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Relationship between Cost of Equity Capital And Voluntary Corporate Disclosures

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Abstract

The relationship between disclosure and cost of equity capital has always been interesting not only for managers, but for investors as well. Economic theory suggests that by increasing the level of corporate reporting firms not only increase their stock market liquidity, but they also decrease the investors' estimation risk, arising from uncertainty about future returns and payout distributions. Utilizing the Residual Income Valuation Model, the implied cost of capital is estimated for a sample of 121 Swiss listed, non-financial companies adopting a finite horizon version of the residual income valuation model. The results show that firms on the Swiss market can reduce their cost of equity capital by increasing the level of their voluntary corporate disclosures. The results persist even after controlling for various firm specific risks, such as firm size or financial leverage and regardless of company's reporting strategy (conservative or aggressive).

Keywords: Equity capital, Corporate disclosure, Swiss companies, Residual income valuation model, Accounting policy

1. Introduction

Understanding the relationship between the level of voluntary corporate disclosures and the cost of equity capital has always been interesting not only for managers, but also for investors. Prior theoretical work on asset pricing (Botosan, 1997) suggests that disclosure policy is negatively associated to a firm's cost of equity capital. In general, two literature streams support the negative relationship of increased disclosures to cost of equity financing. One is based on the improved stock market liquidity (Demsetz, 1968; Copeland & Galai, 1983; Glosten & Milgrom, 1985; Amihud & Mendelson, 1986; Diamond & Verrecchia, 1991); the other relies on the reduced non-diversifiable estimation risk (Botosan, 2006; Barry & Brown, 1985; Coles & Loewenstein, 1988; Handa & Linn 1993)

The former stream argues that if companies disclose more corporate information, they would also attract more long-term investors. This in turn will positively influence the market price and the marketability of the firm's stock, thus reducing company's cost of equity financing. The latter strand focuses on investors' estimations of future cash flows. When determining the present value of their investments, investors focus on disclosed information to forecast

future cash flows. More information results in less uncertainty about future cash flows and consequently less estimation risk, thereby lowering firm's cost of equity financing.

Furthermore, empirical evidence suggests that a negative and significant association between cost of equity capital and voluntary disclosures exists. However, as neither disclosure policy nor cost of equity capital can be directly observed and are highly subjective, empirical work on this relationship has documented somewhat confusing results so far. For example, Botosan & Plumlee (2002) found a positive association between cost of capital and voluntary timely disclosures, while Gietzmann & Ireland (2005) argued that a negative relationship exists for the particular variables. Botosan (1997) finds evidence that in the US market voluntary disclosure actions reduce cost of equity financing, but only for firms with low analyst following. Hail (2002) argues that the number of analysts is not that influential on the cost of equity capital and both firms with high and low analyst following can reduce their cost of equity financing by increasing the level of disclosure. In line with Healy et al. (1999) and Leuz & Verrecchia (2000), he suggests that concentrating on specific occasions and reporting environments, where one can observe significant changes in firms' disclosure actions, makes the subtle effect of voluntary disclosure more easily detectable.

Conforming to this latter perspective we focus on a low disclosure environment, as in the case of Switzerland, in an attempt to further explore the relationship between disclosures and cost of equity financing. In our paper we try to establish a relationship between ex ante costs of equity capital and voluntary corporate disclosures. In this light our paper proceeds as follow: In the next section we briefly discuss the theoretical and empirical literature review in relation to disclosure and the cost of equity capital. We then present our research hypotheses, methodology and data sample. This is followed by our research results. Our paper concludes with a discussion of our findings, limitations of our work and areas for future research.

2. Literature Review of Disclosure and Cost of Equity Capital

The impact of voluntary disclosure actions on the cost of equity financing has always been an interesting topic in the financial-accounting literature, which can be classified to theoretical and empirical. From a theoretical point of view, a negative association between quality of corporate reporting and cost of equity financing is observed, particularly emphasizing on disclosure's ability to influence stock market liquidity and estimation risk. Empirical support for the suggested association is also presented by a growing body of studies, trying to quantify the relationship between cost of equity capital and quality of corporate disclosures.

2.1 Theoretical Literature

From a theoretical perspective, there are two separate approaches of research, sustaining the generally accepted negative association between quality of corporate disclosure and cost of equity capital (Botosan, 1997). The basic assumption, underlying both approaches of theoretical literature, is that companies which provide more corporate information reduce the information asymmetries on the capital markets. The first approach investigates the impact of increased disclosure on stock market liquidity and the second one links firm's reporting level to estimation risk. The idea behind the first approach is that firms voluntarily provide more corporate information in their attempt to overcome investors' unwillingness to hold shares in illiquid markets, and consequently lower their cost of equity financing. The other theoretical approach implies that firms try to reduce investors' estimation risk by greater disclosure of corporate information.

Demsetz (1968), one of the pioneers in this field, argued that greater disclosure lowers the transaction costs and enhances stock market liquidity, thus leading to lower cost of equity financing for firms on the New York Stock Exchange. Copeland & Galai (1983), Glosten & Milgrom (1985), Amihud & Mendelson (1986) concluded that higher disclosure decreases the adverse selection component of the bid-ask spread, thus reducing the transaction costs. This increases the liquidity of the particular stock, which reduces firm's cost of equity financing.

Diamond & Verrecchia (1991) suggest that disclosure improves future liquidity of firm's securities by reducing the information asymmetry for investors and motivating them to demand larger portions in firm's stock. This in turn, reduces the company's costs of equity financing, with large companies benefiting the most. These findings complement the results reported by Diamond (1985), who showed that in fully liquid and perfectly competitive markets, shareholder's welfare is improved by increasing the level of corporate disclosure. Baiman & Verrecchia (1996) established a link between the optimal level of disclosure quality and capital market's liquidity needs. They argued that increased voluntary reporting enables better monitoring of managers and reduces insider-trading opportunities. This in turn, increases investors' demands for firm's securities, and consequently reduces its cost of equity capital. This stem of research is also supported by Bloomfield & Wilks (2000).

