DETERMINANTS AND CONSEQUENCES OF OPERATIONS-RELATED DISCLOSURES

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Determinants and Consequences of Operations-related Disclosures

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Determinants and Consequences of Operations-related Disclosures

Abstract

The study examines the determinants and consequences of operations-related disclosures. Based on a sample of 39,480 firm-year observations during the period 2003 to 2011, I find that the probability of providing operations-related disclosures is positively associated with the issuance of management earnings forecasts, financing activities, liquidity, and growth opportunity. Moreover, firms with global focus and subject to higher litigation risks are more likely to make operations-related disclosures. In contrast, firms that have better profitability, higher leverage ratio and poor earnings quality are less likely to make operations-related disclosures.

To investigate the consequences of operations-related disclosures, this study tests the effect of operations-related disclosures on information asymmetry, analysts following and institutional investor ownership. Results from the analyses show that firms with operations-related disclosures are associated with lower levels of information asymmetry. More frequent operations-related disclosures also result in a decrease in information asymmetry. In addition, firms that provide operations-related

disclosures attract more analysts following and institutional investors. The disclosure frequency is positively associated with more analysts following and higher institutional investor ownership. Further analyses suggest that the negative relation between operations-related disclosures and information asymmetry is more pronounced for subsamples with more analysts following, which suggests that the dissemination role of financial analysts may be a potential mechanism linking operations-related disclosures and the degree of information asymmetry. The overall results are robust to a series of sensitivity tests.

Keywords: Nonfinancial information, Operations-related disclosures, Information Asymmetry

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Determinants and Consequences of Operations-related Disclosures

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Chapter 1 Introduction

"Many leading companies are voluntarily disclosing an extensive amount of business information that appears to be useful in communicating information to investors. The importance of voluntary disclosures is expected to increase in the future because of the fast pace of change in the business environment. Voluntary disclosures related to matters that are important to the success of individual companies are very useful, particularly disclosures of management's view of the company's 'critical success factors' and trends surrounding those factors. ... The metrics used by companies to manage their operations and drive their business strategies often are very useful voluntary disclosures. Those metrics should be explained and consistently disclosed from period to period to the extent they continue to be relevant to a company's success." (FASB, 2001)

1.1 Objectives and motivations

Operations-related disclosures[1] are disclosures on events of fundamental operations, which consist of five categories: business expansions, business reorganization or discontinuation, products-related events, clients-related events

[1] The definition and classification of operations-related disclosures are based on Ma (2012).

and strategic alliances.[2] This special type of nonfinancial disclosure is a common way firms communicate with the market participants. In this study, I examine the determinants of operations-related disclosures and the consequences associated with these disclosures.

There has been a growing body of research on operations-related disclosures.[3] For example, Nichols and Wieland (2009) examine the responses of analysts and the stock market to disclosures on product-related events and business expansions. They suggest that analysts provide more accurate and less dispersed forecasts and substantially increase forecast activities at the date of disclosures. Ma (2012) investigates how the stock market responds to operations-related disclosures. He shows that operations-related disclosures trigger significant abnormal returns, trading volume and return volatility. These studies suggest that operations-related disclosures exert a profound effect on the capital market by providing valuable information to analysts and investors. To have a better understanding of operations-related disclosures, I investigate the factors that determine disclosure decisions and the consequences associated with these disclosures.

[2] Detailed definitions for each category of disclosures are provided in Appendix II.
[3] In contrast to Ma (2012) and my study, Nichols and Wieland (2009) and Nichols (2009) focus on business expansions information and products-related announcements.

Operations-related disclosures offer several unique features that are of high value to academic research on nonfinancial information. First of all, operations-related disclosures constitute a significant portion of corporate disclosures. This study shows that over 35% of the sample firms make operations-related disclosures while 12.67% of the firms issue management earnings forecasts. On average, each firm makes 2 operations-related disclosures per year in the sample period. Among the disclosing firms, about half of them provide more than 4 disclosures per year. These findings indicate that operations-related disclosures are one of the primary means by which the firms signal themselves to the market.

Secondly, operations-related disclosures provide inferences on investment productivity. Such disclosures reveal information about changes in the operating activities and business strategies, which have direct reflections of cash flows from operation. Without operations-related disclosures, market participants other than insiders know little about the firms' operating activities. In other words, operations-related disclosures help to bridge the gap between financial statements and the economic condition about the firms' operation (Glassman,

2003).

Finally, the information incorporated by operations-related disclosures is credible. Different from highly aggregated information on investment productivity at a discrete point of time (e.g. historical data from financial statements) or estimates about future performance (e.g. earnings forecasts), operations-related disclosures provide information about the firms' current operations that is undertaking by the firm.

