A new approach to identify the economic effects of disclosure: Information content of business risk disclosures in Japanese firms

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Abstract

We empirically examine the economic effects of disclosure focusing on Japanese textual business risk disclosures. A unique feature of this study is the construction of a *new* risk measure, enabling us to directly *isolate* economic disclosure effects from fundamental value effects. We find that on average about 40 percent of total risk components are due to the effects of disclosure (i.e., 60 are from fundamental value effects). We find that there is a positive association between the number of items and the text (number of words and/or sentences) within business risk disclosures and our *new* risk measure. This indicates business risk disclosures change investors' risk perceptions (i.e., information risk) and thus results in increasing the information component with the cost of capital. We also find that disclosure of firm-specific business risks increases information risk, but interestingly, decreases fundamental risk. This indicates, as pointed out by Lambert et al. (2007), that "indirect effects" affecting a firm's real decisions may exist. Overall, our empirical evidence strongly rejects the criticism that business risk disclosures suffer from being *boilerplate* information.

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[*] I will attend and present the paper.

1. Introduction

An important but unanswered question is identifying the causal relationship between firm disclosures and the economic disclosure effects on decreasing asymmetric information between a company and investors (i.e., information risk) and/or the information aspect of cost of capital. Previous theoretical studies including Diamond and Verrecchia (1991), Easley and O'Hara (2004) and Kelly and Ljungqvist (2012) show the more information a firm discloses the more its cost of capital decreases. Previous empirical studies indicate a generally negative association between a firm's disclosure and fundamental risk measures, such as total risk and/or cost of capital. This result is interpreted as evidence of the usefulness of disclosures by firms (e.g., Campbell, et al., 2011; Leuz and Verrecchia, 2000; Botosan and Plumlee, 2002; Kothari, et al., 2009). However, a causal relationship has generally been difficult to identify. This is because the economic effects of disclosure reflect both the disclosure contents (information risk) and the fundamental values (fundamental risk) of a firm.

As Lambert et al. (2007) argue in their theoretical paper, accounting information has both "direct" and "indirect" effects. Direct effects are where accounting information, per se, does not affect a firm's cash flow but affects an investor's assessment of expected cash flow. Indirect effects are where accounting information can also influence a firm's real decisions. This can be difficult to identify by just examining the association between accounting disclosure and standard economic risk/return measures such as the cost of capital. The relationship between accounting information and the cost of capital is one of the most important fundamental themes in the field of accounting economics.

This paper constructs a *new* risk measure which aims to rigorously identify economic disclosure effects from fundamental values. We expand an idea of Armstrong and Vashishtha (2012) into accounting economics and try to directly *isolate* the economic effects of a firm's disclosure from fundamental value effects. Armstrong and Vashishtha (2012) calculate *imputed* monthly stock returns to estimate a firm's risk measures (we define this risk as ***fundamental risk***) using operating segment information and the book value of assets in those segments. Using Japanese listed companies we also calculate fundamental risk measure based on daily *imputed* returns. To isolate disclosure effects from fundamental value effects, we subtract *fundamental risk* from the standard total risk, which we calculated from the *realized* stock returns (standard stock returns). The "difference of these two risk measures" presumably reflects the "***firm's disclosures***, information trade in the firm's share, and other features of the firm's information environment" (Armstrong and Vashishtha, 2012, pp.77). Thus, we define this component as ***information risk***.

By using our new risk measure, this paper empirically examines the economic effects of business risk disclosures in the annual reports of Japanese firms. This is equivalent to the risk factor disclosures in the filing of the 10-K form for U.S. firms. Using Japanese public companies, from 2004 to 2010, we investigate whether business risk disclosures change investors' risk perceptions. Business risk disclosures can increase the amount of information available on a firm's risk but it is unclear if this decreases or increases the information component of the cost of capital. In this regard, Kravet and Muslu (2011) argue that "rather than guiding users about the *level* of future performance, risk disclosures guide users about the *range* of future performance." Therefore, we

consider this distinction by adopting the volatility of stock returns as a risk measure when examining the informativeness of business risk disclosures.

Another unique feature of business risk disclosures is that they are *textual* (i.e., written narratives) and thus they explain some factors potentially affecting a firm's future performance. Because the underlying risks relating to corporate activities vary among firms, presumably the risks disclosed also vary. Therefore, business risk disclosures have a *discretionary* characteristic, in the sense that firms can decide what and how much to disclose.

We also investigate the criticism that firms make *boilerplate* risk disclosures just to conform to regulations, and thus company financial reporting lacks useful information about risks and uncertainties. Many firms risk exposures may not change over time, so often a company may tend to repeat their risk factors over consecutive annual filings. To evaluate the *boilerplate* criticism, our risk measure contributes to previous studies by rigorously isolating disclosure effects from fundamental value effects.

In addition, we examine the contents of business risk disclosures to evaluate investor reaction to this information. In theoretical arguments, such as the capital asset pricing model (CAPM), there are two sources of risk factor depending if the risk components are diversifiable or not. They are idiosyncratic (i.e., firm-specific) and systematic risk. We separate *textual* business risk disclosures into these two subcategories.

The empirical evidence we find in this paper is summarized as follows: We find that on average disclosure effects account for about 40 percent of total risk (i.e., 60 percent is from fundamental value effects). We find that there is a positive association

between our new risk measure and the number of business risk disclosures (number of items, sentences and/or word counts). This indicates that business risk disclosures change investors' risk perceptions and increase the information component of the cost of capital. In this sense, Japanese business risk disclosures increase the information content of a firm's risks, thus it is not simply *boilerplate* information. Disclosure of firm-specific business risks increases risk perceptions (i.e., information risk), but interestingly, decreases fundamental risk. This indicates that there exist "indirect" effects affecting a firm's real decisions as Lambert et al. (2007) point out. Overall, our empirical evidence strongly rejects the criticism that business risk disclosures suffer from being *boilerplate*.

Our paper relates to two strands of literature. The first stream looks at the links between accounting information and the cost of capital for firms. From the viewpoint of research motivation Tang (2011) is closest to our paper. Tang (2011) uses a unique Chinese institutional setting to isolate information risk from fundamental risk and finds that information asymmetry has no effect on the cost of capital in the Chinese market. We do not depend on an institutional setting to isolate disclosure effects from fundamental value effects. The second literature stream explores the effects of textual business risk disclosures upon investors. Campbell et al. (2011) find firms facing greater risk disclose more risk information. The risk disclosures are positively associated with standard risk measures such as total risk. Kravet and Muslu (2011) find risk disclosures reveal unknown unknowns and increase the market's perception of risk and uncertainties.

The remainder of this paper is organized as follows. Section 2 discusses relevant institutional background. Section 3 develops testable hypotheses. Section 4 explains the

data, research methodology and the variables used in our empirical study. Section 5 presents our empirical findings. Section 6 provides concluding remarks.

2. Institutional background

In this section we briefly discuss the history of Japanese business risk disclosure. A revision of the *Cabinet Office Ordinance on Disclosure of Corporate Affairs* has meant that since the fiscal year ending March 2004 Japanese public firms are required to disclose information regarding their business risks in their annual reports. This is equivalent to the risk factor disclosures contained in U.S. firms' 10-K filings[1]. Regulators in some countries have mandated this type of disclosure particularly against a background of increased interest in business risk reporting after the U. S. experiences of large accounting scandals such as Enron and WorldCom (Deumes, 2008).

Business risk disclosures are intended to enable investors to assess a firm's business risk (FSA, 2003; SEC, 2005). They are narrative in nature and included in the 'Business Risk' section of annual reports. The regulation is formally stated as (Form 2 - precautions for recording No. 33):

"Among information about business and financial conditions in annual report, all factors that have possible effects on investor's decision must be disclosed. The description should be summarized concretely and briefly by using plain language. Abnormal changes in financial condition or performance, reliance on specified clients, products, and technology, related regulations, industrial traditions (or trade practices), management policy, an important litigation, matters related to executives, large shareholders, and affiliated companies are included in these factors."

[1] In the United States, business risk disclosures have been required since 2005 under the section 'Risk factors' in annual reports.

Overall, the scope of business risk disclosures should include anything possibly influencing an investor's decisions. Therefore, although business risk disclosures are *mandatory*, they also have a *voluntary* characteristic in the sense that managers have discretion regarding what and how much to disclose.

3. Hypotheses development

In this section, we develop testable hypotheses and introduce variables to test them.

3.1. Economic disclosure effects of business risk disclosures

To evaluate the informativeness of business risk disclosures, we need to pay attention to the possibility that firm managers may disclosure and discuss risks already known to investors. If this is true, then investors would not react to the disclosures, and thus not regard them as useful because they contain little information to cause revision of investors' ex-ante beliefs about business risks. Theoretically, the economic effect of disclosures on a firm's risk indicates an increase in disclosures reduces a firm's cost of capital (e.g., Easley and O'Hara, 2004, and Lambert et al., 2007). On the other hand, empirical results are generally mixed.

In addition, textual business risk disclosures are unique as all information relates to 'unfavorable' conditions and the information risk relates to the uncertainty of a firm's future performance. There are two competing explanations of business risk disclosures being bad news in academic literature. The first is that business risk information is withheld unless its disclosure is mandated. This is because bad news generally

deteriorates a firm's market value, thus managers are reluctant to disclose this information (Verrecchia, 2001). This behavior can also be explained by managers' incentives relating to their careers and compensation (Kothari et al., 2009). Alternatively, managers may have an incentive to disclose business risk; if managers bear larger costs (i.e., litigation and/or reputational costs) they may disclose bad news promptly and voluntarily (Skinner, 1994).

Overall, whether business risk disclosures convey additional information for investors and how it affects risk perceptions are important empirical questions. If the business risk disclosures are informative and investors incorporate the information into their risk assessments, then we expect a *positive* relationship between increased business risk disclosures and our new risk measure (i.e., information risk).