The other theoretical strand hypothesizes that increased levels of corporate disclosure reduce the estimation risk of an asset's future return or payoff distribution, thus lowering the cost of equity capital (Botosan, 2006). The

reasoning is that because investors base their estimates of return parameters only on publicly available information, an increase in the voluntary disclosure actions would help them to better estimate share returns. Therefore, studies following this doctrine of research, also investigate whether parameters of a security's payoff distribution can be estimated based only on firm's return history and/or other publicly available information. Barry and Brown (1985), for instance, concentrated on asset returns and considered the existence of unobservable estimation risk. They suggested that due to this unobservable estimation risk, firms with poor disclosure quality have higher average rates of return per unit of estimated beta than large companies with higher level of voluntary reporting. Coles & Loewenstein (1988) further analyzed estimation risk in an equilibrium framework under uncertainty about assets' payoff distribution.

Prior theoretical research also suggests that at least part of the estimation risk is non diversifiable, as investors have different degree of information for separate securities and this is respectively priced by the market. For example, Handa and Linn (1993) showed, using the Arbitrage Pricing Model, that investors attribute more systematic risk to an asset with low information (e.g. poor disclosure quality) than to an asset with high information, leading to lower demand and prices for these shares. They also supported Barry and Brown's (1985) perspective that investors' estimation risk, reflected in future expected returns, is often unobservable.

In general, the related research suggests that higher disclosure levels reduce the estimation risk, arising from investors' efforts to estimate assets' expected return and payoff distribution. This stream of research is also supported by the relatively recent study of Lambert et al (2007), who suggest that higher corporate disclosure quality influences not only investor's perception of future expected returns; it also enables them to affect firm's future decisions and cash flows.

2.2 Empirical Literature

Based on the above theoretical background, a number of studies have empirically investigated the relationship between cost of equity capital and different types of voluntary disclosure actions. Botosan (1997) and Hail (2002) concentrated on aggregate disclosures based on self-developed indices, while Botosan & Plumlee (2002) and Gietzmann & Ireland (2005) were more interested in timely disclosure actions and Richardson & Welker (2001) distinguished between financial and social disclosures.

Botosan (1997) documented negative and significant association between cost of capital and level of corporate disclosure for companies with low analyst following. Her empirical analysis indicated that firms with higher disclosure scores can reduce their cost of equity capital by approximately 2.8% relative to firms with lower disclosure scores. She argued that, in the rich US disclosure environment, voluntary reporting actions are not influential on the cost of equity financing for firms that attract high analyst following.

Hail (2002) suggested that the subtle effect of increased reporting on cost of capital is more easily detected when the mandated level of disclosure is low and firms have considerable reporting discretion. Using a sample of 73 Swiss (low disclosure environment) listed companies, he also found a negative association between cost of capital and disclosure actions, and reported that high-disclosing companies enjoy about 1.8 % to 2.4% lower cost of equity financing compared to low-disclosing companies.

Francis et al. (2005), using a sample of companies from 34 emerging and developed countries, also confirmed the expected negative association and provided empirical evidence that firms with higher external financial needs generally disclose more information and this leads to reduction of their cost of equity capital.

Richardson & Welker (2001) examined the impact of social and financial disclosure actions on firm's cost of equity financing. For a sample of Canadian firms, they found out that the cost of equity financing is negatively associated with voluntary financial disclosures and positively related to social reporting actions. These results imply that companies, which disclose more social information, are penalized by the market by charging them higher cost of equity capital.

Botosan & Plumlee (2002) investigated the relationship between cost of capital and annual report disclosures, timely disclosures (quarterly or other published reports) and investor relations disclosures. While confirming the expected negative association for the annual report disclosures, their research showed that cost of capital is positively related to timely reporting actions, which could be attributed to the fact that timely disclosures increase the volatility of share prices by attracting transient investors who trade aggressively on short-term earnings. Moreover, they did not find association between cost of equity financing and investor relations disclosures.

Gietzmann & Ireland (2005) criticized Botosan & Plumlee's (2002) outcomes, claiming that the positive relationship between quarterly reporting and cost of capital is a result of inappropriate measurement of timely disclosures. They found that cost of equity capital is negatively related to the quality of timely disclosures for firms

with aggressive accounting policy choice on the UK market. Their findings were further supported by Espinosa & Trombetta (2007) who studied firms with aggressive accounting policy choice on the Spanish market.

Other studies used more indirect measures for the cost of equity capital and the quality of voluntary disclosure. Welker (1995) used analysts' ratings of overall disclosure policy and confirmed that companies with higher ratings (and respectively higher disclosure) have generally lower bid-ask spreads (costs of capital). This is also supported by Leuz and Verrecchia (2000), who considered the switching from the local (German) GAAP to IFRS or US GAAP as a sign for increased voluntary disclosure, and proved that this change decreased the bid-ask spreads for firms on the German market. Cuijpers and Buijink (2005) also confirmed the expected association, but only for firms with high analyst following, while Daske (2006) found no empirical evidence that German firms, adopting higher disclosure standards, reduce their cost of equity financing.

3. Hypotheses Development

As prior research suggests, incorporating higher levels of disclosure helps to reduce the information asymmetries. This should lead to improving investors' capabilities in forecasting future growth rate, and consequently, decrease the estimation risk and information asymmetry components of a firm's cost of equity capital. Thus, the following hypothesis emerges:

H₁: There is a negative relationship between the expected cost of equity capital and the quality of corporate disclosure

As Hail (2002) concludes, there are four major problems when documenting the above stated hypothesis empirically. First of all, the quality of corporate disclosure relies heavily on the individual perception of the researcher, so it contains an important degree of subjectivity. Furthermore, companies might not select their level of disclosure independently, and this makes the variable subject of self-selection bias. The firm's cost of capital and its components cannot be directly observed and they also have a certain degree of subjectivity. Finally, the relationship of disclosure level and market's profitability expectations might be subject to different factors so that no considerable association is observed. Thus, our study aims to deal with each of the above mentioned concerns.

