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Web-Based Customer Value Disclosure: On the Relationship with Environmental Uncertainty, Analyst Following and Information Asymmetry

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Web-Based Customer Value Disclosure:
On the Relationship with Environment Uncertainty, Analyst Following and Information Asymmetry

Abstract:

In this study, we assert and test that Web-based customer value disclosure, environment uncertainty, financial analyst following, and information asymmetry between managers and investors are closely intertwined. Taking into account endogeneity between disclosure and firm specific factors, results show significant interrelationships between financial analyst following and customer value disclosure. More specifically, we observe that the potential for customer value disclosure to attract financial analysts depends on a firm's environmental factors such as dynamism, diversification, competition, volatility and resource availability. Our results also show that the potential for such disclosure to attract analysts reach an optimal point after which the effect decreases for high levels of dynamism, diversification, competition, and volatility. Finally, customer disclosure leads to a reduction in share price volatility.

Key words: analyst following, customer value, environmental uncertainty, information asymmetry, product market.

Reporting sur le web à propos de la valeur client :
relation avec l'incertitude de l'environnement,
le suivi des analystes financiers et l'asymétrie informationnelle

Résumé :

Dans cette étude, nous postulons que le reporting à propos de la valeur client, l'incertitude environnementale, le suivi des analystes financiers et l'asymétrie informationnelle sont étroitement liés. En tenant compte de l'endogénéité entre la divulgation et les facteurs spécifiques à la firme, nos résultats montrent des relations significatives entre le suivi des analystes financiers et le reporting à propos de la valeur client. Nous montrons que l'attrait du reporting pour les analystes financiers est fonction du niveau de dynamisme de la firme, de sa diversification, de la compétition, de la volatilité et des ressources financières dont dispose la firme. De plus, nos résultats montrent que la capacité de ce reporting d'attirer les analystes financiers atteint un point optimal au-delà duquel l'effet s'estompe. C'est le cas des firmes au degré élevé de dynamisme, de diversification, de compétition et de volatilité face aux ventes. Par ailleurs, la divulgation valeur client est liée à une réduction de la volatilité des titres boursiers.

Mots-clés : asymétrie informationnelle, incertitude environnementale, marché des produits, reporting valeur client, suivi des analystes financiers.

Introduction

Mandated financial reporting is crucial for the financial analyst's work (Lang and Lundholm, 1996). However, in a complex environment, this type of information in itself is not sufficient for producing accurate earnings forecasts (Collins, Maydew and Weiss, 1997; Francis and Schipper, 1999; Lev and Zarowin, 1999). The purpose of using both financial and non-financial information is to use the best indicators in order to produce the more accurate analyst forecasts. Relying on relevant information reduces forecasts' errors and potential loss of credibility for the analyst. Ultimately, the objective is to translate collected information into financial outcomes for investors.

Financial analysts refer to non-financial measures in their company reports and use these measures to assess the long-term performance of a firm (Dempsey *et al*., 1997; Healy, Hutton and Palepu, 1999). There is also evidence that disclosure that extends beyond financial performance measures may be value relevant for investors for market valuation needs (Amir and Lev, 1996; Lev and Zarowin, 1999, Aerts, Cormier and Magnan, 2007; Cormier, Ledoux and Magnan, 2009). To have forward-looking attributes, corporate disclosure must encompass a broader scope than information traditionally released in annual reports. An example of this broader scope reporting is the disclosure of information about customer satisfaction.

In this paper, we explore the relationships between web-based customer value disclosure, financial analysts' following, and information asymmetry in the stock market, taking into account environmental uncertainty, namely, dynamism, diversification, competition, volatility, and resource availability.

Our findings show that the potential for such disclosure to attract financial analysts depends on the level of dynamism, diversification, competition, volatility and resource availability

that the firm faces. Results also show that the ability for such disclosure to attract analysts reaches an optimal point after which the effect decreases for high levels of dynamism, diversification, competition, and volatility. This curvilinear relationship between disclosure usefulness and environmental uncertainty seems to reflect the tradeoff between potential financial benefits and cost related to analysts' work. Finally, customer disclosure appears to be associated with a reduction in share price volatility.

This study contributes to our understanding of corporate disclosure in the following manner. First, to the best of our knowledge, this study is the first to investigate how the level of environmental uncertainty influences the relationship between customer value disclosure and analyst following. Second, our results suggest that when assessing the relevance of customer value disclosure for market participants, it is important to control for the endogenous nature of a firm's decision to disclose information.

The remainder of the paper is organized as follows. Section 2 presents the theoretical background and hypotheses. The study's method is described in section 3. Results are presented in section 4. Finally, section 5 provides a conclusion and a discussion of potential implications of the results.

2. Disclosure about Customer Value: Background and hypotheses

2.1 Disclosure and Analyst following

Financial analysts use their earnings forecasts along with other information to estimate stock's value and make recommendations (Bradshaw, 2004). Earnings forecast accuracy is an important issue since poor predictions impact on analyst reputation, turnover and promotion

(Mikhail, Walther and Lewis, 1999; Hong and Kubi, 2003; Wu and Zang, 2009). In forecasting process, time is also an issue. Investors react to early more than to late analyst recommendations, even though forecasts tend to be more precise when the window is reduced (Womack, 1996). In this vein, Cooper, Day and Lewis (2001) find that lead analysts, based on forecast timeliness, have a greater impact on stock prices than follower analysts. They also find that performance rankings on that basis are more informative than those built on abnormal trading volume and forecast accuracy. After earlier signal, i.e. the beginning of the forecasting period, the value added by analyst work starts to decrease. At the peak of the curve of forecast precision, value creation for investors and analysts reach a maximum.

Liquid and efficient capital markets critically rely on market participants' ability to obtain at low cost, timely, and relevant information about firm performance. Analysts are considered to be sophisticated users of company information, and, unlike market expectations, their expectations are directly observable. Lang and Lundholm (1996), Higgins (1998), and Hope (2003a, b) provide empirical evidence that is consistent with corporate financial disclosure, such as annual report disclosure metrics, leading to more accurate analyst forecasts.

However, there is an emerging body of evidence suggesting that non-financial performance measures may be useful in predicting a firm's future earnings and, ultimately, its stock market value. The balanced scorecard literature provides a template to capture the various dimensions of value creation processes, which derives from successful management of a firm's financial resources, customer relations, internal processes and human capital (e.g. Kaplan and Norton, 2004). The benefit of using both financial and non-financial measures to capture firms' future value has analytical roots (e.g., Holmstrom, 1979; Locke and Latham, 1990) while there is

growing empirical evidence that non-financial metrics help predicting financial performance (Behn and Riley, 1999; Rajgopal, Venkatachalam and Kotha, 2003).

