



**Market Assessment of Earnings Management:
The Moderating Effect of Environmental Uncertainty**

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September 2009

The authors acknowledge receiving financial support from Autorité des marchés financiers (Québec), PricewaterhouseCoopers and KPMG. All usual caveats apply.

Cette recherche a été réalisée grâce au soutien financier du Fonds pour l'éducation et la saine gouvernance de l'Autorité des marchés financiers ("l'Autorité"), PricewaterhouseCoopers et KPMG. Les informations, renseignements, opinions et avis exprimés au présent article n'engagent que la responsabilité des auteurs. Le contenu de cet article ne reflète pas nécessairement l'opinion de l'Autorité, de PricewaterhouseCoopers et de KPMG et les erreurs éventuelles relèvent de la responsabilité des auteurs.

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Abstract

In this study, we investigate the market assessment of earnings management in contexts of environmental uncertainty. Overall, our results show that environmental uncertainty moderates the relationship between abnormal accruals and stock volatility and pricing. More specifically, the positive effect of earnings management on share price volatility and stock market valuation is smaller for diversified firms and those facing high volatility, suggesting the difficulty for the market to assess the information content of abnormal accrual in contexts of uncertain. However, for dynamic firms that offer growth opportunities and which are highly followed by financial analysts, our results suggest that earnings management is even more informative. Finally, our results appear to be driven by US-cross listing.

Key words: earnings management, environmental uncertainty, share price volatility, stock pricing.

Incidence sur les marchés boursiers de la gestion des résultats : L'effet modérateur de l'incertitude environnementale

Résumé

Dans cette étude, nous analysons la relation entre la gestion des résultats comptables, l'asymétrie informationnelle et la valorisation boursière en tenant compte des facteurs environnementaux tels que la diversification, la volatilité et le dynamisme. Nos résultats montrent que la relation positive entre la gestion des résultats, l'asymétrie informationnelle et la valorisation boursière est fortement réduite pour les firmes diversifiées et celles dont les ventes et le risque systématique sont volatiles. De plus, la gestion du résultat augmente l'asymétrie informationnelle dans une plus grande mesure pour les firmes dynamique, tel que mesuré par le niveau de recherche et développement. Enfin, nos résultats sont affectés par le fait qu'une entreprise soit cotée sur une bourse américaine.

Mots clés : gestion des résultats, incertitude environnementale, valorisation boursière, volatilité des titres.

1. Introduction

The theory of the firm (Child, 1972; Williamson, 1975) recognizes that environmental uncertainty places considerable constraints on firms, affecting strategy and decisions making. However, although firms are constrained by the nature of their environment, managers do have opportunities to respond strategically to uncertainty (Ghosh and Olsen, 2009). One of these opportunities is earnings management.

This study investigates the association between earnings management, share price volatility and valuation considering environmental uncertainty. The extent of opportunistic earnings management is likely to be higher the greater the level of information asymmetry (Dye, 1988; Trueman and Titman, 1988). In turn, earnings quality could lessen the uncertainty about the distribution of a firm's future cash flows, which would create information asymmetry between the informed and less informed investors (Bhattacharya, Desai and Venkataraman, 2006).

In our study, environmental uncertainty refers to the following three environmental factors: diversification, volatility, and dynamism. First, the diversity of operations increases the level of difficulty for investors to assess earnings quality (Lim, Ding, and Thong, 2008). Financial reporting is expected to be more complex for firms with diversified business and geographical operations. Hence, we expect earnings management to be higher for diversified firm and to be more difficult to detect by stock market participants. Second, volatility, as captured by sales variability or systematic risk, affects managerial decisions (Child, 1972; Cyert and March, 1963; Williamson, 1975). It is generally assumed that it is in managers' interests to reduce the variability of reported earnings (Gul, Chen and Tsui, 2003; Ghosh and Olsen, 2009)

but in a volatile environment, earnings management is expected to be more difficult to detect because of a lack of stability in accounting figures. Therefore, we can expect earnings management occurring in such environment to be less informative for market valuation and to affect share price volatility in a lesser extent. Finally, dynamic firms, especially those investing intensively in intangible assets (Barth, Kasznik and McNichols, 2001), attract market participants. Those firms generally offer growth potential and are likely to be scrutinized by investors. Thus, for these firms, earnings management is more likely to increase information asymmetry while being informative for valuation purposes.

Concerning the incidence of environmental uncertainty on stock market pricing, we expect it to moderate the relationship between abnormal accruals and stock market valuation, especially for US cross-listed firms. US stock markets, being more liquid and highly covered by financial analysts, are in better position than Canadian markets to detect earnings management in contexts of uncertainty.

Our main findings are the following. First, we observe that environmental uncertainty leads to earnings management. Second, earnings management affects, to a lesser extent, share price volatility for diversified firms and those facing high volatility. Third, earnings management affects share price volatility to a greater extent for firms involved in research and development activities. Fourth, governance attributes are associated with less earnings management suggesting that the board of directors and its committees play a monitoring role in assessing earnings quality. This is expected to be the case in a country like Canada where there is extensive investor protection. Fifth, in contexts of environmental uncertainty, earnings management is not valued by investors, especially for firms cross-listed on a US stock market. Finally, our results show that normal and abnormal accruals are valued in the same proportion by investors.

Overall, our findings suggest that earnings management is harder to detect for diversified firms and for those facing high volatility. This evidence supports the notion that accruals anomaly is partially driven by investors' failure to correctly assess future earnings implications of accruals (Gong, Li and Xie, 2009). We do not observe such a market anomaly for sample firms listed on a US stock exchange, a more liquid market than the Canadian stock market. In addition, our results suggest that markets participants get to detect earnings management for firms that are highly involved in research and development activities, i.e. firms generally offering growth potential and that are more scrutinized by market participants.

This study contributes to our understanding of earnings quality implications in the following manner. First, to the best of our knowledge, this study is the first to investigate how the level of diversity, volatility, and dynamism affects stock market assessment of earnings management. By combining an investigation of specific environmental incentives to engage into earnings management with an assessment of share price volatility and valuation usefulness of earnings components, this study contributes to our understanding of earnings quality implications. Second, our results suggest that it is important to control for the endogenous nature of earnings management, namely corporate governance mechanisms and media coverage.

