Voluntary Disclosure Quality and Equity Prices*

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Abstract

This paper investigates the extent to which voluntary disclosure quality (*VDQ)* of firms is reflected in equity prices. In environments where we expect informational efficiency to be high, *VDQ* is not associated with returns beyond those available through passively investing in popular styles, and a standard two-stage cross-sectional approach also suggests that *VDQ* is not a priced risk factor. By contrast, among small firms, those with little analyst coverage, and those not widely covered in the media, firms with the highest *VDQ* deliver the greatest risk-adjusted excess returns. This is consistent with the notion that for these relatively opaque firms, today's equity prices do not incorporate all information and that value reporting provides benefits, for example, by allowing more efficient internal capital deployment.

Keywords: *Voluntary disclosure quality, portfolio analysis, value reporting, disclosure*

JEL classification: G11, G14, G30, M41

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1 Introduction

This paper investigates whether voluntary disclosure quality is priced in equity valuations. A key feature of our analysis is that our sample covers a large portion of a major public capital market and thus allows us to study the role of voluntary disclosure quality for firms with widely varying degrees of public information available. We find that in a sample of firms about which much is known in the market, voluntary disclosure quality is not a priced risk factor and does not contribute to explaining variation in realized returns. By contrast, for a sample of relatively opaque firms, where we do not expect equity prices to immediately incorporate all available information, investors can earn significantly positive risk-adjusted excess returns by investing in firms with a high voluntary disclosure quality of companies. Our additional analysis suggests that the latter result is most consistent with a causal effect of voluntary disclosure quality on firm performance and is unlikely to be driven by endogeneity.

The study of the role of voluntary disclosure quality (or "value reporting") for equity prices is of significant practical and academic interest. Yet, ambiguous views prevail so far.[1]

First, there is uncertainty regarding the benefits and costs of voluntary disclosure quality. Value reporting is an element of value-based management (Rappaport 1986). As such, it may help firms to allocate capital more efficiently internally, perhaps because higher voluntary disclosure quality is only obtained if management itself understands well the sources of value in their company. Furthermore, voluntary disclosure quality may reduce the gap between the internal and external views of company value, potentially implying enhanced liquidity and easier access to the capital markets. Also, corporate reputation is often classified as an intangible asset and as a signal about the underlying quality of a firm's products (Milgrom and Roberts 1982, Michalisin, Kline, and Smith 2000, Roberts and Dowling 2002). On the negative side, preparing and releasing information to the public is a costly process. Moreover, indirect costs may arise due to a reduction in firm value when a company reveals beneficial information to competitors (Verrecchia 1990). Voluntary disclosure can also potentially increase legal costs for the firm.

A second issue that presents challenges for an empirical analysis of the pricing of voluntary disclosure quality, and for the interpretation of existing studies, is the question *when* the above-mentioned advantages and disadvantages will be reflected in equity prices.

[1] See Healy and Palepu (2001) and Beyer et al. (2010) for reviews, and PricewaterhouseCoopers (2006) for an industry survey.

One possibility, often implicitly assumed in empirical studies, is that the market operates efficiently and incorporates all available information in equity prices today. In this case, if voluntary disclosure quality creates value for firms, those companies with higher voluntary disclosure quality will have *lower* future excess returns. Equivalently, some papers also directly frame the research question as being about whether voluntary disclosure quality makes a firm less systematically risky, thus reducing the cost of capital (future returns). One source of such systematic risk is liquidity risk (Amihud and Mendelson 1986), and some work indeed documents a positive relationship between liquidity measures and disclosure quality (see, e.g., Healy, Hutton and Palepu 1999; Leuz and Verrecchia 2000; Welker 1995). A second literature has developed the idea that information risk is priced (Baiman and Verrecchia 1996; Barry and Brown 1984; Diamond and Verrecchia 1991; Easley und O'Hara 2004; Merton 1987). Others argue that information risk may be diversifiable (Hughes, Liu and Liu 2007), that, even if is non-diversifiable, it may not need to be included as an additional risk factor in asset-pricing models (Lambert, Leuz and Verrecchia 2007) or that its effect may be non-linear and may depend on the level of other factor loadings (Armstrong, Banerjee and Corona 2011). On the empirical side, there are different ways to measure disclosure quality. Some authors use market-based measures drawing on accruals quality (e.g., Francis, LaFond, Olsson and Schipper (2005)) and other features of earnings (e.g., Barth, Konchitchki and Landsman (2011)).[2] Francis, LaFond, Olsson and Schipper (2005) interpret their findings as documenting support for a negative relationship between the proxy of information quality and cost of capital, while Core, Guay and Verdi (2008), using essentially the same sample, instead find no evidence of a realized return premium for (lack of) accrual quality in a standard two-stage cross-sectional regression approach, which suggests that accruals quality is not, a risk factor.

Our work is more closely related to a smaller number of papers that have used direct measures of voluntary disclosure quality, either based on analysts' evaluations of firms' disclosure practices documented in the Association for Investment Management and Research (AIMR) scores (e.g., Botosan (1997), Healy, Hutton and Palepu (1999)) or on hand-collected data (e.g., Francis, Nanda and Olsson (2008)).[3] Botosan (1997) finds a negative association

[2] There are further ways in order to measure information quality with market data: Easley, Hvidjkaer and O'Hara (2002) use the PIN measure. Hussainey and Mouselli (2010) use the number of forward-looking statements as a proxy for disclosure quality.

[3] One advantage of these direct measures is that they are unlikely to be directly driven by the incentives of management, while market-based measures that include accruals are subject to opportunistic manipulation by management (Bergstresser and Philippon 2006).

between voluntary disclosure quality and an imputed measure of cost of equity capital for firms with little analyst coverage. Ambivalent results for cost of capital obtain in Botosan and Plumlee (2002) for quarterly and yearly voluntary disclosure. Francis, Nanda and Olsson (2008) find, in a cross-sectional study covering one year, that their measure of voluntary disclosure quality constructed from annual reports is not significantly negatively correlated with cost of equity as soon as they control for variables often interpreted as risk factors (such as firm size and book-to-market) or earnings quality.

All of this literature presumes that information is immediately reflected in valuations today. But for some firms there may be lags in this process. In this case, voluntary disclosure quality is not necessarily reflected in prices today but rather in *future* valuations. If voluntary disclosure quality is net beneficial for shareholders, those firms with higher voluntary disclosure quality will then have *higher* excess returns.

Depending on the assumption one makes about information processing, one therefore obtains diametrically opposed predictions for the relationship between voluntary disclosure quality and excess returns. To our knowledge, these two positions have not been allowed to co-exist in a single sample. In fact, it seems at least conceivable that ambiguous overall results are partially due to a cancelling out of the two effects. Our paper tries to make a step towards clarifying these matters.

To do so, we require a broad sample of firms that covers some firms for which high information efficiency is a plausible assumption and some for which it is more reasonable to assume that information is less completely and more slowly incorporated in today's valuations. A dataset from Switzerland fulfills this requirement. Here, a yearly index of voluntary disclosure quality, *VDQ*, of a large number of Swiss listed companies is provided by the Department of Banking and Finance of the University of Zurich. Averaging over the years 1999-2007, this index covers 96% of the main index of the Swiss stock market (the SPI) and 91% of the complete public Swiss Equity Market, and the covered companies vary widely in terms of size, analyst following, and media coverage. The disclosure quality index consists of theoretically-grounded criteria, following Botosan (1997)) and some criteria developed from conversations with practitioners. It has been used in a previous study (Hail 2002). For other major capital markets, data with an equivalently broad range are not available to our knowledge. For example, the U.S. AIMR index comprises around 250 to 550 companies per year, covering about 30-50% of the US market capitalization. Also, the analyst subcommittees that compiled the index selected firms based on size, among other things, and as shown in Lang and Lundholm (1993, 1996) and Botosan and Plumlee (2002), the average firm in the AIMR sample is both very large and has a very large analyst following.[4]

Our findings are as follows. We first use portfolio formation techniques to assess the (excess) returns available to investors from picking stocks according to voluntary disclosure quality. We consider individual portfolios (where the quintile "*Top Portfolio*" with the 20% of firms with the best voluntary disclosure quality is of particular interest) as well as a long-short ("*Spread*") portfolio formed by buying the 20% of firms with the best voluntary disclosure quality and shorting those 20% with the worst voluntary disclosure quality. We document that, in the overall sample, there is no robust monotonic relationship between *VDQ* and excess returns, once one controls for popular investment styles, such as value, size, and momentum. These results are confirmed in a two-stage cross-sectional regressions (2SCSR) framework: We build a disclosure risk factor by constructing a portfolio that goes long in the 40% of firms with the lowest voluntary disclosure quality and shorts those 40% with the highest voluntary disclosure quality. We label this candidate risk factor *DISC*. In the first stage we estimate the factor betas and in the second stage the factor risk premiums. The second-stage factor risk premia are insignificant, suggesting that *DISC* is not priced as a risk factor in the overall sample.[5] These baseline findings are consistent with Francis, Nanda and Olsson (2008), who show that voluntary disclosure quality is not significantly related to an implied cost of equity estimate once standard risk factors are controlled for, and with Core, Guay and Verdi (2008), who show that a different proxy of disclosure quality, accruals quality, is not priced in a 2SCSR framework.

