)
37	Corporate environmental responsibility compliance.	Gisbert and Navallas (2013); Yuen et al (2009); Nurunnabi and Hossain (2012); Allegrini and Greco (2013) and Ho and Taylor (2013)
38	Information about investment in social programs.	Gisbert and Navallas (2013); Yuen et al. (2009); and Ho and Taylor (2013)

Source: Rodrigues (2014)

APPENDIX A – CALCULATION OF EX-ANTE COST OF CAPITAL EXAMPLE

Company_Ano:	LAME_2008		**Lojas Americanas**									
Parameters:	FY_1	FY_2	FY_3	Solver_ICC								
Earnings forecasts	0,21	0,21	0,33									
Book value	0,45	BOOK										
Dividend payout ratio	26,1%	PAYOUT										
Actual price	8,97	PRICE										
Industry return on equity	13,52%	ROE_IND										
Ex ante cost of capital	**4,60%**	**ICC**		-2,97%	-2,97%	-2,97%	-2,97%	-2,97%	-2,97%	-2,97%	-2,97%	-2,97%
	0,00%		-26,74%	-23,77%	-20,80%	-17,83%	-14,86%	-11,89%	-8,91%	-5,94%	-2,97%	0,00%

$$ROE = \frac{EPS}{PL\_t\text{-}1} \rightarrow EPS = ROE * PL\_t\text{-}1$$

	Explicit Forecast Period			*Fading Period (9 years)*									*Perpetuity*
Year	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**RV**
Periodo	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	
Earnings	0,21	0,21	0,33	0,39	0,46	0,53	0,59	0,64	0,67	0,68	0,66	0,60	**0,60**
Dividend	0,06	0,00	0,09	0,10	0,12	0,14	0,15	0,17	0,17	0,18	0,17	0,16	**0,16**
Book value (beginning of year)	0,45	0,61	0,82	1,06	1,35	1,69	2,08	2,51	2,98	3,48	3,98	4,46	**4,46**
Effective return on equity	47,63%	35,27%	**40,26%**	37,29%	34,32%	31,34%	28,37%	25,40%	22,43%	19,46%	16,49%	13,52%	**13,52%**
Ex ante cost of capital	4,60%	4,60%	4,60%	4,60%	4,60%	4,60%	4,60%	4,60%	4,60%	4,60%	4,60%	4,60%	**4,60%**
Abnormal return on equity	43,03%	30,67%	35,66%	32,68%	29,71%	26,74%	23,77%	20,80%	17,83%	14,85%	11,88%	8,91%	**8,91%**
Residual income (RI)	0,19	0,19	0,29	0,34	0,40	0,45	0,49	0,52	0,53	0,52	0,47	0,40	**8,64**
Present value of RI	0,18	0,17	0,26	0,29	0,32	0,34	0,36	0,36	0,35	0,33	0,29	0,23	**5,03**
Cum. Present value of RI	8,52												
Implied value	8,97												

Notes: This appendix provides an example of the calculation of the implied cost of capital for Lojas Americanas (LAME) as of April of 2008. I follow Gebhardt et al. (2001) and Luiz and Hail (2006) to use the following parameters: FY_1, FY_2 and FY_3 are the consensus of analysts' forecast for one, two and three year ahead. Different from the mentioned studies, I used the third year ahead instead of the Long Term Growth (LTG), consistently with available data on I/B/E/S® database, from Thomson Reuters® to lead to a minor loss of data. I use a three-stage approach to calculate the intrinsic value in a finite horizon of twelve years plus the terminal value, as it follows: The *first* step is the using of explicit earnings forecast for the next three years; *Second*, I derived earnings forecasts by linearly fading year 2010 expected Return on Equity (ROE) to the median market (industry) ROE by year 2010 (13.52%); *Third*, I calculated the intrinsic value of the firm in April 30th by assuming the latest residual income as a perpetuity (terminal value) and solve for the internal rate of return, yielding an implied cost of capital of 4.60% for LAME in 2008

APPENDIX B – WINSORIZED ICC AND LIQUITITY AS DEPENDENT VARIABLE

Table 20 - Linear regressions for winsorized ICC and Liquidity as dependent variables.