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

2. Background and hypotheses

2.1 *Stock market assessment of earnings management*

Prior research shows a relationship between earnings quality and information asymmetry on the market place. Measuring accruals quality as the standard deviation of residuals from regressions relating current accruals to cash flows, Francis *et al.* (2005) find that poorer accruals quality is associated with higher information asymmetry, leading to larger costs of debt and equity. They also show that investors accord greater weight (in the determination of costs of capital) to accruals that reflect intrinsic features of the firm's business model, relative to accruals that reflect a combination of pure noise and opportunistic choices (which increase information risk) and management's attempts to make earnings more informative (which decrease information risk). In the same vein, Liu and Wysocki (2007) argue that the documented relation between accrual quality and cost of capital is primarily driven by volatility of firms' operating activities that are not related to accounting and less subject to managerial manipulation. Moreover, Bhattacharya *et al.* (2009) document, for a US sample, that poor earnings quality is significantly and incrementally associated with higher information asymmetry, as measured by bid-ask spread. Therefore, we predict abnormal accruals to affect positively information asymmetry.

2.2 *Earnings management and stock market valuation*

Prior research shows that firms with high magnitudes of accruals, or abnormal accruals, earn positive risk-adjusted returns (e.g., Sloan, 1996; Xie, 2001). In this vein, Callen and Segal (2004) focus on two components of accounting earnings, accruals and operating cash flows, and examine their relative importance in driving firm-level stock returns. Their findings show that changes in expected future accruals are a primary driver, if not the primary driver, of current stock returns.¹

Subramanyam (1996) finds that discretionary accruals are associated with contemporaneous stock prices and future earnings, cash flows, and dividend change and concludes that managers choose accruals to enhance the informativeness of accounting earnings. Moreover, prior studies suggest that in markets with high liquidity and sophisticated investors (e.g., the U.S. markets), accruals are more value relevant than cash flow from operations (e.g. Wilson, 1986 ; Sloan, 1996) or complement cash flow in helping investors to assess a firm's performance (Bowen, Burgstahler et Daley, 1987; Cormier et Martinez, 2006). Finally, normal accruals appear to be more valued than abnormal accruals (Dechow, 1994; Subramanyam, 1996).

Hence, we expect abnormal accruals to be value relevant for stock market pricing. However, we argue that US stock markets are in a better position to detect earnings management in contexts of uncertainty than Canadian markets. If such is the case, abnormal accruals will be less valued for US cross-listed firms.

¹ However, prior studies suggest that, in the long term, abnormal accruals are overpriced, and then less persistent than the cash flow component (Sloan, 1996; Xie (2001). This suggests that investors do not seem to trade as if they understand the differential implications of accruals and cash flows for future returns. In the same vein, Bradshaw, Richardson and Sloan (2001) document that analysts overweight accruals in making forecasts of subsequent earnings, with the result that firms with high accruals in a base year tend to have more negative forecast errors in the subsequent year.

2.3 *Environmental uncertainty and stock market assessment of earnings management*

Pfeffer and Salancik (1978) define environmental uncertainty as the degree to which future events and states cannot be anticipated or predicted. In our study, environmental uncertainty refers to the following three environmental factors: diversification, volatility, and dynamism. Market assessment of earning management is likely to be influenced by environmental uncertainty.

2.3.1 Environmental diversification

Diversity of operations increases the level of difficulty for investors to assess earnings quality. Accounting is more complex for firms with diversified business and geographical operations. In this vein, Erwin and Perry (2000) examine the effect of foreign acquisitions by U.S. firms on analysts' prediction errors. For a sample of focus-preserving (FP) foreign acquisitions and focus-decreasing (FD) acquisitions, they find that post-merger analysts' prediction errors are significantly higher for U.S. firms that choose to expand internationally outside their core business segment, relative to those that undertake global expansion within their core business. Moreover, Jiraporn, Kim and Mathur (2008) show that diversified firms do not suffer more severe information asymmetry compared with non-diversified firms.²

Concerning the relationship between diversification and earnings management, Lim, Ding, and Thong (2008), based on a sample of seasoned equity offering, find that current

² The authors use two proxies to measure information asymmetry: earnings forecast errors and earnings forecast dispersion.

abnormal accruals are higher among diversified firms than in non-diversified ones. Their evidence is consistent with the view that the extent of firm diversification is directly related to the degree of earnings management.

Hence, given the increase in difficulty for investors to assess earnings quality for diversified firms, we expect abnormal accruals to affect to a lesser extent share price volatility and stock market valuation for firms with diversified operations, i.e., business operations and geographical operations.

H1a: Environmental diversification moderates the relationship between earnings management and share price volatility.

H1b: Environmental diversification moderates the relationship between earnings management and stock market valuation.

2.3.2 Environmental volatility

Volatility is a powerful contextual factor affecting managerial decisions (Child, 1972; Cyert and March, 1963; Williamson, 1975). Prior research suggests that managers have incentives to reduce the variability of reported earnings (e.g. Gul, Chen and Tsui, 2003; Wang and Williams, 1994). For example, Leblebici and Salancik (1981) find that bank loan officers search for more information when making loan decisions when the environment is volatile. Accounting standards provides a degree of flexibility allowing opportunities for managers to use

discretion in reporting earnings in an attempt to reduce the variability in reported earnings via accrual management (e.g. Bannister and Newman, 1996).

Sales or earnings variability increase the level of difficulty for investors to assess earnings quality. In the context of sales or earnings volatility, managers have incentives to reduce the variability of reported earnings (Gul, Chen and Tsui, 2003). For firms with volatile sales or earnings, earnings management might be more difficult to detect by market participants.

Two proxies are used to capture a firm's volatility: Sales coefficient of variation and systematic risk (beta).

Sales coefficient of variation. Prior research (e.g. Ghosh and Olsen, 2009) shows that managers use discretionary accruals to reduce variability in reported earnings for firms with high sales variation. In a context of high sales variation, it is more difficult for investors to assess earnings quality. We expect abnormal accruals to affect to a lesser extent share price volatility for firms with unstable sales.

Systematic risk. Firms with high systematic risk are more likely to face high variability in earnings. Building up an accruals cushion to maintain a firm's financial flexibility and to stabilize dividend payments is consistent with executives striving to insulate themselves from the effects of risk (Jensen, 1986). In this context, it is more difficult for investors to assess earnings quality.³ We expect abnormal accruals to affect to a lesser extent share price volatility and stock market valuation for firms with high systematic risk.