However, previous empirical work fails to fully clarify the relationship between cost of equity capital and voluntary corporate disclosures. Botosan (1997) and Botosan & Plumlee (2001), for example, found a significantly negative relationship only for firms with low analyst following, but not for their entire sample. Thus, in line with Espinosa & Trombetta (2007) this study aims to investigate if aggressive firms have more incentives to differentiate themselves by increasing the level of disclosure than companies with conservative accounting policy. Therefore, the following hypothesis is tested:

H₂: The relationship between cost of equity capital and disclosure depends on the firm's accounting policy.

which splits to:

H_{2A}: There is a significant negative relationship between cost of equity capital and disclosure for firms with aggressive accounting policy, and

H_{2B}: no relationship exists between cost of capital and disclosure for companies choosing a conservative reporting strategy.

4. Methodology and Data Selection

4.1 Measurement of Implied Cost of Equity Capital

The Residual Income Valuation Model is adopted in order to compute the implied cost of capital. The model applied here was first suggested by Hail (2002) and further used in Espinosa & Trombetta (2007). The intrinsic value of each firm is measured by a three-stage, originally described by Lee et al (1999) and Gebhardt et al (2001). First, the explicit earnings forecasts are collected for the next three years; then, the earnings forecasts are calculated by linearly fading year t+3 Return on Investment (ROE) to the median Swiss market ROE by the year t+T; and finally, the terminal value is estimated by assuming the latest Residual Income (RI) as perpetuity. This approach deals with the Residual Income Model's (RIM) most significant problem- the requirement of forecasted future earnings and book values of equity to infinity- and leads to the following finite time specification:

$$P_t = bv_t + \sum_{k=1}^n \frac{(x_{k+1} - r_e \bullet bv_{t+k-1})}{(1+r_e)^k} + \sum_{k=n+1}^T \frac{(x_{k+1} - r_e \bullet bv_{t+k-1})}{(1+r_e)^k} + \frac{(x_{t+13} - r_e \bullet bv_{t+k-1})}{r_e(1+r_e)^{12}} \quad (1)$$

where:

- P_t = market price of company's stock at date t
 bv_t = accounting book value per share at the beginning of the year
 x_{t+k} = expected future accounting earning per share for period (t+k-1, t+k), explicitly forecasted, acquired by linear fading rate or assumed constant (Hail, 2002)
 r_e = the implied cost of equity capital, which solves equation (1)
 bv_{t+k} = expected future accounting BVE. It is assumed that the clean-surplus relationship holds and the $bv_{t+k} = bv_{t+k-1} + x_{t+k} - \text{Dividends}_{t+k}$

In this particular approach, the market price of firm's stock is set equal to the current Book Value of Equity (BVE) plus RI over short-term period of analysts' forecasts, medium-term fading period and long-term perpetuity. In order to implement it, several proxies are used for current and future accounting numbers. June 30, 2008, is set as our observation date, because by this point all companies were supposed to have released their annual reports for fiscal 2007, with analysis being based only on publicly available information (Hail, 2002).

In our paper, in accordance to Gebhardt et al (2001), the current stock price is set equal to the intrinsic value of the company. For this reasons particular care is taken when choosing this.. Prior empirical work suggests that choosing an equally weighted average stock price for the observation month delivers a better proxy for the intrinsic value of the firm, than arbitrary choosing the closing price of a single day (Gebhardt et al, 2001). However, Hail (2002) estimates the cost of equity capital using both types of proxies and concludes that results are insensitive to alternative price specifications. Therefore, the closing price for June, 2008, is chosen as proxy for the intrinsic value of each company. Thus, the valuation formula (1) takes the following format, which is applied to each company:

$$P_{June} = bv_t + \sum_{k=1}^3 \frac{(x_{k+1} - r_e \cdot bv_{t+k-1})}{(1+r_e)^k} + \sum_{k=4}^{12} \frac{(x_{k+1} - r_e \cdot bv_{t+k-1})}{(1+r_e)^k} + \frac{(x_{t+13} - r_e \cdot bv_{t+12})}{r_e(1+r_e)^{12}} \quad (2)$$

The following methodology is used to estimate future accounting earnings,: (1) analysts' consensus forecasts as accounting earnings for fiscal 2008 and 2009 are selected; (2) for fiscal 2010 expected accounting earnings are estimated by multiplying one plus analysts' consensus long term growth forecast with last year's forecasted earnings per share; (3) for years 2011 up to 2019 expected accounting earnings are calculated by multiplying the last year's book value per share with the effective ROE. The effective ROE is the ratio between current earnings per share (EPS) and last year's BVE. (4) The 2019 year's earnings per share are finally used as EPS proxy for perpetuity.

The book value of equity for each year is calculated by solely assuming that the clean-surplus relationship holds. The clean-surplus relationship states that all gains and losses are included in the net income (earnings per share in this case), and the book value per share is only subject to last year's book value, earnings and dividends. As book value per share for 2008 we use the common shareholder equity for the beginning of the year, divided by the number of outstanding shares, downloaded from DataStream. The dividends are computed as a fraction of the earnings per share for the particular year. For each firm, we calculate a dividend payout ratio, based on the company's average dividend payout over the last five years. We use the following estimation formula:

$$\text{DividentPayoutRatio} = \frac{1}{5} \cdot \sum_{k=1}^5 \frac{DPS_k}{EPS_k} \quad (3)$$

For the implementation of the RIM we use explicit fixed forecast horizon, consisting of twelve future periods. The target accounting return on equity is 9.59% and is estimated as the median of past returns from all companies, listed on the Swiss Exchange, over the last five years. Each company's effective ROE fades linearly to the target Swiss market ROE. The same approach has been applied when estimating the ex ante cost of equity capital for all 121 companies. Equity prices and accounting numbers have been collected though DataStream. Earnings forecasts and analyst data are collected from I/B/E/S International database on DataStream or Wharton Research Data Services.