From a customer perspective, prior research generally suggests that customers' volume, satisfaction and loyalty are useful predictors of a firm's future financial performance and, ultimately, value creation. Amir and Lev (1996) report that the number of customers signed up by a wireless operator, and its related costs, contain relevant information about future earnings and stock returns. Smith and Wright (2004) report measures of customer loyalty to explain relative revenue growth and profitability while providing competitive advantage in the PC industry.

A positive relationship between customer satisfaction and future accounting performance was documented in telecom (Potter and Srinivasan, 2000). In resort industry, public release of this measure is statistically associated with excess stock market returns over a ten-day announcement period while only partially reflected in current accounting book values (Ittner and Larcker, 1998). Anderson, Fornell, and Lehmann (1994) show positive contemporaneous associations between customer satisfaction and return on assets in Swedish manufacturing firms, but weaker or negative associations in service firms. Mixed evidence also exists on the extent to which customer satisfaction measures provide value-relevant information beyond that contained in current financial statements (e.g. Jacobson and Mizik [2009] for the internet sector and Riley, Pearson and Trompeter [2003] for the airline industry).

This gives rise to our first hypothesis:

H1: Web-based disclosure about customer value attracts financial analysts.

2.2 Environment uncertainty and Analyst following

Pfeffer and Salancik (1978) define environmental uncertainty as the degree to which future events and states cannot be anticipated or predicted. For Govindarajin (1984), uncertainty refers to the unpredictability of the actions of customers, suppliers, competitors and regulatory groups. In addition, Chenhall (2003) defines uncertainty as situations in which probabilities cannot be attached and even elements of the environment may not be predicable. Uncertainty also exists when it is difficult to predict the impact of the environment on the firm and its key success factors (Milliken, 1987); the relation is complex and difficult to assess (Duncan, 1972; Lawrence and Lorch, 1967).[1]

Firms' environmental uncertainty amplifies the financial analyst's work in terms of information gathering and processing. The level of difficulty of the forecasting task varies across firms and it relies to the collection and treatment of information and is induced by a firm's external environment (Duru and Reeb, 2002; Khurana, Pereira and Raman, 2003; Tihanyi and Thomas, 2005). At the same time, those firms represent a potential of value creation for investors and therefore for the market intermediary. Among financial analysts, only the more competent would express early opinions on those stocks, although the so-called followers will mimic them.

Investors are willing to pay for brokerage investment advice only if the expected benefit is at least as great as the cost of the advice (Womack, 1996). Analyst motivation to follow a firm is driven by economic considerations, i.e. when expected benefits of his work exceed costs (e.g.

[1] The various terms that are used to describe the organizational environment fall generally into three categories (Child, 1972): complexity (the level of complex knowledge that understanding the environment requires), instability or dynamism and resource availability (the level of resources available to firms from the environment). Mintzberg (1979) describes three dimensions of the environment similar to those proposed by Child (1972), but adds new facets for each. He introduced the term market diversification to reflect what Thompson (1967) means by heterogeneity and Child (1972) by complexity, while reserving the term complexity for the degree of sophisticated knowledge necessary to operate in a given environment of a technical or scientific nature. According to Dess and Beard (1984), uncertainty is the outcome of complexity and dynamism. Aldrich (1979) identifies industry concentration (competition) as an important part of complexity.

Barth, Kasznik and McNichols, 2001). Costs are likely to increase with the extent of forecast accuracy since forecasts that are more precise are assumed more expensive to produce (Lys and Soo, 1995). Moreover, earnings are undoubtedly easier to predict for some firms than others (e.g., Pincus, 1983). Hence, the cost of achieving a given level of precision should decrease as earnings predictability increases. Finally, the analyst's effort in data collection and processing reaches an optimal point after which costs exceeds benefits for the value added of his forecasting work.

In our study, uncertainty in the product market posture refers to the following five environmental factors: dynamism, diversification, competition, volatility, and resource availability. We argue that an optimal level of environmental uncertainty is reached beyond which the value added of information for the analyst work is decreasing. Hence, we expect a non-linear relation in the impact of the five organizational factors on the ability for customer value disclosure to attract financial analysts.

2.2.1 Dynamism and Analyst following

Environmental dynamism refers to the rate of change of the firms' environment (Dess and Beard, 1984). Such turbulence in the market place may reflect changes in the composition of customers and their preferences and in competition intensity. Firms operating in high market turbulence more frequently alter their products and services in order to cater to customers' changing preferences and competitors' attacks (Wang, 2007). Those changes may also reflect technological advances and firms' ability to adjust their processes accordingly. Firms operating in a dynamic environment are most likely involved in innovation activities, which imply greater investment on intangible assets such as human capital, patents, copyrights, trademarks and software.

The relevance of non-financial measures for value creation has been widely recognized in industries where there are sizable intangibles assets (e.g. Dempsey *et al*., 1997; Healy, Hutton and Palepu, 1999). However, dynamism increases the difficulty in predicting the future of a given environment that can stem from changes in either market patterns or technology.

The disclosure about customer value will attract analyst when the level of dynamism as expressed by research and development expenditure is important. In the end, the level of R&D can measure success in relation to the innovation and learning perspective. Barth, Kasznik and McNichols (2001) find that analyst coverage is significantly greater for firms with more intangible assets. This result is consistent with findings in Barth, Clinch, and Shibano (2003) who assume intangible assets to have more uncertain payoffs than other assets of the firm. There is also empirical evidence suggesting that R&D investment positively relates to operating and market performance. For example, Anagnostopoulou and Levis (2008) based on U.K. companies during the period 1990-2003, confirm the relation between R&D intensity and consistent growth in sale and gross income in industries highly involved in R&D activities. Moreover, they observe a positive relation between R&D intensity and subsequent risk-adjusted excess returns among firms that engage in R&D as testified by prior literature.

However, we can expect the positive effect of dynamism on analysts following to reach an optimal point after which it decreases.

Hence, our second hypothesis:

H2: Dynamism first enhances the association between web-based disclosure about customer value and analyst following and then, after a certain breakpoint, reduces this association.

2.2.2 Diversification and Analyst following

Firms undertake a variety of actions to reduce risk through diversification in lines of business and geographic activities. Market diversity is one the components of environmental complexity identified by Mintzberg (1979). Based on a factor analysis, Dess and Beard (1984) find that only geographic concentration reflects on the complexity factor. Laeven (2001) examines the effect of product and geographic diversification on firm value for a sample of 1,914 firms operating in eighteen countries. His results show that both product and geographic diversification destroy value at high levels of diversification, suggesting that agency and influence costs arising from the increased complexity outweigh the benefits of diversification at high levels.

