DISCLOSURE INTERACTIONS AND THE COST OF EQUITY CAPITAL: EVIDENCE FROM THE SPANISH CONTINUOUS MARKET

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Abstract

The purpose of this paper is to test empirically the theoretical model of Gietzmann and Trombetta (2003). In their paper these two authors were the first to highlight how the relationship between disclosure and the cost of equity capital may depend crucially on the accounting policy chosen by the firm. The absence of accounting policy choice as one of the explanatory variables for the cost of equity capital can be one of the reasons why the expected negative relationship between disclosure quality and cost of equity capital has been difficult to find empirically in the work of Botosan (1997) and Botosan and Plumlee (2002).

We test their theoretical hypothesis using a sample of Spanish firms quoted on the Madrid stock exchange. Following the methodology developed by previous studies (e.g., Hail (2002)) we measure cost of equity capital, for years 2000 and 2001, using a reduced version of the discounted abnormal returns model of valuation (cf. Ohlson (1995)), taking analysts predictions as a proxy for expected earnings. As explanatory variable we use an index measuring annual report disclosure quality that is produced annually by a pool of experts of a prestigious business magazine. This measure of disclosure is combined with a proxy for the accounting policy choice of the firm. This novel variable is constructed directly from the annual report of the companies included in the sample and tries to distinguish between “aggressive” and “conservative” mixes of accounting policy choices. In order to construct the variable, the section of the annual report dedicated to the description of the accounting policy choices is used.

Our results confirm the existence of the interaction equilibrium proposed by Gietzmann and Trombetta (2003) showing that the relationship between disclosure and cost of capital is crucially shaped by the choice of accounting policy.

The results of the study provide an important contribution to the understanding of the complex relationship between the financial reporting activity of the firm and the cost of equity capital.

Keywords: disclosure quality, cost of capital, accounting policy choice

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1. INTRODUCTION

The benefit of firms increased disclosure is one of the most important issues in today’s research in accounting. Among these advantages, several authors have found that it reduces the cost of equity capital; however there is little empirical evidence that give support to this assertion (Botosan, 1997; Hail, 2002). The lack of conclusive results in this area may be due in part to two determinants factors: neither cost of equity capital nor quality of disclosure can be observed directly by the researcher and rely on individual perceptions, so they involve an important degree of subjectivity.

Moreover as claimed by Gietzmann and Trombetta (2003) the empirical tests used so far may suffer from a specification problem because they do not consider the possible effect of accounting policy choice. The purpose of our paper is to fill in this gap and provide a specification that takes into account this suggestion.

To measure disclosure many authors have used indexes, but they are very different among the studies. While in some studies only voluntary disclosure activity is considered (Firth, 1979; Chow and Wong-Boren, 1987; Raffournier, 1995), in others, both compulsory and voluntary disclosure is included in the index (Singhvi and Desai, 1971; Choi, 1973; Barrett, 1976; Cooke, 1989; Giner, 1997). Indexes based on annual report information are more focused on the quality of compulsory disclosure, whereas indexes based on voluntary additional communication activity tend to measure disclosure quantity.

In analysing the quality of the information disclosed by the companies of our sample we have focused in firms’ annual reports. We have created an index of quality of information using data that are regularly published by a prestigious business magazine (“Actualidad Económica”) that studies the annual reports of the companies that trade on the Spanish continuous market and on the Madrid stock market.

In estimating cost of equity capital we can find two streams in the existing literature: an ex-ante estimate, which relies in forecasted data, and an ex-post cost of capital, obtained using historical realised returns.

In this paper, we estimate the ex-ante cost of equity capital for 119 firm-year non-financial Spanish firms in 2000 and 2001, using the finite horizon version of the accounting valuation formula developed by Gebhardt et al. (2001)

The purpose of our work is to test the empirical validity of the interaction equilibrium presented by Gietzmann and Trombetta (2003). The distinguishing feature of this equilibrium was that the cost of equity capital was jointly determined by disclosure quality and accounting policy choice. The lowest cost was experienced by conservative companies even if their disclosure was at a minimal level. On the other side aggressive companies could reduce their cost of capital by increasing their disclosure. This result could potentially explain the difficulty in finding a statistically significant inverse relationship between cost of equity capital and disclosure experienced, for example, by Botosan (1997) and Botosan and Plumlee (2002). If accounting policy choice is relevant, then the relationship between the cost of equity capital and disclosure is not monotonic. It is negative for aggressive firms, but in the case of conservative firms no significant relationship is expected. Hence if we do not control for accounting policy choice in
our empirical estimation of the model, then we can not expected to find a significantly negative coefficient for our proxy of disclosure.

The novelty of our work is precisely the inclusion of a proxy of accounting policy choice, interacting with disclosure, in our empirical specification of the cost of capital model. By looking directly at companies’ annual reports, we have created a dummy variable that differentiates between conservative and aggressive firms.

Our results show that accounting policy choice is significant in determining the relationship between cost of equity capital and disclosure. In the case of aggressive firms the relationship is negative as expected while the fact of being aggressive increases the cost of capital. On the other hand for conservative firms disclosure is not a significant determinant of the cost of capital. We interpret this as positive evidence in favour of the existence of the interaction equilibrium theoretically predicted by Gietzmann and Trombetta (2003).

The remainder of the paper is organized as follows. In the following section we review the relevant related literature. In section 3 we present our hypothesis and the variable we will use to test them. Section 4 provides a description of our estimation of the cost of equity capital. Section 5 describes our methodology and the empirical results we obtain. Finally, section 6 provides some conclusions.