Critically, we obtain markedly different findings for firms where it appears plausible that the market does not fully incorporate company-specific information and that voluntary disclosure quality's effect on firm value is not immediately reflected in equity prices. Specifically, we consider firms with a small analyst following, a small size, and a small media coverage.

For companies with below-median analyst following (the *low analyst sample*), the *Top* and *Spread Portfolios* show large positive abnormal returns. For example, the equally-

[4] Admittedly, it would be in principle possible to hand-collect data from annual reports of U.S. companies following the lines of Francis, Nanda and Olsson (2008). However, as described in their paper, even collecting data for a single year is an extremely time-intensive endeavor. The empirical framework that we use requires multi-year data.

[5] This standard procedure to investigate whether a factor fulfills the necessary conditions to be a risk factor is common in the literature; see, for example, Jagannathan and Wang (1996), Campbell and Vuolteenaho (2004), Petkova (2006), Core, Guay and Verdi (2008) and Hirshleifer, Hou and Teoh (2011).

weighted (value-weighted) excess return for the *Spread Portfolio* is 13.9% (14.3%) per year, or more than one percentage point per month. Even including a generous allowance for transaction costs, this suggests high profitability of this investment strategy, or, equivalently, that companies in this market segment derive substantial benefits from enhanced voluntary disclosure quality.[6] The same result holds, overall, for company size, a variable which also proxies for opaqueness under the assumption that larger firms are better known. The *Spread Portfolios* for smaller companies (those below median market value) have (significant) abnormal returns of 9.7% for the equally-weighted and 13.3% for the value-weighted method, respectively. Finally, in the subset of companies not widely covered in the Swiss media, investors in the *Spread Portfolio* earn excess returns of 10.6% for the equally-weighted and 4.7% for the value-weighted method, respectively. We reject a reverse causation hypothesis by observing that increases in *VDQ* are not, in fact, related to future outperformance, as would be expected if managers who have positive (negative) private information about future alpha wish to be particularly forthcoming (careful) with communication. We also find that our results do not depend on whether we consider firms that are active in high or low enforcement environments, suggesting that the rigor of enforcement was not a relevant omitted variable driving our results. We obtain similar results with a large number of robustness tests (including tests of alternative portfolio formation techniques, alternative definitions of risk factors, inclusion of a liquidity risk factor, and the exclusion of some special companies such as financials, etc.).

In sum, we interpret the results as being most consistent with simultaneously (a) a positive relevance of value reporting for firm value in the low analyst, small size, low media coverage sample (that is, where some mispricing is likely to exist) and (b) absence of mispricing and no distinct role for voluntary disclosure quality as a risk factor in the high analyst, large size, high media coverage sample (that is, where we do not expect mispricing in the first place).

The paper is organized as follows. Section 2 discusses the empirical strategy in more detail. Section 3 presents the data. Section 4 shows and discusses the results. Section 5 concludes.

[6] Botosan (1997) instead documents, in a cross-sectional analysis involving one year, a negative association between voluntary disclosure quality and an imputed measure of cost of equity capital for firms with a low analyst following (though the AIMR data she uses tend to cover very large firms). We instead use a panel of data, covering a more recent time period, and we rely on realized returns, which may, in particular for firms in the low information sample, differ from implied cost of equity capital estimates.

2 Empirical strategy

We use two empirical approaches to investigate how disclosure quality is priced in a stock: performance attribution regressions and two-stage cross-sectional regressions.

2.1 Performance attribution regressions

2.1.1 Implementation

In this analysis, we sort the stocks based on their *VDQ* score into five portfolios (but consider other sorts/cutoff points in the robustness tests). The portfolio containing the stocks below the first quintile of the *VDQ* is called *Bottom Portfolio* P0020, whereas the *Top Portfolio* P8000 includes the stocks above the fourth quintile. Additionally, we build a long-short *Spread Portfolio*, where the investor buys the *Top Portfolio* and sells the *Bottom Portfolio*. For the baseline analysis with quintile portfolios this *Spread Portfolio* is called LS8020. We construct both an equally-weighted (EW) and value-weighted (VW) set of quintile portfolios. The VW portfolios are rebalanced monthly based on the actual market value weight. The results of each rating are published in the business magazine Bilanz in September of the corresponding year. Therefore, we set the starting date of the primary portfolio analysis in October (but consider alternative starting dates in the robustness tests).

Part of any observed differences in portfolio returns is probably driven by differences in riskiness or "style" of portfolios. Several equity characteristics have been found to explain differences in realized returns. Therefore, we calculate the abnormal portfolio return alpha (α) based on three different models: (i) the Capital Asset Pricing Model (CAPM) introduced by Sharpe (1964) and Lintner (1965); (ii) the three-factor model of Fama and French (1993), and (iii) the Carhart (1997) portfolio analysis regression model. For example, the portfolio attribution regression for the full model (iii) is:

$$R_{it} - R_{ft} = \alpha + \beta_1 RMRF_t + \beta_2 SMB_t + \beta_3 HML_t + \beta_4 WML_t + e_t \quad (1)$$

where $R_{it} - R_{ft}$ is the time series of excess returns of portfolio i, $RMRF_t$ is the excess return over the risk free rate of the market, SMB_t is the premium return of "Small Minus Big", (size risk factor; measured by market capitalization), HML_t is the premium return of "High Minus Low", (value risk factor; measured by the book-to-market ratio), and WML_t is the premium return of "Winners Minus Losers," (momentum risk factor; measured by the one-year past returns without the most recent month). Fama and French (1998) and Griffin (2002) find that the Fama-French risk factors are country-specific. Therefore, we take the appropriate

Swiss risk factors, which are provided by Ammann and Steiner (2008). There is, of course, an ongoing debate about whether these factors are, in fact, proxies for risk. We do not take a stance on this question. We simply view these models as providing insight into performance attribution and allowing us to control for features that are known to explain returns. We interpret alpha as the abnormal return in excess of what could have been achieved by passive investment in these factors.

2.1.2 Interpretation

While the technical implementation of a portfolio analysis is relatively straightforward, the interpretation of the results can be tricky. When conducting such an analysis, the basic question one needs to ask is whether one assumes that prices correctly incorporate available information or not. In the literature, two polar assumptions are employed, sometimes making comparisons across studies difficult.

Specifically, some studies operate under the assumption of efficient pricing. An increase in cash flows or a decrease in systematic risk exposure thus increases the stock market valuation immediately. For example, if voluntary disclosure quality reduces information risk and this is not diversifiable and, therefore, a priced risk factor, then we expect portfolios with higher *VDQ* to have lower alphas, implying *lower* future returns.

Other studies instead impose the assumption of mispricing – in this case, sorting helps identify firm characteristics that have a positive effect on stock prices in the future (when investors realize that value has been created), resulting in higher realized returns. Thus, if voluntary disclosure quality helps with better internal capital allocation and is underpriced today, we expect portfolios with higher *VDQ* to have higher alphas, implying *higher* future returns.

An example of the former approach is Barth, Konchitchki and Landsman (2011). They find that portfolios of firms with higher transparency earn lower Fama-French-alphas than portfolios of firms with low transparency. They interpret this finding as evidence that transparency decreases cost of capital (incremental to the standard risk factors). An example of the latter approach (in a different context) is Gompers, Ishii and Metrick (2003). They find that portfolios of firms with good ("democratic") governance earn higher Fama-French-alphas than portfolios of firms with bad ("dictatorial") governance. Because they begin their analysis by positing that information is not fully incorporated into equity prices, they conclude (in conjunction with other pieces of evidence) that good governance enhances the value of firms by helping mitigate agency problems.

It seems likely that the extent to which information is incorporated into prices varies across securities. To capture this idea, we split the sample along dimensions that arguably proxy for the degree to which we can expect information to be priced efficiently.

2.2 Two-stage cross-sectional regressions

In our second approach, we perform a two-stage cross-sectional regression (2SCSR) in order to consider if disclosure quality gives rise to a priced risk factor. This is a standard approach, used in many papers, including Jagannathan and Wang (1996), Campbell and Vuolteenaho (2004), Petkova (2006), Core, Guay and Verdi (2008) and Hirshleifer, Hou and Teoh (2011). It presupposes that security prices incorporate all available information.