Laeven's study (2001) was conducted prior to the adoption of the international accounting standard IFRS No. 8 (2007)[2] that now requires financial information to be reported on the same basis as is used internally for evaluating operating segment performance and deciding how to allocate resources to operating segments. These accounting standards allow more discretion in defining reporting segments. If firms generally understand the benefits of analyst following, they will provide appropriate segment disclosures to increase the benefits of analyst following. Hope, Kang, Thomas and Vasvari (2008) find that increases in geographic segment disclosure are incrementally value relevant beyond other SFAS No.131 reporting according to the U.S. accounting standard about segment disclosure. In that regard, Prather (2000) documents an increase in analyst following with voluntary geographic segment disclosure. Nichols, Tunnel and Seipel (1995) show that after adjustment for differences in earnings variability, financial analysts'

[2] The international accounting standard IFRS No. 8 (2007), the U.S. standard SFAS No. 131 (1997), and the Canadian standard counterpart (CICA Handbook section 1701, 1999) require an entity to report financial and descriptive information about its reportable segments. Reportable segments are operating segments or aggregations of operating segments that meet specified criteria. Operating segments are components of an entity about which separate financial information is available, i.e. evaluated regularly by the chief operating decision maker in deciding how to allocate resources and in assessing performance. Generally, firms are required to report information on the same basis as is used internally for evaluating operating segment performance and deciding how to allocate resources to operating segments.

forecasts of the earnings of multinational firms did become significantly more accurate (relative to that of a group of control firms) after the disclosure of geographic segment information.

Barth, Kasznik and McNichols (2001) find that analyst coverage is decreasing with the effort they must expend to follow the firm. On the one hand, we can expect the voluntary disclosure about product diversification, as measured by the number of segments, to attract financial analysts in their assessment of firms' risk and future cash flows. However, the analyst work is increasing with diversification, thus preventing him to invest time and effort in analyzing customer value disclosure.[3] Hence, the product-mix diversification as expressed by the number of segments is likely to increase analyst work in his search to assess a firm's potential and to make earning forecast more complex (Duru and Reeb, 2002), which leads to the following hypothesis:

H3: Diversification first enhances the association between web-based disclosure about customer value and analyst following and then, after a certain breakpoint, reduces this association.

2.2.3 Competition and Analyst following

Barnett (1997) defines environmental competition in terms of the effect a firm has on other firms' survival chance. As such, the degree of external competition threatens the achievement of organizational objectives (Khandwalla, 1972). In a competitive market, numerous actors battle for market shares. Competing activities to attract and keep customers include price competition, promotion competition, and so forth. Firms are also concerned with challenging competitors' actual position while preventing new competitors to enter the market. Barriers to entry may take

[3] The "Intermediate Model" of Palich, Cardinal and Miller (2000) suggest that diversification has a positive impact on performance, but the returns fall beyond some point where the optimal is reached. Their model focuses on internal value creation that includes financial market considerations.

the form of product differentiation, economies of scale, restricted access to distribution channels or established brands and trademarks, which necessitate heavy investment in intellectual capital, advertising, and plant and equipment (Porter, 1985). In this vein, capital investment intensity and intellectual property rights represent a cost for new competitors and restrict market penetration.

Incentives for managers to release corporate information in a competitive market are mixed. The value relevance of disclosure either for financial or product market has been shown (e.g., Hope, 2003b), especially when it can provide the firm with a competitive advantage (Verrecchia, 1983). However, disclosing private information may induce proprietary costs. Dye (1985) asserts that an incumbent firm with good news to communicate may choose to withhold information to prevent competition.

Arya and Mittendorf (2007) demonstrate that while competition can inhibit disclosure, analysts' insistence on guidance can be beneficial to firms and consumers alike. In their setting, although firms are reluctant to disclose information which competitors deem pertinent, competition may induce them to voluntary release information in an attempt to attract customers. In addition, if a firm opts not to disclose information, it runs the risk of losing analyst following (Bhushan, 1989; Lang and Lundholm, 1996; Healy, Hutton and Palepu, 1999).

Indeed, we can argue that a competitive market offers an opportunity for analyst to play his intermediary role in the financial market, given the complexity and uncertainty surrounding those firms. Hence, disclosure of information about customer value is likely to attract financial analysts in a larger extent in the context of competition as measured by reverse of capital intensity ratio. Once again, we expect the positive impact of competition for attracting financial analysts to reach an optimal after which a decrease in this relationship will occur.

Hence, our fourth hypothesis:

H4: Competition first enhances the association between web-based disclosure about customer value and analyst following and then, after a certain breakpoint, reduces this association.

2.2.4 Volatility and Analyst following

Previous studies of environmental volatility have focused on variability of accounting variables such as sales or earnings (Kren, 1992). More stable patterns in such measures across time indicate a more stable environment and thus are easier to predict (Tosi, Aldag and Storey, 1973; Bourgeois 1985).

The level of volatility that a firm might face on the product market, as expressed by sales stability is likely to influence how the analyst will use disclosure about customer value in his assessment of a firm's value. Lensink, Van Steen and Sterken (2005) find that the conditional variance over the conditional mean of expected sales has a significant negative impact on the level of investment decisions made by firm managers. Moreover, Barth, Kasznik and McNichols (2001) and Branson and Pagash (2005), find that analyst coverage is increasing with uncertainty about earnings predictability. In addition, Bhushan (1989) as well as Lang, Lins and Miller (2003) document a positive relationship between earnings volatility and analyst following.

However, since the analyst work is likely to increase with sales volatility, we can expect that he will be less likely to invest in financial analysis for firms for which sales are highly unstable.

Hence, our fifth hypothesis:

H5: Volatility first enhances the association between web-based disclosure about customer value and analyst following and then, after a certain breakpoint, reduces this association.

2.2.5 Resource availability and Analyst following

Resource dependency is an open-system theory stating that all organizations exchange resources with the environment is a condition for survival (Scott, 1998). Scott (1998, p. 114) states, "the need to acquire resources creates dependencies between organizations and external units". In this vein, Pfeffer and Salancik (1978, p. 12) suggest that the organization's environment can be defined as a set of external "events in the world which has any effect on the activities or outcomes of the organization". Groups that control the most vital resources have the most power. Within a resource dependency perspective, the acquisition of financial resources by an organization is not taken as given and can actually be problematic and uncertain. Resource providers can actually become unreliable in situations of economic or financial stress (Carpenter and Feroz, 2001).

In a content analysis of analysts' reports, Previts, Bricker, Robinson and Young (1994) document that analysts find cash flows more important in assessing firm value for highly leveraged firms. This is consistent with cash flows providing information about solvency and liquidity (Beaver, 1966; Ohlson, 1980). Moreover, firms with extensive free cash flows (operating cash flow minus capital expenditures) face less external monitoring (Jensen, 1986). The level resource availability can affect how a firm may fulfill customers' demand. We assert that the level of resource availability, as expressed by a firm's free cash flow is likely to influence how the financial analyst uses disclosure about customer value in his assessment of a firm's value. We expect that the more a firm possesses financial resources, the more relevant is the information about its customers. One again, we expect the positive impact of resource availability on attracting financial analysts to reach an optimal point after which the effect decreases.