H1: Increased business risk disclosures are *positively* associated with information risk disclosure.

3.2. Real effects of business risk disclosures

Lambert et al. (2007) argue in their theoretical paper that there are two effects of accounting information, "direct" and "indirect". Direct effects are where accounting information, per se, does not affect cash flow. We try to identify this part as the economic disclosure effects using the above risk measures. Indirect effects are where accounting information can also influence a firm's real decisions, for example, with respect to production or investment. An increase in the quality of information may change cash flow expectations and/or a firm's cost of capital. In addition, Lambert et al. (2007)

demonstrate theoretically that if better accounting information reduces cash flow appropriated by managers, the disclosure can increase stock prices and/or reduce a firm's cost of capital.

Based on these arguments, the quality of business risk disclosures can also have indirect effects on a firm's real decisions. Whether these effects increase or decrease a firm's risk is an empirical question. Generally it is difficult to identify this by only examining the association between accounting disclosures and standard economic risk/return measures, such as cost of capital or stock return volatility. Fortunately, our risk measure is decomposed into real and disclosure parts. Thus we directly examine the above hypothesis using the "real" component of our risk measure (i.e., fundamental risk).

H2: Increased business risk disclosures affect a firm's *real* risk decisions and thus increase or decrease fundamental risk.

3.3. The economic effects of different business risk contents

To identify the economic effects of business risk disclosures we examine the contents of business risk disclosures. Traditionally, there are two sources of risk factors depending on whether the risk components are diversifiable. Business risk disclosures are separated into two subcategories; idiosyncratic (i.e., firm-specific) and systematic risk. In Sections 4.2 and 4.4 we explain in detail the list of business risk categories.

Generally speaking, by definition, total risk measures reflect both a firm's idiosyncratic and systematic risk. If investors can diversify their idiosyncratic risk, then business risk disclosures relating to a firm's specific risks may not be related to total risk.

On the other hand, we expect a *positive* relationship between increases in idiosyncratic risk disclosures and our risk measures (i.e., information and fundamental risk), if the disclosures are informative and investors incorporate the information into their risk assessments[2]. We support the latter view presuming there is only limited room for risk diversification. Nonetheless, this should be empirically examined. With respect to systematic risk, we expect a *positive* relationship between increases in systematic risk disclosures and our risk measures (i.e., information risk and fundamental risk), presumably because there is no room for risk diversification.

H3-1: Increased *idiosyncrati*c risk disclosures are *positively* associated with information risk (fundamental risk).

H3-2: Increased *systematic* risk disclosures are *positively* associated with information risk (fundamental risk).

4. Data and specifications

This section describes the data and methodologies used in the following analyses.

[2] As we will explain in detail later, if we define the disclosure effects component of a firm's risk ($\sigma_{DISCLSOURE}$) as the difference between total risk ($\sigma(r_{j,t})$) and the fundamental risk calculated from the *imputed* returns is, as in Armstrong and Vashishtha (2012), ($\sigma(\hat{r}_{j,t})$). That is, $\sigma_{DISCLSOURE} \equiv \sigma(r_{j,t}) - \sigma(\hat{r}_{j,t})$. Then, note that total risk is the sum of idiosyncratic risk plus systematic risk: $\sigma(r_{j,t}) = \sigma_{IDIOSYNCRATIC} + \sigma_{SYSTEMATIC}$. Similarly, note that $\sigma(\hat{r}_{j,t}) = \hat{\sigma}_{IDIOSYNCRATIC} + \hat{\sigma}_{SYSTEMATIC}$. Thus, technically, we can decompose our risk measure of disclosure effects into a idiosyncratic risk component and a systematic risk component by using CAPM (i.e., market model or two index model) and/or Fama-French 3 factor model:

$$\sigma_{DISCLOSURE} = (\sigma_{IDIOSYNCRATIC} + \sigma_{SYSTEMATIC}) - (\hat{\sigma}_{IDIOSYNCRATIC} + \hat{\sigma}_{SYSTEMATIC})$$
$$= (\sigma_{IDIOSYNCRATIC} - \hat{\sigma}_{IDIOSYNCRATIC}) + (\sigma_{SYSTEMATIC} - \hat{\sigma}_{SYSTEMATIC})$$
$$= \sigma_{DISCLOSURE,IDIOSYNCRATIC} + \sigma_{DISCLOSURE,SYSTEMATIC}$$

At this point, we don't calculate these risk measures, but this should be our next body of work.

4.1. Sample and data

Our sample includes all Japanese listed companies from the fiscal years 2004 to 2010. Japanese business risk disclosure began in the 2004 fiscal year, therefore we use 2004 as our beginning point. A revision of the *Accounting Standard for Disclosures about Segments of an Enterprise and Related information* (ASBJ Statement No.17) took effect from the 2011 fiscal year. This changed the segmentation rule and its associated disclosures. As we calculate fundamental risk based on industry segment (discussed in Section 4.3), our sample period ends in the 2010 fiscal year. This is to exclude any possible effects from changes in the segment disclosure rule[3].

Companies listed on the first section of the Tokyo Stock Exchange were selected. We excluded those with their fiscal year not ending on March 31, so as to eliminate any possible differences from various year-ends. In addition, we excluded finance-related companies (i.e., banking, securities, insurance and other financial businesses) as these industries are highly regulated and there are substantial differences between them and other industries (Kim and Fukukawa, forthcoming). Finally, we dropped observations that lacked the data necessary for our analyses. Our final sample resulted in 7,258 observations. Financial data were collected from the NEEDS Financial QUEST (NEEDS-FQ) and Nikkei Economic Electronic Databank System Corporate Governance

[3] The revision of accounting standards is based on the so-called management approach. This requires disclosures about segments of an enterprise and related information should provide proper information on the nature of various business activities in which it engages and the economic environments in which it operates (ASBJ Statement No. 17). Since segment disclosure, based on the management approach more directly links real management activities, a study from 2010 maybe plausible. This will form our future study.

Evaluation System (NEEDS-Cges) databases. Daily stock return data were obtained from the Astra manager database.

4.2. Business risk data collection

Business risk variables were collated from text found in the "Business Risk" section of annual reports. We then counted the number of business risk items, words and sentences as measures indicating business risk disclosure. We categorized the collected text data into 24 risk categories[4] based on the content of the risk items. While Campbell et al. (2011) adopt a keyword count as a business risk category, in Japanese we believe categorization based on the content is more plausible. This is because keywords are sometimes used in discussions about completely unrelated business risks. To categorize risk items we use a category rule function from the IBM SPSS Text Analytics for Surveys 4.0.1 program. This function enables categorization including necessary keywords but excluding unnecessary keywords, solving the discussed problem. We have about 200 category rules.

Table 1 shows business risk disclosure levels.

Insert Table 1 around here

N_Risks, *N_Words* and *N_Sentences* in Table 1 are the number of risk items and the natural logs of the word and sentence counts, as disclosed in the annual report "Business Risk" sections. Table 1 shows the sample companies disclose, on average

[4] Actually, we have 26 categories but two are "explanation of business" and "results of operation." These are categories are not considered business risks.

during the sample period, 7.56 business risk items, 7.30 word counts (1,977.52 word counts) and 2.94 sentence counts (24.12 sentence counts). Table 1 also indicates business risk disclosures have increased. Furthermore, while the minimum of *N_Risks* is 1, the maximum is 74. This reflects the unique characteristics of business risk disclosures in the sense that they have a *voluntary* aspect. Figure 1 provides the content of business risk disclosures.

Insert Figure 1 around here

To examine the effects of business risk contents on a firms risk, we re-categorize the 24 risk items into idiosyncratic and systematic risk. Idiosyncratic risks relate to: the quality of goods and services, strategy, organizational structure, relationships with critical suppliers, financial conditions, information security, R&D investment, operation, intellectual property, litigation, human resources, consolidated companies, brand value, relationships with other companies, related parties and on-going concerns. Items relating to economic conditions or systematic risk are: the business environment, regulations, the purchase of raw materials, geopolitical conditions, natural disasters, accounting standards and environmental issues.

4.3. Measurement of a firm's risk disclosure

In this section, we suggest a *new* risk measure enabling us to directly identify the economic effects of disclosures. We expand the idea of Armstrong and Vashishtha (2012)

into the field of accounting economics. We aim to *isolate* the economic effect aspect of risk disclosures from fundamental risks. The basic idea comes from the following:

"Realized volatility reflects not only the outcome of a CEO's risk-taking decisions, but also the firms' ***disclosures***, information trade in the firms' shares, and other features of the firm's information environment (See, Armstrong and Vashishtha, 2012)."

To construct our new risk measure we use the *imputed* daily returns for each firm. Following Armstrong and Vashishtha's (2012) argument, "a firm is considered as a portfolio of industries the CEO chooses to achieve his desired level of systematic and idiosyncratic risk[5]. The CEO can alter the firm's risk profile by investing in new industries, divesting from existing industries, and altering the weight of the firm's existing industry segments."