We build a candidate risk factor *DISC* by taking the portfolio returns of the two bottom quintile portfolios minus the two top quintile portfolios. (We conduct all the tests for both weighting approaches.) We would expect that the *DISC* factor yields a positive premium if this type of "information risk" is priced. (Note, though, that this merely tests whether the necessary conditions for a risk factor are fulfilled.) To examine whether this risk premium exists, in the first stage we estimate the multivariate beta loadings for nine portfolios portfolios sorted independently by book-to-market and size by regressing the individual portfolio excess return on the Fama-French or Carhart factor including the *DISC* factor.[7]

$$r_{it} - r_{ft} = \alpha + \beta_{i,RMRF} RMRF_t + \beta_{i,SMB} SMB_t + \beta_{i,HML} HML_t + (\beta_{i,WML} WML_t) + \beta_{i,DISC} DISC_t + e_{i,t} \quad (2)$$

As in Core, Guay and Verdi (2008), we then estimate over the full time period in a second stage a single cross-sectional regression of mean excess returns on the individual factor estimates from Equation (2) as follows:

$$\bar{r}_i - \bar{r}_f = \lambda_0 + \lambda_1 \beta_{i,RMRF} + \lambda_2 \beta_{i,SMB} + \lambda_3 \beta_{i,HML} + \lambda_4 (\beta_{i,WML}) + \lambda_5 \beta_{i,DISC} + u_i \quad (3)$$

where $\bar{r}_{it} - \bar{r}_{ft}$ is the mean excess return for portfolio i. $\lambda_1 - \lambda_4$ give us an indication if the factor is a potential candidate that is priced in the returns. Specifically, if *DISC* is priced, we expect a positive λ_5 given the way the risk factor is constructed.

[7] Due to the relatively small sample size, a larger number of portfolios would not provide additional insights. As an alternative, we use individual stock returns.

3 Data

3.1 Voluntary disclosure quality

We use a direct measure of the voluntary disclosure quality of a company.[8] Since 1999 the Department of Banking and Finance (DBF, formerly Swiss Banking Institute) of the University of Zurich conducts an annual value reporting rating. This rating determines the situation of voluntary disclosure quality (*VDQ*) in annual reports of Swiss companies.[9] We use this rating as a measure of voluntary disclosure quality. The voluntary disclosure quality is assessed using a scorecard with over 100 questions aggregated into 35 items in 9 subindices/categories, which are thought to be important for the decision-making process of an investor, based on Botosan (1997) and conversations with practitioners. An overview of the checklist is presented in Table 1; the full scorecard is available on request.

[Insert Table 1 about here]

The total score of the ranking is a straightforward summation of the checklist with 35 items, which are graded (1 = no information; 6 = very high information quality) based on the information content and quality. On the checklist that assessors use to rate companies, the currently required disclosure level is exactly specified. We use the ratio of the number of reached points over the number of total reachable points as our measure of *VDQ*. Summary statistics and further information are available in Table 2.

[Insert Table 2 about here]

In contrast to other research (e.g., Botosan 1997) the sample is not limited to one industry. It contains a broad variety of firms with arguably widely differing degrees of public information available. Also, the voluntary disclosure quality of Swiss firms varies widely, making it potentially informative for variations in stock returns. Also adding to existing research (e.g., Hail (2002); Francis, Nanda and Olsson (2008)), our sample is not limited to a cross-section

[8] The seminal contributions (especially as regards normative suggestions for the actual implementation for companies) in the Swiss and Anglo-American literature, respectively, are Labhart (1999) and Eccles et al. (2001).

[9] In the time period under consideration, value reporting through the annual report was the most important channel. Therefore, the voluntary disclosure quality found in the annual report is taken to be a reasonable proxy of overall voluntary disclosure quality. Conference calls and other communications are not analyzed in this rating. In future research, as online communication becomes more important, it will be interesting to see how ongoing value reporting on the company's website is reflected in valuations and returns.

of one year, but ranges from 1999 to 2008. Table 2 suggests that voluntary disclosure quality is relatively stable over time in Switzerland. Although the median/average *VDQ* score in 2002 is low (perhaps the assessors responded to the Enron and WorldCom scandals), this does not affect the validity of sorting on the relative ranking. The disparity between the high and low rated companies, as measured by the spread of *VDQ* quintiles 4 and 1, has been broadly stable as well, with a slight hump-shaped pattern over the years under consideration.

In the portfolio approach, the times series variation of *VDQ* implies that portfolio turnover is high. For example, each year, the Top Portfolio (the top quintile) contains 40% of new stocks on average over the sample period. The Bottom Portfolio (the first quintile), 47% are stocks that were sorted into a different portfolio in the previous year. Part of this turnover is due to new firms entering and other firms leaving the sample. While the high turnover implies that transaction costs of executing the trading strategy we study can be substantial, it has the advantage that our results are not simply picking up permanent portfolio composition effects.

Any rating system has some degree of subjectivity attached to it, and this rating is no exception. A number of features suggest a high reliability of the rating, though. The DBF carefully recruits every year around eight assessors to perform the rating. A team consists of two independent assessors, allowing double checking. The study head gives a preparatory training and screens the ratings and compares them with previous results to maintain consistency. One can reasonably disagree with both the voluntary disclosure attributes the DBF focuses on and with the index we compute. Good voluntary disclosure quality comes down to a lot more than a point system (just like good governance, as argued by Jack and Suzy Welch[10]). However, if the index were to convey no information, we would simply find that the index we use is not related to stock returns. A final reason to hope for undistorted quality, even if there may be some noise, is that the DBF does not sell the data, nor does it provide paid consulting services to the companies that are being studied. Therefore, there is no reason to expect a systematic bias by which certain companies get the best scores.

3.2 The Swiss stock market and the sample

At the end of the sample period, in October 2008, the Swiss stock market (SIX Swiss Exchange) contained 324 listed (domestic 253; foreign 71) companies with a market capitalization of US 866 billion, which is 2.52% of the world-wide market capitalization. The

[10] "A dangerous division of labor" by Jack and Suzy Welch, Business Week, November 6, 2006.

value of shares traded in that year was US$ 122’341 million. Averaging over the past ten years, Switzerland has the 10th highest market capitalization in the world. Understanding the implications of value reporting for Swiss companies may, therefore, subject to the general caveat of transferring empirical results from one sample to another, be of general interest nonetheless.

The coverage of *VDQ* rating is excellent. Specifically, 278 Swiss companies have been rated by the SBI since 1999. For this analysis we exclude all companies which have never been listed during the sample period. We further exclude five companies due to the lack of market data. Our final sample size is 196 distinct companies. The sample contains 124 continuously listed and 73 continuously rated companies. 37 companies enter the sample during the analysis and are still listed. 30 companies are disappearing due to mergers, acquisitions or going privates. Three companies went bankrupt. Two companies have been listed and delisted during the sample period. Table 3 summarizes the sample construction process.

[Insert Table 3 about here]

To eliminate potential survivorship bias, we do not exclude companies which have been delisted during the sample period. Companies which are newly listed or went public are included as soon a *VDQ* score is available.

3.3 Other data

We obtain data on stock returns (return index (RI), adjusted for splits and dividends), market value (MV) and data from the financial statements from Thomson Reuters Datastream.[11] We use end-of-month market data from October 1999 to October 2008.

In the main analysis, we use the four Swiss Carhart risk factors as calculated by Ammann and Steiner (2008). To be consistent with the methodology and their factors we use the call money rate (from the Swiss National Bank) as the risk free rate. We also determine the cross-listing status (ADR level) using the Edgar database.

We use three sample splits to study separately firms with a significant degree of public information available and firms where little public information is available. One split is

[11] As we work with individual return data from Thomson Reuters Datastream, we screened our dataset for the problems described in Ince and Porter (2006).

according to market value (size). A second split is according to the extent of analyst following. For this, we use the number of stock recommendations from the I/B/E/S as well as the number of earnings forecasts. Specifically, we calculate the average number of recommendations in a year by averaging over the monthly number of recommendations within each calendar year. The third split follows media coverage. Here, we consider the coverage in the largest daily Swiss newspaper (Tages-Anzeiger), the leading weekly investors magazine (Handelszeitung) and the Swiss equivalent of the Associated Press (Schweizerische Depeschenagentur). To obtain the number of relevant articles we follow standard procedures as in Fang and Peress (2009). As the source for our searches, we use LexisNexis. For a robustness check we also obtain the number of articles in the database of Neue Zürcher Zeitung (NZZ), which is not covered in LexisNexis, even though it is an important Swiss newspaper that is relevant also for international investors. Descriptive statistics are in Table 4.