Hence, our sixth hypothesis:

H6: Resource availability enhances the association between web-based disclosure about customer value and analyst following and then, after a certain breakpoint, reduces this association.

2.3 Disclosure and Information asymmetry

Information transparency can mitigate the adverse selection problem by reducing the transaction cost and/or information asymmetry, increase the overall liquidity of stocks, and reduce cost of capital (Verrecchia, 2001; Graham, Harvey and Rajgopal, 2005; Leuz and Wysocki, 2008).

Barron, Kile and O'Keefe (1999) show, and empirically test, that analyst forecasts' dispersion, varies inversely with the quality of publicly available information contained in the Management Discussion and Analysis report. Lang and Lundholm (1996), Higgins (1998) and Hope (2003a, b) provide empirical evidence that is consistent with more corporate disclosure leading to less analyst forecasts' dispersion, that is, less information asymmetry.

Moreover, there is empirical evidence showing that non-financial performance measures may be useful in predicting a firm's future earnings and, ultimately, reduce asymmetry between managers and investors. Most of these studies are industry-specific since, in contrast to financial performance, there is no single generally accepted non-financial performance measure. For instance, Amir and Lev (1996) report that the number of customers signed up by a wireless operator, and its related costs, contain relevant information about future earnings and stock returns. Ittner and Larcker (1998) show that, in the context of some industries, non-financial performance measures are leading indicators of future financial performance measures such as sales or earnings that ultimately translate into enhanced stock market performance.

Moreover, Rajgopal, Venkatachalam and Kotha (2003) show that some non-financial measures of business activity and success are associated with financial performance. In the Canadian context, Cormier, Aerts, Ledoux and Magnan (2009) find that web-based social and human capital disclosure reduces share price volatility.

To the extent that customer value disclosure is informative about a firm's future prospects, we hypothesize that:

H7: Web-based disclosure about customer value reduces information asymmetry on stock markets.

3. Method

3.1 Sample

The sample comprises 136 observations of web disclosure for the year 2005. We initially collected web disclosure in the summer of 2002 for an international study (XXX, 2007). All non-financial firms represented on the Toronto Stock Exchange S&P/TSX Index were identified (the total index comprises 220 firms in summer 2002). The resulting 2002 sample comprised 189 non-financial firms. Mergers and acquisitions, bankruptcies and delistings reduced our sample to 155 in 2005. The final sample comprises 136 firms since, out of the initial sample of 155 firms, there are missing data for share volatility and Tobin's Q (19 firms). These 136 firms represent 44% of the total market capitalization of the Toronto Stock Exchange (TSE) and 80% of market capitalization of non-financial firms listed on the TSE.

The same coding grid has been used by Aerts, Cormier and Magnan (2007) and Cormier, Ledoux and Magnan (2009). Financial data was collected from the Stock Guide. Sample firms operate in the following industries: Metals and mines; Gold and precious metals; Oil and gas;

Paper and forest products; Consumer products; Industrial products; Real estate; Utilities; Communication and media; Merchandising.

3.2 Empirical model

This study attempts to provide an integrated analysis of firms' customer value disclosure strategy. We posit that this strategy simultaneously affects analyst following, information asymmetry and disclosure. Prior research suggests that increased analyst following is associated with an increase in market-wide volatility and a decline in firm-specific volatility (Piotroski and Roulstone, 2004; Chan and Hameed, 2006). There is also empirical evidence suggesting that non-financial disclosure is associated with a reduction in share price volatility (e.g. Cormier, Aerts, Ledoux and Magnan, 2009).

Given the endogenous nature of disclosure, analyst following and share price volatility, we rely to the following system of structural equations with SURE (seemingly unrelated regression estimation) being the estimation method:

Analyst following $_{it}$ =

$f(\delta_0 + \delta_1$ Systematic risk $+ \delta_2$ Firm size $+ \delta_3$ Free float $+ \delta_4$ Disclosure customers $+$

$\delta_{5, 7, 9, 11, 13}$ Disclosure customers*Environmental uncertainty $+ \delta_{6, 8, 10, 12, 14}$ Disclosure customers*Environment uncertainty-high) $_{it}$

Share price volatility $_{it}$ =

$f(\delta_0 + \delta_1$ Analyst following $+ \delta_2$ Systematic risk $+ \delta_3$ Firm size $+ \delta_4$ Customer value disclosure $+ \delta_5$ Disclosure customers) $_{it}$

Disclosure $_{it}$ =

$f(\delta_0 + \delta_1$ Concentration ratio, $+ \delta_2$ 1-Capital intensity $+ \delta_3$ Tobin’s Q $+ \delta_4$ Firm size) $_{it}$

We use share price volatility as a proxy for information asymmetry. Share price volatility is defined as the standard deviation of percentage changes in daily stock prices for 2005.

3.3 Measurement of variables

Disclosure. Prior research shows that analyst coverage tends to be positively related to the degree of information disclosure by a company, presumably because better disclosure decreases the cost of doing research on a company (Lang and Lundholm, 1996; Healy, Hutton and Palepu, 1999). Hence, analysts are less likely to be attracted to firms with poor disclosure (Lang and Lundholm, 1996; Healy, Hutton and Palepu, 1999; Bushman and Smith, 2003).

We focus on performance disclosure that firms voluntarily put on their Web site in an HTML format. Customer value disclosure is based on balance scorecard literature and emerging performance measurement practices (e.g. Ittner and Larker, 1998; Kaplan and Norton, 1996; Robb, Single and Zarzeski, 2001). We measure web-based disclosure using a coding instrument in a way that is similar to Wiseman (1982), Cormier and Magnan (2003), Aerts, Cormier and Magnan (2007), and Cormier, Ledoux and Magnan (2009). The grid comprises 12 items (see table 1). The rating is based on a score of one to three per element, with each item possibly comprising many elements. A score of three is given for an element that is described in monetary or quantitative terms, a score two for an element that is specifically described, and a score of one for an element discussed in general. Each of these elements could be coded, which would imply a total score for this item greater than three. To ensure consistency among firms, two persons reviewed all individual scores independently. One of the co-researchers subsequently reviewed all disagreements.[4]

[4] A coding manual documenting coding instructions as well as standardized coding worksheets were prepared before hand. Each coder then applied the following coding sequence: (1) independent identification of the occurrence of

3.3.1 Analyst following model

Beta. Prior research documents a relation between stock volatility and analyst coverage (e.g. Bhushan, 1989; Lang, Lins and Miller, 2003), suggesting that demand for analysts' services in higher for companies with higher financial risk. Therefore, we expect a positive relationship between beta and analyst following.