2. RELATED RESEARCH

The relation between cost of equity capital and disclosure has been attended in the last years by several theoretic and empirical studies. From the theoretical point of view disclosure reduces information asymmetry, and consequently reduces a firm cost of capital. However empirical results are mixed and depend crucially on the metrics of disclosure and cost of capital.

By revealing private information firms try to solve the reluctance of potential investors for holding shares in illiquid markets, and thus, reduce the cost of capital. In this line, Diamond and Verrecchia (1991) show that companies reduce the cost of equity financing by improving disclosures, which implies higher liquidity of firms securities and increase the demand from large investors. Other benefit from improving disclosure is that providing better information firms try to reduce potential investors’ estimation risk regarding the parameters of a security’s future return or payoff distribution. It is assumed that investors attribute more systematic risk to an asset with low information than to an asset with high information (Handa and Linn (1993), Klein and Bawa (1976), Coles et al. (1995), Clarkson et al. (1996))

From the empirical evidence we can also refer to several studies. Botosan (1997) demonstrate that among firms attracting a low analyst following, those that present higher-quality disclosures benefit from lower levels of cost of capital. She used a sample of 115 firms and measured cost of capital using a version of the residual income model. In Botosan and Plumlee (2002) they estimate cost of capital using four alternative methods, and they find that after controlling for firm size and market beta, greater disclosure is associated with a lower cost of capital. Hail (2002), using a similar technique to Botosan (1997), shows for a cross-sectional sample of 73 non-financial Swiss firms a negative and highly significant relation.
between the cost of equity capital and disclosure. This result holds in general, even for firms with high analyst following. Gebhardt et al (2002) show that the book-to-market ratio is the single most important variable in explaining cross-sectional variations in the implied cost of capital, however they did not find the expected negative relation between size and the risk premium. Leuz and Verrechia (2001) find that increased disclosure, documented in an international reporting strategy rather than in local GAAP, implies lower bid-ask spreads and higher share turnover, after controlling for several firm characteristics. In this line, Welker (1995) and Sengupta (1998) also document a significant negative relation between financial analysts’ disclosure rankings and a firm’s bid-ask spread and cost of debt. Healy et al (1999) show that stock performance and capital market intermediation is improved when voluntary disclosure increases. Others, like Marquardt and Wiedman (1998) provide evidence that managers believe that increasing voluntary disclosure reduce information asymmetry and consequently the cost of capital.

But if we focus on the estimate of cost of equity capital we can differentiate between two streams: on the one hand we can find studies that uses past realized returns (ex-post estimate) and on the other hand we have several studies that estimate the rate of return that the market implicitly uses to discount the expected future cash flows of the firm (ex-ante estimate).

Among the studies that approach for an ex-post estimate, stand out the ones of O’Hanlon and Steele (2000) and Giner and Reverte (2003), which are based on the Ohlson (1995) valuation framework. Both studies estimate the cost of capital from a regression of two accounting fundamentals: accounting profitability and unrecorded goodwill, and obtain an average implied cost of capital around 14% in both works.

But using the ex-post approach is not free from criticizes, and after extensive testing of CAPM and three-factor based industry cost of capital, Fama and French (1997) conclude that these cost of capital estimates are imprecise. Actually, they identify three potential problems associated to the use of past realized returns to compute risk premia: i) difficulties in identifying the right asset pricing model, ii) imprecision in the estimates of factor loadings, and iii) imprecision in the estimates of factor risk premia. Therefore, we can find several studies that adopt an ex-ante perspective, such as Botosan (1997), Gebhardt et al (2001), Hail (2002), Claus and Thomas (1999a&b), Gode and Mohanram (2002), Easton et al (2002)\(^1\).

They compute the implied cost of capital for each firm as the internal rate of return that equates the present value of expected future cash flows to the current stock price. To do that it is necessary to forecast cash flows up to a terminal period and to establish a suitable terminal value at the terminal period to capture the value of cash flows beyond the terminal period. Despite this stream is also subject of comments such as, the use of forecasts of the main accounting variables as well as assumptions regarding the terminal value computation, we have followed the above mentioned authors and we have used a version of the discounted cash flow model referred to as the residual income model.

\(^1\) Easton et al (2002) also use the residual income valuation model but to estimate simultaneously the expected cost of capital and the growth rate.
3. HYPOTHESIS DEVELOPMENT AND RESEARCH DESIGN

3.1 Hypothesis Development

The adverse selection problem, caused by the information asymmetries, gives raise to transaction costs when shares are bought and sold. Firms with higher levels of asymmetries of information show reduced levels of liquidity in their shares, and so buyers are more reluctance to acquire them. Increasing the levels of disclosure reduces the possibilities of information asymmetry, and hence, the adverse selection problem. It should consequently improve investors’ capabilities in forecasting future growth and therefore reduce the estimation risk and information asymmetry components of a firm’s cost of capital.

Following this line of argument we can state the following hypothesis:

\[ H_1: \text{There is a negative association between the cost of equity capital and the quality of firm disclosures.} \]

However, the relationship between cost of capital and disclosure is not totally clear. For instance, Botosan (1997) finds no statistically significant relationship between cost of equity capital and disclosure on her full sample, but she finds a significantly negative relationship for firms with a low analyst following. The above mentioned hypothesis may depend crucially on the accounting policy chosen by the firm. The adoption of aggressive accounting policies may look suspicious to investors and induce more voluntary disclosure by firms wanting to assure the market of good prospects. So, the market might penalize firms that adopt an aggressive accounting policy by charging them a higher cost of capital.