Therefore, we gather information about the operating segments and book value of assets and define $\hat{r}_{j,t}$ as the imputed daily return for the firm *j* in the following equation (1):

$$\hat{r}_{j,t} \equiv \sum_{i=1}^{n_j} \frac{A_j^i}{A_j} r_t^i \qquad (1)$$

where A_j^i is the book value of the assets of the *i* th segment of the firm *j* (assuming the book value is constant during the estimation window for *t* period). There are some observations where the sum of total segments does not equal total assets. This is because accounting standards quantitative criteria require disclosed segment sizes to be greater than 10% of total assets (the materiality principle). Therefore, we adjust the segment size

[5] Of course, as Armstrong and Vashishtha (2012) point out, managers can alter their exposure to their firm's risk through personal hedging. However, several previous researchers such as Jagolinzer et al. (2007) identify this as a small effect.

in assets as follows: in observations with a sum of total segments smaller than the size of total assets (called hereafter smaller observations), we set a new segment defined as the difference between the two totals. In observations with a sum of total segments larger than the total assets (called hereafter larger observations), we downsize all the segments equally to equal the size of total assets. A_j is the book value of the total assets of the firm *j*. r_t^i is the daily *t* return for the *i* th industry segment. We adopt the TOPIX (the capitalization-weighted index of all firms that are categorized in the same industry of the Tokyo Stock Exchange) industrial index returns as a return from each industry segment.[6] For the new segment of smaller observation, we adopt the daily-adjusted risk free rate as a proxy of the industry return.

We then calculate the daily volatility of *imputed* returns $\hat{r}_{j,t}$ for each firm in each fiscal year. This standard deviation $\sigma(\hat{r}_{j,t})$ is defined as our *fundamental risk* measure.[7] This captures the *real* (i.e., fundamental value) part of total risk. We denote $r_{j,t}$ as the realized return of firm *j* on day *t*. We then subtract $\sigma(\hat{r}_{j,t})$ from the standard (normal) total risk $\sigma(r_{j,t})$calculated from future *realized* daily stock returns. The *difference of these two risk measures* (i.e., $\sigma(r_{j,t})-\sigma(\hat{r}_{j,t})$) presumably reflects the effects of a "*firm's disclosures*, information trade in the firm's share, and other features of the firm's

[6] The Japanese database only contains information about industry segments based on the Japanese Standardized Industrial Classification (SIC). Yet the Japanese stock market index does not use this classification. Therefore we re-categorized the Japanese SIC into the Tokyo Stock Exchanges' industrial classification because it is based on Japanese SIC.

[7] Book value weights of the segments are assumed to be constant during each fiscal year. However, these weights can and do vary across fiscal years.

information environment" (Armstrong and Vashishtha, 2012, pp.77).[8] Thus, the difference is our *information risk* measure.

4.4. Research Design

To investigate the economic effects of business risk disclosures on information and fundamental risk (H1 and H2), we adopt the following equation (2):

$$\begin{aligned} Risk_{i,t+1} = \alpha &+ \beta_1 Disc\_Risks_{i,t} + \beta_2 Size_{i,t} + \beta_3 MB_{i,t} + \beta_4 ROA_{i,t} + \beta_5 Ret_{i,t} \\ &+ \beta_6 Loss_{i,t} + \beta_7 Instown_{i,t} + \beta_8 Forown_{i,t} + \beta_9 Dirown_{i,t} \\ &+ \beta_{10} Outdir_{i,t} + \beta_{11} Debt_{i,t} + \beta_{12} Filing_{i,t} + \beta_{13} Trading_{i,t} + \varepsilon_{i,t-1} \end{aligned} \quad (2)$$

Risk is the variable indicating the firm's risk measure. As discussed previously, we use two risk measures; the disclosure and real part of total risk (i.e., information risk and fundamental risk). We calculate risk measures using daily stock returns. This is based on three estimation windows: each beginning from two days following filing and ending at 184 days after, 61 days after and 11 days after filing. Because Japanese stock market regulations require listed companies to disclose their financial statements before filing (known as Kessan Tanshin, a unique Japanese regulation setting), we calculate stock volatility by day 184, after the filing day not including the Kessan Tanshin of the next

[8] An alternative calculation to estimate the volatility of disclosure risks is to regress realized returns on imputed returns:

$$\sigma(r_{j,t}) = \alpha_{j,t} + \beta_{j,t}\sigma(\hat{r}_{j,t}) + \varepsilon_{i,t}$$

We then calculate the standard deviation of the residuals of this equation, implying that the variation cannot be explained by the risk of imputed returns and thus interpreted as reflecting disclosure effects in this component. At this point, we do not construct this risk version. However, this should be our future work confirming the robustness of results obtained in this paper.

fiscal year. We also use the window by day 61 and days 2 by day 11, after filing, to exclude any effects of interim reporting and/or other factors.

Disc_Risks is the variable indicating *textual* business risk disclosure volume. We use three *Disc_Risks* measures. They are, the number of risk items (*N_Risks*), the natural word count log (*N_Words*) and natural sentence count log (*N_Sentences*), all disclosed in the "Business Risk" section of annual reports.

We also include control variables which indicate any possible effects on a firm's risk. *Size* is the natural log of total assets. *MB* is the total market value of equity and book value of debt deflated by total assets. *ROA* is the ratio of business income to total assets. *Ret* is daily stock returns (including dividends) for each fiscal year. *Loss* is an indicator variable which is used if a firm has net income losses for two consecutive years. *Instown*, *Forown* and *Dirown* are defined as the ratios of institutional ownership, foreign ownership, and executive ownership, respectively.[9] *OutDir* is the ratio of outside directors to total directors. *Debt* is the ratio of book value debt to total assets. *Filing* is the natural log of firms with the same filing day. *Trading* is the weighted average trading volume for 25 days until two days prior to the filing day deflated by the total number of shares.

To examine the effect of business risk contents on information and fundamental risk (H3-1 and H3-2), we adopt the following equation (3):

$$Risk_{i,t+1} = \alpha + \beta_1 Idio\_Risks_{i,t} + \beta_2 Sys\_Risks_{i,t} + \beta_3 Size_{i,t} + \beta_4 MB_{i,t} + \beta_5 ROA_{i,t} + \beta_6 Ret_{i,t} + \beta_7 Loss_{i,t} + \beta_8 Instown_{i,t} + \beta_9 Forown_{i,t} + \beta_{10} Dirown_{i,t}$$

[9] The *voluntary* disclosure practice of business risk can also be influenced by company ownership and governance structures. Abraham and Cox (2007) found this with narrative risk information in the United Kingdom while Campbell et al. (2011) found institutional ownership was associated with risk factor disclosures in the United States.

$$+ \beta_{11} Outdir_{i,t} + \beta_{12} Debt_{i,t} + \beta_{13} Filing_{i,t} + \beta_{14} Trading_{i,t} + \varepsilon_{i,t-1} \quad (3)$$

Idio_Risks are the number of idiosyncratic risk items and *Sys_Risks* are the number of systematic risk items disclosed.

As *boilerplate* disclosures are likely to be similar across time or homogenous across firms in the same industry, we include industry and year fixed effects in our specifications. Table 2 shows the list of variables and their definitions.

Insert Table 2 around here

5. Empirical results

5.1. Summary Statistics

Panel A of Table 3 and Figure 2 show the descriptive statistics for our risk measures and the share of disclosure effects to total risk across our sample periods, depending on the estimation window for the total risk measures. In Table 3, Panel B provides descriptive statistics for our risk measures and a firm's characteristics while Panel C shows the correlation matrix of a firm's characteristics' variables.

Insert Table 3 around here

Insert Figure 2 around here

Panel A of Table 3 and Figure 2 indicate the average share of information risk, as an effect of disclosure, which is about 40% (i.e., 60% are from fundamental effects). The

lowest share of information risk (i.e., highest share of fundamental risk) is about 30%, experienced in 2008, in the middle of the Global Financial Crisis (GFC). This indicates the GFC damaged Japanese firms' fundamental values. The share of information risk increases as the estimation window is narrowed, presumably because market reactions are more likely to be reflected in the short term. For example, from Panel C of Figure 2, the average share of information risk is about 45%. This tendency agrees with the idea that information risk is reflected in stock prices more in the short term.

5.2. Regression results

5.2.1. Information risk and fundamental risk

Panels A, B, and C of Table 4 show the effects of business risk disclosures on information risk, depending on estimation periods. As seen in Panel A, the coefficients of business risk disclosures are positive and statistically significant, regardless of business risk measures and/or our sample restrictions (based on segment numbers). The results indicate information risk increases with additional textual business risk disclosures. For example, in column 1, one business risk item increases and information risk increases by about 0.15%. Thus, the results agree with the idea that business risk disclosures convey additional information to investors changing risk perceptions towards a higher cost of capital.

Panels A, B, and C of Table 5 are the fundamental risk results, creating a counterpart to those in Table 4. Interestingly, and perhaps surprisingly, the coefficients of *N_Risks* are negative and statistically significant in all estimation intervals. This is the opposite of results obtained in Table 4. In column 1 of Panel A in Table 5, the results

indicate an increase of one item of *N_Risks* increases fundamental risk by about 0.025%. This finding agrees with Lambert et al. (2007), regarding the existence of indirect effects. If this interpretation is correct, company managers change their real decisions, such as investing in the risk management business disclosure process, presumably reflecting their awareness of a firm's future prospects. In contrast, other business risk measure variables are statistically insignificant. The difference in this result may relate to the characteristics of *textual* business risk. Kravet and Muslu (2011) point out that the number of items reflects the future performance *range*. Alternatively, other measures may fail to capture the *range*, reflecting the amount and/or level of future performance. Nonetheless, the results indicate business risk disclosures effect information risk and fundamental risk differently.

Insert Table 4 around here

Insert Table 5 around here

With respect to the control variables of information risk, almost all control variables are statistically significant in the first three columns of Table 4 except for the coefficients of *Dirown and OutDir*. Interestingly, these results disagree with the counterpart of fundamental risk in Table 5. The coefficients of *ROA* and *Ret*, *Instown* and *Debt*, are statistically significant in the first three columns of Table 5. Comparing them, the characteristics of each risk measure are reflected in the different results. For example, *Size* and/or *MB* can be considered an important source of information for investors but

this information seems to be already reflected in the fundamental parts of the firm. Thus there is no correlation between these variables and fundamental risk. In contrast, it is interesting to note that ownership of *Dirown and OutDir* are only significant for fundamental risks. This indicates the results are consistent with the agency theory that ownership structures can affect company managers' real decisions and are not related to the disclosure aspect of risks.