Size. Prior research on analyst following in the US shows that firm size is positively related to analyst following. Bhushan (1989) argues that firm size affects both the aggregate demand and the aggregate supply for analysts' services. Demand is positively affected by firm size because the aggregate potential payoff for shareholders from access to higher quality information is more important for larger firms. Supply is positively affected, presumably because there are significant fixed costs in following a company and the payoff from following is related to its size (Bhushan, 1989). Therefore, we expect a positive relationship between size, measured by lnAssets, and analyst following.

Free float. There is likely to be a greater demand for analysts' services if ownership is more widely dispersed. As Hope (2003c) posits, when ownership is concentrated, information is likely to be communicated through private channels, decreasing the role of financial analysts. Moreover, Lang, Lins and Miller (2004) argue that analysts are unwilling to follow firms with potential agency problems. They document that analyst coverage is negatively related to the control rights held by family or management groups. We anticipate a positive relationship

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items relative to the different coding categories; (2) independent coding of the items according to quality level of content and (3) timed reconciliation on a subset of company reports. The coders were intensively trained in applying coding instructions and in using the coding worksheets. They were unaware of the research hypotheses. Initial differences in identifying grid items accounted for on average 7% of the maximum number of items identified. Of the information quality level coding, less than 10% had to be discussed for reconciliation. Disagreement between coders mostly happened at the beginning of the coding process (essentially the first 30 sample firms). A researcher reconciled coding disagreements exceeding 5% of the highest total score between the two coders. Smaller disagreements were resolved by the two coders themselves.

between free float and analyst following. The variable is measured as the percentage of shares that are not closely held (total shares outstanding minus control blocks of 10% or more).

Five distinct variables are used to capture a firm's environment and its impact on the association between customer value disclosure and analyst following. We estimate five separate regressions adding in turn interaction terms *Disclosure*R&D, Disclosure*Segments, Disclosure*1-Capital intensity, Disclosure*Sales CV,* and *Disclosure*Free cash flow* to the Analyst following regressions. We also add five interaction terms to control for non-linearity in the impact of the five organizational factors on the ability for customer value disclosure to attract financial analysts.

Dynamism. We measure dynamism by the level of research and development expenditures in percentage of total sales and expect this variable to enhance the association between web-based disclosure about customer value and analyst following until a certain breakpoint. Two interaction terms are introduced in the model: *Disclosure*R&D* and *Disclosure*R&D-high*. *R&D* is a binary variable measured as R&D scaled by sales greater than sample mean while *R&D-high* is a binary variable measured R&D scaled by sales greater or equal to the 90% percentile of the sample. We expect the coefficient of the variable *Disclosure*R&D* to be positively associated with analyst following and the coefficient for variable *Disclosure*R&D-high* to be negatively associated with analyst following.

Diversification. We measure diversification as the sum of business and geographical segments. Two interaction terms are introduced in the model: *Disclosure*Segments* and *Disclosure*Segments-high*. *Segments* is a binary variable measured one if total segments is greater than the sample mean while *Segments-high* is a binary variable measured as total segments greater or equal to the 90% percentile of the sample. We expect the coefficient of the variable

*Disclosure*Segments* to be positively associated with analyst following and the inverse for the variable *Disclosure*Segments-high*.

Competition. We measure competition as the reverse of capital intensity (1-total fixed assets in percentage of total assets). We expect competition in the product market to enhance the association between web-based disclosure about customer value and analyst following. Two interaction terms are introduced in the model: *Disclosure*1-Capital intensity* and *Disclosure*1-Capital intensity-high*. The variable *1-Capital intensity* is a binary variable measured one if 1-Capital intensity is greater than the sample mean while the variable *1-Capital intensity-high* is a binary variable that takes the value of one if it is greater or equal to the 90% percentile of the sample. We expect the coefficient of the variable *Disclosure*1-Capital intensity* to be positively associated with analyst following while we expect the opposite for the variable *Disclosure*1-Capital intensity-high.*

Volatility. Sales volatility is measured by the variation of sales and is expected to enhance the association between web-based disclosure about customer value and analyst following. Two interaction terms are introduced in the model: *Disclosure*Sales CV* and *Disclosure*Sales CV-high*. The variable *Sales CV* is a binary variable that takes the value of one if *Sales CV* is greater or equal to the 10% percentile of the sample while the variable *Sales CV-high* is a binary variable that takes the value of one if it is greater or equal to the 90% percentile of the sample.[5] We expect the coefficient of the variable *Disclosure*Sales CV* to be positively associated with analyst following while the opposite is expected for the variable *Disclosure*Sales CV-high*.

Resource availability. We measure resource availability as free cash flow and expect resource availability to enhance the association between web-based disclosure about customer

[5] We use 10% percentile instead of the sample mean to assess the impact of sales volatility on attracting analysts because in our sample, sales are highly volatile since the sample mean of the variable Sales coefficient of variation is near to 30%.

value and analyst following. Free cash flow proxies for the demand for external financing (in negative sense) by measuring a firm's ability to cover its capital expenditures. The higher the free cash flow, the lower the need for external financing. Free cash flow is defined as cash flow from operations minus the average of capital expenditures over the last three years scaled by total assets. Two interaction terms are introduced in the model: *Disclosure*Free cash flow* and *Disclosure*Free cash flow-high*. *Free cash flow* is a binary variable measured one if Free cash flow is greater than the sample mean while *Free cash flow-high* is a binary variable measured as total segments greater or equal to the 90% percentile of the sample. We expect the coefficient of the variable *Disclosure*Free* cash flow to be positively associated with analyst following and the inverse for the variable *Disclosure*Free cash flow-high.*

3.3.2 Share price volatility model

Analyst following. Analyst forecasts' work is likely to improve, as more information about a company is processed and disclosed by analysts (Alford and Berger, 1999). Hence, we expect a negative relationship between analyst following and share price volatility.

Systematic risk. The higher a firm's systematic risk, the more difficult it is for investors to precisely assess a firm's value and the more likely they are expected to incur information costs to assess its risk drivers. Prior research shows that investors charge a higher cost of equity for firms with higher systematic risk (e.g. Botosan, 1997; Leuz and Verrecchia, 2000; Mikhail, Walther and Willis, 2004; Botosan and Plumlee, 2005; Hail and Leuz, 2006). A positive relationship is expected between systematic risk and share price volatility.

Size. Several studies (e.g. Botosan, 1997; Sengupta, 1998; Gebhard, Lee Swaminathan, 2001; Botosan and Plumlee, 2005) document that larger firms benefit from a lower information

asymmetry and therefore a lower cost of capital. We thus expect share price volatility to be negatively associated with firm size.

Disclosure. We posit that Web-based disclosure about customer value reduces information asymmetry between managers and investors.