1.2 Overview of research method and major findings

The primary objective of this study is to examine the determinants of operations-related disclosures. I begin with the extraction of data from Capital IQ. Five major groups of disclosures are categorized as operations-related disclosures based on the classification of key developments: business expansions, business reorganization or discontinuation, product announcements, client announcements and strategic alliances. I estimate a Probit regression to identify firm characteristics that determine operations-related disclosures using a sample of 39,480 firm-year observations over the period 2003 to 2011. The results suggest that the likelihood of making operations-related disclosures is

higher for firms that issue earnings forecasts. Moreover, firms with more financing activities, better growth opportunity and higher liquidity levels are more likely to provide operations-related disclosures. In addition, the probability of operations-related disclosures is higher if the firms are subject to more litigation risks. In contrast, firms with better performance and poor earnings quality are less likely to make operations-related disclosures.

The second objective of this study is to investigate the consequences associated with operations-related disclosures. To address potential issues of selection bias and endogeneity, I employ Heckman (1979) two-stage approach in the main analyses. The inverse Mills ratio (IMR) is derived from the first-stage regression of the likelihood model and included as an additional control variable in the second-stage regression. Throughout the analyses, I adopt the lead-lag approach to establish causality. Standard errors are adjusted clustering at the firm level to account for cross-sectional correlation.

I examine the effect of operations-related disclosures on information asymmetry and expect that firms with operations-related disclosures are associated with lower degrees of information asymmetry. To test this prediction,

I follow Welker (1995) and use bid-ask spreads as a proxy for information asymmetry. Regression analyses show that there is a negative relation between operations-related disclosures and bid-ask spreads. Besides, firms with more frequent operations-related disclosures experience lower bid-ask spreads. These results are in line with disclosure theory (Diamond and Verrecchia, 1991), which suggests that more disclosures reduce information asymmetry and consistent with empirical findings in prior research (e.g. Petersen and Plenborg. 2006; Buskirk, 2012).

Next, the effect of operations-related disclosures on analysts following is tested. I define analysts following as the number of analysts issuing annual earnings forecasts for the firm during the fiscal year and use the logarithmic transformation as the dependent variable in the regression. The results suggest that operations-related disclosures trigger more analysts following the firm, which supports the argument that more disclosures lead to an increase in analyst service (Francis et al., 1998). Furthermore, the frequency of operations-related disclosures is also positively associated with analysts following.

Then I analyze the effect of operations-related disclosures on institutional

investor ownership. Institutional investor ownership is the percentage of the aggregate common stocks held by institutions during the fiscal year. The regression results indicate that firms with operations-related disclosures attract more institutional investors and the frequency of operations-related disclosures is also positively related to institutional investor ownership. These results provide empirical evidence that institutional investors prefer investments to firms with more transparent disclosure environment (Lang and Lundholm, 1996).

To examine whether the results are robust, I perform the following tests. First, I use alternative proxies to measure the key variables to ensure that the results are not driven by measurement errors. Second, I apply a propensity score matching procedure (Tuck, 2010) to repeat the analyses. A sample of firms that do not provide operations-related disclosures is constructed to match those making disclosures in terms of predicted probability, industry and year. The matching procedure thus controls for relevant differences between these two sample groups. Third, I use the fixed effects research design (Lennox et al., 2012) to re-examine the consequences of operations-related disclosures after controlling for unobservable and time-invariant differences across firms. Finally,

to address the concern over reverse causality, I construct a sample that does not have analysts following in the year prior to disclosure and a sample that does not have institutional ownership in the year prior to disclosure. I used the reduced samples to replicate the analyses. These analyses provide consistent results suggesting that firms with operations-related disclosures are associated with lower levels of information asymmetry, more analysts following and higher institutional investor ownership.

Additional analyses are conducted to examine whether the dissemination role of financial analysts links between operations-related disclosures and the reduction of information asymmetry. I partition the full sample into two groups: a subsample with analysts following above median and a subsample with analysts below median. The results from the analyses show that the negative relation between operations-related disclosures and information asymmetry is more pronounced for the subsample with analysts following above median. These results suggest that financial analysts play an important role in interpreting the information impounded by operations-related disclosures. Furthermore, they provide additional support for the prediction that operations-related disclosures result in a decrease in the degree of information

asymmetry.

1.3 Contributions

This study contributes to the literature in several ways. It sheds light on corporate decisions to voluntary disclosure. The findings of this study illustrate firm characteristics that determine operations-related disclosures. This study documents that financing activities, liquidity, growth opportunity, global focus and litigation risk are positively related to the probability of operations-related disclosures. The results also suggest that there is a complementary relationship between operations-related disclosures and management earnings forecasts.