4.2 Measurement of Quality of Corporate Disclosure

The measurement of a firm's disclosure quality is based on the amount of voluntary disclosure provided in the annual report to shareholders. Among all channels of corporate communication, the annual report was selected because it should serve as best estimate for overall quality of voluntary disclosures provided by a firm. This is partly due to the fact that annual report disclosure levels are positively correlated with the amount of disclosure, communicated though other media (Lang & Lundholm, 1993), suggesting that companies coordinate their overall

disclosure policy. Furthermore, the annual report is generally considered as the most important source of corporate information (Knutson, 1992). Moreover, it is the one communication channel, over which the management has complete control and is not subject to distortions by other media (Guthrie & Parker, 1989). However, results from disclosure measures, based solely on annual reports, should be interpreted with caution. Despite the positive correlation of disclosure means, the marginal effect of voluntary reporting in the annual report could be overstated. The outcomes are likely to reflect the effect of all means of voluntary disclosures and not the annual report alone (Botosan, 1997).

Our disclosure measure, referred here as DPNTS, is based on questionnaire and is developed in a similar way as in Botosan (1997). The issues included in the questionnaire rely on a study conducted by the Swiss Banking Institute (SBI) at the University of Zurich. DPNTS is based on the voluntary information companies publish with respect to Swiss accounting law and Swiss GAAP in their 2008 annual report to shareholders. This leaves management with considerable discretion in determining the firm's disclosure policy. The authors' original goal was to identify all information items, voluntarily provided in the annual report to shareholders, and to differentiate them from those, whose disclosure is compulsory by the SWISS GAAP. However, this procedure proved to be rather unrealistic and, therefore, this research focus only on aspects discussed by the SBI in their survey. These items are considered as most informative for financial-statement users in their decision-making process.

DPNTS consists of three types of voluntary disclosures (see Appendix): (1) Background and key non-financial disclosure (DPNTS_1); (2) trend analysis and management discussion (DPNTS_2); (3) risk, value-based and forecasted information (DPNTS_3). Two points are assigned to each of the 27 items if the management provides a detailed representation, including quantitative information and qualitative discussion, one point if it is only briefly mentioned in the annual report and zero otherwise. The total absolute score is computed by the following formula:

$$DPNTS_t = \sum_{i=1}^3 SCORE_{it} \quad (4)$$

In order to make the regression coefficients easier to interpret, the fractional rank of a company's disclosure is used (DISCL), which is also less sensitive to outliers. The fractional rank is estimated as the disclosure score DPNTS divided by the number of firms 121 and increases with the disclosure quality. Using absolute disclosure values DPNTS does not qualitatively change the results.

4.3 Other Independent Variables

The ex ante cost of equity capital is simply a theoretical measure and its relevance needs to be additionally justified. One reasonable way to do this is to investigate its relationship with other measures that reflect companies' various risk factors. Numerous prior studies in this field, such as Botosan (1997), Botosan & Plumlee (2002), Hail (2002), Leuz & Hail (2006), employ different accounting and market-based risk proxies to justify the relevance of the ex ante cost of equity capital. Based on their research and taking into consideration their results, three additional risk factor measures were included in our empirical research: the firm's leverage, its size and market beta.

4.3.1 Leverage

The firm's leverage serves as a proxy for the firm's financial risk. Prior research indicates that the amount of debt and its capital structure is an increasing function of the company's cost of equity capital and higher debt is, therefore, associated with higher volatility of future earnings (Gebhardt et al, 2001; Hail, 2002). Numerous other studies have also investigated this link and also observed a positive relation between the ex ante cost of capital and the firm's leverage (Leuz & Hail, 2006; Guay et al, 2005). However, due to information asymmetries, it is still unclear if higher debt announcements are a good or bad news for the investors.

As a proxy for firm's financial leverage, the ratio of total debt to market value of outstanding equity at the beginning of 2008 (LEV) is used.

4.3.2 Beta

The stock's market beta serves as a proxy of the firm's systematic or market risk. The Capital Asset Pricing Model (CAPM) suggests that the beta should be positively correlated with the cost of equity capital. Some studies, such as the one of Hail (2002), confirm the relation for Switzerland or other countries (Leuz & Hail, 2006). However, other studies, such as of Gebhardt et al (2001), fail to consistently show the expected relationship.

In order to estimate the market beta (BETA) a Market Model regression is applied, requiring at least 24 weekly return observations in a two year period ended June 30, 2008. As a benchmark the Swiss Market Index is employed.

4.3.3 Size

As prior research indicates, firm size serves as a proxy for information availability. Bigger firms provide generally more information than the smaller firms which leads to lower risk, regarding future earnings, and also implies lower cost of equity capital. As a proxy for the firm's size the market value of outstanding equity at the beginning of 2008 (MARKET, in CHF millions) is selected. For the final regression, the natural logarithm of the outstanding equity is employed because the results are less sensitive to influence of outliers and the coefficients are easier to interpret.

4.3.4 Accounting Policy

A measure of firm's accounting policy choice, either aggressive or conservative, is necessary in order to test hypothesis H_2 . The classification is based on companies' annual reports for 2008 according to the following criteria: bad debt, bad investment, inventory and general risk provisions; which, after thorough research, were considered as the most suitable (Espinoza & Trombetta, 2007).