[Insert Table 4 about here]

4 Empirical Results

This section presents our empirical results. We first examine the performance attribution regressions. We begin with the full sample (Section 4.1). Then we present the analysis for a sample split based on the number of analysts following the company the company size, and press coverage (Section 4.2). We interpret the main results in Section 4.3. Finally, we provide additional results and robustness checks in Section 4.4.

4.1 Full Sample

4.1.1 Portfolio Performance Attribution

We present the results of this analysis in Table 5 for equally-weighted portfolios and value-weighted portfolios.[12] Panel A (B) shows the mean excess returns and the annualized alphas from the estimated regressions with one, three and four risk factors based on equally-weighted (value-weighted) portfolio returns. The corresponding *t*-statistic is in parenthesis below the alphas. Panel C reports the estimated factor loadings on the four (Carhart) risk factors, which provide relevant insight into the constitution of the portfolios. Panel D contains common

[12] Under the VW approach, highly capitalized stocks may strongly influence the portfolio returns. For example in Portfolio P8000 six stocks (Novartis, Roche, Nestlé, UBS, ABB and Swiss Re) are responsible for 94% of the weights due to their high market value in contrast with the size of the other 13 smaller stocks within the portfolio for the first year of the analysis. Therefore, EW returns may provide more robust insights.

portfolio summary statistics, such as the annualized portfolio standard deviation or mean market value. Finally, the mean portfolio members and the portfolio's Sharpe ratio are reported.[13]

The main findings of our analysis are as follows. The mean excess returns of the *Spread Portfolios* and those from adjusting for market risk (CAPM alpha) are negative (and, in the case of value-weighting, even significantly so). If one assumes that in the overall market information is on average incorporated into securities prices efficiently, these results suggest that information risk is priced and that firms with higher voluntary disclosure quality enjoy lower costs of equity. However, controlling for the other risk factors (size, value, and momentum) changes the picture. Looking at the 4-factor alphas in Panel A and B, we find insignificant evidence for the *Spread Portfolios* depending on the weighting approaches (EW-alpha: 0.9% / VW-alpha: -3.9%).[14] While we are using a different methodology, these findings are consistent with Francis, Nanda, and Olsson (2008): They show that voluntary disclosure quality is statistically significantly negatively correlated with cost of equity only if one controls for neither accruals quality nor risk factors; if one controls for either, the significance vanishes. In the light of their results, separately controlling for accruals quality is unlikely to yield additional insights.

[Insert Table 5 about here]

4.1.2 Two stage cross-sectional regressions

A second approach to investigate the role of disclosure quality for equity prices is to consider a more direct test of whether voluntary disclosure quality is a priced risk factor. As described in Section 4, we build a candidate risk factor *DISC* by taking the portfolio returns of the two bottom quintile portfolios in terms of *VDQ* minus the two top quintile portfolios. We do the same procedure as well with the stock returns of the companies from this sample. Table 6 provides the results of this investigation.

[Insert Table 6 about here]

[13] The factor loadings and the portfolio characteristics (standard deviation, skewness and Sharpe ratio) are broadly similar for the value-weighted approach and are, therefore, omitted, to conserve space. Details are available on request.

[14] For value-weighted Top Portfolio P8000 the factor loading on SMB is negative because size is positively related to voluntary disclosure quality; see also the mean market values provided in Panel D. This echoes previous studies, e.g., Lang and Lundholm (1993).

Using the 2SCSR method, we find that *DISC* is not a priced risk factor for the full sample. It is neither significant nor does it increase the adjusted R-square in noteworthy ways.[15] These results are consistent with our findings from the performance attribution regressions. That realized return premia for the market factor are often insignificant is a common result in the literature (Petkova 2006).

Overall, we interpret this evidence as suggesting that greater voluntary disclosure quality is in general not associated with higher valuations and lower abnormal returns. Note that we observe significant positive alphas for the P6080 portfolio for both weighting approaches (EW-alpha: 8.7% / VW-alpha: 13.8%). This is at first puzzling. If information is incorporated in the securities prices efficiently, then this finding would suggest that the market views this relatively high information quality portfolio is being exposed to particularly high systematic risk not captured by the other risk factors – a rather implausible argument. We instead believe that this result can be understood when separately studying firms for which we are likely to see at least some degree of mispricing. This is what we investigate next.

4.2 Firms with relatively little public information

For firms about which (relatively) little is known, two effects may come into play: First, equity prices may not immediately incorporate all information. Therefore, voluntary disclosure quality's potential benefit in terms of lower expected returns (due to lower cost of capital, implying higher equity prices now) may not occur as much. Second, the benefits for management from learning more about the value creation inside the firm may be substantial, resulting in more effective capital deployment. Because at some point investors do incorporate this information, stock prices are expected to go up in the future, implying higher alphas for the firms with higher voluntary disclosure quality.

We consider three proxies for the degree of public information available about a firm: the extent of analyst following, firm size, and media coverage. Clearly, these three proxies are correlated. However, as Panel D in Table 2 demonstrates, the overlap between the three criteria is far from complete.

[15] Similarly, we find no evidence of *DISC* being priced in the large size, many analysts and high media coverage samples.

4.2.1 Extent of Analyst Following

We first draw on the notion that analysts may act as information multipliers and intermediaries. Based on the average number of stock recommendations per company in each year, we split the sample into two parts, above-median and below-median analyst following. Panel A in Table 7 provides the result from this analysis.

[Insert Table 7 about here]

Strikingly, the equally-weighted (value-weighted) excess return for the (quintile-based) *Spread Portfolio* for the low analyst following split is 13.9% (14.3%) per year. For high followed companies, the alphas of *Top* and *Spread Portfolios* are mainly negative. As one might expect, these alphas are not statistically significant from zero at high significance levels for all combinations. However, as is evident from visual inspection of Table 5, there is a marked difference between companies with little analyst following (on the left-hand side of the table) compared to those with a high analyst following (in the middle of the table). More formally, we perform a trading strategy which takes a long position in the *Spread Portfolio* based on companies with a low extent of analyst following and a short position in the same *Spread Portfolio* but for companies with high analyst coverage. The results can be found on the right-hand side of the table. For example, the equally-weighted (value-weighted) excess return for the strategy based on quintile portfolios is 14.8% (12.1%) per year. For some portfolios, the outperformance is remarkable. For example, when this strategy is applied to the decile *Spread Portfolios,* it yields risk-adjusted excess returns of 23.8% (EW) and 33.2% (VW). The equally-weighted results are generally stronger than the value-weighted ones. Note, however, that obtaining significance in this “double” long-short strategy is very challenging to begin with.

4.2.2 Company Size

Many investors are arguably focusing their attention on large companies because these are more visible. Instead, information for smaller companies tends to be scarce. Will those among the small firms that voluntarily increase their transparency and enhance their voluntary disclosure quality ultimately be rewarded for doing so? To check for this possibility, we split the sample into two parts around the corresponding median market value of the current year and then perform the portfolio analysis. The results are presented in Panel B in Table 7.

Generally, the extra returns that investors earn by picking smaller companies with good voluntary disclosure quality compared to worse disclosure quality are higher than the extra returns they earn by paying attention to voluntary disclosure quality for firms above the median market value size. Again, this is not a result that holds for each possible portfolio one can construct, but again the alphas on the left-hand side of the table look strikingly different from those in the middle. For example, the equally-weighted (value-weighted) excess return for the (quintile-based) *Spread Portfolio* based on the smaller companies is 9.7% (13.3%) per year. The corresponding portfolios based on large companies yield -2.3% (-0.9%) per year. Moreover, the difference between the strategies based on small and large companies (on the right-hand side of the table) for the same *Spread Portfolios* suggests a systematic difference in the economic effect of voluntary disclosure quality.

4.2.3 Media Coverage

A third proxy for the degree to which information asymmetries exist between firms and investors is the (lack of) press coverage. It is possible that within the set of those companies about which relatively few articles are written, firms benefit from enhanced voluntary disclosure quality more than within the set of companies for which media coverage is strong. To evaluate this hypothesis, we split the sample based on the yearly media coverage of the rated companies in relevant Swiss media.