Variables	W_ICC		Liquidity	
	FE	**Rob**	**FE**	**Rob**
Intro	**0.0211****	**0.0193****	-0.433	0.0753
	(2.480)	**(2.230)**	(-1.109)	(0.302)
Grow	0.00132	4.64e-05	-0.367	-0.199
	(0.229)	(0.00920)	(-1.388)	(-0.739)
Shake	0.0140	0.00948	-0.560	**-0.894****
	(1.072)	(0.794)	(-1.033)	**(-1.975)**
Decl	**0.0437****	**0.0466***	0.0863	0.382
	(2.559)	**(1.873)**	(0.112)	(1.410)
Size	-0.00381	-0.00368	0.0682	**0.565*****
	(-1.524)	(-1.577)	(0.649)	**(6.064)**
MTB	**-0.000372***	-0.000373	**0.0300*****	0.0357
	(-1.791)	(-0.967)	**(3.114)**	(1.069)
Lev	0.0215	0.0199	0.853	0.140
	(1.168)	(1.066)	(1.020)	(0.111)
Beta	**0.0130*****	0.0113	-0.236	-0.419
	(2.660)	(1.641)	(-1.186)	(-1.510)
Constant	**0.151*****	**0.0823****	-0.0716	**-4.701*****
	(3.930)	**(2.318)**	(-0.0439)	**(-3.556)**
Observations	515	515	543	543
R^2	5.00%	32.3%	2.7%	26.2%
Number of ind	18	-	18	-
Year control	Yes	Yes	Yes	Yes
Industry control	Yes	Yes	Yes	Yes
F	3.236***	17.16***	1.774*	5.968***

Notes: *(i)* For each dependent variable, I use year and industry fixed effects approach (FE) and pooled approach with dummies for each year and each industries with White's correction (Rob) to estimate the coefficients. *(ii*); *ICC* is the implied cost of capital – fourth dependent variable; (*iii*) *W_CC* is the winsorized implied cost of capital at 2.5% in each tail. *(iii)* Standard errors are presented in parentheses; *(iv)* $Intro_i$ means the ith-company belonging to the *Introduction* stage; *(v)* $Grow_i$ for Growing companies; *(vi)* $Shake_i$ for the stage of *Shake-out; (vii)* $Decl_i$ for those companies into the *Decline* phase; and (*vii*) * significant at 10% level; ** significant at 5% level; and *** significant at 1% level.

APPENDIX C – TESTS FOR COMPANIES WITH AMERICAN DEPOSITARY RECEIPT (ADR)

Table 21 - Linear regressions for voluntary disclosure indexes and ICC for companies with ADR.

Variables	Discl		EFDiscl		SEDiscl		ICC	
	FE	**Rob**	**FE**	**Rob**	**FE**	**Rob**	**FE**	**Rob**
intro	**-0.141****	-0.116	**-0.109****	-0.0903	**-0.228****	-0.183	-0.0181	-0.0248
	(-2.466)	(-1.250)	**(-2.301)**	(-1.123)	**(-2.261)**	(-1.364)	(-0.254)	(-0.769)
grow	-0.00206	0.00449	0.00495	0.0103	-0.0214	-0.0117	0.00506	0.00658
	(-0.126)	(0.281)	(0.368)	(0.792)	(-0.746)	(-0.402)	(0.254)	(0.331)
shake	0.0230	-0.00567	0.00849	-0.0136	0.0627	0.0165	0.000385	0.00940
	(0.492)	(-0.131)	(0.220)	(-0.409)	(0.763)	(0.185)	(0.00679)	(0.253)
decl	-0.0328	-0.0153	-0.0330	-0.0158	-0.0315	-0.0136	0.0225	0.0403
	(-0.451)	(-0.268)	(-0.550)	(-0.291)	(-0.247)	(-0.132)	(0.264)	(0.866)
size	0.00426	-0.0182	0.00608	-0.000473	-0.000900	-0.0668	-0.00578	-0.00500
	(0.337)	(-0.663)	(0.583)	(-0.0216)	(-0.0405)	(-1.323)	(-0.315)	(-0.115)
mtb	0.00998	0.0106	0.00503	0.00533	**0.0234****	**0.0248****	**-0.0295*****	**-0.0303*****
	(1.605)	(1.637)	(0.981)	(1.063)	**(2.143)**	**(2.025)**	**(-3.734)**	**(-2.965)**
beta	0.0122	0.00984	0.0135	0.0101*	0.00823	0.00891	0.0161	0.0242816
	(1.129)	(1.552)	(1.515)	(1.740)	(0.435)	(0.852)	(0.722)	(0.60)
lev	**-0.271*****	**-0.315*****	**-0.232*****	**-0.267*****	**-0.374*****	**-0.440*****	**0.297*****	**0.312****
	(-3.837)	**(-4.044)**	**(-3.969)**	**(-4.244)**	**(-3.012)**	**(-3.041)**	**(3.310)**	**(2.101)**
Constant	0.374*	0.719	0.308*	0.400	0.548	1.583*	0.174	0.165
	(1.697)	(1.616)	(1.693)	(1.141)	(1.413)	(1.917)	(0.542)	(0.185)
Observations	110	110	110	110	110	110	102	102
R^2	21.50%	73.10%	21.20%	74.60%	18.40%	66.20%	21.20%	38.30%
Adj R^2	5.99%	65.50%	5.65%	67.50%	2.30%	56.70%	4.06%	20.20%
Year control	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry control	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Num. Of Ind.	11		11		11		11	
F	3.118***	46.53***	3.066***	32.53***	2.571***	46.91***	2.784***	1.898***