Then, four ratios were determined for each company by dividing the above provisions by total receivables, total financial assets, total inventory, and total liabilities, respectively. The median of these ratios serves as a criterion to determine the type of accounting policy. If more than two ratios were below their median value for a particular firm then this firm was considered to follow an aggressive accounting policy. A dummy variable was created (D^{AGG}) whose value is one in this case and zero otherwise. The reasoning behind our measure is that companies, whose provision ratios are lower, may have incentives to increase their annual earnings more than companies with higher provision ratios, which can be indicative of a more aggressive accounting policy (Espinoza & Trombetta, 2007).

4.4 Data Collection

Our paper focuses on a low disclosure environment. Switzerland appears particularly appropriate for such kind of analysis, since Swiss companies have considerable reporting discretion and their mandated level of disclosures is notably low. The only requirement for companies to be listed on the local exchange is compliance with Swiss GAAP, which leaves firms with significant freedom in choosing their voluntary disclosure policy. Furthermore, a number of prior studies also focus on Switzerland, or include it in a more international sample, as the local stock market displays many common features of a typical market in continental Europe and management relies heavily on shareholders' value in their attempt to improve firm's overall financial situation. Therefore, this specific research environment should make the subtle effect of increased voluntary disclosures on firms' cost of equity capital more easily detectable.

Totally, there are 334 companies listed on the Swiss Stock Exchange. The list of firms includes highest capitalized Swiss companies, along with some small publicly held companies, trading on the local exchange. This sample of firms implies that a positive bias in a potential disclosure score may exist, because disclosure quality is positively correlated with company's market value (Lang & Lundholm, 1993). Disclosure quality is negatively related with the firm size and large companies are generally assumed to have a richer information environment in terms of media and analyst coverage. However, if there is a sufficient cross-sectional variation in the disclosure score, this should not cause problems for the empirical research.

Our original sample consisted of all 334 companies listed on the Swiss Stock Exchange SWX. Out of them, 150 were dropped because no proper stock or forecasted information is available on DataStream and I/B/E/S International. Another 10 firms were excluded because their fiscal year does not end on December 31, 2007 or within the first quarter of 2008. For 35 companies a full annual report online could not be found, so it was requested via e-mail. However, 31 failed to reply on time or at all and, therefore, they were also excluded from the sample. In line with Hail (2002), our sample includes companies from various industries. Contrary to Botosan (1997), who restricts her sample on companies from a particular industry, we believe that a cross-sectional sample delivers more consistent and reasonable results. However, 22 companies were excluded from banking, investment and insurance sector, because their disclosure practices are heavily influenced by regulatory requirements and their business differs significantly from other industries. As illustrated on Table 1, the sample selection procedure yields a total of 121 non-financial companies listed on the Swiss Stock Exchange SWX. Finally, Table 2 provides descriptive statistics for the sample.

5. Empirical Analysis

The cost of equity capital and quality of corporate disclosure are both highly subjective variables, relying heavily of researcher's individual perception rather than actual use. Therefore, the validity of these proxies, of the disclosure measure and of the cost of capital was initially assessed and confirmed, before testing the hypotheses.

5.1 Assessment of Validity of the Disclosure Score

Prior studies such as of Marston & Shrikes (1991), Lang & Lundholm (1993), Botosan (1997), Botosan & Plumlee (2001), and Hail (2002), confirm that disclosure indices are a useful research tool and usually lead to reasonable and

significant results. However, they suffer from subjectivity. Thus, the validity of the disclosure measure DPNTS was assessed in three different ways.

First positive and highly significant correlation coefficients between DPNTS and its three components were found (see Table 3). However, the coefficients among the components themselves were considerably lower than the ones including DPNTS, which implies that the three categories may reflect different aspects of disclosure.

Second, the relationship between DPNTS and the following variables was estimated: MARKET, market value of outstanding equity (in CHF millions); RETURN, average realized ROE for the sample of firms over last several years; CR_LIST, dummy variable equal to one if company's shares are multiple listed or zero otherwise; LEV, financial leverage measured as the ratio of total debt to market value of outstanding equity at the beginning of 2008; and AUDIT, dummy variable equal to one if a firm is audited by a "BIG SIX" audit company or zero otherwise. To diminish the influence of outliers, the log transformations of the market value of outstanding equity were used instead of absolute values. MARKET, RETURN and AUDIT show a positive and highly significant correlation with the disclosure variable DPNTS (Table 3). However, CR_LIST and LEV do not show a significant relationship with DPNTS, which it implies that the highly levered Swiss companies do not seem to look for options to reduce their monitoring costs by disclosing more information.

Finally, the multivariate analysis of the relationship between firm's fractional disclosure score DISCL and the other firm specific characteristics showed that, while RETURN and AUDIT variables remain positive and statistically significant, MARKET loses its explanatory power. Approximately 53% of the variation in the disclosure score is explained by variables included in the regression model (Table 4). Thus, the validity of the disclosure measure is confirmed.

5.2 Assessment of Validity of Ex ante Cost of Equity Capital Estimate

A valid cost of capital estimate should be an increasing function of the risk, as measured by market beta and financial leverage, and it should also display a well known "size effect" (Botosan, 1997; Botosan and Plumlee 2002; Hail, 2002). The validity of the ex-ante cost of equity capital estimate is assessed by the OLS regression analysis (Table 5). ROE, the proxy of future expected cost of equity capital, is the dependent variable and BETA, LEV and MARKET are the independent or explanatory variables. To diminish the influence of outliers, the log transformations of the market value of outstanding equity were used instead of absolute values.