Therefore we can assert the following hypothesis that we will try to test:

\[ H_2: \text{There exists a significant negative relationship between cost of capital and quality of disclosure for firms adopting an aggressive accounting policy, while there is no relation for firms with a conservative accounting policy.} \]

3.2 Sample and variables

3.2.1 Sample selection

Initially we considered all the companies for which we have disclosure data for years 1999 and 2000. Then we have to exclude all companies for which some of the data needed in order to calculate the cost of equity capital measure were missing. We ended with a final panel of 119 firm-year observations. The details can be found in Table 1.

[Table 1 here]
3.2.2 Disclosure data

Our disclosure quality proxy is based on the data regularly published by a prestigious business magazine (“Actualidad Económica”) that studies the annual reports of the companies that trade on the Spanish continuous market and on the Madrid stock market. Several items are graded in order to produce a score that measures the quality of the information provided in the annual report. Among them we find: historical data, analytical account of results, composition of shareholding, shares percentage held by the board of directors, order and clarity of the report, design, number of branches, directors' remuneration, returns on shares, market evolution, review of operations, on-line information².

A score is given for each one of these items of the annual report. With these scores we have created a revelation index based on the sum of scores obtained divided by the maximum sum of scores obtainable.

3.2.3 Accounting policy

Our proxy for accounting policy choice is also based on companies’ annual reports. This time our objective is to distinguish between aggressive and conservative mixes of accounting policy choices. In order to do that, we have paid attention to some accounting issues that could be object of discretion of managers, so that they could affect profits. In particular, we have considered four kinds of provisions: general provision for risk, inventory provision, bad financial investment provision and bad debt provision.

For each company in each year the value of this provision has been divided respectively by total liabilities, total inventory, total financial assets and receivables. Then we have obtained the median values for each of these ratios on both years. Finally we have created a dummy variable whose value is zero if three or four firm’s provisions are located above their median values and one otherwise. The intuition behind our proxy is that firms showing higher values in their provisions ratios may intend to reduce their annual earnings more than firms with lower provisions ratios and this can be interpreted as a more conservative accounting policy. Hereby, we include in our analysis a dichotomous variable that differentiate between firms having a conservative accounting policy and firms with an aggressive accounting policy mix.

3.2.4 Other independent variables

The implied cost of capital is just a theoretical measure; therefore one way to justify its relevance is to study its relationship with other measures that reflect risk factors of the firm as perceived by investors. In fact, some recent researches such as Botosan (1997), Botosan and Plumlee (2002), Gebhardt et al. (2001) or Hail (2002) examine different accounting and market-based risk proxies.

We have considered the following risk characteristics in our analysis:

² The full list of items can be found in appendix.
i) Leverage:
The amount of debt in its capital structure should be an increasing function of a firm’s cost of equity, because debt increases the volatility of future earnings. Several empirical works as Hail (2002), Botosan and Plumlee (2001) or Gebhardt et al. (2001), have documented this positive relation, however, whether leverage is seen as a good or bad new by investors is not clear from the perspective of the asymmetries of information.
We have considered a measure of market leverage for each year, measured as total liabilities over market capitalization. These data have been obtained from Compustat data base.

ii) Beta:
The Capital Assets Pricing Model (CAPM) suggests a stock’s market beta should be positively correlated with its cost of capital. However, previous studies do not consistently show such expected relationship, this is the case of Gebhardt et al. (2001) while others like Hail (2002) confirm the expected positive sign for the Swiss market.
We have obtained beta of each stock using a Market Model for the 60 months prior to the month t, requiring at least, 12 monthly return observations.

iii) Size:
Firm size could be use as a proxy for availability of information, because information is more available for bigger firms than for smaller ones. As long as companies provide more information, future earnings are perceived by investors to have lower risk, and it implies a lower cost of capital. Therefore, we expect a lower cost of capital for larger firms than for smaller ones. We have considered three proxies of size: a) the logarithm of market capitalization, b) total assets and c) number of employees.

4. ESTIMATION OF THE IMPLIED COST OF CAPITAL
To obtain the ex-ante cost of capital we implement a version of the discounted cash flow model referred to as the residual income model. In order to be able to apply this model we assume the clean surplus relation, that is, all future changes in book values emerge either from dividends, earnings or capital contributions. The residual income model consider firm value as a function of current and forecasted accounting data, and computes the ex-ante cost of capital as the internal rate of return that equates the present value of expected future cash flows to the current stock price.
The residual income model derivate of the dividend discount model, thereby, according to the last one, the stock price is the present value of its expected future dividends:
(1.1) \[ P_t = \sum_{i=1}^{\infty} E_t \left[ \frac{d_t}{(1 + r)^i} \right] \]

where
- \( P_t \) = current stock price
- \( E_t \) = expectation based on information available at time t
- \( d_t \) = net dividends paid during the period (t-1,t)
- \( r \) = cost of equity capital based on information set at time t

This definition assumes a flat term-structure of discount rates. The clean surplus accounting assumption implies that:

(1.2) \[ b_{vt} = b_{vt-1} + x_t - d_t \]

where
- \( b_{vt} \) = accounting book value of equity at date t
- \( x_t \) = accounting earnings for period (t-1,t)

By solving the clean surplus relation (1.2) for dividends and substituting into the dividend discount formula (1.1) we obtain the residual income model. According to this model the stock price can be rewritten as the reported book value, plus an infinite sum of discounted residual income (economics profits):

(1.3) \[ P_t = b_{vt} + \sum_{i=1}^{\infty} E_t \left[ \frac{x_t (1 + r)^i}{(1 + r)^i} \right] = b_{vt} + \sum_{i=1}^{\infty} E_t \left[ \frac{(ROE_{t+i} - r)b_{vt+i-1}}{(1 + r)^i} \right] \]

With the residual income model, in equation (1.3) we express the intrinsic value of a firm using forecasts of future earnings and book values infinitely. However, for practical purposes, an explicit forecast period must be defined. Consequently, a “terminal value” is needed to be determined, that is, an estimate of the value of the firm based on the residual income earned after the explicit forecasting period.