H2a: Environmental volatility moderates the relationship between earnings management and share price volatility.

³ In our sample, we also observe that lower earnings figures are associated with higher systematic risk (correlation of -38% between return on assets and systematic risk).

H2b: Environmental volatility moderates the relationship between earnings management and stock market valuation.

2.3.3 Environmental dynamism

Dynamic firms, especially those highly involved in intangible capital, attract market participants and especially financial analysts (Barth, Kasznik and McNichols, 2001). Those firms generally offer growth potential and, therefore, are more scrutinized by investors. Given the particular interest of investors for dynamic firms and the extensive work performed by financial analysts, we would expect that earnings management is more likely to be detected by market participants. Prior studies indicate that both current R&D investment levels and current or recent changes in R&D investment are positively associated with subsequent excess (risk-adjusted) stock returns (Chambers, Jennings and Thomson, 2002; Anagnostopoulou and Levis, 2008). Thus, earnings management is more likely to be detected by market participants.

We expect abnormal accruals to largely affect share price volatility and stock market valuation for firms involved in research and development activities.

H3a: Environmental dynamism moderates the relationship between earnings management and share price volatility.

H3b: Environmental dynamism moderates the relationship between earnings management and stock market valuation.

3. Method

3.1 *Sample*

The sample comprises 138 observations for the year 2005. We fix the sample based on an initial data set (XXX, 2009) in which we collected articles about media exposure for the period of 1997 to 2001. Therefore, since we integrate a five year annual mean score of media exposure in the current study (2000 to 2004), our starting point is 189 non-financial firms representing the Toronto Stock Exchange S&P/TSX Index identified in 2002 (the total index comprises 220 firms in summer 2002). Mergers and acquisitions, bankruptcies and delistings reduced our sample from 189 to 155 in 2005. The final sample comprises 138 firms since, out of the initial sample of 155 firms, there are missing data for governance attributes and share price volatility (17 firms). These 138 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.

For the current research, governance attributes were collected from proxy statements. Financial data was collected from the Stock Guide, a Canadian financial database. 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 *Models*

3.2.1 Share price volatility

This study attempts to provide an integrated analysis of earnings management and share price volatility. It is thus important to control for the presence of endogeneity between earnings management and critical variables. The following equation summarizes the approach adopted in the empirical analysis:

Dependent variable

Share price volatility $_{it}$ =

$$f(\beta_0 + \beta_1 \text{Systematic risk} + \beta_2 \text{Free float} + \beta_3 \text{Analyst following} + \beta_4 \text{ABS Abnormal accruals} + \beta_{5,6,7,8} \text{ABS Abnormal accruals} * \text{Environmental uncertainty})_{it}$$

Instrumented variable: ABS Abnormal accruals

Instruments: Firm Size, Board independence, Board size, Board size squared, Audit committee size, Media exposure, US listing.

Share price volatility is measured as the standard deviation of percentage changes in daily stock prices.

The board's monitoring influences managerial discretion and induces firms to more transparency in organizational performance measurement and reporting (Fama, 1980, Eng and Mak, 2003).

In this sense, we treat ABS Abnormal accruals as an endogenous variable and governance

attributes as instruments.⁴ Four variables are used to capture board effectiveness: *Board independence*; *Board size*; *Board size squared*; and *Audit committee size*.⁵ Some prior studies assume the relationship between board size and board performance to be curvilinear (e.g. Vafeas, 1999; Yermack, 1996; Eisenberg, Sundgren and Wells, 1998; Golden and Zajac, 2001). To control for the possible curvilinearity in the relationship between board size and earnings management, we include the variable *Board size squared* as an instrument.

Brown and Caylor (2005) find that managers try to avoid losses and earnings decreases and that media coverage may be responsible for the shift in benchmarks. Media exposure is computed by taking the average number of articles for the period 2000 through 2004, as contained in the database ABI/Inform ProQuest. The reason for this choice is that earnings management in 2005 may be affected by the amount and types of articles published about a firm in the recent past. We expect that as media exposure increases, the firm will be more inclined to manage earnings.

While US listing is not expected to affect accruals *per se*, the incremental scrutiny and monitoring it brings is likely to attenuate a firm's propensity to engage in earnings management. Hence, we introduce US listing, a dummy variable that takes a value of 1 if a firm is publicly-traded in the United States and of 0 if not.

Consistent with Han and Wang (1998) and Erickson and Wang (1999), abnormal accruals are estimated by a cross sectional regression for the 2001 to 2003 period (155 firms X 3 years = 465 firm-year observations).

⁴ Prior studies document that the presence of an independent and competent board of directors should limit managers' ability to manage earnings (Klein, 2002; Peasnell, Pope and Young, 2003). More recently, Chang and Sun (2009) show that the passage of Sarbanes-Oxley Act (SOX) improves the effectiveness of an independent audit committee and other corporate governance functions in monitoring the earnings quality of cross-listed foreign firms.

⁵ In Canada, audit committees must comprise at least three independent members. We consider that adding a few more members could enhance the monitoring role of the audit committee.

Since 28% of sample firms incurred negative earnings during the estimation period (2001 to 2004), we add a dummy variable net loss (1/0) to control for this. The estimated accruals measure is then subtracted from sample firms' actual total accruals to obtain an estimate of abnormal accruals. We introduce abnormal accruals in absolute value to capture earnings quality.

Two models are estimated: Total abnormal accruals and current abnormal accruals.

Total accruals model

The estimation of an accruals determination model requires that potential sources of non-normal accruals be specified. From the literature, it appears that three key variables are closely linked with non-discretionary accruals: (1) underlying performance, (2) level of depreciable fixed assets, (3) lagged cash flow from operations (e.g. Dechow *et al.* 1995; Erickson and Wang, 1999) or lagged accruals (Beneish, 1997; Defond and Park, 1997). First, a firm's underlying performance is expected to influence its level of normal accruals, good performance implying higher accruals than poor performance (e.g. receivables or inventories). A comprehensive measure of a firm's underlying performance is the year-to-year change in sales (e.g. Jones, 1991). Second, the variable *Fixed assets* is included in order to control for systematic accruals resulting from depreciation, i.e., the normal part of depreciation. Third, lagged cash flow from operations has been observed to be negatively correlated with current period.