All coefficients confirmed the expected relationship, documented by prior studies (Botosan, 1997; Gebhardt et al, 2001; Botosan and Plumlee, 2001; Hail, 2002). Market beta and financial leverage are positively related to the cost of equity capital, while firm's size shows a negative association. With one exception, all coefficients are significant at least at 10%. These results together confirm the validity of our cost of capital proxy. However, as indicated on panel B, the maximum adjusted R^2 is 34.3%, which means that considerable variation in the cost of capital still remains unexplained.

5.3 Empirical Analysis of Hypothesis One

Prior studies confirm the expected negative relationship between cost of equity capital and quality of corporate disclosure (e.g. Botosan, 1997; Botosan and Plumlee, 2001; Hail, 2002; Leuz and Hail, 2006).

Table 6 provides Pearson correlation coefficients between our cost of capital estimate and firm-specific characteristics, including market and financial risk BETA and LEV, fractional disclosure scores DISCL and firm size MARKET. The correlation between our proxy of future expected cost of capital and the quality of corporate disclosure DISCL is -0.480 and highly significant at all levels according to the two-tail test of statistical significance. This result is consistent with the statement that cost of equity capital decreases as the quality of corporate disclosure increases. As prior studies document, cost of equity capital should correlate positively with market beta and financial leverage and negatively with firm's size (Botosan, 1997; Botosan and Plumlee, 2001; Leuz and Hail, 2006). Our correlation coefficients confirm the expected association and are all statistically significant, except for the LEV variable, which does not show any explanatory power at all. All of the correlation coefficients are less than 0.5, which indicates that multicollinearity should not be a problem, if including all variables in the same model.

Therefore, hypothesis one is tested by taking all variables into consideration and using the following regression model:

$$\text{Cost of Capital}_i = \alpha + \beta_1 \text{MarketRisk}_i + \beta_2 \text{FirmRisk}_i + \beta_3 \text{Disclosure}_i + \beta_4 \text{Size}_i + \varepsilon_i \quad (5a)$$

Or more specifically:

$$\text{ROE}_i = \alpha + \beta_1 \text{BETA}_i + \beta_2 \text{LEV}_i + \beta_3 \text{DISCL}_i + \beta_4 \ln(\text{MARKET}_i) + \varepsilon_i \quad (5b)$$

Table 7 provides the results from a simple OLS regression of the equation illustrated above. All coefficients confirm the expected signs. BETA and LEV are positively related to the ROE and confirm Hail's (2002) conclusion that cost of equity capital is positively related to systematic and financial risk in the Swiss market. The coefficients are economically relevant and statistically significant according to the two-tail test employed in this study. As expected, the firm's size is negatively associated to the cost of equity capital, implying that the particular variable might also capture some other not closely defined influences. Eventually, the voluntary disclosure quality, DISCL, is negatively related to our cost of capital measure. All coefficients are relevant at all levels of statistical significance using two-tail tests. These results confirm that by improving their disclosure quality, firms can reduce their cost of equity capital. The claim holds even after controlling for cross-sectional variation in market beta, financial leverage and company size. The coefficients on DISCL range from -0.115 to -0.148, implying that companies in the sample, with higher fractional disclosure score, enjoy cost reduction somewhere between 11.5% and 14.8% compared to companies that choose lower levels of voluntary corporate disclosure.

The particular regression model is also estimated using absolute disclosure score, DPNTS, instead of the fractional score DISCL. This analysis indicates that one unit increase in the absolute disclosure score DPNTS results in a reduction in cost of equity capital of 0.1%. In order to illustrate the magnitude of these results, we consider the following example. SIKA AG, operating in the construction and materials industry, receives a total of 37 points, which is the highest score, awarded in the sample. In its 2008 annual report, the company provides extensive qualitative and quantitative information on background, non-financial and value-based information. One interpretation of these results would imply that by providing this information, holding all else equal, SIKA AG has reduced its cost of equity capital by approximately 3.7% (i.e. $37 * 0.1\%$) relative to a company that provided poor background and non-financial information and no value-based discussion. The results are not only statistically significant, but also economically relevant.

However, these findings should be interpreted with caution for two different reasons. First, including disclosure quality proxy in the model increases the adjusted R^2 to a maximum of 43.8%. This means that significant variation in the cost of capital still remains to be explained otherwise. And second, given the self-selection of disclosure policy is an issue, simple OLS analysis would overestimate the effect of corporate reporting quality on company's cost of equity capital.

5.4 Empirical Analysis of Hypothesis Two

According to hypothesis two the influence of voluntary disclosure actions on cost of equity capital depends on firm's accounting policy choice. More specifically, H_{2A} states that companies, adopting aggressive corporate reporting, might look unreliable to potential investors and are likely to have higher cost of equity capital. They would, therefore, voluntarily provide more information in an attempt to reduce this effect. On the other hand, according to H_{2B} companies choosing conservative accounting policy generally engage in higher disclosure levels and additional voluntary reporting might not be that influential on their cost of equity capital.

In order to test H_2 , two different regression models were used. The first one investigated the impact of voluntary disclosure actions on cost of equity capital for firms with aggressive accounting policy choice (H_{2A}):

$$ROE_i = \alpha + \beta_1 BETA_i + \beta_2 LEV_i + \beta_3 D_i^{AGG} DISCL_i + \beta_4 \ln(MARKET_i) + \varepsilon_i \quad (6)$$

To distinguish between firms with different accounting policy, the dummy variable D_i^{AGG} is employed which equals one if the company has aggressive reporting strategy and zero otherwise. The interaction term is also included alone to determine whether aggressive firms try to counteract the potentially negative effect of their reporting choice by adopting higher levels of disclosure quality. All coefficients confirm the expected signs (Table 8). It seems that aggressive firms reduce their cost of equity capital by improving the quality of their voluntarily disclosed information. However, the coefficient before the interaction term, despite positive, is statistically insignificant, which indicates that aggressive companies do not necessarily provide this information to compensate for the effects of their accounting policy choice.