Following the methodology used by several authors like Lee et al (1999), Gebhardt et al (2001) and Hail (2002), we use a three-stage approach to compute intrinsic value: 1) Firstly, we use explicit earnings forecasts for the next three years, 2) Secondly we obtain earning forecasts by linearly fading year \( t+3 \) return on equity (ROE) to the mean market ROE by year \( t+T \), 3) Lastly, we assume the latest residual income as a perpetuity to calculate terminal value.

Introducing these assumptions in equation (1.3) we obtain a finite horizon specification:
\[ P_t = bv_t + \sum_{i=1}^{\infty} \frac{(\hat{x}_{t+i} - r_e bv_{t+i-1})}{(1 + r_e)^i} + \sum_{i=n+1}^{T} \frac{(\hat{x}_{t+i} - r_e bv_{t+i-1})}{(1 + r_e)^i} + \frac{(\hat{x}_{t+T} - r_e bv_{t+T})}{r_e (1 + r_e)^T} \]

where

- \( P_t \) = market price of a firm’s stock at date \( t \)
- \( \hat{x}_{t+i} \) = expected future accounting earnings for period \( (t+i-1, t+i) \)
- \( r_e \) = estimate of the ex ante cost of capital
- \( bv_{t+i} \) = expected future accounting book value at date \( t+i \), assuming the clean surplus relation. Expected future net dividends for period \( (t+i-1, t+i) \) obtained from the dividend payout ratio \( k \) times the earnings forecast \( \hat{x}_{t+i} \).

We have solved this relationship by an iterative process\(^3\) and produced an estimate of the ex-ante cost of capital conditioned on the currently available information. But this model is just a particular case of forecasting dividends up to period \( t+T \) combined with a suitable compute of the terminal value.

We have obtained estimates of the cost of capital for years 2000 and 2001. We have needed several proxies of current and future accounting numbers, besides stock prices, to implement for each year the finite horizon specification. As observation date we use June 30th both for year 2000 and 2001, because at that moment companies have already released their annual reports for the previous year. Hence we have taken the closing June price as the market value of the firm. Then we have solved for the cost of equity capital that makes this market value equal to the value estimated by using the residual income model.

We have considered analysts’ consensus forecasts as the best proxy of accounting earnings for the first two years, and we have obtained these data from JCF database. For the third year, as not many earnings forecasts are available, we obtain future expected earnings by multiplying one plus the estimated long-term earnings growth rate with two-year-ahead earnings forecasts (Hail, 2002). Net dividends are needed in order to compute book values. We obtained them using a constant ratio of expected future earnings up to the finite forecast horizon, and keep it constantly equal to \( t+T \) earnings thereafter, assuming, as is common in residual value calculation, no more growth in later periods. We estimate the dividend payout ratio dividing actual dividends from the most recent fiscal year by earnings over the same time period; future net dividends are estimated using the firms’ average dividend payout ratio over the last five years.

The results obtained in this paper are obtained using forecasts of earnings up to 12 future years and estimate a terminal value beyond year 12 \((T=12)\) (Gebhardt et al (2001), Hail (2002)). Targets ROEs are 12.66% and 11.70% for years 2001 and 2000 respectively. We have obtained them as the median of past ROEs from all Spanish listed companies over the last five years. As the Spanish market is not so wide, we have not adjusted for industry specific returns.

\(^3\) This has been done by using the Mathematica\(^ \text{©} \) software
We compute the following finite horizon estimate for each firm:

\[ P_t = bv_t + \sum_{i=1}^{3} \left( \frac{\hat{X}_{t+i} - r_e \cdot bv_{t+i-1}}{1 + r_e} \right) + \sum_{i=4}^{12} \left( \frac{\hat{X}_{t+i} - r_e \cdot bv_{t+i-1}}{r_e (1 + r_e)^{i-3}} \right) + \frac{\hat{X}_{t+13} - r_e \cdot bv_{t+12}}{r_e (1 + r_e)^{12}} \]

where

- \( P_t \) = closing price of the month of June
- \( bv_t \) = accounting book value per share at the beginning of the fiscal year
- \( \hat{X}_{t+i} \) = analysts’ consensus forecasts and the mean long-term earnings growth rate as of June to obtain one, two and three years ahead EPS; beyond year \( t+3 \), earnings are forecasted by linearly fading actual ROE to a median market ROE by year \( t+12 \).
- \( r_e \) = estimate of the ex ante cost of capital
- \( bv_{t+i} \) = expected future accounting book value at date \( t+i \), assuming the clean surplus relation. Expected future net dividends for period \( (t+i-1, t+i) \) are obtained using the firm’s average dividend payout ratio over the last five years.

We show in detail the estimate of the cost of equity capital for one firm in the Appendix. Earnings forecasts and analyst’s data are collected from JCF database, while accounting numbers and prices are provided by Compustat.

## 5. EMPIRICAL ANALYSIS

### 5.1 Preliminary analysis of the Cost of Capital proxy

Previous research on cost of capital suggests several relations among this measure and firm characteristics, particularly, among it and firm-specific risk features. An appropriate measure of cost of equity capital should be increasing in risk and show the “size effect”. Risk is measured by a firm’s market beta and market leverage. As a measure of size we have considered the logarithm of market capitalization and the logarithm of total assets.