5.2.2. Information type of business risk disclosure

Panels A and B in Table 6 show the results of analyses separating *textual* business risk disclosures into idiosyncratic and systematic risk. Column 1 of Panel A is the benchmark result for information risk, and the coefficient of *N_IdioRisks* is positive and statistically significant. In contrast, the coefficient of *N_SysRisks* is insignificant in column 1 although the specifications including *N_SysRisks* are positively significant in columns 3 and 6. The explanatory power of *N_SysRisks* is completely stripped if we include *N_IdioRisks* thus we believe the specification of column 1 (and/or column 4) is more convincing. The results imply that information risk increases with increases of textual business idiosyncratic risk but not systematic risk. One additional item of idiosyncratic risk increases information risk by about 0.18%. The results agree with the idea that business risk disclosures are informative and investors incorporate the information into their risk assessments.

Insert Table 6 around here

Similarly, Panel B in Table 6 indicates the results of fundamental risk where the coefficient of *N_IdioRisks* is negative but the coefficient of *N_SysRisks* is positive. Both variables are statistically significant. Again, following the logic of Panel A in Table 6, the results of column 1 and/or column 4 are more convincing compared with other specifications. The results indicate fundamental risk decreases with increases in textual business idiosyncratic risk. Presumably because firm managers make real decisions to reduce their idiosyncratic risks through disclosure and risk management processes, again consistent with Lambert et al. (2007) argument of indirect effects. In column 1 of Panel B, one increase in business risk items decreases fundamental risk by about 0.12%. In comparison with information risk, the results imply that idiosyncratic risk has a greater impact on information risk than on fundamental risk, thus total impacts should increase total risk.

Column 1 of Panel B indicates that one increase in systematic risk items increases fundamental risk by about 0.11%. This is consistent with standard finance theory, such as CAPM, in the sense that managers cannot decrease systematic risk even if there are indirect effects with idiosyncratic risk. The impact of systematic risk on fundamental and information risk is similar, indicating these risks appear to be offsetting each other. Nonetheless, these results agree with the idea that business risk disclosures convey additional information to investors and the type of risk facing a company is important so managers can make appropriate real decisions.

Overall, our empirical evidence strongly rejects the criticism that business risk disclosures suffer from being *boilerplate* information.

6. Conclusions

We empirically examined the economic effects of disclosure focusing on Japanese textual business risk disclosures. We expand Armstrong and Vashishtha's (2012) idea into the field of accounting economics and attempt to directly *isolate* the economic effects of firm disclosures from the fundamental values of companies.

This paper's empirical evidence is summarized as follows.

First, on average about 40 percent of total risk components are due to the effects of disclosure (i.e., 60 are from fundamental value effects).

Second, there is a positive association between the number of textual business risks disclosed (the number of items listed) and our new risk measure. This indicates that business risk disclosures change investors' risk perceptions and increase the information component within the cost of capital. In this sense, Japanese business risk disclosures generally increase firms' risk information therefore it is not just boilerplate information.

Third, disclosure of business risks relating to firm-specific factors increases risk perceptions (information risk), but interestingly, decreases fundamental risk. This indicates indirect effects affecting a firm's real decisions may exist, as Lambert et al. (2007) highlight.

Overall, our empirical evidence strongly rejects the criticism that business risk disclosures suffer from being *boilerplate* in their nature.

Our findings are subject to several caveats. First, as discussed in the introduction, *textual* business risk disclosures have a *discretionary* characteristic even if they are *mandatory.* Firm managers make strategic choices regarding business risk disclosures. Thus, our results may suffer from endogenous problems. Thus, estimations via

instrumental variables (IV) may be warranted for several reasons. Perhaps the most compelling reason for using IVs is that some of the omitted variables, which are compounded into the disturbance term in equation (2) and/or (3), are also likely to affect the dependent variable at the same firm even if the economic disclosure effects are stripped out from the fundamental effects by our risk measures. Hence, we may need to strip *Dis_Risk* of its correlation with the disturbance via an IV and/or the GMM estimate. Second, currently our risk measures are not decomposed into idiosyncratic and systematic risk parts. However, this process can be easily undertaken and should form our next body of work particularly focusing on the confirmation of the indirect effects of business risk disclosures.

Nonetheless, we believe this paper offers insights into the field of business disclosures and has policy implications for financial reporting and disclosure regulation.

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Figure 1
Contents of business risk

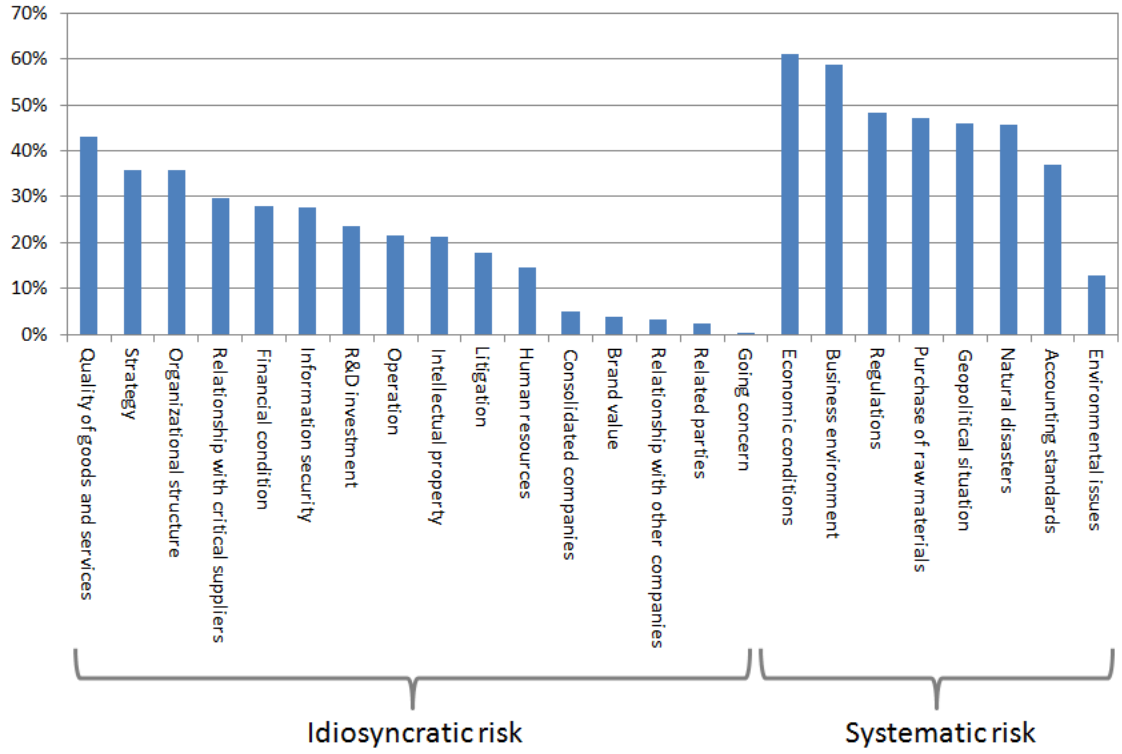

Figure 2
Descriptive statistics of risk measures

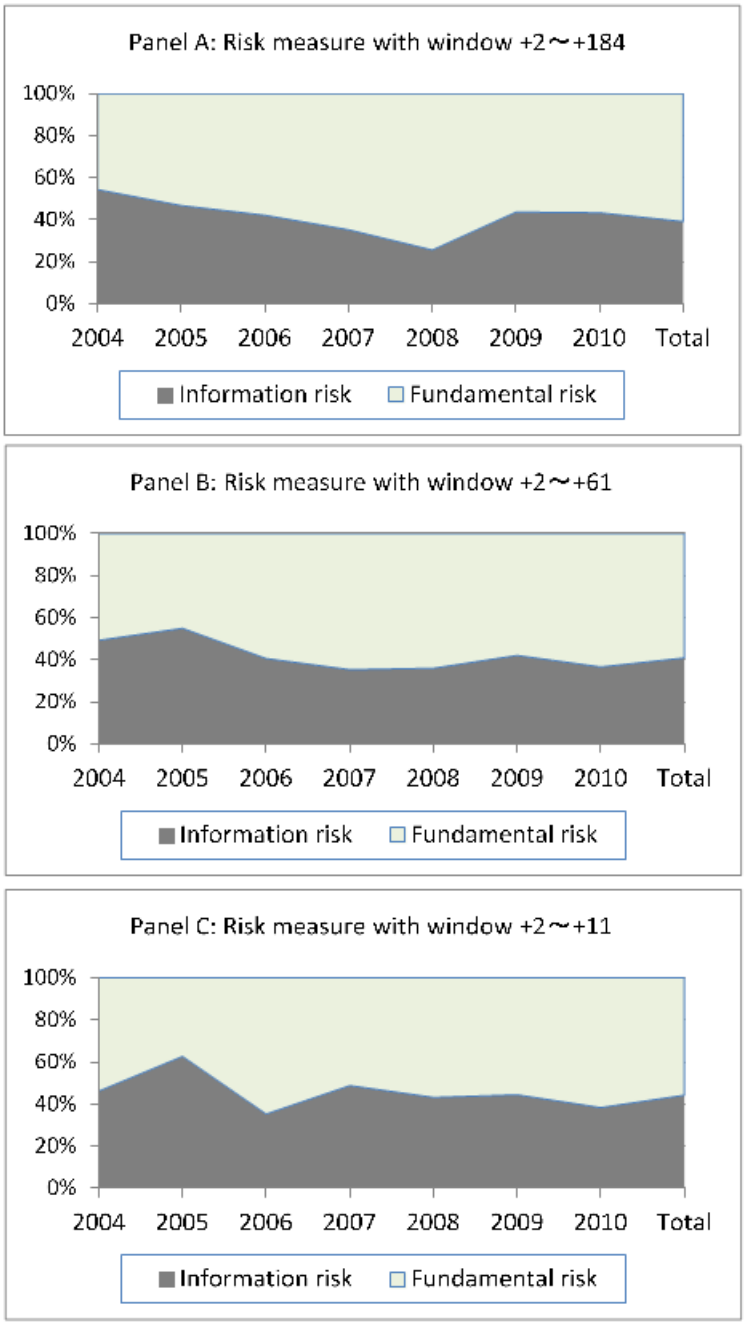

Figure 2 shows the ratio of information risk (fundamental risk) to the total risk for each year and total period.