We measure total accruals as the difference between net earnings and cash flow from operations. Hribar and Collins (2002) argue that the difference between net income and cash flow from operations is the correct measure of total accruals and that the use of balance sheet approach (e.g. working capital accruals) may lead to a systematic bias in discretionary accruals estimation. They show that balance sheet accruals estimates are predictably biased in studies

where the partitioning event is correlated with either mergers and acquisitions or discontinued operations. The authors demonstrate that tests of market mispricing of accruals will be understated due to erroneous classification of "extreme" accruals firms.⁶ While a firm's total accruals are easily accessible from its financial statements, normal and abnormal accruals are not directly observable and must be inferred through an estimation model. Normal accruals reflect a firm's economic environment or its underlying level of activity, independent of managerial incentives. For a given firm (i), current period (t) total normal accruals is modeled in the following manner:

$$\text{Total accruals}_{it} = \alpha_1 \text{Change in sales}_{it} + \alpha_2 \text{Operating Cash flow}_{it-1} + \alpha_3 \text{PPE}_{it} + \alpha_4 \text{Negative earnings (1/0)}_{it} + \varepsilon_{it}$$

Change in sales is a proxy for a firm's performance while lagged cash flow from operations is assumed to systematically determine current period normal accruals since changes in cash flow and in accruals are correlated over time (Dechow, 1994). The level of property, plant and equipment controls for the portion of depreciation expense that is not conditional on managerial discretion (Jones, 1991).

The coefficients from the above regression (variable scaled by lagged total assets except the dummy variable for net loss) are then used to compute fitted values (also called normal accruals).⁷

6 The balance sheet method of accruals may create bias in the estimation of normal accruals when the firm is involved in mergers and acquisitions. Hence, the change in working capital accounts can be affected by the operation of mergers and acquisitions without any earning management intention. The Canadian stock market is very active in mergers and acquisitions.

7 The total normal accruals model is the following (R-square: 18.2%; F-statistic: 6.9):

$$\begin{aligned} \text{Accruals}_{it} = & 0.026 + 0.063 \text{Change in sales}_{it} - 0.288 \text{Operating cash flow}_{it-1} - 0.160 \text{PPE}_{it} \\ & (0.156) (0.052) \qquad \qquad \qquad (0.017) \qquad \qquad \qquad (0.004) \\ & - 0.092 \text{Negative Earnings}_{it} \\ & (0.001) \end{aligned}$$

Results remain very similar when we add dummies for S&P/TSX industry classification. Coefficients for industry are not significant in any case.

Current accruals model

In the total accruals model, property, plant and equipment is likely to capture the normal part of depreciation and amortization. Hence, earnings management that can occur by a change in depreciation method or a change of the estimation of an asset's life. However, this tool for managing earnings is easier to detect by market participants than current accruals (e.g. provisions for bad debts, change in the policy of suppliers). Moreover, in general, the depreciation charge constitutes a large portion of total accruals. Finally, the total accruals model contains accruals elements such as restructuring losses, write-offs, other non-operating profits or losses.

As a second estimation model, we focus on current accruals, which are accruals net of depreciation, amortization and unusual items. Unusual items (field 70 in Stock Guide database) include such elements as non-recurring gains and losses, restructuring provisions, write-offs, and other non-operating gains or losses. For a given firm (i), current period (t) current normal accruals is modeled in the following manner:

$$\text{Current accruals}_{it} = \alpha_1 \text{Change in sales}_{it} + \alpha_2 \text{Operating Cash flow}_{it-1} + \alpha_3 \text{Negative earnings (1/0)}_{it} + \varepsilon_{it}$$

Consistent with total accruals model, results remain very similar when we add dummies for S&P/TSX industry classification.⁸ Coefficients for industry are not significant in any case.

⁸ The current normal accruals model is the following (R-square: 15.9%; F-statistic: 33.2):

$$\begin{aligned} \text{Current accruals}_{it} = & 0.017 + 0.045 \text{ Change in Sales}_{it} - 0.258 \text{ Operating cash Flow}_{it-1} \\ & (0.007) \quad (0.053) \qquad \qquad \qquad (0.000) \\ & - 0.018 \text{ Negative Earnings}_{it} \\ & (0.052) \end{aligned}$$

Measurement of variables

Prior studies on the determinants of the information asymmetry suggest numerous proxies (Leuz and Verrecchia, 2000). Based on that literature, we use *Analyst following*, *Systematic risk*, and *Free float* as key determinants of 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 documents an association between systematic risk and the cost of capital (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.

Free float. Control blocks have generally greater access to private information than a diffuse ownership (Leuz and Verrecchia, 2000). Free float is used as an inverse proxy for insider control. We expect a negative association between free float and share price volatility.

Analyst following. A firm's analyst following may proxy for the extent of a firm's communication with financial analysts (Leuz, 2003). Prior research suggests that analyst coverage reduces asymmetry in the stock market (Alford and Berger, 1999). Hence, we expect a negative relationship between analyst following and share price volatility.

Five distinct variables are used to capture a firm's environment and its impact on the association between abnormal accruals and share price volatility. We estimate five separate regressions adding in turn interaction terms *ABS Abnormal accruals*Segments*, *ABS Abnormal accruals*Sales CV*, *ABS Abnormal accruals*Systematic risk* and *ABS Abnormal accruals*R&D* to the regressions.

Diversification. We measure diversity as the sum of business and geographical segments. The following interaction term is introduced in the model: *ABS Abnormal accruals*Segments*. *Segments* is a binary variable measured one if the total number of segments is greater than the sample mean. We expect the coefficient of the variable *ABS Abnormal accruals*Segments* to be negatively associated with share price volatility.

Volatility. Two interaction terms are used to measure volatility: the coefficient of variation of sales (*Sales CV*) and systematic risk (*beta*) are used as interaction terms with *ABS Abnormal accruals*. The variable *Sales CV* is a binary variable that takes the value of one if *Sales CV* is greater or equal to the sample mean. We expect the coefficient for the interaction term *ABS Abnormal accruals*Sales CV* to be negatively associated with share price volatility. *Systematic risk* is a binary variable that takes the value of one if *beta* is higher than the market risk, i.e., a *beta* of one. We expect the coefficient for the interaction term *ABS abnormal accruals*Systematic risk* to be negatively associated with share price volatility.