The second contribution of this study is to the literature on the role of financial analysts and institutional investors. The empirical results of this study suggest that financial analysts and institutional investors are attracted by firms with more disclosures. This study also lends support to the argument that financial analysts and institutional investors can make better use of nonfinancial disclosures.

Last but not the least, this study contributes to the literature by extending

the research on operations-related disclosures. Some recent studies (Nichols and Wieland, 2009; Ma, 2012) have examined the response of market participants to operations-related disclosures. However, little attention has been paid to the consequences of the firms that make operations-related disclosures. To the best of my knowledge, this study is the first one that provides comprehensive evidence on consequences associated with operations-related disclosures.

A closed related study is Nichols (2009), the only other study that examines determinants and consequences of operations-related disclosures. However, my study differs from Nichols (2009) in the following aspects. First, Nichols (2009) restricts the "operations-related disclosures" to business expansions and product-related announcements while this study adopts Ma (2012)'s concept of operations-related disclosures, which consist of five categories of disclosures as mentioned above. Second, Nichols (2009) aims to differentiate the determinants for operations-related disclosures from those for management earnings forecasts. In contrast, the purpose of this study is to identify firm characteristics that determine operations-related disclosures. Third, I explicitly examine the consequences of operations-related disclosures and provide direct evidence for benefits associated with these disclosures. Finally, this study differs from

Nichols (2009) methodologically. I employ Heckman (1979) two-stage analyses enhanced with a lead-lag approach. Nichols (2009) conducts an events study to examine the consequences of operations-related disclosures.

1.4 Thesis structure

The remainder of the thesis proceeds as follows. Chapter 2 reviews the literature related to this study. Chapter 3 examines the determinants of operations-related disclosures. Chapter 4 investigates the consequences of operations-related disclosures. Chapter 5 concludes the thesis.

Chapter 2 Literature Review for Nonfinancial Disclosure

Since operations-related disclosures are one special type of nonfinancial disclosure, this chapter reviews relevant literature on this topic. Section 2.1 reviews literature on definitions and background of nonfinancial disclosure. Section 2.2 reviews literature on value relevance of nonfinancial disclosure. Section 2.3 reviews literature on reliability of nonfinancial disclosure. Section 2.4 reviews literature on determinants of nonfinancial disclosure. Section 2.5 reviews literature on consequences of nonfinancial disclosure. Section 2.6 summarizes this chapter.

2.1 Definitions and Background

The definition of nonfinancial information varies in previous studies.[4] A stream of literature refers nonfinancial information as all performance measures that are not denominated in currency. Substantial studies in the later 1990s focus on certain specific industry and regard performance data that are different from mainstream financial performance measure as nonfinancial information. For example, market penetration (Amir and Lev, 1996), on-time performance (Behn and Riley, 1999) and customer satisfaction (Ittner and Larcker, 1998a) are

[4] See Luft (2009).

considered to be nonfinancial information.

Some recent studies (e.g. Robb et al., 2001; Vanstraelen et al, 2003) refer nonfinancial information as "qualitative information included in company annual report, but outside of the four financial statements and related footnotes". Their classifications of nonfinancial information based on two reports from by the American Institute of Certified Public Accountants (AICPA, 1994a; 1994b).

The following definition of nonfinancial information becomes more generally accepted in recent literature. It is defined as "all quantitative and qualitative data on the policy pursued, the business operations and the results of policy in form of outcome, without a direct link with financial registration system" (NIVRA, 2008). According to this definition, nonfinancial information refers to information that falls outside the scope of traditional financial statements. For instance, environmental disclosure (Plumlee et al., 2008) and corporate social responsibility (Dhaliwal et al., 2011) are regarded as nonfinancial information.

Traditional accounting statements that are based on an evaluation of

tangible assets provide a historical perspective on the economic value of the firm. With the rapid changes in business environment in the 1990s, the value of intangible assets was highlighted and the differences between corporate market value and book value became significant. Accounting literature recognized a long-term decline in the relevance of financial statement information (Brown, et al., 1999; Lev and Zarowin, 1999).

The valuation role of mainstream financial information faced an unprecedented challenge. Academic research (Wallman, 1995; 1996) expresses the concern that financial accounting and corporate disclosure are not keeping pace with changes in the business world. This concern gave rise to calls for greater disclosure of nonfinancial information. The report by Jenkins Committee recommends that financial reporting focus more on leading nonfinancial measures of key business activities (AICPA, 1994b). [5] In response to call for disclosure of nonfinancial information, a significant number of studies test the value relevance of nonfinancial information.