Table 1
Business risk disclosure statistics

		mean	s.d.	min.	med.	max	obs.
N_Risks							
	2004	5.962	3.932	1.000	5.000	37.000	911
	2005	6.734	4.061	1.000	6.000	38.000	984
	2006	7.286	4.471	1.000	6.000	52.000	1,010
	2007	7.554	4.581	1.000	7.000	56.000	1,033
	2008	7.938	4.920	1.000	7.000	71.000	1,091
	2009	8.334	5.066	1.000	7.000	74.000	1,108
	2010	8.641	5.213	1.000	8.000	74.000	1,121
	Total	7.550	4.733	1.000	7.000	74.000	7,258
N_Words							
	2004	7.103	0.749	4.443	7.084	10.069	911
	2005	7.212	0.713	4.419	7.185	10.222	984
	2006	7.277	0.706	4.920	7.239	10.358	1,010
	2007	7.299	0.687	5.118	7.265	10.400	1,033
	2008	7.345	0.704	5.118	7.305	10.636	1,091
	2009	7.398	0.702	5.118	7.357	10.605	1,108
	2010	7.430	0.705	5.118	7.382	10.614	1,121
	Total	7.302	0.716	4.419	7.261	10.636	7,258
N_Sentences							
	2004	2.752	0.695	0.000	2.708	5.403	911
	2005	2.859	0.661	0.000	2.833	5.576	984
	2006	2.918	0.649	0.693	2.890	5.727	1,010
	2007	2.939	0.631	1.099	2.890	5.802	1,033
	2008	2.977	0.654	0.000	2.944	6.026	1,091
	2009	3.022	0.650	0.000	2.944	5.927	1,108
	2010	3.049	0.654	0.000	2.996	5.961	1,121
	Total	2.937	0.662	0.000	2.890	6.026	7,258

N_Risks is the number of risk items, *N_Words* is the natural log of the word count, and *N_Sentences* is the natural log of the sentence count disclosed in the "Business Risk" section

Table 2
Variables, their definitions, and data sources

Variables	Descriptions	Data sources
Risk measures		
Total risk	Standard deviation of past one year daily stock returns×	Astra Manager
Fundamental risk	Standard deviation of past one year daily "*imputed*" stock returns of Armstrong et al. (2012) ×Square root of 250 days	Astra Manager
Information risk	Total risk - fundamental risk	Astra Manager
Business risk related variables		
N_Risks	Number of risk items disclosed in the "Business Risk etc." section	Annual Report
N_Words	Natural log of the word count disclosed in the "Business Risk etc." section	Annual Report
N_Sentences	Natural log of the sentence count disclosed in the "Business Risk etc." section	Annual Report
N_IdioRisks	Number of idiosyncratic risk items disclosed in the "Business Risk etc." section	Annual Report
N_SysRisks	Number of systematic risk items disclosed in the "Business Risk etc." section	Annual Report
Firm's characteristics		
Size	Natural log of the total assets	NEEDS-FQ
MB	Total value of market value of equity and book value of debt / the total assets	NEEDS-FQ
ROA	Business income/ the total assets (%)	NEEDS-FQ
Ret	Daily stock returns (including dividend) for each year	NEEDS-Cges
Loss	Dummy equal to one if a firm has a net income loss for two consecutive years	NEEDS-Cges
Instown	Ratio of institutional ownership (%)	NEEDS-Cges
Forown	Ratio of foreign ownership (%)	NEEDS-Cges
Dirown	Ratio of executive ownership (%)	NEEDS-Cges
OutDir	Ratio of the number of outside directors to the total number of directors (%)	NEEDS-Cges
Debt	Book value of debt / the total assets	NEEDS-Cges
Filing	Natural log of the number of firms with the same filing day	NEEDS-Cges
Trading	Weighted average trading volume for 25 days until two day before the filing day / the total number of shares	NEEDS-FQ

Table 3

Summary statistics

Panel A: Descriptive statistics of risk measures								
			Window : +2 ~ +184		Window : +2 ~ +61		Window : +2 ~ +11	
		Obs.	mean	s.d.	mean	s.d.	mean	s.d.
2004	*Total risk*	911	27.830	11.318	27.925	12.471	27.680	12.815
	Fundamental risk		12.694	2.936	14.170	3.561	14.901	4.023
	Information risk		15.136	11.142	13.755	12.160	12.779	12.667
2005	*Total risk*	984	33.407	9.985	23.972	9.547	17.935	9.894
	Fundamental risk		17.777	4.877	10.794	3.121	6.692	2.259
	Information risk		15.630	10.225	13.178	9.609	11.243	9.928
2006	*Total risk*	1,010	29.463	9.055	30.345	10.436	28.289	12.296
	Fundamental risk		17.033	4.022	18.012	4.000	18.306	4.431
	Information risk		12.430	9.396	12.333	10.722	9.984	12.348
2007	*Total risk*	1,033	42.776	12.247	36.825	13.544	21.681	14.983
	Fundamental risk		27.689	8.066	23.807	8.059	11.104	3.461
	Information risk		15.087	12.628	13.018	13.996	10.577	15.145
2008	*Total risk*	1,091	61.884	16.714	42.838	14.953	31.334	16.845
	Fundamental risk		46.010	11.417	27.411	8.273	17.794	7.100
	Information risk		15.874	16.336	15.427	14.651	13.540	17.143
2009	*Total risk*	1,108	33.769	12.291	34.382	14.214	36.276	19.838
	Fundamental risk		19.009	5.148	19.904	5.496	20.154	6.028
	Information risk		14.760	11.671	14.477	13.620	16.122	19.436
2010	*Total risk*	1,121	40.067	14.308	29.584	11.060	29.241	12.653
	Fundamental risk		22.679	4.539	18.749	5.043	18.034	5.882
	Information risk		17.388	14.234	10.835	10.701	11.207	12.361
Total	*Total risk*	7,258	38.856	16.630	32.476	13.787	27.692	15.681
	Fundamental risk		23.635	12.221	19.192	7.707	15.442	6.716
	Information risk		15.221	12.599	13.285	12.454	12.250	14.718

Panels A provides descriptive statistics for risk measures. For each variable definition, see Table 2.

(continued on next page)

Table 3 (continued)
Summary statistics

Panel B: Descriptive statistics of firm's characteristics

	mean	s.d.	min.	1Q	med.	3Q	max.	Obs.
Size	11.707	1.433	7.532	10.721	11.470	12.503	17.299	7,258
MB	1.200	1.071	0.256	0.910	1.049	1.264	58.591	7,258
ROA	5.715	6.049	-31.045	2.383	4.614	8.050	86.465	7,258
Ret	0.017	0.182	-1.290	-0.093	0.022	0.130	1.011	7,258
Loss	0.047	0.212	0.000	0.000	0.000	0.000	1.000	7,258
Instown	24.076	15.623	0.010	11.050	21.530	34.683	74.880	7,258
Forown	13.222	11.219	0.010	3.998	10.240	19.810	70.240	7,258
Dirown	3.801	8.316	0.000	0.128	0.433	2.673	100.000	7,258
OutDir	7.839	12.163	0.000	0.000	0.000	14.286	85.714	7,258
Debt	52.275	20.094	1.540	37.478	53.200	68.163	99.920	7,258
Filing	6.351	1.254	0.000	5.710	6.989	7.332	7.435	7,258
Trading	0.005	0.040	0.000	0.001	0.003	0.005	3.259	7,258