Dynamism. We measure dynamism by the level of research and development expenditures in percentage of total sales. *ABS Abnormal accruals*R&D* is a binary variable measured as R&D scaled by sales greater than sample mean. We expect the coefficient of the variable *ABS Abnormal accruals*R&D* to be positively associated with share price volatility.

3.2.2 Stock market valuation

In this section, we investigate the relationship between earnings components and a firm's stock price taking into account environmental uncertainty. Reported earnings comprise three components: Cash flow from operations, total normal accruals and total abnormal accruals. Consistent with Amir and Lev (1996/1997) and Kothari and Zimmerman (1995), the following model is used to explore the value relevance of earnings components:

Share Price $_{i,t}$ =

$$\begin{aligned} & b_0 + b_1 \text{Book Value per Share }_{i,t} + b_2 \text{Operating Cash Flow per Share }_{i,t} + b_3 \text{Normal} \\ & \text{Accruals per Share }_{i,t} + b_4 \text{Abnormal Accruals per Share }_{i,t} + b_5 \text{Abnormal Accruals per} \\ & \text{Share*Environmental Uncertainty }_{i,t} + b_6 \text{Abnormal Accruals per Share*Environmental} \\ & \text{Uncertainty*US }_{i,t} + b_6 \text{US-listing }_{i,t} \end{aligned}$$

Prior studies suggest that, compared to Canadian and most other national stock markets, the U.S. stock market is the most efficient in the way information is collected and analyzed, the most liquid and the most transparent in matters of corporate disclosure (Saudaragan and Biddle, 1992; Saudaragan and Meek, 1997). Hence, we add interaction terms *Environmental uncertainty*US* to assess the influence of US cross listing on stock market valuation.

4. Results

4.1 Descriptive statistics

Table 1 provides some descriptive statistics. Sample firms are relatively large (total assets averaging \$5 billion). About 78% of sample firms are free float. Firms are on average followed by seven financial analysts. Total abnormal accruals are on average 0.05% (median 0.07%) of total assets while the absolute value of total abnormal accruals averages 4.9% (median 3.9%) of total assets. Current abnormal accruals account for 0.05% (median -0.5%) of total assets while the absolute value averages 5.7% (median 1.9%) of total assets. On average, firms invest in R&D in a proportion of 3.8% of total assets, operate in near five business divisions and geographical segments, and exhibit high sales volatility (a mean of sales coefficient of variation of 28%). Finally, our sample firms have independent directors in a proportion of 36% while presenting CEO and board chair duality of in 20% of the cases. On average, firms were covered by media in a proportion close to five articles per year over the last five years (median 1.7). Finally, more than half of sample firms are cross-listed on a US stock exchange.

[Insert table 1]

In table 2, we show abnormal accruals in absolute value for high and low levels of sales coefficient of variation, systematic risk, and research and development activities. Results confirm our expectations. We observe more abnormal accruals for firms facing volatility as expressed by *Sales CV* and *Systematic risk*, and highly involved in R&D. The level of diversification as

measured by the number of segments does not affect statistically the extent of abnormal accruals. This last result supports the argument of Jiraporn, Kim and Mathur (2008) that accruals from disparate business divisions tend to offset each other, making it difficult for managers to manage earnings considerably in either direction. Finally, we do not observe statistical differences based on the extent of activities in research and development and current abnormal accruals.

[Insert table 2]

Table 3 presents correlations. Consistent with our expectation, *Abnormal accruals* are positively associated with *Share price volatility* (0.25 for total and 0.36 for current accruals). We also observe an association between *ABS Abnormal accruals* and *Board size* (-0.22 for total accruals and 0.21 for current accruals), and *Audit committee size* (-0.19 for total accruals and -0.16 for current accruals). This result shows the importance to treat *ABS Abnormal accruals* endogenously and use governance attributes as instruments. We also observe that firms with large media exposure tend to be followed by financial analysts (0.38), to be larger firms (0.27) and to face higher systematic risk (0.37). Moreover, we observe a positive relationship between abnormal accrual and *Sales CV* for both total accruals (0.26) and current accruals (0.29). Finally, US listing is associated with systematic risk (0.22), total *ABS Abnormal accruals* (0.19), *Board independence* (-0.17), and *Free float* (0.17).

[Insert table 3]

4.2 *Multivariate analyses*

4.2.1 Share price volatility

Since we posit that a firm's governance attributes and media exposure affect earnings quality simultaneously, we first assess whether or not interaction exists between these variables using Hausman test.

First, relying on ordinary least square estimations, we regress ABS Abnormal accruals on Firm Size, Board independence, Board size, Board size squared, Audit committee size, Media exposure, US listing. Moreover, except for the variable *Board independence*, all coefficients for explanatory variables are significantly related to ABS abnormal accruals (total accruals and current accruals). The variable *Board size squared* (coefficient with a positive sign) captures the non-linear relationship between board size and earnings management. Coefficients for *Board size* and *Audit committee size* are negative while the coefficient for the variable *Media exposure* is positive, suggesting that efficient governance leads to better quality earnings while media exposure leads to lesser quality earnings. Finally, it seems that US listing modifies managerial incentives for earnings management since the coefficient for US listing is statistically significant for ABS Abnormal accruals. However, this relationship is not observed for current accruals.

Second, the residuals of the regressions are used as explanatory variable in the Share price volatility regressions. The student t-test of the coefficient for the variable *Residuals* constitutes the Hausman test. Using this procedure, we reject the null hypothesis of no endogeneity with respect to *Share price volatility* and *ABS Abnormal accruals* (t-test = 5.37; $p < 0.00$ for total accruals and 5.14; $p < 0.00$ for current accruals). Therefore, abnormal accruals will

be treated as an endogeneous variable. In light of this diagnostic, we rely on a two-stage estimation procedure for a system of simultaneous equations. The software being used is STATA.

In panel A of table 4, we present results for total accruals model. Results are consistent with our hypotheses.