Panel C in Table 7 presents the result of the portfolio analysis based on the split of the sample by the media coverage in the LexisNexis database. The equally-weighted excess return for the quintile-based *Spread Portfolio* for the companies with low media coverage is 10.6% per year. The value-weighted excess return is 4.7%, but insignificant. For both weighting approaches the *Top Portfolio* yields positive significant abnormal returns. Long short strategies based on the equally-weighted approach for other portfolio cutoffs also indicate abnormal returns that are not explained by the four standard factors. By contrast, the quintile *Spread Portfolio* for companies with a high level of media coverage provides no significant excess returns for both weighting approaches. To combine these results, consider a trading strategy which takes a long position in the quintile *Spread Portfolio* for little-covered companies and a short position in the same *Spread Portfolio* but for companies with a high extent of press coverage. The risk-adjusted trading profit is 14.95% for the equally-weighted approach. As in the case of the analyst following split, for the value-weighted approach, the difference is generally less significant.

4.3 Interpretation of findings

To the extent that in the low analyst, small size, and low media coverage subsamples information about voluntary disclosure quality is not immediately incorporated in equity prices today, the results are consistent with the hypothesis that higher *VDQ* helps firms create value and, thus, excess returns.[16]

The returns are so sizable that they are unlikely to be explained by transaction costs, despite the aforementioned relatively high portfolio turnover.

A potential concern with the results is that, since firms did not adopt voluntary disclosure quality randomly, evidence obtained on the basis of the portfolio approach does not necessarily imply a causal relationship between the characteristic *VDQ* and outperformance.

A perfect, natural experiment is, unfortunately, not available. Indeed, the existing literature, including the work on the effects of accruals quality, rarely considers the endogeneity problem. However, we can explore the implications and assess the supportive evidence for several causal hypotheses. Three candidate explanations for the findings for firms operating in an opaque information environment are as follows. First, high *VDQ* may lead to better performance, resulting in higher alpha. This is the causal effects hypothesis. Second, managers who anticipate future alpha may already today adjust their companies' value reporting. This is the reverse causality hypothesis. Finally, the omitted variables hypothesis is that factors not considered in the portfolio formation, but correlated with *VDQ*, are actually driving differential returns.

Consider first the reverse causality hypothesis. Conceivably, a lack of voluntary disclosure quality does not cause worse resource allocation inside the firm or less trust in a firm's products, but managers who forecasted poor performance for their firms in the coming year(s) decreased *VDQ* (perhaps to veil future performance to better secure their jobs), and those who forecasted strong performance increased *VDQ* (to increase chances of being recognized as superior business leaders). There are several conceptual problems with this argument. First, it is equally possible that companies with anticipated bad performance would increase their voluntary disclosure in order to explain their poor performance. Second, it is

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[16] The alternative interpretation would be that, in fact, information is efficiently reflected in stock prices today even in these firms. Then, the results would (counter-intuitively) mean that *VDQ* increases cost of capital. That this would be a problematic interpretation can also be seen in the fact that *DISC* is not priced in these subsamples, as a 2SCSR approach confirms. Moreover, even if we add the *DISC* factor to the portfolio performance attribution regressions, the excess returns from sorting on *VDQ* remain significant for all three low information samples.

not clear that managers are indeed capable of predicting the company's returns in excess of the Carhart four factor model. Third, we question if managers have an incentive to increase voluntary disclosure ahead of time if they expect that the company will outperform the market. These arguments notwithstanding, if managers were increasing voluntary disclosure quality if the performance in the subsequent year was expected to be positive, a trading strategy based on the difference in *VDQ* would show positive abnormal returns. But in results available on request we find no significant abnormal returns for companies that improved their ratings even for the sample splits.

Second, it is possible that higher *VDQ* does not cause better capital allocation, but its presence is correlated with other characteristics that are associated with abnormal returns in the time period under consideration. For example, enforcement could be an omitted variable. If high analyst coverage (or any other information intensity measure) is correlated with the firm being subject to stringent enforcement, then one might expect that little excess returns can be earned by trading on the quality of the report.[17] That is, within the high analyst following sample, we may be capturing firms which do not have much choice in their disclosure quality because these are firms under such close scrutiny or because they are active in other jurisdictions as well and thus are heavily regulated. However, as can be seen in Table 3, the standard deviation of *VDQ* is, in fact, *greater* in the high analyst following sub-sample than in the low analyst following group. The same is true for the other opaqueness measures.

Another version of the enforcement argument is that cross-listed companies may need to fulfill so many requirements that there is little room to maneuver in terms of voluntary disclosure quality. For these firms, therefore, we would not expect any outperformance from paying attention to *VDQ*, and if these firms are those with many analysts, large size, and high media coverage, then this may be driving our results. To address this issue, we exclude those cross-listed companies (American Depositary Receipt - ADR level 2 and 3) and rerun our analysis. The results, available on request, remain very similar.

In the same vein, another potential explanation for the systematic difference between the trading strategies between low and high information environment may be the accounting standard adopted by the companies. International accounting standards like IFRS and US GAAP have a higher enforcement than companies using local standards as for example Swiss GAAP FER or the Swiss Code of Obligations. Generally, companies with an international

[17] Note that his argument would require that even in the high analyst sample stock prices do not incorporate information efficiently today.

accounting standard (IFRS or US GAAP) have a higher *voluntary* disclosure quality than companies with a local standard. Because companies that adopted IFRS or US GAAP standards have larger analyst and media coverage and market capitalization this could explain the low excess returns for the full sample. If only the accounting standard were driving our results, we would expect outperformance for the non-IFRS and non-US GAAP firms for an investment strategy based on *VDQ*. But we do not in fact find that this trading strategy performs differently for these firms than for those that adopted IFRS and US GAAP. Thus, the level of enforcement due to the accounting standard is not the sole driver of the results.

4.4 Additional Results and Robustness checks

The results are robust to several variations in methods. For brevity, we only summarize these here. The detailed tabulations are available on request.

Time Dimension Splits. We explore whether our results are period-specific and how they vary over time. We focus on our quintile Spread Portfolios and consider a trading strategy over rolling 48 months periods.[18]

[Insert Figure 1 about here]

The four panels in Figure 1 are organized in identical ways. They show the four-factor alphas for equal- and value-weighted portfolios (solid lines), plotting also the 90% confidence intervals (dashed lines). For the full sample we see in Figure 1 in Panel A that despite the slight increase in monthly alphas for both weighting approaches, at no point in time did a trading strategy based on voluntary disclosure quality for the full sample yield significant excess returns. Alphas are also stable over time – but significantly positive for equally-weighted portfolios – for companies with a low analyst following (Panel B), though there is a hint of a downward trend over time. This significant result does not hold for value-weighted portfolios. The same pattern is observable for the trading strategy based on companies with low media coverage in Panel D. A somewhat stronger trend is found in Panel C for the small size sample split, for the value-weighted portfolio. While the equal-weighted *Spread Portfolio* implies significant alphas virtually over the complete sample period, the value-weighted portfolio offers significant excess returns only towards the end of the period. If we investigate only the period before the subprime crisis (before July 2007) the results for the

[18] For an application of this approach in a different context, also using portfolio analysis, see Boehme, Huszar and Jordan (2010).

low analyst following and the media coverage split continue to hold, with both weighting approaches yielding significant excess returns. (The size results only obtain borderline significance). Overall, this analysis suggests that our findings on the cross-sectional dimension are fairly stable over time.

Portfolios based on other percentiles. Our main results are not driven by the choice of the portfolio building process; they are robust to forming portfolios based on other percentiles (as already indicated in Table 7 for the sample splits).

Other proxies for media coverage. As a further robustness check we obtain the number of articles of the well-known Swiss newspaper Neue Zurcher Zeitung (NZZ). The overall significance of the results with this proxy is higher than with the LexisNexis-based proxy.

Alternative risk factors. Part I. Ammann and Steiner (2008) use Factset to construct their risk factors. We rerun our analysis with the risk factors provided by Schmidt and von Arx (2011) which are based on Thomson Reuters Datastream and find similar results.

Alternative risk factors. Part II. Replacing the momentum factor with a liquidity factor[19] retains the basic results, especially for the low analyst following and media coverage samples. Therefore, lack of liquidity of the low information environment stocks alone is not likely to drive the results.

Other sample splitting methods. Previously, we concentrate on sample splits based on the median number of the corresponding proxy for information environment. To test the robustness of our results we split the sample in terciles and compare the low with high level of information environment. We find similar results for the sample splits. In an additional analysis we apply our trading strategies only to the companies that have a below the median analyst *and* media coverage *and* company size. The significant abnormal returns for the *Spread Portfolio* are 9.2% p.a. (EW) and 15.1% p.a. (VW).

Further robustness checks. The results are slightly stronger if we exclude companies that went bankrupt. If we exclude the companies from the financial sector the results for the *Spread* portfolio are also slightly higher. We also exclude one potential “Penny-Stock” (Swisslog) from the sample. The results remained robust. Moreover, we use the number of analyst recommendations as a proxy for the number of analysts. Our results are similar to

[19] Based on the average turnover computed as the mean value over the last twelve months.

those with the number of one year EPS forecasts. Furthermore, we have robust results if we form the portfolios in April rather than in October.