Panel C: Correlation matrix of firm's characteristics

	1	2	3	4	5	6	7	8	9	10	11	12
1. *Size*		0.103	-0.071	0.001	-0.071	0.558	0.566	-0.575	0.125	0.240	0.043	0.288
		(0.000)	(0.000)	(0.900)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
2. *MB*	-0.058		0.540	0.312	-0.104	0.278	0.269	-0.052	0.117	0.032	-0.062	0.282
	(0.000)		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.006)	(0.000)	(0.000)
3. *ROA*	-0.115	0.551		0.129	-0.324	0.331	0.322	0.146	0.006	-0.416	-0.145	0.025
	(0.000)	(0.000)		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.606)	(0.000)	(0.000)	(0.033)
4. *Ret*	-0.015	0.155	0.146		-0.008	0.037	0.019	-0.003	-0.064	0.024	0.178	-0.004
	(0.201)	(0.000)	(0.000)		(0.492)	(0.002)	(0.108)	(0.778)	(0.000)	(0.041)	(0.000)	(0.749)
5. *Loss*	-0.062	-0.044	-0.280	-0.011		-0.115	-0.099	-0.001	0.024	0.093	-0.012	0.055
	(0.000)	(0.000)	(0.000)	(0.362)		(0.000)	(0.000)	(0.952)	(0.041)	(0.000)	(0.314)	(0.000)
6. *Instown*	0.524	0.102	0.268	0.019	-0.107		0.889	-0.279	0.126	-0.197	-0.075	0.395
	(0.000)	(0.000)	(0.000)	(0.107)	(0.000)		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
7. *Forown*	0.539	0.153	0.273	0.002	-0.084	0.862		-0.259	0.141	-0.222	-0.102	0.358
	(0.000)	(0.000)	(0.000)	(0.878)	(0.000)	(0.000)		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
8. *Dirown*	-0.305	0.078	0.174	-0.006	0.012	-0.119	-0.097		-0.214	-0.264	-0.048	-0.320
	(0.000)	(0.000)	(0.000)	(0.604)	(0.290)	(0.000)	(0.000)		(0.000)	(0.000)	(0.000)	(0.000)
9. *OutDir*	0.131	0.074	0.030	-0.064	0.038	0.149	0.188	-0.062		0.013	-0.205	0.081
	(0.000)	(0.000)	(0.011)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)		(0.264)	(0.000)	(0.000)
10. *Debt*	0.263	-0.085	-0.367	0.022	0.095	-0.187	-0.203	-0.166	0.005		0.137	0.236
	(0.000)	(0.000)	(0.000)	(0.059)	(0.000)	(0.000)	(0.000)	(0.000)	(0.654)		(0.000)	(0.000)
11. *Filing*	0.062	-0.149	-0.213	0.054	0.018	-0.050	-0.072	-0.142	-0.209	0.133		-0.001
	(0.000)	(0.000)	(0.000)	(0.000)	(0.115)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		(0.915)
12. *Trading*	-0.011	0.068	0.083	0.014	0.023	0.024	0.031	0.007	0.001	0.038	-0.021	
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	

Panels B and C provide descriptive statistics and a correlation matrix for dependent variables, respectively. The values in parentheses of Panel C indicate p-values. For each variable definition, see Table 2.

Table 4
Results of information risk

Panel A: Results of information risk (window: +2 ~ +184)						
	All sample			*Sample which have segments*		
N_Risks	0.154			0.164		
	(4.724) ***			(4.390) ***		
N_Words		0.687			0.671	
		(3.149) ***			(2.662) ***	
N_Sentences			0.904			0.904
			(3.493) ***			(3.321) ***
Size	-2.935	-2.873	-2.899	-3.270	-3.211	-3.259
	(-20.371) ***	(-19.954) ***	(-19.995) ***	(-19.318) ***	(-18.796) ***	(-18.920) ***
MB	0.995	1.082	1.073	0.445	0.532	0.517
	(6.452) ***	(7.100) ***	(7.038) ***	(2.533) **	(3.057) ***	(2.971) ***
ROA	-0.070	-0.069	-0.068	-0.035	-0.031	-0.030
	(-2.192) **	(-2.136) **	(-2.116) **	(-0.856)	(-0.776)	(-0.748)
Ret	-3.189	-3.297	-3.290	-2.617	-2.797	-2.773
	(-3.057) ***	(-3.159) ***	(-3.153) ***	(-2.078) **	(-2.220) **	(-2.203) **
Loss	7.421	7.472	7.462	7.104	7.157	7.134
	(11.210) ***	(11.279) ***	(11.265) ***	(8.990) ***	(9.047) ***	(9.021) ***
Instown	0.104	0.099	0.099	0.030	0.023	0.022
	(5.986) ***	(5.712) ***	(5.697) ***	(1.392)	(1.068)	(1.047)
Forown	0.093	0.099	0.100	0.143	0.154	0.154
	(3.709) ***	(3.973) ***	(3.994) ***	(4.579) ***	(4.967) ***	(4.968) ***
Dirown	0.007	0.006	0.005	-0.036	-0.037	-0.040
	(0.369)	(0.328)	(0.280)	(-1.544)	(-1.582)	(-1.681) *
OutDir	0.004	0.006	0.006	-0.001	0.002	0.002
	(0.371)	(0.552)	(0.551)	(-0.079)	(0.151)	(0.114)
Debt	0.226	0.229	0.228	0.176	0.180	0.180
	(26.722) ***	(27.146) ***	(27.126) ***	(16.676) ***	(17.057) ***	(17.090) ***
Filing	0.578	0.583	0.591	0.525	0.529	0.543
	(5.080) ***	(5.101) ***	(5.167) ***	(3.658) ***	(3.671) ***	(3.767) ***
Trading	16.969	17.247	17.209	12.536	12.823	12.750
	(5.166) ***	(5.248) ***	(5.237) ***	(3.905) ***	(3.991) ***	(3.969) ***
constant	31.928	27.071	29.989	40.477	35.823	38.568
	(18.322) ***	(12.622) ***	(17.040) ***	(19.310) ***	(14.212) ***	(18.279) ***
year fixed effects	*yes*	*yes*	*yes*	*yes*	*yes*	*yes*
industry fixed effects	*yes*	*yes*	*yes*	*yes*	*yes*	*yes*
Adj.R^2	0.238	0.237	0.237	0.245	0.243	0.244
LR	49.248	48.900	48.964	34.755	34.402	34.516
[p-value]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Obs.	7,258	7,258	7,258	4,781	4,781	4,781

The values in parentheses indicate t-statistics. For the definitions of independent variables, see Table 2.
***Significant at the 1% level.
**Significant at the 5% level.
*Significant at the 10% level.

(continued on next page)

Table 4 (continued)
Results of information risk

Panel B: Results of information risk (window: +2 ~ +61)						
	All sample			*Sample which have segments*		
N_Risks	0.143			0.161		
	(4.326) ***			(4.189) ***		
N_Words		0.632			0.712	
		(2.851) ***			(2.753) ***	
N_Sentences			0.676			0.851
			(2.851) ***			(3.039) ***
Size	-2.480	-2.421	-2.432	-2.927	-2.879	-2.910
	(-16.936) ***	(-16.546) ***	(-16.504) ***	(-16.831) ***	(-16.410) ***	(-16.439) ***
MB	1.014	1.095	1.092	0.695	0.778	0.769
	(6.471) ***	(7.074) ***	(7.050) ***	(3.857) ***	(4.353) ***	(4.300) ***
ROA	-0.093	-0.092	-0.090	-0.109	-0.106	-0.105
	(-2.856) ***	(-2.802) ***	(-2.772) ***	(-2.629) ***	(-2.559) **	(-2.522) **
Ret	-0.360	-0.462	-0.471	-0.046	-0.208	-0.207
	(-0.339)	(-0.436)	(-0.444)	(-0.035)	(-0.161)	(-0.160)
Loss	5.376	5.424	5.422	4.574	4.622	4.607
	(7.990) ***	(8.057) ***	(8.053) ***	(5.635) ***	(5.688) ***	(5.671) ***
Instown	0.123	0.119	0.118	0.068	0.061	0.060
	(6.967) ***	(6.718) ***	(6.689) ***	(3.111) ***	(2.826) ***	(2.783) ***
Forown	0.079	0.085	0.086	0.125	0.136	0.137
	(3.098) ***	(3.342) ***	(3.376) ***	(3.914) ***	(4.268) ***	(4.291) ***
Dirown	0.053	0.053	0.053	0.032	0.031	0.029
	(2.950) ***	(2.906) ***	(2.893) ***	(1.350)	(1.280)	(1.218)
OutDir	-0.001	0.001	0.001	0.001	0.004	0.004
	(-0.121)	(0.049)	(0.077)	(0.063)	(0.263)	(0.258)
Debt	0.190	0.193	0.193	0.148	0.151	0.151
	(22.113) ***	(22.498) ***	(22.497) ***	(13.631) ***	(13.973) ***	(14.023) ***
Filing	0.437	0.441	0.444	0.450	0.457	0.466
	(3.775) ***	(3.796) ***	(3.819) ***	(3.050) ***	(3.086) ***	(3.143) ***
Trading	24.901	25.161	25.143	19.744	20.012	19.963
	(7.459) ***	(7.533) ***	(7.527) ***	(5.987) ***	(6.063) ***	(6.049) ***
constant	22.382	17.904	20.685	30.645	25.775	28.814
	(12.637) ***	(8.214) ***	(11.563) ***	(14.230) ***	(9.955) ***	(13.292) ***
year fixed effects	*yes*	*yes*	*yes*	*yes*	*yes*	*yes*
industry fixed effects	*yes*	*yes*	*yes*	*yes*	*yes*	*yes*
Adj.R^2	0.194	0.193	0.193	0.201	0.199	0.199
LR	38.252	37.972	37.972	27.096	26.823	26.868
[p-value]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Obs.	7,258	7,258	7,258	4,781	4,781	4,781

The values in parentheses indicate t-statistics. For the definitions of independent variables, see Table 2.
***Significant at the 1% level.
**Significant at the 5% level.
*Significant at the 10% level.