First, consistent with H1a, the relationship between absolute value of abnormal accruals and share price volatility is smaller for firms with operation and geographical diversification since the coefficient for the interaction term *ABS Abnormal accruals*Segments* is negative and significant (-6.38; $p < 0.05$). Student t-test for equality of coefficients confirms our results since the sum of the coefficients for *ABS Abnormal accruals* and *ABS Abnormal accruals*Segments* is statistically equal to zero ($t = 3.29$; $p < 0.07$). In the presence diversification, earnings management does not appear to affect share price volatility.

Second, hypothesis H2a related to volatility is confirmed since coefficients for interaction terms *ABS Abnormal accruals*Sales CV* (-6.59; $p < 0.01$) and *ABS Abnormal accruals*Systematic risk* (-5.96; $p < 0.05$) are negative and significant. Student t-test for equality of coefficients confirms our results since the sum of the coefficients for *ABS Abnormal accruals* and *ABS Abnormal accruals*Sales CV* ($t = 9.45$; $p < 0.00$) and *ABS Abnormal accruals* and *ABS Abnormal accruals*Systematic risk* are statistically equal to zero ($t = 5.15$; $p < 0.02$).⁹

Third, consistent with H3a, the association between absolute value of abnormal accruals and share price volatility is greater for firms involved in research and development activities since the coefficient for the interaction term *ABS Abnormal accruals*R&D* is positive and

⁹ Consistent with Liu and Wysocki (2007) and Shan (2009), our results (not tabulated) show that the relationship to share price volatility for the abnormal accruals, i.e. the unexpected proportion (3.06; $p < 0.09$) is weaker than for normal accruals, i.e. the fundamental portion (3.815; $p < 0.018$). Student t-test for equality of coefficients confirms this difference ($t = 0.05$; $p < 0.817$).

significant (6.340; $p < 0.05$). Furthermore, Student t-test for equality of coefficients confirms our results since the sum of the coefficients for *ABS Abnormal accruals* and *ABS Abnormal accruals*R&D* is statistically different from zero ($t= 0; 0.85; p < 0.36$). Moreover, our results (not tabulated) show the intensity of R&D is almost twice for firms highly followed by analysts (5% of total assets versus 2.7%). This is consistent with Barth, Kasznik and McNichols (2001) who find that analyst coverage is significantly greater for firms with more intangible assets.¹⁰ This factor could explain why abnormal accruals create volatility in the stock market for firms involved in R&D activities.

In panel B of table 4, we present results for current accruals model. Except for diversification, results are consistent with those presented in panel A. For diversified firms, it seems that investors are in a better position to detect current accruals management than total accruals management. An explanation could be that long-term accruals such as asset impairment, fair value accounting, and change of accounting method such as depreciation method are more complex in a context of business and geographical diversification.

Overall, results suggest that market participants have difficulty to detect earnings management in contexts of uncertainty regardless of the type of accruals, i.e. long term or short term. Results also suggest that investors are in a better position to detect current accruals management than total accruals management in a context of diversification. Finally, as expected, abnormal accruals affect share price volatility largely for firms involved in research and development activities. Those firms generally offer growth potential and then are scrutinized by investors. Therefore, earnings management is more likely to be detected by market participants.

[Insert table 4]

¹⁰ We also observe that firms highly involved in R&D activities have high growth potential as proxied by Tobin's Q (1.91 versus 2.18).

Prior research document that, compared to Canadian and most other national stock markets, the U.S. stock market is the most efficient in the way information is collected and analyzed, the most liquid and the most transparent in matters of corporate disclosure (e.g. Saudaragan and Biddle, 1992). Cormier and Magnan (2002) based on a Canadian oil and gas sample, show that managerial incentives for earnings management as well as investors' appreciation of various performance metrics can be affected by the intensity of external monitoring that accompanies a US stock exchange listing. As a sensitivity analysis, we split the sample between US listed and non-listed firms. Results suggest that coefficients presented in table 4 are essentially driven by firms listed on a US stock exchange. Moreover, the fact that for non-US listed firms, abnormal accruals are associated with share price volatility regardless of the environmental uncertainty could suggest that Canadian stock markets are less liquid and volatiles.

[Insert table 5]

4.2.2 Stock market valuation

From table 2, we observe more abnormal accruals for volatile firms, as measured by sales coefficient of variation and systematic risk, and for dynamic firms, as measured by the level of R&D expenditures.

We now assess the relationship between earnings components and a firm' stock price taking into account environmental uncertainty. Results are presented in table 5. First, Student t-

tests for equality of coefficients suggest that normal and abnormal accruals are valued in a different proportion since the sum of the coefficients for *Normal accruals* and *Abnormal accruals* is statistically different from zero in all four regressions.

Second, consistent with H1b, the coefficient for the interaction term *Abnormal accruals*Segments* (-3.411; $p < 0.05$) is negative and significant while the coefficient for the interaction term *Abnormal accruals*Segments*US* is not significant. This result suggests that the complexity surrounding diversification do not alter market participants' ability to detect earnings management.

Third, coefficients for interaction terms *Abnormal accruals*Sales CV* (3.895; $p < 0.10$) and *Abnormal accruals*Systematic risk* (7.430; $p < 0.01$) are positive and significant. These results suggest that earnings management is more difficult to detect by Canadian investors because of a lack of stability in accounting figures consequent to the environmental uncertainty. This could signal a market anomaly. However, for US listed firms, coefficients for the interaction terms *Abnormal accruals*Sales CV*US listing* (-6.804; $p < 0.05$) and *Abnormal accruals*Systematic risk*US listing* (-9.139; $p < 0.01$) are negative and significant. This result is in line with our hypothesis 2b. For cross-listed firms, environmental volatility moderates the value relevance of earnings management. Student t-test for equality of coefficients suggest that the sum of *Abnormal accruals* and *Abnormal accruals*Sales CV US listing* and *Abnormal accruals*Systematic risk*US listing* are close to zero ($t = 4.14$; $p < 0.044$ and $t = 5.38$; $p < 0.022$). This suggests that US markets are in a better position to detect earnings management in contexts of uncertainty than Canadian markets.