5 Concluding remarks

We have investigated whether there is an empirical relationship of voluntary disclosure quality with returns in excess of passive investments in popular investment styles. No significant relationship between *VDQ* and outperformance exists for firms for which much is arguably already known in the market. Under the assumption that for these firms prices incorporate information efficiently, this suggests that *VDQ* is not priced as a risk factor and that for these firms *VDQ* is not associated with lower costs of equity. Indeed, this finding is confirmed in a standard two-stage cross-sectional regression approach: Firms whose returns are more strongly correlated with a disclosure risk factor (specifically, a factor-mimicking portfolio that buys firms with low *VDQ* scores and sells short those with high *VDQ* scores) do not have higher returns.

A positive, monotonic relationship between *VDQ* and outperformance instead holds for firms about which relatively little is otherwise known and for which it is plausible that security prices do not immediately incorporate all available information. Among various potential explanations for this empirical regularity, the most plausible, to us at least, is that for these opaque firms value reporting can generate value, for example, through facilitating better investment decisions.

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7 Appendix

Table 1: Voluntary Disclosure Quality Index (VDQ)

This table contains an overview of the voluntary disclosure index used by the Department of Banking and Finance of the University of Zurich to measure the voluntary disclosure index. The nine subindices are: i) impression, ii) background information, iii) important non-financials, iv) trend analysis, v) risk information, vi) value based management, vii) management-discussion and analysis of annual financial statements, viii) goals and credibility and ix) sustainability. The numbers in parenthesis contains the amount of subquestions for every item on the scorecard.

1	**Impression**	**5**	**Risk Information**
1.1	Structure, usability (1)	5.1	Implementation of risk management (9)
1.2	Style, comprehensibility, language, illustrations (6)	5.2	Publication of quantitative data of risk management (3)
2	**Background Information**	**6**	**Value Based Management**
2.1	Discussion of important products (4)	6.1	Application of Value Based Management (3)
2.2	Discussion of important markets and market share (9)	6.2	Publication of quantitative data (2)
2.3	Strategy, critical success factors (7)	6.3	System of management compensation (3)
2.4	Corporate Governance I: Organisation (3)	6.4	Quantitative data of management compensation (2)
2.5	Corporate Governance II: Governance (5)		
3	**Important Non-Financials**	**7**	**Management-Discussion and Analysis of Annual Financial Statements**
3.1	Publication of future investments (3)	7.1	Reasons for change in revenue / market share and provisions (3)
3.2	Publication of investments in education of staff (3)	7.2	Reasons for change in profit and provisions (3)
3.3	Discussion of innovation rate and process of development (3)	7.3	Reasons for change in future investments and provisions (3)
3.4	Discussion of customer satisfaction (2)		
3.5	Discussion of employee satisfaction (4)	**8**	**Goals and Credibility**
3.6	Process improvement (2)	8.1	Target rentability or profit (3)
3.7	Brand introduction (8)	8.2	Target growth (revenue/ market share) (3)
4	**Trend Analysis**	**9**	**Sustainability**
4.1	Revenue trend by region/segment (3)	9.1	Illustration of enterprise and product ecology (2)
4.2	Profit trend by region/segment (3)	9.2	Quantitative statements to the environmental impact (1)
4.3	Investment trend by region/segment (3)	9.3	Discussion of environmental issues (6)
4.4	Total shareholder return (5)	9.4	Illustration of social policy (2)
		9.5	Quantitative statements to the social policy (2)
		9.6	Discussion of social policy (3)

Table 2: Summary Statistics *VDQ*

This table summarizes the *VDQ* total score for the years 1999–2007. Panel A shows the total coverage of *VDQ* in this study. Panel B summarizes the *VDQ* scores over the years. Q4 - Q1 is the difference between the 4th quintile and the 1st quintile in percentage points. Panel C shows the industries in our sample. Panel D provides an overview of the subsamples.

	1999	2000	2001	2002	2003	2004	2005	2006	2007
Panel A. Companies in the Sample									
Number of companies	89	115	112	129	136	130	137	138	143
Covered Capitalization in % of Swiss Market	84	88	86	98	91	90	93	91	99
Panel B. *VDQ* Total Score									
Median / Reachable points	38%	44%	48%	22%	38%	40%	42%	43%	46%
Q4 - Q1	23%	26%	24%	16%	15%	17%	19%	23%	20%
Reachable points	48	50	50	58	210	210	210	210	210
Min	5	8	7	1	49	49	43	46	51
1st quintile	13	16	17	10	68	67	71	72	80
2nd quintile	17	21	23	11	76	78	83	88	92
Average	18.1	22.9	23.5	14.6	83.5	86.4	91	95.6	101
Median	18	22	24	13	79	83	89	91	96
3rd quintile	20	24	26	15	84	90	96	101	104
4th quintile	24	29	29	19	100	103	111	120	123
Max	30	44	42	38	158	153	153	164	170
Standard deviation	5.7	7.8	7	7	19.9	21.9	23.4	26.3	24
Skewness	0	0.4	-0.1	1	1.1	0.7	0.4	0.3	0.4
Panel C. Industries in the Sample									
Basic materials	7	9	9	13	13	12	13	12	13
Industrials	29	39	41	42	41	41	41	39	41
Consumer goods	8	15	13	14	16	14	16	15	15
Health care	11	12	13	15	14	12	13	15	15
Consumer services	12	14	13	12	15	16	19	18	18
Telecommunications	0	1	1	1	1	1	1	1	1
Utilities	1	0	0	5	5	5	5	5	5
Financials	20	23	21	24	32	32	33	32	37
Technology	5	7	7	9	9	7	6	7	6
Panel D. Sample Split Overlapping									
In all three subsamples	25	32	29	35	39	36	42	39	43
Low Analyst, Small Size but not in Low Media	10	15	17	14	16	15	11	16	8
Low Analyst and Low Media but not Small Size	7	8	6	11	11	11	10	9	13
Small Size and Low Media but not in Low Analyst	4	4	4	8	9	8	7	5	11
Only in Low Analyst	3	5	7	7	7	8	10	7	9
Only in Small Size	7	7	7	9	7	8	11	9	11
Only in Low Media	10	11	10	12	14	15	14	15	8

Table 3: Sample Attrition

The panel on the left presents the sample breakdown. The panel on the right provides further sample information.

Sample Breakdown		Sample Information	
Unique companies in *VDQ*	278	Continuously listed companies	124
Not listed at all	-75	Continuously rated companies	73
Subtotal	203	Companies listed new in sample	37
Companies not listed in Switzerland	-2	Delisted companies	30
No data available	-5	Listed & delisted companies	2
Total number of companies in sample	196	Bankrupt companies	3

Table 4: Summary Statistics

This table presents the summary statistics for our key variables in this study. We exclude the three bankrupt companies to calculate the monthly company stock return and market value. We obtain the analyst coverage from I/B/E/S. The media coverage is the number of articles written about a company, as recorded in LexisNexis. Size is market capitalization. *VDQ* is the voluntary disclosure quality score.

	Minimum	Mean	Median	Maximum	Standard deviation
Monthly company stock return	-0.722	0.00774	0.0036	2.1368	0.0994
Market value	5	8136	974.5	211473	25655.1
Analyst coverage	0	8.263	5.708	45.67	8.81
Media coverage	0	49.287	10	1696	140.34
VDQ (full sample)	0.052	0.435	0.433	0.880	0.134
VDQ in Low Analyst sample	0.052	0.388	0.386	0.760	0.113
VDQ for Small Size companies	0.052	0.396	0.400	0.760	0.113
VDQ with Low Media coverage	0.052	0.392	0.395	0.760	0.111

Table 5: Voluntary Disclosure Quality Index-Sorted Stock Portfolios

All stocks are sorted based on the companies' *VDQ* scores. We construct 5 portfolios based on quintile cutoffs. This table presents the results from regressions of equally-weighted and value-weighted excess returns over the market on a constant, market return (RMRF), as well as three (RM, SMB, HML) Fama-French and four (RMRF, SMB, HML, WML) Carhart factor regressions. The first portfolio building date is 10/99 and the portfolios are rebalanced monthly and reformed every year. The sample period is 10/99-10/08. Panel A shows monthly alphas (in annualized percent units) from these regressions and the corresponding values of t-statistics (in parentheses) for the equally-weighted approach in Panel A and in Panel B for the value-weighted approach. Panel C shows loadings on the four risk factors and the corresponding *t*-statistics (in parentheses) from the Carhart four-factor regression based on equally-weighting. Panel D reports annualized standard deviation and monthly skewness of equally-weighted portfolio returns, mean market value (MV), market-to-book ratio (MBR) and mean portfolio stock numbers and Sharpe ratios for each portfolio. * denotes significance at 10%, ** at 5%, *** at 1%.