In table 2 we can observe the results of an OLS regression analysis of our dependent variable, cost of capital on beta, leverage and the natural logarithm of market capitalization.

[Table 2 here]
The Capital Assets Pricing Model (CAPM) establishes that stock’s market beta and its cost of capital are positively related. While several studies such as Botosan (1997), Botosan and Plumlee (2000) or Hail (2002) confirm this relationship. However our results are not consistent with this conjecture and we don’t find any significant relation among both variables. This is consistent with Gebhardt et al. (2001) that also were not able to find a positive relation between this risk measure and the cost of capital.

The remaining variables, market leverage and size, behave as predicted and their coefficients are highly significant. We show that our measure of cost of capital increases with debt and decreases with a firm’ market value. Same results are obtained when we use the natural logarithm of total assets as a proxy of size.

Overall these results support the validity of our measure of cost of equity capital.

5.2 Univariate analysis

In table 3 we provide the Pearson correlations among our dependent and independent variables. We can observe that, as we expected, cost of capital is negatively related to disclosure. The coefficient is -0.156, with a 10% of significance. Thereby, at least in a univariate setting, the *ex ante* cost of capital is decreasing in disclosure quality. Consistent with our validity results, cost of equity capital is increasing in leverage, and it is inversely related to each one of the variables that we have considered as proxies of companies’ size, although the only one significant (at a 5% level) is the natural logarithm of market capitalization. We can also observe that every proxy of size is highly and positively related to quality of disclosure, so we have to be very careful in our multivariate analysis to avoid a multicollinearity problem.

5.3 Multivariate analysis

First of all we run the following “classic” cost of capital and disclosure regression in order to test hypothesis H1:

\[
\text{CostCapital} = \alpha + \beta_1 \text{BETA} + \beta_2 \text{LEV} + \beta_3 \text{DISC} + \epsilon_i
\]

Table 4 shows the results of running this regression.

We can appreciate that leverage is the only variable that is significantly related to our dependent variable. Beta is not significant, whereas disclosure has the expected sign but
does not reach the 10% significance level. Therefore, from these results we can only affirm that firms’ cost of capital is increasing in leverage but we cannot conclude that cost of capital is significantly related to the quality of the information the firms’ provide to their stakeholders. Hence our results reject H1.

However, as it has been proposed theoretically by Gietzmann and Trombetta (2003), cost of equity capital is jointly determined by disclosure quality and the accounting policy choice of the firm. If accounting policy choice is relevant, and we do not control for it in our empirical estimation of the model, then we cannot expected to find a significantly negative coefficient for our proxy of disclosure.

Firms implementing an aggressive accounting policy may look suspicious to investors, therefore the market might penalize them by charging a higher cost of capital. So, we expect companies with conservative accounting policies to show a lower cost of equity capital than aggressive firms. This fact, however may induce aggressive firms to provide more quality information to the market in attempt to reduce this effect, hence, firms with aggressive accounting policies could reduce their cost of capital by increasing their disclosure.

In order to test hypothesis H2 we run the following alternative regression:

(1.7) \[ \text{CostCapital} = \alpha + \beta_1 \text{BETA} + \beta_2 \text{LEV} + \beta_3 (\text{DAGG} \times \text{DISC}) + \beta_4 \text{DAGG} + \epsilon \]

We differentiate between firms implementing aggressive or conservative accounting policies through a dichotomous variable whose value is one if the accounting policy of the company could be considered as aggressive and zero otherwise. In order to check whether aggressive firms use disclosure quality as a way to compensate for the potential negative effect of accounting policy choice, we include an interaction term.

[Table 5 here]

Our results show that the coefficient of the dummy variable (9.42) is positive related to our dependent variable, at a 5% level of significance. So we can affirm that aggressive firms have a higher cost of equity than conservative ones. Moreover, the interaction term of aggressiveness and quality of disclosure shows a negative coefficient of \(-12.47\), that is significantly related to the cost of capital, confirming the relationship proposed by Gietzmann and Trombetta (2003), in their interaction equilibrium: by improving the quality or increasing the quantity of information disclosed, firms with aggressive accounting policies can reduce their cost of equity capital.

Apart from these results, we can also observe that, as we expected, leverage is positive and highly significantly related to cost of equity, and contrary to our expectations we again appreciate that market beta although shows the expected positive sign, is not significantly related to our dependent variable so we can conclude that this measure of risk don’t seem to play any significant role in determining cost of capital. Hence our results confirm hypothesis H2.
However, we are also interested in observing if conservative accounting firms can affect their cost of capital through their disclosure policy, so we run the following final regression

\[
\text{CostCapital} = \alpha + \beta_1 \text{BETA} + \beta_2 \text{LEV} + \beta_3 (\text{DCONS} \times \text{DISC}) + \beta_4 \text{DISC} + \epsilon_i
\]

We want to check whether for conservative firms disclosure has a negative effect on the cost of equity capital over and above any possible general effect of disclosure. In order to do that we have to reverse the dummy used in the previous specification and give a value of one to conservative firms and zero to aggressive firms. Then this dummy is used to build a new interaction term which represents the possible additional effect of disclosure quality for conservative firms. The results are shown in Table 6.

[Table 6 here]

The only significant determinant of cost of equity capital in this specification is leverage. Disclosure quality is not significant neither at a general level nor for conservative firms. These results confirm again the predictions of Gietzamnn and Trombetta (2003) interaction equilibrium given that there is no overall negative relationship between disclosure and cost of equity capital and conservative firms do not seem to use disclosure to influence their cost of capital. Hence hypothesis H2 is confirmed again.