Notes: *(i)* For each dependent variable, I use industry fixed effects approach (FE) and pooled approach with dummies for each year and each industries with White's correction (Rob) to estimate the coefficients. *(ii*) Discl means the full index of voluntary disclosure - first dependent variable; EFDiscl represents the index of economic and financial voluntary disclosure – second dependent variable; SEDiscl means the social and environmental voluntary disclosure index – third dependent variable; *ICC* is the implied cost of capital – fourth dependent variable; (*iii*) Standard errors are presented in parentheses; *(iv)* $Intro_i$ means the ith-company belonging to the *Introduction* stage; *(v)* $Grow_i$ for Growing companies; *(vi)* $Shake_i$ for the stage of *Shake-out; (vii)* $Decl_i$ for those companies into the *Decline* phase; and (*vii*) * significant at 10% level; ** significant at 5% level; and *** significant at 1% level.

APPENDIX D – TESTS FOR WINSORIZED IMPLIED COST OF CAPITAL, VOLUNTARY DISCLOSURE CONTROLLING FOR FIRM LIFE CYCLE.

Table 22 - Linear Regression – Winsorized Implied Cost of Capital, Voluntary Disclosure Controlling for Firm Life Cycle

Variables	Discl		EFDiscl		SEDiscl	
	FE	**Rob**	**FE**	**Rob**	**FE**	**Rob**
Discl_intro	-0.0353	-0.0387				
	(-0.789)	(-0.880)				
Discl_grow	**-0.0774****	**-0.0807****				
	(-2.369)	**(-2.208)**				
Discl_mat	**-0.101*****	**-0.101*****				
	(-3.189)	(-2.800)				
Discl_shake	-0.0582	-0.0691				
	(-0.894)	(-1.135)				
Discl_decl	-0.00295	0.00823				
	(-0.0353)	(0.0889)				
EFDiscl_intro			-0.0106	-0.0122		
			(-0.206)	(-0.111)		
EFDiscl_grow			-0.0567	-0.0573		
			(-1.418)	(-0.572)		
EFDiscl_mat			**-0.0802****	-0.0770		
			(-2.032)	(-0.825)		
EFDiscl_shake			-0.0334	-0.0440		
			(-0.480)	(-0.459)		
EFDiscl_decl			0.0223	0.0383		
			(0.263)	(0.411)		
SEDiscl_intro					-0.00998	-0.0122
					(-0.351)	(-0.455)
SEDiscl_grow					**-0.0439****	**-0.0459*****
					(-2.516)	**(-2.712)**
SEDiscl_mat					**-0.0663*****	**-0.0661*****
					(-4.045)	**(-3.824)**
SEDiscl_shake					-0.0194	-0.0223
					(-0.379)	(-0.557)
SEDiscl_decl					0.0139	0.0152
					(0.191)	(0.195)
Size	-0.00176	-0.00106	-0.00281	-0.00247	-0.00163	-0.000936
	(-0.661)	(-0.415)	(-1.063)	(-0.688)	(-0.632)	(-0.396)
MTB	-0.000314	-0.000315	-0.000333	-0.000335	-0.000323	-0.000331
	(-1.518)	(-0.855)	(-1.591)	(-1.029)	(-1.591)	(-0.903)
Lev	0.0187	0.0169	0.0179	0.0162	0.0209	0.0194
	(1.018)	(0.889)	(0.970)	(0.414)	(1.148)	(1.014)
Beta	**0.0149*****	**0.0136****	**0.0146*****	0.0132	**0.0146*****	**0.0134****
	(3.061)	**(1.885)**	**(2.974)**	(1.030)	**(3.008)**	**(1.866)**
Constant	**0.147*****	0.0579	**0.156*****	**0.144*****	**0.137*****	**0.220*****
	(3.744)	(1.560)	**(3.995)**	**(2.998)**	**(3.514)**	**(5.754)**
Observations	515	515	515	515	515	515
R-squared	5.70%	32.70%	4.60%		6.50%	33.30%
Year control	Yes	Yes	Yes	Yes	Yes	Yes
Industry control	Yes	Yes	Yes	Yes	Yes	Yes
F	3.255***	17.01***	2.614*	.	3.755***	18.21***