Fourth, consistent with H3b, the coefficient for the interaction term *Abnormal accruals*R&D*US listing* is negative and significant (-1.869; $p < 0.005$) suggesting that U.S.

investors see through earnings management for dynamic firms. Firms offering growth potential and listed on a US stock exchange are scrutinized by market participants. Student t-test for equality of coefficients suggest that the sum of *Abnormal accruals* and *Abnormal accruals*R&D* US listing* is close to zero ($t = 5.24$; $p < 0.024$). Earnings management in a context of dynamism increases share price volatility and is more likely to be detected by market participants. However, this does not seem to be the case for non-US listed firms since the coefficient for the interaction term *Abnormal accruals*R&D* is not significant, which suggests that abnormal accruals are value relevant.

Fifth, firms with a U.S. listing do appear to benefit from a higher valuation than non-US listed firms, since the coefficient is positively and significantly related to stock price valuation in all four regressions. This result is consistent with prior studies (e.g. Cormier and Magnan, 2002).

Finally, concerning current accruals, when we split accruals in four categories, normal current accruals, other current accruals, abnormal current accruals, and other abnormal accruals, results (not tabulated) show that only other normal accruals (2.622; $p < 0.01$) and other abnormal accruals (3.830; $p < 0.01$) are associated with stock price. This result is consistent with DeFond and Park (2001) who argue that the reversing nature of abnormal working capital accruals reduce the net effect on lifetime earnings, and therefore should be priced differentially by the market. The authors observe that short term abnormal accruals that have little or no net effect on lifetime earnings have little stock price impact in reasonably efficient capital markets. Hence, current accruals do not seem to be value relevant even though they create volatility on the stock market.

In summary, results suggest that (1), normal and abnormal accruals are valued in a different proportion, (2) in contexts of environmental uncertainty, US markets appear to be in a

better position to detect earnings management than Canadian markets, and (3) only non-working capital accruals seem to be valued by investors.

Conclusion

In this paper, we investigate the association between earnings management and share price volatility taking into consideration environmental uncertainty factors such as dynamism, diversification and volatility as well as corporate governance.

Our findings show that market participants have difficulty to detect earnings management in contexts of uncertainty. As expected, findings show that the association between earnings management and share price volatility is smaller for firms facing high volatility. It also appears that abnormal accruals affect share price volatility in a larger extent for firms involved in research and development activities. Those firms generally offer growth potential and then are likely to be scrutinized by investors. This increases the likelihood for market participants to detect earnings management.

Our results also show that governance attributes such as board size and audit committee size are associated with less earnings management suggesting that the board of directors and its audit committee play a monitoring role in assessing earnings quality. Efficient governance may have a positive impact on earnings quality in a country like Canada where there is extensive investor protection. Finally, our findings show that normal and abnormal accruals are valued in a different proportion by investors, and that in the presence of environmental uncertainty, abnormal accruals are more likely to be detected by market participants for stock price valuation, especially for firms listed on a US stock exchange.

The results of this study should be interpreted with caution for at least the following reason. As in all earnings management studies, the present study relies on specific measures of abnormal accruals that may not completely capture the underlying phenomenon. However, we feel that relying on two models' estimation allows for more confidence in the results.

Concerning future research, with a larger sample, we might attempt to distinguish earnings-increasing versus earnings decreasing accruals in the way they affect asymmetry in the stock market. Finally, it would be interesting to extend the research beyond 2011 when Canadian firms will be required to comply with IFRS.

Table 1
Descriptive statistics

N=137	Minimum	Maximum	Mean	Median	Standard deviation
Normal accruals – Total	-0.219	0.352	-0.064	-0.069	0.071
Normal accruals – Current	-0.809	0.305	-0.004	-0.005	0.080
Abnormal accruals – Total	-0.419	0.215	0.005	0.007	0.074
Abnormal accruals – Current	-0.825	1.176	0.005	-0.005	0.152
Abnormal accruals in absolute value – Total	0.001	0.410	0.049	0.039	0.055
Abnormal accruals in absolute value – Current	0.001	1.176	0.057	0.019	0.142
Share price volatility	0.818	10.385	2.233	1.809	1.494
Analyst following	0	35	6.829	3	5.888
Systematic risk (beta)	0	2.71	0.682	0.480	0.489
Free float	0.098	0.999	0.776	0.845	0.225
R&D (in % of sales)	0	0.826	0.038	0	0.114
Segments	1	31	4.854	4	3.545
Sales coefficient of variation	0.023	1.677	0.293	0.261	0.259
Firm size (Total Assets in million Can \$)	26	40 076	4 844	1 832	7 226
Board independence	0	2	0.909	1	0.515
<i>Independent directors</i>	0	0.860	0.360	0	0.178
<i>Board chair duality</i>	0	1	0.200	0	0.401
Board size	4	18	9.987	10	2.755
Audit committee size	2	9	3.980	4	1.103
Media exposure (average annual number of articles for the period 2000 through 2004)	0	80	4.683	1.52	9.706
US listing	0	1	0.512	1	0.501

Table 2
Descriptive statistics
Abnormal accruals in absolute value based on dynamism, diversity and volatility

	Total accruals			Current accruals		
	Low	High	t difference p value	Low	High	t difference p value
Segments	0.052	0.045	0.241	0.049	0.069	0.221
Sales CV	0.044	0.085	0.000	0.033	0.181	0.000
Systematic risk (beta)	0.045	0.071	0.012	0.039	0.059	0.043
R&D (in % of sales)	0.043	0.064	0.018	0.057	0.055	0.466

Table 3
Correlations

		2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	Share price volatility	*0.26	*0.36	*0.26	0.06	*-0.44	*-0.14	-0.07	*-0.38	*-0.33	-0.02	*0.17	-0.04	0.09	0.05
2	ABS Abnormal total accruals	1	*0.64	*0.23	0.04	*-0.33	-0.10	-0.05	*-0.22	*-0.19	-0.05	*0.25	-0.02	*0.21	*0.19
3	ABS Abnormal current accruals		1	*0.29	-0.02	*-0.25	-0.09	-0.07	*-0.20	*-0.14	-0.08	*0.18	-0.10	*0.18	-0.04
4	Systematic risk			1	*0.17	-0.11	*0.20	0.06	-0.12	-0.13	*0.37	0.04	-0.01	0.01	*0.22
5	Free float				1	*-0.14	0.12	0.12	-0.12	0.05	*0.17	0.05	0.05	0.07	*0.17
6	Firm size					1	*0.26	-0.07	*0.53	*0.42	*0.27	*-0.10	-0.01	-0.06	*0.13
7	Analyst						1	-0.09	0.03	0.06	*0.38	*0.18	*0.13	*0.22	*0.10
8	Board independence							1	0.11	0.09	-0.08	0.04	0.03	0.08	*-0.17
9	Board size								1	*0.55	*0.20	-0.28	-0.06	*-0.17	-0.07
10	Audit committee size									1	*0.17	-0.10	0.01	-0.07	-0.05
11	Media exposure										1	0.08	*0.19	*0.13	*0.20
12	R&D (in % of sales)											1	*0.16	*0.20	*0.19
13	Segments												1	*0.12	0.09
14	Sales CV													1	0.05
15	US listing														1