6. CONCLUSIONS

The objective of our study was to investigate the relationship between disclosure and cost of equity capital for a sample of Spanish firms in years 2000 and 2001. In particular we wanted to test the empirical existence of the interaction equilibrium of the theoretical model proposed by Gietzmann and Trombetta (2003). The distinguishing feature of their model was the direct consideration of the possible interaction between disclosure and accounting policy choice in determining the cost of equity capital.

First of all our results reject the existence of an overall negative relationship between disclosure quality and cost of equity capital. This result is in line with, for example, Botosan (1997) who runs a similar regression on a sample of a fairly similar size.

Then we have re-specified our empirical model in order to test the possible interaction effect of accounting policy choice. This has been done by introducing dummy variables based on a originally developed measure of conservativism. Our results confirm the existence of this interaction effect. Aggressive firms experience an overall higher cost of capital, but they manage to reduce it by increasing disclosure quality. On the other hand conservative firms show a lower level of cost of capital, but do not seem to use disclosure to reduce it even further. Both these results provide positive evidence in favour of the empirical existence of the interaction equilibrium.

This empirical evidence supports the need to always consider the full communication strategy of a company. To focus only of one communication channel, either disclosure or accounting numbers, may be misleading because these two channels do seem to interact in a significant way.
APPENDIX A

Our key independent variable is a measure of the quality of the companies’ annual report disclosures produced by a well known business magazine ("Actualidad Económica"). The following is the list of the items considered by the magazine while computing the score.

The President's Letter: If it is signed during the first quarter of the year, it gets one point. The contents of the letter may be awarded up to 5 points if a clear definition of the company’s strategy is outlined. (Scale: from 0 to 6 points).

Historical Data: 2 points if the main data for year t-2 of the profit and loss account and of the balance-sheet appear. 4 points if those for year t-3 are also included, and 6 if those for year t-4 appear as well. (Scale: from 0 to 6 points).

Basic Data: 8 points if a summary of the main data of the accounts, financial ratios and market ratios appear. Both the quantity and the quality of the data are evaluated. (Scale: From 0 to 8 points).

Analysis of results: Full analysis of the operations, mean total assets, quarterly results analysis of year t compared to year t-1 are given up to 6 points. If only data for year t are included, 4 points are given. (Scale: from 0 to 6 points).

The Management’s Report: 6 points, if all legally required information is included: i.e., the evolution of the business and of the current situation of the company, events that occurred after the closing of the audit, the evolution of the company, its purchases of its own shares and R+D activities. The clarity and the quantity of the information is awarded up to 12 points. (From 0 to 12 points).

Order and Clarity: the clarity, conciseness and precision of the language are valued here, as well as whether the information follows a logical order. (From 0 to 3 points).

Design: The quality of the design and its graphics and pictures. (From 0 to 2 points).

Affiliates: Two points for information about the activity, home, participation, own funds and results of different affiliates. 4 points if the dividends received by the affiliates and their book-values are included. 6 points if the accounts are included. (From 0 to 6 points).

Segmental reporting: Break-down of the business by categories of activities and geographical markets. A complete analysis of the contribution to the overall results for each of these areas is rewarded with 4 points. (From 0 to 4 points).

The Audit: 4 points for audits without qualifications, 2 for those that contain qualifications and zero if the auditor indicates limitations or reserves his opinion. The cost of the audit is evaluated on a 2-point scale. (From 0 to 6 points).

Shareholders: 2 points if it gives information about the shareholders who hold more than 10% of the firm’s total stock. 4 points if the percentage of total capital is specified, and 6 if any additional information is included. (From 0 to 6 points).
**Board of Directors**: 2 points for information on the shares held by the board. 4 points if the participation of some of its members is also specified, and 6 if it is detailed. (From 0 to 6 points).

**Directors’ Remuneration**: If there is global information on the total remuneration 2 points are given. 4 points if there is a breakdown. 6 points if the breakdown of Directors’ remuneration is done nominally. (From 0 to 6 points).

**Stock options plans**: A description of the plans, beneficiaries, conditions, cost to the company and other characteristics. To achieve the maximum points, the options granted to their executives and directors must be broken-down by individual. (From 0 to 4 points).

**Other Information**: up to 4 points are granted to companies that offer excellent information on their true situation. The degree of concentration of sales and suppliers; their market-share; a market analysis; the volume of distribution channels, or, information on either quality or environmental initiatives, are some of the items considered here. (From 0 to 4 points).

**On-line Information**: The inclusion of the annual report in the company’s web page is evaluated on a two-point scale. If quarterly reports are also included it is added 2 more points. (From 0 to 4 points).

**Good Policy Norms**: A complete and detailed declaration of the firm’s norms and policies. To achieve the maximum points, the company must explain to what degree it has managed to implement the recommendations included in the Spanish good governance ("Olivencia") Report. (From 0 to 5 points).