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Table 4 (continued)
Results of information risk

Panel C: Results of information risk (window: +2 ~ +11)						
	All sample			*Sample which have segments*		
N_Risks	0.168			0.156		
	(4.125) ***			(3.303) ***		
N_Words		0.690			0.730	
		(2.525) **			(2.291) **	
N_Sentences			0.635			0.713
			(2.173) **			(2.070) **
Size	-2.482	-2.403	-2.397	-2.932	-2.893	-2.894
	(-13.739) ***	(-13.316) ***	(-13.188) ***	(-13.687) ***	(-13.390) ***	(-13.273) ***
MB	0.920	1.020	1.024	0.614	0.692	0.692
	(4.763) ***	(5.341) ***	(5.357) ***	(2.765) ***	(3.145) ***	(3.143) ***
ROA	-0.141	-0.139	-0.137	-0.136	-0.134	-0.132
	(-3.515) ***	(-3.453) ***	(-3.413) ***	(-2.666) ***	(-2.616) ***	(-2.574) **
Ret	-2.600	-2.732	-2.762	-2.213	-2.362	-2.394
	(-1.988) **	(-2.088) **	(-2.111) **	(-1.389)	(-1.482)	(-1.503)
Loss	4.645	4.707	4.715	4.453	4.495	4.496
	(5.597) ***	(5.669) ***	(5.678) ***	(4.453) ***	(4.493) ***	(4.493) ***
Instown	0.067	0.061	0.060	0.002	-0.004	-0.006
	(3.077) ***	(2.819) ***	(2.774) ***	(0.069)	(-0.154)	(-0.223)
Forown	0.088	0.096	0.097	0.152	0.162	0.164
	(2.816) ***	(3.061) ***	(3.111) ***	(3.854) ***	(4.129) ***	(4.177) ***
Dirown	0.043	0.042	0.043	-0.012	-0.014	-0.014
	(1.915) *	(1.895) *	(1.919) *	(-0.421)	(-0.481)	(-0.482)
OutDir	-0.015	-0.013	-0.012	-0.015	-0.013	-0.012
	(-1.061)	(-0.879)	(-0.821)	(-0.865)	(-0.719)	(-0.686)
Debt	0.166	0.170	0.170	0.144	0.147	0.148
	(15.716) ***	(16.076) ***	(16.098) ***	(10.769) ***	(11.034) ***	(11.101) ***
Filing	0.430	0.432	0.429	0.561	0.570	0.570
	(3.012) ***	(3.014) ***	(2.995) ***	(3.089) ***	(3.126) ***	(3.124) ***
Trading	33.731	34.048	34.051	27.835	28.085	28.078
	(8.192) ***	(8.265) ***	(8.265) ***	(6.851) ***	(6.911) ***	(6.908) ***
constant	24.771	19.812	22.982	31.303	26.360	29.651
	(11.340) ***	(7.370) ***	(10.415) ***	(11.800) ***	(8.269) ***	(11.105) ***
year fixed effects	*yes*	*yes*	*yes*	*yes*	*yes*	*yes*
industry fixed effects	*yes*	*yes*	*yes*	*yes*	*yes*	*yes*
Adj.R^2	0.123	0.121	0.121	0.138	0.137	0.136
LR	22.589	22.330	22.290	17.594	17.450	17.426
[p-value]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Obs.	7,258	7,258	7,258	4,781	4,781	4,781

The values in parentheses indicate t-statistics. For the definitions of independent variables, see Table 2.
***Significant at the 1% level.
**Significant at the 5% level.
*Significant at the 10% level.

Table 5
Results of fundamental risk

Panel A: Results of fundamental risk (window: +2 ~ +184)						
	All sample			*Sample which have segments*		
N_Risks	-0.039			-0.044		
	(-2.452) **			(-2.490) **		
N_Words		-0.070			-0.148	
		(-0.663)			(-1.235)	
N_Sentences			-0.060			-0.146
			(-0.530)			(-1.132)
Size	0.087	0.054	0.052	0.511	0.489	0.489
	(1.239)	(0.766)	(0.741)	(6.354) ***	(6.028) ***	(5.981) ***
MB	0.014	-0.015	-0.016	0.132	0.107	0.107
	(0.191)	(-0.200)	(-0.210)	(1.585)	(1.292)	(1.292)
ROA	0.052	0.050	0.050	0.033	0.032	0.032
	(3.309) ***	(3.231) ***	(3.220) ***	(1.727) *	(1.670) *	(1.648) *
Ret	-2.465	-2.414	-2.410	-2.945	-2.889	-2.882
	(-4.863) ***	(-4.762) ***	(-4.755) ***	(-4.927) ***	(-4.833) ***	(-4.824) ***
Loss	0.016	-0.008	-0.009	-0.386	-0.403	-0.403
	(0.051)	(-0.023)	(-0.027)	(-1.028)	(-1.074)	(-1.074)
Instown	0.021	0.023	0.023	0.044	0.046	0.046
	(2.491) **	(2.707) ***	(2.722) ***	(4.339) ***	(4.565) ***	(4.609) ***
Forown	-0.009	-0.012	-0.012	-0.037	-0.040	-0.041
	(-0.773)	(-0.972)	(-0.988)	(-2.487) **	(-2.730) ***	(-2.756) ***
Dirown	0.057	0.057	0.057	0.069	0.069	0.069
	(6.639) ***	(6.543) ***	(6.529) ***	(6.240) ***	(6.213) ***	(6.209) ***
OutDir	0.000	-0.001	-0.002	0.012	0.011	0.011
	(-0.063)	(-0.261)	(-0.280)	(1.879) *	(1.726) *	(1.711) *
Debt	0.024	0.023	0.023	0.070	0.069	0.069
	(5.759) ***	(5.543) ***	(5.534) ***	(13.906) ***	(13.751) ***	(13.741) ***
Filing	-0.005	-0.001	0.000	0.047	0.047	0.047
	(-0.096)	(-0.016)	(-0.007)	(0.685)	(0.692)	(0.689)
Trading	-1.554	-1.646	-1.647	-0.866	-0.952	-0.950
	(-0.974)	(-1.031)	(-1.032)	(-0.568)	(-0.624)	(-0.623)
constant	13.758	14.386	14.058	5.487	6.555	5.892
	(16.249) ***	(13.811) ***	(16.444) ***	(5.513) ***	(5.482) ***	(5.883) ***
year fixed effects	*yes*	*yes*	*yes*	*yes*	*yes*	*yes*
industry fixed effects	*yes*	*yes*	*yes*	*yes*	*yes*	*yes*
Adj.R ^{2}	0.809	0.809	0.809	0.812	0.812	0.812
LR	654.269	653.645	653.627	450.291	449.745	449.717
[p-value]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Obs.	7,258	7,258	7,258	4,781	4,781	4,781

The values in parentheses indicate t-statistics. For the definitions of independent variables, see Table 2.
***Significant at the 1% level.
**Significant at the 5% level.
*Significant at the 10% level.

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Table 5 (continued)
Results of fundamental risk

Panel B: Results of fundamental risk (window: +2 ~ +61)						
	All sample			*Sample which have segments*		
N_Risks	-0.025			-0.031		
	(-1.857) *			(-2.070) **		
N_Words		-0.030			-0.095	
		(-0.333)			(-0.937)	
N_Sentences			-0.011			-0.085
			(-0.110)			(-0.783)
Size	0.034	0.010	0.006	0.392	0.374	0.373
	(0.565)	(0.163)	(0.108)	(5.767) ***	(5.468) ***	(5.401) ***
MB	0.141	0.121	0.120	0.231	0.212	0.212
	(2.200) **	(1.912) *	(1.889)	(3.277) ***	(3.045) ***	(3.036) ***
ROA	0.003	0.002	0.002	-0.009	-0.010	-0.010
	(0.215)	(0.148)	(0.136)	(-0.555)	(-0.605)	(-0.624)
Ret	-0.861	-0.824	-0.819	-1.210	-1.168	-1.162
	(-1.982) **	(-1.898) *	(-1.887) *	(-2.396) **	(-2.314) **	(-2.303) **
Loss	0.266	0.248	0.246	0.088	0.075	0.074
	(0.964)	(0.902)	(0.894)	(0.278)	(0.237)	(0.234)
Instown	0.022	0.023	0.023	0.039	0.041	0.041
	(2.979) ***	(3.156) ***	(3.173) ***	(4.578) ***	(4.779) ***	(4.819) ***
Forown	-0.009	-0.010	-0.011	-0.029	-0.032	-0.032
	(-0.842)	(-1.005)	(-1.022)	(-2.334) **	(-2.545) **	(-2.569) **
Dirown	0.051	0.051	0.050	0.064	0.063	0.063
	(6.898) ***	(6.803) ***	(6.779) ***	(6.766) ***	(6.730) ***	(6.716) ***
OutDir	0.000	-0.001	-0.001	0.010	0.009	0.009
	(-0.025)	(-0.192)	(-0.217)	(1.811) *	(1.677) *	(1.658) *
Debt	0.017	0.016	0.016	0.056	0.055	0.055
	(4.735) ***	(4.562) ***	(4.547) ***	(13.281) ***	(13.153) ***	(13.143) ***
Filing	0.071	0.075	0.076	0.141	0.142	0.142
	(1.503)	(1.575)	(1.596)	(2.447) **	(2.455) **	(2.459) **
Trading	-1.080	-1.143	-1.147	-0.571	-0.633	-0.634
	(-0.790)	(-0.836)	(-0.839)	(-0.443)	(-0.492)	(-0.492)
constant	10.909	11.228	11.067	3.677	4.377	3.943
	(15.042) ***	(12.587) ***	(15.116) ***	(4.373) ***	(4.333) ***	(4.660) ***
year fixed effects	*yes*	*yes*	*yes*	*yes*	*yes*	*yes*
industry fixed effects	*yes*	*yes*	*yes*	*yes*	*yes*	*yes*
Adj.R^2	0.647	0.647	0.647	0.665	0.665	0.665
LR	284.377	284.175	284.169	207.697	207.474	207.456
[p-value]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Obs.	7,258	7,258	7,258	4,781	4,781	4,781

The values in parentheses indicate t-statistics. For the definitions of independent variables, see Table 2.
***Significant at the 1% level.
**Significant at the 5% level.
*Significant at the 10% level.