3.3.2 Disclosure model

Barriers to entry constitute a cost that a new entrant would have to face compared to existing companies. These include cost in making capital investment intensity, existing intellectual property rights that make entry difficult, and industry concentration. Dye (1985) asserts that an incumbent firm with good news to communicate may choose to withhold information to prevent competition. The lower the market competition, the easier a firm can keep private information (Verrecchia, 1983). In the opposite, Darrough and Stoughton (1990) assess that the more it is difficult to enter a market, the more confident the incumbents will feel about disclosing information. Two variables are used to capture product market concerns with respect to a firm's customer value disclosure:

Concentration ratio. We use the concentration ratio, that is, an indicator of the relative size of firms in relation to the industry as a whole. It is common to use the four-firm concentration ratio, which consists of the percentage of market share owned by the largest four firms in the industry. In contrast to capital investment intensity, which is firm specific, the concentration ratio approaches the notion of barriers to entry from an industry-wide perspective. We predict a negative association between concentration ratio and disclosure about customer value.

1-Capital intensity. We use a well-known measure of entry barriers: the level of capital investment as measured by gross property, plant and equipment as expressed in percentage of total

assets. We expect competition, measured by the reverse of capital investment intensity, to be positively associated with disclosure about customer value.

Tobin's Q. Tobin's Q may proxies for factors like intangible capital and sales growth opportunities (Connolly and Hirschey, 2005). Consistent with prior literature (e.g. Clarkson, Li, Richardson and Vasvari, 2008; Cormier, Aerts, Ledoux and Magnan, 2009), we expect a positive relationship between disclosure about customer value and Tobin's Q.

Firm Size. Prior evidence is consistent in showing a positive relation between the extent of corporate disclosure and firm size (Scott, 1994; Neu, Warsame and Pedwell, 1998). Firm size proxies also for other factors, such as the extent of monitoring by analysts. Firm size, measured as ln (Assets), is introduced with an expectation of a positive relation with disclosure about customer value.

4. Results

4.1 Descriptive statistics

As illustrated in Table 1, customer value disclosure shows a mean score of 4.77. Internal consistency estimates (not tabulated) show that the variance is quite systematic with a Cronbach's alpha on score components of 0.71. This is slightly higher than Botosan (1997) who finds an alpha of 0.64 for an index including five categories of disclosure in annual reports. Cronbach's alpha estimates the proportion of variance in the test scores that can be attributed to a true score variance. It can range from 0 (if no variance is consistent) to 1.00 (if all variances are consistent). According to Nunnaly (1978), a score of 0.70 is acceptable.

[Insert table 1]

Table 2 provides some descriptive statistics about sample firms' financial variables.

Sample firms are relatively large (total assets averaging $5 billion) and followed by seven analysts on average. About 78% of sample firms are free float. The level of diversification as expressed by the number of segments (business and geographical) is quite high averaging five segments while the dynamism is quite low since R&D expenditures in percentage of sales is only 3.8%. This is not surprising since the Canadian economy is composed of many resource-based companies. The levels of competition at firm level as well as volatility are quite low as expressed by variables *1-Capital intensity* (mean of 0.60) and *Sales CV* (mean of 0.29).

[Insert table 2]

Table 3 presents correlations. *Analyst following* is statistically correlated with customer value disclosure (0.25), the level of diversification as expressed by *Segments* (0.20),volatility as measured by *Sales CV* (-0.13), competition as expressed by the variable *1-Capital intensity* (0.13), dynamism as measured by *R&D* (0.15), resource availability as measured by *Free cash flow* (0.14), and *Firm size* (0.20). *Share price volatility* is statistically correlated with *1-Capital intensity* (0.19), *R&D* (0.14), *Free cash flow* (0.40), and *Firm size* (-0.44).

[Insert table 3]

4.2 Multivariate analyses

Since we posit that a firm's information dynamics affect customer value disclosure and analyst following as well as share price volatility simultaneously, we first assess whether or not interaction exists between these variables using a Hausman test. Using this procedure, we reject the null hypothesis of no endogeneity with respect to *Analyst following* and *Disclosure* ($t=1.59$; $p < 0.11$) and with respect to *Share price volatility* and *Disclosure* ($t=1.79$; $p < 0.07$). Therefore, these variables are treated as endogenous variables. In light of this diagnostic, we rely on a three-stage estimation model regarding the simultaneous test of analyst following, share price volatility

and disclosure about customers. The seemingly unrelated regression (SURE) method is used. The software being used is STATA.

SURE may improve the efficiency of parameter estimates when there is contemporaneous correlation of errors across equations. In practice, the contemporaneous correlation matrix is estimated using OLS residuals. Moreover the greater the intra-equation multicollinearity the more likely SURE provides a considerable gain in efficiency for the entire system (Binkley 1982). We do not observe correlation of errors across equations for our sample since the higher correlation coefficient between residuals is between Analyst following equation and Disclosure equation (-0.02). In our models, we use interaction terms, which is likely to create multicollinearity. The variable *Disclosure* is correlated at 0.93 with *Disclosure*R&D*, at 0.85 with *Disclosure*Segments*, at 0.90 with *Disclosure*1-Capital intensity*, 0.94 with *Disclosure*Sales CV*, and 0.92 with *Disclosure*Free cash flow*. Therefore, since multicollinearity could be a problem, SURE is likely to provide a considerable gain in efficiency for the entire system (Binkley 1982).

Table 4 reports results of a three-stage least square estimation (seemingly unrelated least squares) regarding the simultaneous test of analyst following, share price volatility and customer value disclosure, controlling for environmental uncertainty.

[Insert table 4]

4.2.1 Analyst following

Results presented in panel A of table 4 support our hypothesis 1 that Web-based disclosure about customer value attracts financial analysts since, for the five regressions, the interaction terms *Disclosure*Environment uncertainty* are all positive and significant. Our findings suggest

that disclosure about customers attract financial analysts for firms that are dynamic, diversified, face competition, deal with variability concerning their sales, and are in a good financial condition.

Second, results suggest that, consistent with H2, higher dynamism as expressed by research and development expenditures enhances the association between web-based customer value disclosure and analyst following since the coefficient for the interaction term *Disclosure*R&D* is positive and significant (0.475; $p < 0.010$). Furthermore, Student t-test for coefficient difference confirms our results since the sum of coefficients for *Disclosure* and *Disclosure*R&D* is statistically larger than zero ($\beta_4 + \beta_5 > 0$; 2.75; $p < 0.09$). Results also show that the positive effect of dynamism for attracting financial analysts reach an optimal point after which the effect decreases since the coefficient for the interaction term *Disclosure*R&D-high* is negative and significant (-0.333; $p < 0.050$). Student t-test for coefficient difference confirms our results since the sum of coefficients for *Disclosure* and *Disclosure*R&D-high* is statistically larger than zero ($\beta_4 + \beta_6 > 0$; 2.45; $p < 0.10$).