* Significant at 0.10

Table 4
2SLS Estimation of the Relationship between
Accruals and Share Price Volatility in interaction with Environmental Uncertainty

		Environmental uncertainty			
			Volatility		
N=137		Segments	Sales CV	Systematic risk	R&D
Panel A Total accruals					
Systematic risk	+	***0.875	***1.001	-	***0.858
Free float	-	0.348	0.437	0.510	0.304
Analyst	-	***-0.053	***-0.055	**-.0.047	***-0.051
Abs Abnormal accruals	+	**5.099	***7.091	***7.046	*2.158
Abs Abnormal accruals*Segments	-	**-.6.380			
Abs Abnormal accruals*Sales CV	-		***-6.596		
Abs Abnormal accruals*Systematic risk	-			**-.5.966	
Abs Abnormal accruals*R&D	+				**6.340
Main effect	+/-	0.115	-0.137	***1.426	-0.091
Test of equality of coefficients Abs Abnormal accruals and the interaction term		3.29(0.07)	9.45(0.00)	5.15(0.02)	0.85(0.36)
R-square		19.1%	21.2%	18.9%	19.8%
F statistic		3.53(0.002)	16.9(0.000)	8.51(0.000)	4.90(0.000)
Panel B Current accruals					
Systematic risk	+	***0.959	***0.983	-	***0.763
Free float	-	0.497	0.421	0.733	0.403
Analyst	-	***-0.053	***-0.055	***-0.054	***-0.048
Abs Abnormal accruals	+	**2.045	***8.147	***3.337	***2.644
Abs Abnormal accruals*Segments	-	1.308			
Abs Abnormal accruals*Sales CV	-		**-.5.305		
Abs Abnormal accruals*Systematic risk	-			**-.4.882	
Abs Abnormal accruals*R&D	+				**4.361
Main effect	+/-	-0.211	-0.304	***1.433	0.148
Test of equality of coefficients Abs Abnormal accruals and the interaction term		0.07(0.78)	7.71 (0.00)	4.94 (0.02)	0.33(0.56)
R-square		21.2%	28.4%	24.5%	23.3%
F statistic		7.13(0.000)	8.64(0.000)	7.00(0.000)	7.94(0.000)

*: $p < 0.10$; **: $p < 0.05$; ***: $p < 0.01$. One-tailed if directional prediction, two-tailed otherwise.

Instrumented variable: Abs Abnormal accruals

Instruments: Firm Size, Board independence, Board size, Board size squared Audit committee size, Media exposure.

Table 5
2SLS Estimation of the Relationship between
Total Accruals and Share Price Volatility in interaction with Environmental Uncertainty
Sample split between US listed and Non-US listed Firms

		Environmental uncertainty			R&D
		Segments	Sales CV	Systematic risk	
<i>Non-US listed (N: 61)</i>					
Abs Abnormal accruals	+	*3.878	**5.805	*11.039	**4.502
Abs Abnormal accruals*Segments	-	3.963			
Abs Abnormal accruals*Sales CV	-		2.903		
Abs Abnormal accruals*Systematic risk	-			7.793	
Abs Abnormal accruals*R&D	+				2.642
<i>US listed (N: 76)</i>					
Abs Abnormal accruals	+	***10.241	***8.656	***10.082	**2.671
Abs Abnormal accruals*Segments	-	***-10.977			
Abs Abnormal accruals*Sales CV	-		***-8.066		
Abs Abnormal accruals*Systematic risk	-			***-10.265	
Abs Abnormal accruals*R&D	+				***7.318
Percentage of US listing		48%	50%	66%	56%

*. p < 0.10; **. p < 0.05; ***. p < 0.01. One-tailed.

Table 6
Ordinary Least Square Estimation of the Value Relevance of Earnings Components
in interaction with Environmental Uncertainty
(Total accruals model)

Dependent Variable: Stock Price

		Segments	Environmental uncertainty		
			Sales CV	Volatility Systematic risk	R&D
Equity per share	+	***1.246	***1.164	***0.883	***1.082
Operating cash flow per share	+	***2.572	***3.126	***3.435	***2.552
Normal accruals per share	+	***3.191	***2.819	***3.550	**1.804
Abnormal accruals per share	+	***4.421	***3.078	***3.786	**3.147
Abnormal accruals per share*Segments	-	** -3.411			
Abnormal accruals per share*Segments*US listing	-	3.056			
Abnormal accruals per share*Sales CV	-		*3.895		
Abnormal accruals per share*Sales CV*US listing	-		** -6.804		
Abnormal accruals per share*Systematic risk	-			***7.430	
Abnormal accruals per share*Systematic risk*US listing	-			*** -9.139	
Abnormal accruals per share *R&D	-				-0.785
Abnormal accruals per share *R&D*US listing	-				** -1.869
Main effect Environmental uncertainty	+/-	4.212	*8.830	-3.199	3.406
US listing	+	*11.452	***8.217	*3.854	***11.324
R-square		50.8%	51.8%	52.6%	50.8%
F statistic		11.5(0.000)	9.3(0.000)	10.6(0.000)	11.5(0.000)
Test of equality of coefficients Normal accruals and Abnormal accruals		2.12(0.149)	0.09(0.758)	0.14(0.706)	1.54(0.217)
Test of equality of coefficients Abnormal accruals and the interaction term for uncertainty		5.07(0.027)	0.07(0.792)	3.11(0.081)	2.46(0.119)
Test of equality of coefficients Abnormal accruals and the two interaction terms		1.87(0.175)	4.14(0.044)	5.38(0.022)	5.24(0.024)

*: p < 0.10; **: p < 0.05; ***: p < 0.01. One-tailed if directional prediction, two-tailed otherwise.

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