In order to further investigate the validity of H_{2B} , the relationship between cost of equity capital and quality of corporate disclosure is examined for companies with conservative accounting policy, using the following regression model:

$$ROE_i = \alpha + \beta_1 BETA_i + \beta_2 LEV_i + \beta_3 DISCL_i + \beta_4 D_i^{CONS} DISCL_i + \beta_5 \ln(MARKET_i) + \varepsilon_i \quad (7)$$

In order to distinguish between aggressive and conservative firms, we reverse the value of the dummy variable from the previous specification and use D_i^{CONS} with value of one for conservative companies and zero otherwise. The results show that disclosure quality, despite insignificant for conservative firms, is statistically relevant at a general level (Table 9). Thus, it could be concluded that firms on the Swiss market can reduce their cost of equity capital by

increasing the level of voluntary disclosures, regardless of their accounting policy choice. Therefore, hypothesis two is rejected.

6. Discussion and Conclusions

In this study we document negative and highly significant relationship between our proxy of future expected cost of capital ROE and DISCL, companies' fractional disclosure score. The results hold even after adjusting for systematic risk, financial risk and firm size. This statistically strong association may be partially explained by the different institutional factors between capital markets with divergent disclosure requirements. Our findings support the opinion of Leuz and Verrecchia (2000), that the economic consequences of increased voluntary reporting are easier to detect in a low disclosure environment.

Our results also confirmed the expected negative relationship between disclosure quality and cost of equity capital for firms with aggressive reporting choice, but the insignificant coefficient before the interaction term implies that this effect might not be result of company's effort to compensate for the potentially negative effect of its reporting strategy. Our analysis also revealed that this negative relationship between disclosure quality and cost of equity capital exists as well for conservative firms. Thus, it could be concluded that the accounting policy choice does not influence the relationship between cost of equity capital and quality of corporate disclosure, at least on the Swiss market.

7. Study Limitations and Recommendations

This study provides some important insights to financial executives and regulators, revealing that increased levels of disclosure result in inferior cost of equity capital, regardless of firm's accounting policy choice. Furthermore, this study introduces a procedure of constructing a cost of capital proxy, increasing in market beta and decreasing in firms' size. This procedure may be further used in future studies, in which firm-specific cost of equity capital estimates are required and analyst forecast data is available.

The analysis and results reported here are limited to a relatively small sample of 121 companies in a single market during one-year period. Therefore, all conclusions should be interpreted with caution and the results should not be generalized to other markets or other time horizons. To reduce potential distortions due to endogenous bias, future work should focus on better understanding of the determinants of firm's voluntary reporting behavior. By increasing the time horizon, for instance, one can investigate the change of disclosure level over time and its influence on firm's risk situation. To diminish distortions from sample selection bias, similar approach may be employed to study the particular relationship from a more international point of view, by including companies from different countries and different corporate reporting environments.

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Table 1. Summary of Sample Selection Procedure

	Number	Percent
Firms listed on the Swiss Stock Exchange	334	100%
Firms not followed by I/B/E/S International (no financial analysts' forecast data available)	-150	-44.9%
Firms with fiscal year end not on December 31, 2007, or not within the first quarter of 2008	-10	-2.9%
Firms for with no full annual report was found	-31	-9.3%
Firms available for analysis	143	42.8%
Financial institutions (banking, investments and insurance companies)	-22	-6.4%
Total number of sample firms	121	36.2%

Table 2. Descriptive Statistics for sample Firms

Variable	N	Minimum	Maximum	Mean	Std. Deviation
<i>Size (in CHF millions)</i>					
MARKET	121	12	153,046	6,180	16,735
TOTAL ASSETS	121	28	293,055	8,902	33,154
TOTAL SALES	121	21	46,133	4,214	8,891
<i>Risk</i>					
BETA	121	-0.46	3.19	1.18	0.66
LEV	121	0.00	2.10	0.49	0.49
<i>Disclosure</i>					
DPNTS	121	8	37	18.2	7.2
<i>Ex ante Cost of Capital</i>					
ROE	121	4.29%	18.02%	8.02%	2.18%

Table 3. Pearson Correlation Coefficients (two-tailed) for Disclosure Scores and Firm Characteristics

	DPNTS	DPNTS_1	DPNTS_2	DPNTS_3	MARKET	RETURN	CR_LIST	LEV
DPNTS_1	0.735 (0.000)							
DPNTS_2	0.819 (0.000)	0.336 (0.000)						
DPNTS_3	0.756 (0.000)	0.302 (0.001)	0.571 (0.000)					
MARKET	0.284 (0.002)	0.180 (0.048)	0.147 (0.107)	0.374 (0.000)				
RETURN	0.658 (0.000)	0.485 (0.000)	0.524 (0.000)	0.500 (0.000)	0.099 (0.280)			
CR_LIST	0.143 (0.117)	0.053 (0.563)	0.125 (0.170)	0.173 (0.058)	0.338 (0.000)	0.089 (0.331)		
LEV	0.005 (0.958)	-0.039 (0.674)	0.052 (0.573)	0.008 (0.928)	-0.027 (0.766)	-0.044 (0.631)	0.132 (0.150)	
AUDIT	0.554 (0.000)	0.441 (0.000)	0.457 (0.000)	0.397 (0.000)	0.141 (0.124)	0.395 (0.000)	0.033 (0.718)	-0.139 (0.129)

Table 4. Regression of absolute disclosure DISCL on firm specific variables MARKET, RETURN, CR_LIST, LEV and AUDIT

$$DISCL_i = \alpha + \beta_1 \ln(MARKET_i) + \beta_2 RETURN_i + \beta_3 CR_LIST_i + \beta_4 LEV_i + \beta_5 AUDIT_i$$