Third, consistent with H3, a higher diversification as expressed by the number of segments enhances the association between web-based customer value disclosure and analyst following since the coefficient for the interaction term *Disclosure*Segments* is positive and significant (0.411; $p < 0.010$). Student t-test for coefficient difference confirms our results since the sum of coefficients for *Disclosure* and *Disclosure*Segments* is statistically larger than zero ($\beta_4 + \beta_7 > 0$; 2.81; $p < 0.09$). Moreover, as expected, our results suggest that diversification has a positive impact on performance, but the returns fall beyond some point where the optimal is reached since the coefficient for the interaction term *Disclosure*Segments-high* is negative and significant (-0.651; $p < 0.050$). Student t-test for coefficient difference confirms our results since the sum of

coefficients for *Disclosure* and *Disclosure*Segments-high* is statistically larger than zero ($\beta_4 + \beta_8 > 0$; 2.88; $p < 0.08$).

Fourth, consistent with H4, higher competition in the product market as expressed by the reverse of capital intensity enhances the association between web-based customer disclosure and analyst following since the coefficient for the interaction terms *Disclosure*1-Capital intensity* (0.582; $p < 0.010$) is positive and significant. Student t-test for coefficient difference confirms our results since the sum of coefficients for *Disclosure* and *Disclosure*1-Capital intensity* is statistically larger than zero ($\beta_4 + \beta_9 > 0$; 3.40; $p < 0.06$). Results also show that the positive effect of competition for attracting financial analysts reach an optimal point after which the effect decreases since the coefficient for the interaction term *Disclosure*1-Capital intensity* is negative and significant (-0.353; $p < 0.050$). However, Student t-test for coefficient difference does not confirm this result since the sum of coefficients for *Disclosure* and *Disclosure*1-Capital intensity-high* is not statistically different from zero ($\beta_4 + \beta_{10} > 0$; 0.30; $p < 0.58$).

Fifth, consistent with H5, higher uncertainty in the product market as expressed by sales coefficient of variation enhances the association between web-based customer disclosure (0.709; $p < 0.050$). Once again, Student t-test for coefficient difference confirms our results since the sum of coefficients for *Disclosure* and *Disclosure*Sales CV* is statistically larger than zero ($\beta_4 + \beta_{11} > 0$; 3.28; $p < 0.070$). Results also show that the positive effect of sales volatility for attracting financial analysts reach an optimal point after which the effect decreases since the coefficient for the interaction term *Disclosure*Sales CV-high* is negative and significant (-0.714; $p < 0.010$). This result suggests that under high volatility about future sales, the disclosure about customer value being less reliable for financial analysis, the analyst would be less attracted by such disclosure. Student t-test for coefficient difference confirms our results since the sum of

coefficients for Disclosure customers and *Disclosure*Sales CV- high* is statistically larger than zero ($\beta_4 + \beta_{12} > 0$; 9.65; $p < 0.001$). As a sensitivity analysis, *Sales CV-high* takes the value of one if it is greater than sample mean. The coefficient for this variable is negative and significant (-0.341; $p < 0.05$) while the coefficient for the variable *Disclosure*Sales CV* remains positive and significant (0.683; $p < 0.05$). This result is not surprising since the Sales coefficient of variation sample mean is 29.3%, which is quite high.

Finally, consistent with H6, resource availability as expressed by free cash flow enhances the association between web-based customer disclosure (0.327; $p < 0.010$). The Student t-test for coefficient difference confirms our results since the sum of coefficients for *Disclosure* and *Disclosure*Free cash flow* is statistically larger than zero ($\beta_4 + \beta_{13} > 0$; 2.47; $p < 0.10$). The level of financial resources seems to influence how the analyst relies on disclosure about customer value in his assessment of a firm's value. The level of free cash flow conditions how a firm may fulfill customer demand. However, contrary to other environmental factors, we do not observe a curvilinear relation for the effect of resource availability on the analyst use of customer disclosure. The coefficient for the variable *Disclosure*Free cash flow-high* is not statistically significant.

4.2.2 Share price volatility

Panel B of table 4 presents the results for share price volatility regressions. Consistent with hypothesis 7, results show that the coefficient for the variable *Disclosure* remains negative and significant in all individual regressions. As expected, *Beta* is positively associated with *Share price volatility* while the opposite is observed for *Analyst following* and *Firm size*.

4.2.3 Disclosure

Panel C of table 4 presents the results for disclosure regressions. As expected, results show that the coefficients for the variable *1-Capital intensity*, *Tobin's Q* and *Firm size* are positively and statistically associated with customer value disclosure. These results are consistent with prior research that document a positive relation ship between voluntary disclosure and competition, firm size and growth opportunities as proxied by Tobin's Q.

4.2.3 Summary results

In summary, our results suggest that: 1) dynamism, diversification, competition, volatility, and resource availability are associated with a positive relationship between customer value disclosure and analyst following; 2) The positive effect of customer value disclosure on attracting analysts decreases for high levels of dynamism, diversification, competition, and volatility; 3) customer value disclosure reduces information asymmetry on stock markets as measured by share price volatility.

5. Conclusion

In this paper, we build on prior literature on voluntary disclosure by investigating the relevance of web-based disclosure related to customer value for financial analysts taking into account firms' environmental factors such as dynamism, diversification, competition, volatility, and resource availability. We also assess the impact of such disclosure on information asymmetry between managers and investors. More specifically, we assert and test that the determination of

Web-based customer value disclosure, organizational environment, financial analyst following, and information asymmetry between managers and investors are closely intertwined processes.

Taking into account endogeneity between disclosure and firm specific factors, first, results suggest that Web-based disclosure about customer value attracts financial analysts. Second, we observe that the potential for such disclosure to attract analysts depends on environmental uncertainty. Moreover, our results suggest that the potential for such disclosure to attract analysts reach an optimal point after which the effect decreases for high levels of dynamism, diversification, competition, and volatility.

Our results suggest that when assessing information relevance for market participants, it is important to control for the endogenous relationship of a firm's decision to disclose information.

The present study contributes to our knowledge of voluntary disclosure in the following manner. Our findings reveal that the relation between customer value disclosure, analyst following and information asymmetry on the stock market is not straightforward but depends on a firm's environmental uncertainty. Such insights may help standard setters and regulators in the development of new and effective disclosure guidelines.

The results of this study should be interpreted with caution at least for three reasons. First, our model is sensitive to the choice and validity of independent variables, especially those treated endogenously. To mitigate specification error, we base the choice of explanatory variables on prior empirical studies. However, it does not completely eliminate the potential for model misspecification and bias of the regression coefficients. Second, the paper focuses on HTML disclosure, which excludes hyperlinked documents in PDF. However, these documents (e.g., annual reports, proxy statements) are typically also published in paper form that are, most of the time mandatory while we focus on voluntary disclosure. Finally, sample size may be an issue.