**Evolution of the Market**: 3 points if information is included on the evolution of the interest-rate, recruiting volume and days of trading. 4 if market ratios are included. 5 if the rate is compared to the general Stock Market index or the Ibex35, and 6 if it also includes the sector’s index. (From 0 to 6 points).
APPENDIX B

EXAMPLE OF CALCULATION COST OF CAPITAL:

CEPSA 2000

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Forecast year 1</th>
<th>Forecast year 2</th>
<th>Ltg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Earnings Forecasts</td>
<td>1.00</td>
<td>1.13</td>
<td>1.23</td>
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<tr>
<td>Book value</td>
<td>1724</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Payout ratio</td>
<td>36.2%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Close Price</td>
<td>9.4</td>
<td></td>
<td></td>
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<tr>
<td>Spanish market ROE</td>
<td>11.70%</td>
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<td></td>
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Ex Ante Cost of Capital 10.62%

<table>
<thead>
<tr>
<th></th>
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<tr>
<td>Earnings</td>
<td>1.00</td>
<td>1.13</td>
<td>1.23</td>
<td>1.35</td>
<td>1.45</td>
<td>1.55</td>
<td>1.65</td>
<td>1.74</td>
<td>1.84</td>
<td>1.93</td>
<td>2.01</td>
<td>2.08</td>
<td>2.08</td>
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<tr>
<td>Dividend</td>
<td>3.50</td>
<td>3.70</td>
<td>3.88</td>
<td>0.49</td>
<td>0.52</td>
<td>0.56</td>
<td>0.59</td>
<td>0.63</td>
<td>0.67</td>
<td>0.70</td>
<td>0.73</td>
<td>2.08</td>
<td>2.08</td>
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<tr>
<td>Book Value(per share)</td>
<td>6.44</td>
<td>7.08</td>
<td>7.88</td>
<td>8.75</td>
<td>9.67</td>
<td>10.66</td>
<td>11.71</td>
<td>12.82</td>
<td>14.00</td>
<td>15.23</td>
<td>16.51</td>
<td>17.84</td>
<td>17.84</td>
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<tr>
<td>Effective ROE</td>
<td>16.00%</td>
<td>16.00%</td>
<td>15.98%</td>
<td>15.51%</td>
<td>15.04%</td>
<td>14.57%</td>
<td>14.10%</td>
<td>13.62%</td>
<td>13.14%</td>
<td>12.66%</td>
<td>12.18%</td>
<td>11.70%</td>
<td>11.70%</td>
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</tbody>
</table>
References


<table>
<thead>
<tr>
<th></th>
<th>Cost Capital 01</th>
<th>Cost Capital 00</th>
<th>Total</th>
<th>Percent</th>
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</thead>
<tbody>
<tr>
<td><strong>Firms with disclosure score available</strong></td>
<td>124</td>
<td>117</td>
<td>241</td>
<td>100%</td>
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<tr>
<td><strong>Firms not followed by JCF</strong></td>
<td>17</td>
<td>13</td>
<td>30</td>
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<td><strong>Missing accounting data (Bv/shares)</strong></td>
<td>19</td>
<td>26</td>
<td>45</td>
<td>18.7%</td>
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<tr>
<td><strong>Missing payout</strong></td>
<td>22</td>
<td>16</td>
<td>38</td>
<td>15.7%</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>66</td>
<td>62</td>
<td>128</td>
<td>53.2%</td>
</tr>
</tbody>
</table>
TABLE 2
Regression of ex ante Cost of Capital on Risk Characteristics and Size

\[ \text{CostCapital} = \alpha + \beta_1 \text{BETA} + \beta_2 \text{LEV} + \beta_3 \ln(\text{MarketCapit}) + \epsilon_i \]

<table>
<thead>
<tr>
<th></th>
<th>Intercept</th>
<th>BETA</th>
<th>LEV</th>
<th>LN(MKCAP)</th>
<th>Adj. R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>(+)</td>
<td>8.4701</td>
<td>1.9094</td>
<td>(0.0002)</td>
<td>(0.3421)</td>
<td>0.0107</td>
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<tr>
<td>P-value</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(-)</td>
<td>6.0320</td>
<td>9.0891</td>
<td>(0.0003)</td>
<td>(0.0278)</td>
<td>0.2421</td>
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<td>P-value</td>
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<tr>
<td></td>
<td>27.5516</td>
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<td></td>
<td>-1.2527</td>
<td>0.0455</td>
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<td>P-value</td>
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<td>Panel A: Simple Regressions (OLS)</td>
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<td></td>
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<tr>
<td>Coefficient</td>
<td>24.8489</td>
<td>1.6079</td>
<td>(0.0028)</td>
<td>(0.4322)</td>
<td>0.0510</td>
</tr>
<tr>
<td>P-value</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coefficient</td>
<td>17.1044</td>
<td>8.6129</td>
<td>(0.0005)</td>
<td>(0.0371)</td>
<td>0.2574</td>
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<tr>
<td>P-value</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Coefficient</td>
<td>24.8489</td>
<td>1.6079</td>
<td>(0.0028)</td>
<td>(0.4322)</td>
<td>0.0510</td>
</tr>
<tr>
<td>P-value</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Coefficient</td>
<td>15.5205</td>
<td>1.0323</td>
<td>8.4882</td>
<td>(0.0065)</td>
<td>0.2566</td>
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<tr>
<td>P-value</td>
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<tr>
<td>Panel B: Multiple Regressions (OLS)</td>
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</tbody>
</table>