(continued on next page)

Table 5 (continued)
Results of fundamental risk

Panel C: Results of fundamental risk (window: +2 ~ +11)						
	All sample			*Sample which have segments*		
N_Risks	-0.024 (-1.820) *			-0.027 (-1.824) *		
N_Words		-0.076 (-0.863)			-0.110 (-1.118)	
N_Sentences			-0.058 (-0.617)			-0.084 (-0.793)
Size	0.049 (0.840)	0.034 (0.584)	0.031 (0.533)	0.299 (4.533) ***	0.290 (4.355) ***	0.285 (4.252) ***
MB	0.228 (3.670) ***	0.212 (3.460) ***	0.211 (3.437) ***	0.335 (4.901) ***	0.321 (4.742) ***	0.320 (4.717) ***
ROA	-0.035 (-2.713) ***	-0.036 (-2.750) ***	-0.036 (-2.771) ***	-0.059 (-3.739) ***	-0.059 (-3.771) ***	-0.060 (-3.798) ***
Ret	0.112 (0.266)	0.135 (0.323)	0.141 (0.336)	-0.541 (-1.102)	-0.512 (-1.043)	-0.502 (-1.023)
Loss	0.755 (2.834) ***	0.744 (2.792) ***	0.742 (2.783) ***	0.659 (2.140) **	0.651 (2.112) **	0.648 (2.104) **
Instown	0.012 (1.761) *	0.013 (1.900) *	0.013 (1.923) *	0.025 (2.991) ***	0.026 (3.139) ***	0.026 (3.191) ***
Forown	0.000 (0.041)	-0.001 (-0.082)	-0.001 (-0.105)	-0.009 (-0.744)	-0.011 (-0.901)	-0.011 (-0.937)
Dirown	0.046 (6.417) ***	0.046 (6.377) ***	0.046 (6.353) ***	0.056 (6.108) ***	0.056 (6.105) ***	0.056 (6.075) ***
OutDir	-0.006 (-1.277)	-0.006 (-1.384)	-0.007 (-1.418)	0.004 (0.822)	0.004 (0.728)	0.004 (0.694)
Debt	0.006 (1.725) *	0.005 (1.580)	0.005 (1.563)	0.037 (9.093) ***	0.037 (8.995) ***	0.037 (8.966) ***
Filing	0.002 (0.044)	0.003 (0.064)	0.004 (0.084)	0.053 (0.957)	0.053 (0.940)	0.054 (0.962)
Trading	-1.282 (-0.970)	-1.331 (-1.007)	-1.334 (-1.009)	-0.588 (-0.470)	-0.634 (-0.507)	-0.639 (-0.511)
constant	12.736 (18.162) ***	13.310 (15.432) ***	12.947 (18.290) ***	7.219 (8.836) ***	7.978 (8.129) ***	7.458 (9.074) ***
year fixed effects	*yes*	*yes*	*yes*	*yes*	*yes*	*yes*
industry fixed effects	*yes*	*yes*	*yes*	*yes*	*yes*	*yes*
Adj.R^2	0.566	0.566	0.566	0.595	0.595	0.595
LR	202.174	202.047	202.029	153.543	153.431	153.397
[p-value]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Obs.	7,258	7,258	7,258	4,781	4,781	4,781

The values in parentheses indicate t-statistics. For the definitions of independent variables, see Table 2.
***Significant at the 1% level.
**Significant at the 5% level.
*Significant at the 10% level.

Table 6

Business risk results

Panel A: Results of infomation risk (window: +2 ~ +184)						
	All sample			*Sample which have segments*		
N_IdioRisks	0.180	0.178		0.188	0.189	
	(4.229) ***	(4.701) ***		(3.974) ***	(4.454) ***	
N_SysRisks	-0.006		0.107	0.002		0.121
	(-0.106)		(2.054) **	(0.034)		(2.008) **
Size	-2.874	-2.878	-2.852	-3.216	-3.214	-3.197
	(-19.589) ***	(-20.352) ***	(-19.428) ***	(-18.568) ***	(-19.307) ***	(-18.439) ***
MB	1.019	1.018	1.101	0.477	0.478	0.542
	(6.643) ***	(6.642) ***	(7.233) ***	(2.735) ***	(2.738) ***	(3.112) ***
ROA	-0.074	-0.074	-0.065	-0.042	-0.042	-0.027
	(-2.308) **	(-2.306) **	(-2.012) **	(-1.030)	(-1.033)	(-0.677)
Ret	-3.205	-3.206	-3.410	-2.650	-2.650	-2.900
	(-3.073) ***	(-3.073) ***	(-3.268) ***	(-2.105) **	(-2.106) **	(-2.303) **
Loss	7.415	7.416	7.541	7.086	7.086	7.236
	(11.196) ***	(11.201) ***	(11.385) ***	(8.963) ***	(8.967) ***	(9.148) ***
Instown	0.104	0.104	0.098	0.031	0.031	0.020
	(5.978) ***	(5.979) ***	(5.625) ***	(1.472)	(1.473)	(0.956)
Forown	0.093	0.093	0.103	0.142	0.142	0.158
	(3.702) ***	(3.704) ***	(4.115) ***	(4.530) ***	(4.531) ***	(5.096) ***
Dirown	0.006	0.006	0.011	-0.035	-0.035	-0.032
	(0.337)	(0.338)	(0.597)	(-1.500)	(-1.500)	(-1.372)
OutDir	0.004	0.004	0.009	-0.001	-0.001	0.004
	(0.314)	(0.312)	(0.744)	(-0.078)	(-0.078)	(0.285)
Debt	0.228	0.228	0.229	0.178	0.179	0.180
	(27.009) ***	(27.076) ***	(27.094) ***	(16.943) ***	(16.995) ***	(17.046) ***
Filing	0.584	0.584	0.551	0.530	0.530	0.501
	(5.129) ***	(5.128) ***	(4.842) ***	(3.691) ***	(3.692) ***	(3.489) ***
Trading	17.136	17.138	17.374	12.731	12.730	12.973
	(5.218) ***	(5.219) ***	(5.285) ***	(3.967) ***	(3.967) ***	(4.037) ***
constant	31.574	31.607	31.732	40.173	40.160	40.377
	(17.890) ***	(18.200) ***	(17.962) ***	(18.911) ***	(19.214) ***	(18.983) ***
year fixed effects	*yes*	*yes*	*yes*	*yes*	*yes*	*yes*
industry fixed effects	*yes*	*yes*	*yes*	*yes*	*yes*	*yes*
Adj.R ^{2}	0.238	0.238	0.236	0.245	0.245	0.243
LR	48.209	49.241	48.740	34.024	34.771	34.314
[p-value]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Obs.	7,258	7,258	7,258	4,781	4,781	4,781

The values in parentheses indicate t-statistics. For the definitions of independent variables, see Table 2.

*** Significant at the 1% level.

** Significant at the 5% level.

* Significant at the 10% level.

(continued on next page)

Table 6 (continued)
Business risk results

Panel B: Results of fundamental risk (window: +2 ~ +184)						
	All sample			*Sample which have segments*		
N_IdioRisks	-0.119	-0.082		-0.098	-0.077	
	(-5.769) ***	(-4.446) ***		(-4.356) ***	(-3.840) ***	
N_SysRisks	0.112		0.037	0.066		0.004
	(3.961) ***		(1.484)	(2.058) **		(0.136)
Size	0.023	0.098	0.008	0.467	0.513	0.457
	(0.319)	(1.422)	(0.113)	(5.687) ***	(6.502) ***	(5.560) ***
MB	0.025	0.031	-0.030	0.130	0.136	0.097
	(0.339)	(0.421)	(-0.400)	(1.575)	(1.648) *	(1.174)
ROA	0.056	0.055	0.050	0.039	0.037	0.031
	(3.585) ***	(3.509) ***	(3.179) ***	(2.009) **	(1.932) *	(1.623)
Ret	-2.517	-2.513	-2.382	-2.979	-2.981	-2.849
	(-4.977) ***	(-4.963) ***	(-4.704) ***	(-4.992) ***	(-4.993) ***	(-4.771) ***
Loss	0.067	0.045	-0.017	-0.339	-0.362	-0.417
	(0.208)	(0.139)	(-0.052)	(-0.905)	(-0.965)	(-1.111)
Instown	0.020	0.019	0.024	0.041	0.041	0.047
	(2.316) **	(2.296) **	(2.823) ***	(4.082) ***	(4.098) ***	(4.687) ***
Forown	-0.006	-0.007	-0.013	-0.033	-0.034	-0.042
	(-0.522)	(-0.572)	(-1.069)	(-2.236) **	(-2.282) **	(-2.835) ***
Dirown	0.059	0.059	0.056	0.070	0.070	0.068
	(6.837) ***	(6.785) ***	(6.481) ***	(6.264) ***	(6.272) ***	(6.117) ***
OutDir	0.001	0.001	-0.002	0.013	0.013	0.011
	(0.146)	(0.212)	(-0.438)	(2.005) **	(2.018) **	(1.612)
Debt	0.023	0.024	0.022	0.069	0.070	0.068
	(5.501) ***	(5.802) ***	(5.344) ***	(13.767) ***	(13.955) ***	(13.614) ***
Filing	-0.017	-0.015	0.005	0.041	0.040	0.056
	(-0.309)	(-0.267)	(0.090)	(0.598)	(0.588)	(0.819)
Trading	-1.509	-1.544	-1.667	-0.864	-0.882	-0.990
	(-0.947)	(-0.969)	(-1.044)	(-0.568)	(-0.579)	(-0.649)
constant	14.325	13.722	14.221	5.860	5.491	5.754
	(16.739) ***	(16.278) ***	(16.584) ***	(5.818) ***	(5.538) ***	(5.703) ***
year fixed effects	*yes*	*yes*	*yes*	*yes*	*yes*	*yes*
industry fixed effects	*yes*	*yes*	*yes*	*yes*	*yes*	*yes*
Adj.R ^{2}	0.810	0.809	0.809	0.813	0.812	0.812
LR	643.781	655.808	653.842	442.078	451.288	449.569
[p-value]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Obs.	7,258	7,258	7,258	4,781	4,781	4,781

The values in parentheses indicate t-statistics. For the definitions of independent variables, see Table 2.
***Significant at the 1% level.
**Significant at the 5% level.
*Significant at the 10% level.