VDQ	(low)				(high)	
Quintile Portfolio	P0020	P2040	P4060	P6080	P8000	LS8020
Panel A. Portfolio Alphas (Equally-Weighted)						
Mean excess return	7.22	5.45	5.99	14.72**	3.31	-3.66
	(1.228)	(0.874)	(1.003)	(1.994)	(0.548)	(-1.016)
CAPM alpha	6.07	4.10	4.75	13.11***	1.86	-3.99
	(1.499)	(1.111)	(1.262)	(2.851)	(0.741)	(-1.178)
3-factor alpha	0.19	-1.37	-1.12	6.56*	-0.85	-1.04
	(0.061)	(-0.496)	(-0.416)	(1.863)	(-0.388)	(-0.322)
4-factor alpha	0.12	-1.03	-1.39	8.67**	1.01	0.88
	(0.036)	(-0.343)	(-0.482)	(2.288)	(0.432)	(0.253)
Panel B. Portfolio Alphas (Value-Weighted)						
Mean excess return	9.51	5.88	3.09	12.26	0.39	-8.38*
	(1.43)	(0.83)	(0.41)	(1.43)	(0.08)	(-1.77)
CAPM alpha	8.25*	4.39	1.40	10.40*	-0.79	-8.40*
	(1.72)	(1.01)	(0.34)	(1.96)	(-0.46)	(-1.77)
3-factor alpha	4.86	0.86	1.14	8.33	-0.03	-4.68
	(1.04)	(0.21)	(0.27)	(1.61)	(-0.02)	(-1.00)
4-factor alpha	4.81	-0.54	1.61	13.77**	0.72	-3.92
	(0.95)	(-0.12)	(0.35)	(2.49)	(0.38)	(-0.77)
Panel C. Four-Factor Regression Coefficients (Equally-Weighted)						
RMRF	1.0667***	1.1997***	1.1626***	1.2673***	1.1354***	0.0687
	(12.825)	(16.426)	(16.455)	(14.307)	(20.118)	(0.815)
SMB	0.8359***	0.7816***	0.8362***	0.8562***	0.3782***	-0.4577***
	(8.146)	(8.673)	(9.592)	(7.834)	(5.431)	(-4.399)
HML	0.2575**	0.4907***	0.5528***	0.6649***	0.2964***	0.0389
	(2.104)	(4.567)	(5.319)	(5.102)	(3.570)	(0.314)
WML	0.0050	-0.0248	0.0199	-0.1400	-0.1316***	-0.1366
	(0.057)	(-0.320)	(0.265)	(-1.488)	(-2.194)	(-1.525)
Panel D. Portfolio Characteristics (Equally-Weighted)						
Portfolio stdev	0.171	0.183	0.174	0.208	0.179	0.110
Portfolio skewness	-0.116	-0.647	-0.844	0.289	-0.837	-0.9048
Mean market value	1119.38	2473.87	2316.10	6067.69	29951.02	
Mean market to book ratio	2.13	2.32	2.82	2.48	3.25	
Mean number of portfolio constituents	30	27	28	27	25	
Sharpe ratio	0.423	0.298	0.343	0.708	0.186	-.3305

Table 6: Two-Stage Cross-Sectional Regressions

This table provides the result from the two-stage cross-sectional-regression approach. Panel A (C) presents the result of first stage regression noted in Equation 2 for portfolio (stock) returns. We build an equally-weighted (EW) and value-weighted (VW) candidate risk factor *DISC* by taking the portfolio returns of the two bottom quintile portfolios minus the two top quintile portfolios based on the voluntary disclosure quality. The other explanatory variables are the four (RMRF, SMB, HML, WML) Carhart factors. We report the average coefficient estimates of the time-series regressions of contemporaneous 9 size and book-to-market portfolios on the Carhart risk factors and the *DISC* factor. Panel B (D) provides the result from the second stage of the two-stage cross-sectional-regression as described in Equation 3 where we use the estimates from the first stage on the portfolio (stock) level. Panel A shows the average t-stat. Panel B. calculates the t-standards with the standard errors using the Fama and MacBeth (1973) procedure. The sample period is 10/99-10/08.

Panel A. First Stage (Portfolio Level)						
	Carhart		Carhart & DISC (VW)		Carhart & DISC (EW)	
	Estimate	t-stat	Estimate	t-stat	Estimate	t-stat
Intercept	0.002	(0.62)	0.002	(0.70)	0.003	(0.71)
RMRF	1.148	(10.92)	1.048	(9.88)	1.157	(10.97)
SMB	0.605	(4.35)	0.447	(3.20)	0.577	(4.10)
HML	0.417	(2.48)	0.316	(1.97)	0.431	(2.53)
WML	-0.070	(-0.46)	-0.102	(-0.70)	-0.088	(-0.54)
DISC			0.276	(2.30)	0.140	(0.49)
R- Squared	0.643		0.670		0.648	
Panel B. Second Stage (Portfolio Level)						
	Estimate	FM t-stat	Estimate	FM t-stat	Estimate	FM t-stat
Intercept	0.001	(0.09)	-0.004	(-0.46)	0.000	(-0.04)
RMRF	0.003	(0.29)	0.009	(0.83)	0.004	(0.43)
SMB	-0.001	(-0.21)	-0.002	(-0.30)	-0.001	(-0.20)
HML	0.008	(1.52)	0.011	(1.90)	0.008	(1.54)
WML	0.015	(1.16)	0.018	(1.43)	0.016	(1.23)
DISC			-0.001	(-0.08)	0.000	(-0.07)
Panel C. First Stage (Stock Level)						
	Estimate	t-stat	Estimate	t-stat	Estimate	t-stat
Intercept	0.000	(0.17)	0.000	(0.18)	0.001	(0.20)
RMRF	1.153	(3.98)	1.062	(3.51)	1.165	(4.01)
SMB	0.759	(1.82)	0.627	(1.38)	0.711	(1.70)
HML	0.468	(0.99)	0.371	(0.76)	0.492	(1.03)
WML	-0.020	(0.15)	-0.065	(0.04)	-0.040	(0.12)
DISC			0.316	(0.92)	0.203	(0.22)
R- Squared	0.237		0.256		0.249	
Panel D. Second Stage (Stock Level)						
	Estimate	FM t-stat	Estimate	FM t-stat	Estimate	FM t-stat
Intercept	0.009	(3.04)	0.009	(2.83)	0.009	(3.08)
RMRF	0.001	(0.42)	-0.002	(-0.13)	0.001	(0.44)
SMB	-0.001	(-0.13)	-0.002	(-0.20)	-0.002	(-0.02)
HML	-0.007	(-1.08)	-0.005	(-0.11)	-0.007	(-1.17)
WML	0.007	(1.26)	0.008	(1.44)	0.007	(1.51)
DISC			0.007	(1.33)	0.000	(0.23)

Table 7: Cross-Sectional Sample Splits

This table summarizes the four factor alphas (in annualized percent units) and the corresponding values of t-statistics (in parentheses) of the portfolio analysis with a sample split based on the median extent of analyst following from I/B/E/S in Panel A, based on median company size in Panel B, based on median coverage in relevant Swiss newspapers (Tages-Anzeiger, Handelszeitung, Sonntagszeitung and Schweizerische Depeschenagentur) in Panel C. Panel D reports annualized standard deviation and monthly skewness of equally-weighted portfolio returns, mean market value (MV), market-to-book ratio (MBR) and mean portfolio stock numbers and Sharpe ratios for each portfolio of the split for low analyst coverage. The LS8020 portfolio is our standard Spread Portfolio based on quintile cutoffs. Other portfolios are based on different percentiles. For example, the portfolios based on quartiles result in P7500 as the Top Portfolio and LS7525 as the corresponding Spread Portfolio which buys the Top Portfolio P7500 and sells the corresponding Bottom Portfolio P0025. All results are from regressions of equally-weighted (EW) and value-weighted (VW) excess returns over the market on a constant (alpha), and the four (RMRF, SMB, HML, WML) Carhart factor regressions. The first portfolio building date is 10/99 and the portfolios are rebalanced monthly and reformed every year. The sample period is 10/99-10/08. * denotes significance at 10%, ** at 5%, *** at 1%.