Notes. BETA is estimated via a market model regression requiring at least 12 monthly return observations
in the five-year period ended June 30th, 2000 and 2001 respectively. LEV is the ratio of total debt to
market value of outstanding equity at the beginning of each year. LN(MKCAP) is the natural logarithm
of market value of outstanding equity at the end of each fiscal year 1999 and 2000.
<table>
<thead>
<tr>
<th>Variable</th>
<th>Cost Capital</th>
<th>Leverage</th>
<th>LnSize</th>
<th>Total Assets</th>
<th>Employee</th>
<th>Beta</th>
<th>Disclosure</th>
</tr>
</thead>
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<td>Cost Capital</td>
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<td></td>
</tr>
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<td>Leverage</td>
<td>0.499</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>(0.000)***</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>LnSize</td>
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<td>-0.176</td>
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</tr>
<tr>
<td></td>
<td>(0.011)**</td>
<td>(0.056)*</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Total Assets</td>
<td>-0.085</td>
<td>0.077</td>
<td>0.630</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>(0.360)</td>
<td>(0.405)</td>
<td>(0.000)***</td>
<td></td>
<td></td>
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<tr>
<td>Employee</td>
<td>-0.104</td>
<td>-0.044</td>
<td>0.586</td>
<td>0.776</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.259)</td>
<td>(0.631)</td>
<td>(0.000)***</td>
<td>(0.000)***</td>
<td></td>
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<tr>
<td>Beta</td>
<td>0.138</td>
<td>0.106</td>
<td>-0.099</td>
<td>-0.086</td>
<td>-0.099</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.134)</td>
<td>(0.251)</td>
<td>(0.283)</td>
<td>(0.354)</td>
<td>(0.282)</td>
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</tr>
<tr>
<td>Disclosure</td>
<td>-0.156</td>
<td>-0.060</td>
<td>0.417</td>
<td>0.254</td>
<td>0.182</td>
<td>0.020</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>(0.090)*</td>
<td>(0.519)</td>
<td>(0.000)***</td>
<td>(0.005)***</td>
<td>(0.048)**</td>
<td>(0.833)</td>
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</tr>
<tr>
<td>Disclosure</td>
<td>-0.156</td>
<td>-0.060</td>
<td>0.417</td>
<td>0.254</td>
<td>0.182</td>
<td>0.020</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>(0.090)*</td>
<td>(0.519)</td>
<td>(0.000)***</td>
<td>(0.005)***</td>
<td>(0.048)**</td>
<td>(0.833)</td>
<td></td>
</tr>
</tbody>
</table>
TABLE 4
CLASSIC REGRESSION

CostCapital = $\alpha + \beta_1 \text{BETA} + \beta_2 \text{LEV} + \beta_3 \text{DISC} + \varepsilon_i$

<table>
<thead>
<tr>
<th></th>
<th>Intercept</th>
<th>BETA</th>
<th>LEV</th>
<th>DISC</th>
<th>Adj. R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coefficient</td>
<td>9.8668</td>
<td>1.2393</td>
<td>8.7748</td>
<td>-8.6045</td>
<td>0.2535</td>
</tr>
<tr>
<td>P-value</td>
<td>(0.0063)***</td>
<td>(0.2642)</td>
<td>(0.0000)***</td>
<td>(0.1081)</td>
<td>(0.0000)</td>
</tr>
</tbody>
</table>

Notes. BETA is estimated via a market model regression requiring at least 12 monthly return observations in the five-year period ended June 30th, 2000 and 2001 respectively. LEV is the ratio of total debt to market value of outstanding equity at the beginning of each year. DISC is our index of quality of disclosure obtained for years 1999 and 2000.
TABLE 5
INTERACTION REGRESSION: AGGRESSIVE FIRMS

\[ \text{CostCapital} = \alpha + \beta_1 \text{BETA} + \beta_2 \text{LEV} + \beta_3 (\text{DAGG} \times \text{DISC}) + \beta_4 \text{DAGG} + \epsilon_i \]

<table>
<thead>
<tr>
<th>Intercept</th>
<th>BETA (+)</th>
<th>LEV (-)</th>
<th>DAGG*DISC</th>
<th>DAGG (+)</th>
<th>Adj. R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coefficient</td>
<td>3.0180</td>
<td>1.2287</td>
<td>9.1978</td>
<td>-12.4731</td>
<td>9.4223</td>
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<tr>
<td>P-value</td>
<td>0.1163</td>
<td>(0.2654)***</td>
<td>(0.0000)**</td>
<td>(0.0644)*</td>
<td>(0.0229)**</td>
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</tbody>
</table>

Notes. BETA is estimated via a market model regression requiring at least 12 monthly return observations in the five-year period ended June 30th, 2000 and 2001 respectively. LEV is the ratio of total debt to market value of outstanding equity at the beginning of each year. DAGG*DISC is the interaction term constructed multiplying our measure of quality of disclosure DISC by a dummy variable DAGG whose value is 1 for aggressive firms and zero otherwise.
TABLE 6
INTERACTION REGRESSION: CONSERVATIVE FIRMS

\[ \text{CostCapital} = \alpha + \beta_1 \text{BETA} + \beta_2 \text{LEV} + \beta_3 (\text{DCONS*DISC}) + \beta_4 \text{DISC} + \epsilon_i \]

<table>
<thead>
<tr>
<th>Intercept</th>
<th>BETA (+)</th>
<th>LEV (+)</th>
<th>DCONS*DISC (?)</th>
<th>DISC (-)</th>
<th>Adj. R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.2537</td>
<td>1.1796</td>
<td>8.9244</td>
<td>-1.9102</td>
<td>-6.8505</td>
<td>0.2505</td>
</tr>
</tbody>
</table>

P-value

| 0.0127    | (0.2900) | (0.0000)*** | (0.4663) | (0.2433) | (0.0000) |

Notes. BETA is estimated via a market model regression requiring at least 12 monthly return observations in the five-year period ended June 30th, 2000 and 2001 respectively. LEV is the ratio of total debt to market value of outstanding equity at the beginning of each year. DCONS*DISC is the interaction term constructed multiplying our measure of quality of disclosure DISC by a dummy variable DCONS whose value is 1 for conservative firms and zero otherwise.