	Intercept	MARKET	RETURN	CR_LIST	LEV	AUDIT	Adj. R ²
Coefficient	-0.96	0.115	0.514	0.018	0.052	0.351	53.4%
P-Value (2-tail)	(0.018)	(0.117)	(0.000)	(0.806)	(0.421)	(0.000)	(0.000)

Table 5. Regression of Ex ante Cost of Capital on Beta, Leverage and Market Value

$$ROE_i = \alpha + \beta_1 BETA_i + \beta_2 LEV_i + \beta_3 \ln(MARKET_i) + \varepsilon_i$$

	Intercept	BETA (+)	LEV (+)	MARKET (-)	Adj. R ²
Panel A: Simple Regressions (OLS)					
Coefficient	0.66	0.012			11.9%
P-Value (2-tail)	(0.000)	(0.000)			(0.000)
Coefficient	0.077		0.006		0.9%
P-Value (2-tail)	(0.000)		(0.156)		(0.156)
Coefficient	0.138			-0.005	22.4%
P-Value (2-tail)	(0.000)			(0.000)	(0.000)
Panel B: Multiple Regressions (OLS)					
Coefficient	0.123	0.011		-0.0039	33.2%
P-Value (2-tail)	(0.000)	(0.000)		(0.000)	(0.000)
Coefficient	0.136		0.007	-0.0047	24.3%
P-Value (2-tail)	(0.000)		(0.048)	(0.000)	(0.000)
Coefficient	0.122	0.011	0.006	-0.004	34.3%
P-Value (2-tail)	(0.000)	(0.000)	(0.085)	(0.000)	(0.000)

Table 6. Pearson Correlation Coefficients (2-tail) for ex ante Cost of Capital and Firm Characteristics

Variable	ROE	BETA	LEV	DISCL
BETA	0.356 (0.000)			
LEV	0.130 (0.156)	0.089 (0.331)		
DISCL	-0.450 (0.000)	-0.233 (0.010)	-0.003 (0.976)	
MARKET	-0.480 (0.000)	-0.041 (0.625)	0.060 (0.510)	0.115 (0.211)

Table 7. Regression of Ex ante Cost of Capital on BETA, Leverage, Disclosure Score and Market Value

$$ROE_i = \alpha + \beta_1 BETA_i + \beta_2 LEV_i + \beta_3 DISCL_i + \beta_4 \ln(MARKET_i) + \varepsilon_i$$

	Intercept	BETA (+)	LEV (+)	DISCL (-)	MARKET (-)	Adj. R ²
Panel A: Simple Regressions (OLS)						
Coefficient	0.103			-0.148		15.6%
P-Value (2-tail)	(0.000)			(0.000)		(0.000)
Panel B: Multiple Regressions (OLS)						
Coefficient	0.140	0.009		-0.115	-0.0038	42.4%
P-Value (2-tail)	(0.000)	(0.000)		(0.000)	(0.000)	(0.000)
Coefficient	0.153		0.007	0.135	-0.004	37.5%
P-Value (2-tail)	(0.000)		(0.031)	(0.000)	(0.000)	(0.000)
Coefficient	0.139	0.008	0.006	-0.116	-0.004	43.8%
P-Value (2-tail)	(0.000)	(0.001)	(0.052)	(0.000)	(0.000)	(0.000)

Table 8. Interaction Regression: Firms with Aggressive Accounting Policy

$$ROE_i = \alpha + \beta_1 BETA_i + \beta_2 LEV_i + \beta_3 D_i^{AGG} DISCL_i + \beta_4 D_i^{AGG} + \beta_5 \ln(MARKET_i) + \varepsilon_i$$

	Intercept	BETA	LEV	D ^{AGG} DISCL	D ^{AGG}	ln(MARKET)	Adj. R ²
Coefficient	0.126	0.010	0.006	-0.082	0.007	-0.004	38.6%
P-Value (2-tail)	(0.000)	(0.000)	(0.074)	(0.047)	(0.379)	(0.000)	(0.000)

Table 9. Interaction Regression: Firms with Conservative Accounting Policy

$$ROE_i = \alpha + \beta_1 BETA_i + \beta_2 LEV_i + \beta_3 D_i^{CONS} DISCL_i + \beta_4 DISCL_i + \beta_5 \ln(MARKET_i) + \varepsilon_i$$

	Intercept	BETA	LEV	D ^{CONS} DISCL	DISCL	ln(MARKET)	Adj. R ²
Coefficient	0.140	0.009	0.006	-0.006	-0.118	-0.004	43.3%
P-Value (2-tail)	(0.000)	(0.000)	(0.074)	(0.785)	(0.000)	(0.000)	(0.000)

APPENDIX

Summary of the Components of Disclosure Score DPNTS

Part 1: Background and key non-financial Information (DPNTS_1)

1. Primary products
2. Primary markets and market shares
3. Business environment and crucial success factors
4. Corporate governance and organizational structure
5. Client satisfaction
6. Employee satisfaction
7. Investment in human resources and management development
8. Investment in research and development and other intangible assets
9. Product life cycle and innovation
10. Operational efficiency

Part 2: Trend analysis and management discussion (DPNTS_2)

1. Trend in sales over the last five years
2. Detailed sales information by region and business segment
3. Trend in operation income over the last five years
4. Detailed information about the operating income by region and segment
5. Capital expenditures trend over the last five years
6. Capital expenditures by region and business segment
7. Trend in stock prices and total shareholders return
8. Qualitative discussion in sales and market shares
9. Qualitative discussion in operating income
10. Discussion of changes in capital expenditures / research and development

Part 3: Risk, value-based and forecasted information (DPNTS_3)

1. Qualitative discussion of the risk management technique
2. Quantitative risk exposure measures
3. Implementation of value-based management
4. Qualitative measures of shareholder value creation
5. Management compensation
6. Profit forecast
7. Sales and growth forecasts