Panel A. Results based on Sample Split on Analyst Coverage

Analysts Following:	Low (Below Median)				High (Above Median)				Difference (Low – High)	
Weighting:	Equally-Weighted		Value-Weighted		Equally-Weighted		Value-Weighted		EW	VW
Portfolio:	Top	LS	Top	LS	Top	LS	Top	LS	LS	LS
P9000 | LS9010	5.1	17.75***	11.15	25.4**	0.12	-4.95	-0.64	-6	23.77**	33.21**
	(1.303)	(2.743)	(1.257)	(2.192)	(0.037)	(-0.602)	(-0.219)	(-0.821)	(2.163)	(2.248)
P8000 | LS8020	9.26***	13.86***	17.26*	14.32	-1.7	-0.82	0.11	1.81	14.80**	12.31
	(2.681)	(3.111)	(1.768)	(1.429)	(-0.616)	(-0.170)	(0.046)	(0.360)	(2.122)	(1.045)
P7500 | LS7525	6.42**	9.99**	13.59	9.83	-1.94	-4.37	0.15	-0.32	14.96**	10.18
	(2.188)	(2.522)	(1.565)	(1.106)	(-0.644)	(-0.927)	(0.061)	(-0.066)	(2.199)	(0.959)
P6600 | LS6633	4.97*	6.82**	11.82	7.54	1.2	0.44	0.89	2.27	6.35	5.16
	(1.694)	(2.044)	(1.496)	(0.981)	(0.466)	(0.125)	(0.448)	(0.540)	(1.259)	(0.598)

Panel B. Results based on Sample Split on Company Size

Company Size:	Small (Below Median)				Large (Above Median)				Difference (Small – Large)	
P9000 | LS9010	4.70	10.33	3.53	10.65	1.15	-3.40	0.74	-8.35	14.17	20.57*
	(1.007)	(1.330)	(0.646)	(1.104)	(0.400)	(-0.590)	(0.282)	(-1.301)	(1.422)	(1.679)
P8000 | LS8020	9.24***	9.65	9.51**	13.26*	-1.55	-2.27	-0.01	-0.91	12.18*	14.29
	(2.816)	(1.626)	(2.138)	(1.682)	(-0.534)	(-0.597)	(-0.004)	(-0.185)	(1.840)	(1.612)
P7500 | LS7525	9.66***	8.67*	8.96**	8.56	0.17	-0.41	0.52	0.71	9.12	7.80
	(2.929)	(1.802)	(2.083)	(1.351)	(0.064)	(-0.110)	(0.236)	(0.140)	(1.585)	(0.950)
P6600 | LS6633	2.67	1.73	3.59	5.03	0.01	0.69	0.64	0.30	1.03	4.71
	(0.876)	(0.456)	(0.971)	(0.944)	(0.005)	(0.202)	(0.343)	(0.067)	(0.216)	(0.676)

Panel C. Results based on Sample Split on Media Coverage (LexisNexis)										
P9000 | LS9010	3.39	13.92**	0.76	11.73	-0.60	3.15	-1.09	-8.49	10.47	21.92*
	(0.812)	(2.057)	(0.116)	(1.334)	(-0.202)	(0.510)	(-0.376)	(-1.259)	(1.191)	(1.908)
P8000 | LS8020	7.83**	10.63**	12.3**	4.71	-2.37	-3.80	-0.83	0.88	14.95**	3.80
	(2.267)	(2.552)	(2.111)	(0.678)	(-0.788)	(-0.689)	(-0.352)	(0.147)	(2.029)	(0.441)
P7500 | LS7525	8.30**	8.61**	12.5**	8.15	-1.25	-1.73	0.45	3.14	10.51	4.88
	(2.496)	(2.108)	(2.228)	(1.163)	(-0.461)	(-0.346)	(0.201)	(0.567)	(1.443)	(0.578)
P6600 | LS6633	7.58**	7.22*	11.4**	7.37	1.28	2.87	0.85	1.39	4.24	5.90
	(2.432)	(1.917)	(2.266)	(1.213)	(0.477)	(0.773)	(0.449)	(0.320)	(0.756)	(0.807)

Panel D. Portfolio Characteristics (Equally-Weighted) for Low Analyst Coverage

Quintile Portfolio	P0020	P2040	P4060	P6080	P8000	LS8020
Portfolio stdev	0.192	0.216	0.218	0.298	0.283	0.259
Portfolio skewness	-0.380	0.006	0.556	0.814	-0.688	
Mean market value	526.33	925.51	883.74	877.64	2243.64	
Mean market to book ratio	1.81	1.90	1.83	1.82	1.83	
Mean number of portfolio	16	13	14	14	14	
Sharpe ratio	0.221	0.351	0.517	0.423	0.479	0.348

Figure 1: Spread Portfolios Over Time

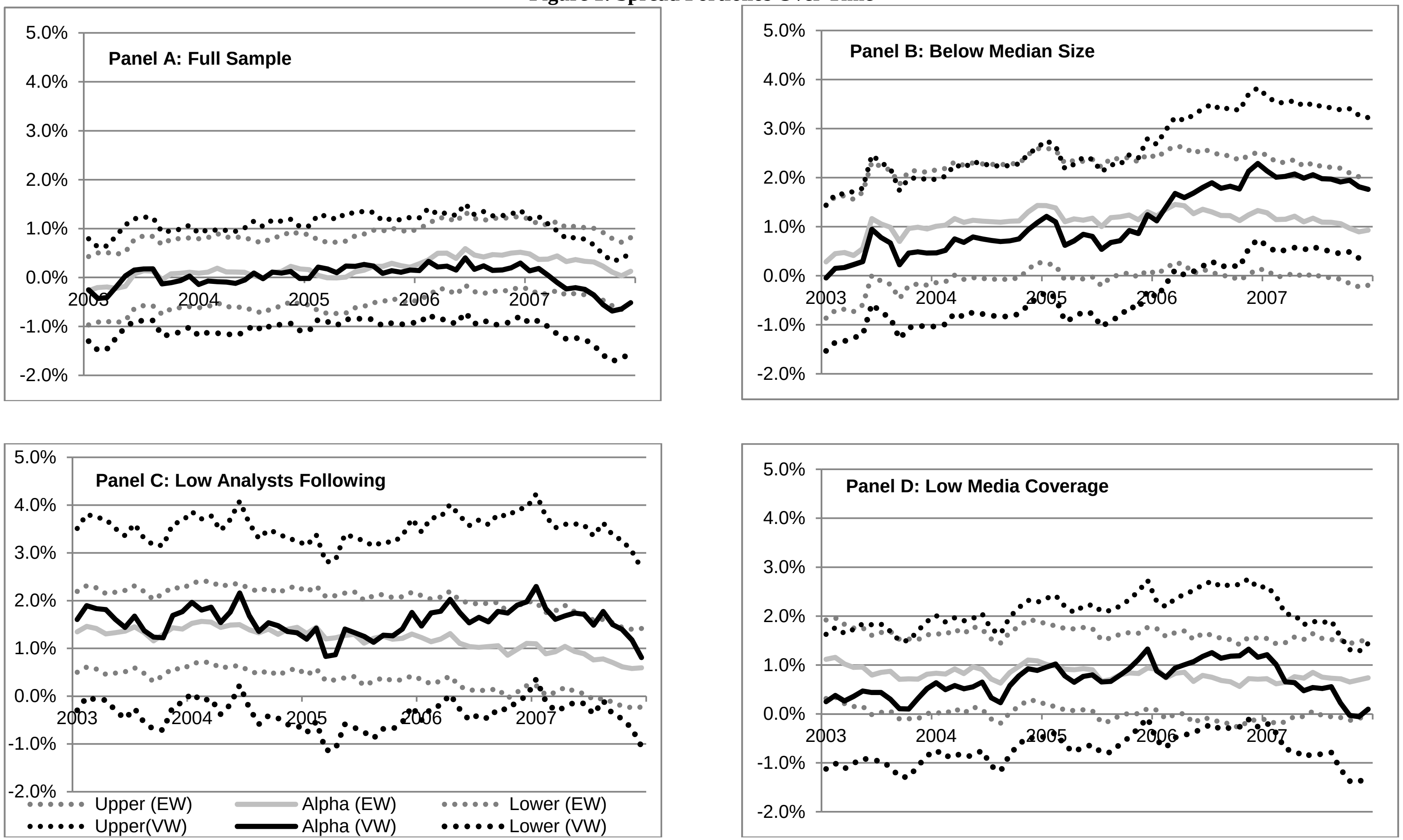

Figure 1 contains monthly Carhart-alphas (monthly abnormal returns) for long-short-portfolios LS8020 formed on the *VDQ* score. The estimation is based on rolling 48-month intervals from October 2003 until September 2008.This figure shows the intercept (alpha) and the 90% confidence interval for equally-weighted and value-weighted portfolios. Panel A shows the result for the full sample. Panels B, C, and D present the results for the low analyst, small size, and low media coverage sample, respectively