However, sample firms do represent a wide cross-section of Canada's industries and a significant proportion of the Canada's stock market capitalization.

Table 1

Customer Value Disclosure
Component Mean scores

	Minimum	Maximum	Mean	Std dev.
Customer profile / market segment / market share / number of customers	0	30	3.26	4.10
Pre-sales support: information / counsel / orders follow-up	0	8	0.79	1.27
After-sales service / insurance	0	8	0.50	1.28
Customer satisfaction / complaints management	0	5	0.11	0.55
Customer loyalty	0	1	0.01	0.08
Awards	0	6	0.06	0.53
Total disclosure	**0**	**48**	**4.77**	**5.57**

Table 2

Descriptive statistics

	Minimum	Maximum	Mean	Std dev.
Share price volatility	0.818	10.385	2.233	1.494
Analyst following	0	35	6.829	5.888
Tobin's Q	0.751	9.862	1.997	1.294
Systematic risk	0	2.71	0.682	0.489
Free float	0.098	0.999	0.776	0.225
Segments	1	31	4.854	3.545
Concentration ratio	0.550	0.970	0.656	0.121
1-Capital intensity	0.059	1	0.597	0.258
R&D (in % of Sales)	0	0.826	0.038	0.114
Sales coefficient of variation	0.023	1.677	0.293	0.259
Free cash flow	-1.53	0.30	0.018	0.157
Firm size (Total Assets in million Can $)	26	40 076	4 844	7 226

Table 3
Correlations

		2	3	4	5	6	7	8	9	10	11	12	13
1	Analyst following	*-0.14	*0.25	*0.16	*0.28	0.12	*0.20	*-0.13	0.02	*0.13	*0.15	*0.14	*0.20
2	Share price volatility	1	-0.09	0.11	*0.26	0.06	-0.04	0.12	-0.05	*0.19	*-0.14	*-0.40	*-0.44
3	Disclosure customers		1	*0.15	*0.26	0.03	0.02	-0.08	-0.07	*0.27	*0.17	0.12	-0.02
4	Tobin's Q			1	*0.27	*0.17	-0.01	*0.15	-0.03	0.03	0.12	0.04	*-0.18
5	Systematic risk				1	*0.17	*0.15	*0.15	*-0.19	*0.30	*0.40	-0.01	-0.05
6	Free float					1	0.05	0.06	-0.09	0.03	0.12	-0.04	*-0.14
7	Segments						1	-0.07	-0.04	0.12	0.02	-0.04	*0.14
8	Sales coefficient of variation							1	*0.13	0.07	0.09	*-0.24	*-0.17
9	Concentration ratio								1	-0.03	*-0.22	-0.04	0.09
10	1-Capital intensity									1	*-0.33	*-0.13	*0.35
11	R&D										1	-0.08	*-0.29
12	Free cash flow											1	*0.30
13	Firm size												1

Note: *: $p < 0.10$.

Table 4
Three Stage Regression Model
(Seemingly Unrelated Regression Estimation)
Customer value disclosure in interaction with organizational environment

			Environmental uncertainty factors				
	Sign		R&D	Segments	Capital intensity	Sales coefficient of variation	Free cash flow
Panel A Analyst following							
Beta	+	β_1	***3.132	***3.096	***2.831	***4.065	***3.065
Firm size	+	β_2	***1.017	***0.829	***1.034	***0.907	***0.919
Free Float	+	β_3	1.529	1.831	1.974	2.216	2.331
Disclosure	+	β_4	-0.036	0.043	-0.189	-0.393	-0.138
Disclosure*R&D	+	β_5	***0.475				
Disclosure*R&D – High	-	β_6	**-0.333				
Disclosure*Segments	+	β_7		***0.411			
Disclosure*Segments – High	-	β_8		**-0.651			
Disclosure*1-Capital intensity	+	β_9			***0.582		
Disclosure*1-Capital intensity – High	-	β_{10}			**-0.353		
Disclosure*Sales CV	+	β_{11}				**0.709	
Disclosure*Sales CV – High	-	β_{12}				***-0.714	
Disclosure*Free cash flow	+	β_{13}					**0.327
Disclosure*Free cash flow – High	-	β_{14}					0.254
Interaction Main effect	?	β_{15}	-2.168	-1.764	-1.045	-0.971	-0.233
Interaction Main effect – High	?	β_{16}	1.890	3.594	0.666	0.291	-1.155
R-square			22.3%	23.5%	24.5%	27.8%	25.4%
Chi2			41.9(0.00)	43.7(0.00)	45.8(0.00)	51.5(0.00)	49.1(0.00)
Test $\beta_4 + \beta_5 > 0$ t-test			2.75(0.09)				
Test $\beta_4 + \beta_6 > 0$ t-test			2.45(0.10)				
Test $\beta_4 + \beta_7 > 0$ t-test				2.81(0.09)			
Test $\beta_4 + \beta_8 > 0$ t-test				2.88(0.08)			
Test $\beta_4 + \beta_9 > 0$ t-test					3.40(0.06)		
Test $\beta_4 + \beta_{10} > 0$ t-test					0.30(0.58)		
Test $\beta_4 + \beta_{11} > 0$ t-test						3.28(0.07)	
Test $\beta_4 + \beta_{12} > 0$ t-test						9.65(0.00)	
Test $\beta_4 + \beta_{13} > 0$ t-test							2.47(0.10)
Test $\beta_4 + \beta_{14} > 0$ t-test							2.42(0.12)
Panel B Share price volatility							
Analyst	-	β_1	**-0.031	**-0.030	**-0.322	**-0.030	**-0.031
Beta	+	β_2	***0.788	***0.786	***0.793	***0.785	***0.788
Size	-	β_3	***-0.373	***-0.374	***-0.372	***-0.374	***-0.373
Disclosure customers	-	β_4	*-0.026	*-0.026	*-0.025	*-0.026	*-0.026
R-square			32.1%	32.1%	32.1%	32.1%	32.1%
Chi2			63.4(0.00)	63.3(0.00)	63.6(0.00)	56.8(0.00)	63.4(0.00)
Panel C Disclosure							
Concentration ratio	-	β_1	-3.704	-3.756	-3.799	-3.733	-3.712
1-Capital intensity	+	β_2	***7.336	***7.306	***7.281	***7.281	***7.331
Tobin's Q	+	β_3	**0.732	**0.725	**0.729	**0.743	**0.731
Firm size	+	β_4	**0.607	**0.604	**0.604	**0.606	**0.607
R-square			12.1%	12.1%	12.1%	12.1%	12.1%
Chi2			19.1(0.001)	18.9(0.001)	18.8(0.001)	18.3(0.001)	19.0(0.000)

*: $p < 0.10$; **: $p < 0.05$; ***: $p < 0.01$.One-tailed if there is a predicted sign, two-tailed otherwise.

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