2.2 Relevance of Nonfinancial Information

Studies that examine relevance of nonfinancial information aim to provide

[5] the American Institute of Certified Public Accountants.

evidence on the underlying linkages between nonfinancial information, equity values, and future financial information. They adopt two approaches[6]: (1) value relevance tests, which demonstrate a direct link between nonfinancial information and equity values; (2) predictive ability tests, which establish a link between current nonfinancial information and future financial information.

Amir and Lev (1996) analyze data in the wireless communications industry to examine value relevance of financial and nonfinancial information during the period 1984 to 1993. Using two nonfinancial measures: population coverage in the service area and the market penetration in the area, they observe a positive relationship between stock prices and both measures. They find that integration with nonfinancial information can increase the relevance of financial measures for security valuation while financial measures stand-alone are largely value irrelevant. These results suggest that the value relevance of nonfinancial indicators overwhelms that of traditional financial information, such as earnings, book values and cash flows. Their study documents a complementary relationship between financial and nonfinancial information.

Behn and Riley (1999) explore the relationship between financial and

[6] See AAA FASC (2002)

nonfinancial information. Based on a sample of 213 observations in the airline industry over 1988 to 1996, they set up a contemporaneous model and test whether timely nonfinancial information can help to predict financial measures. They identify a number of fundamental metrics for nonfinancial measures and employ an instrumental variable for customer satisfaction. Their analyses show that the nonfinancial metrics are contemporaneously associated with financial performance measure. They also present empirical evidence that nonfinancial performance information can be used to predict financial performance.

Ittner and Larcker (1998a) use customer satisfaction as a nonfinancial measure and investigate value relevance of this measure by three levels of tests. The customer-level tests show that future revenues are positively associated with customer satisfaction index. Extensions of the business-level analyses support the claim that customer satisfaction measures are leading indicators of financial performance. The results from firm-level tests and event study indicate that disclosures of customer satisfaction measure generate excess stock market return over a ten-day announcement period, providing evidence that the release of nonfinancial information provides incremental information to stock market.

Deng, Lev, and Narin (1999) explore the connection between nonfinancial information on patents and market-to-book ratios and stock returns. Using a sample of 388 science- and technology-based firms over 1989 to 1995, they examine three patent attributes: patent numbers, citation impact and science link. Their analyses indicate that all three patent measurements are positively associated with subsequent market-to-book ratios and stock performance. They suggest that patent-related measurements can be useful tools to predict future market-to-book ratios and stock performances because this information reflects research ability and innovations.

Hirschey et al. (2001) investigate whether nonfinancial information on patent quality data affects the relationship between research and development expense and equity value. Their sample comprises 1,290 companies in the high-tech sector from 1989 to 1995. Adopting the fixed effects estimation method, they find that the relation between research and development expense and market value tends to be more consistent for firms with higher patent quality. They conclude that the relation between traditional accounting data and equity value is more consistent when supplement with nonfinancial data. Their results also demonstrate a complementary relation between financial and nonfinancial

information, similar to the finding in Amir and Lev (1996).

Trueman et al. (2001) test the ability nonfinancial data on web usage to predict future financial performance. For a sample of internet firms over the period 1998 to 2000, they examine the roles of past revenues, web usage data and analysts in forecasting future revenues. Their analyses provide mixed results. They find that current revenue growth is significant correlated with growth in web traffic. Their results indicate that historical revenue growth has incremental power in predicting time-series performance. They conclude that although estimates of web usage growth do not contribute to analysts' forecasts, foreknowledge of actual web usage growth provides additional explanatory power over analysts' forecasts.

Using a sample of 225 Taiwan companies in information electronics industry from 1998 to 2000, Liang and Yao (2005) explore the valuation role of financial and nonfinancial measures. They integrate the balanced scorecard framework[7] with intellectual capital to analyze reasons for the difference between book value and market value. They find that traditional financial performance measure such as net income does not signify explanatory power for

[7] Kaplan and Norton (2001).

equity value, which can be enhanced by its component items. They also provide weak evidence for value relevance of nonfinancial measurements. They suggest that the nonfinancial performance measures provide incremental explanatory power only for the companies with market value in the midstream sample.

Based on a sample of 92 E-commence firms, Rajgopal et al. (2003) examines value relevance of network advantages stemming from web traffic. They identify several factors for value relevance of network advantage. They also document a positive association between network advantages and analyst consensus forecasts, such as one-year-ahead and two-year ahead earnings forecasts. Moreover, they show that network advantages explain a substantial portion of variation in stock prices. They conclude that explanatory power of nonfinancial information performs better than that of traditional financial measures.

Rajgopal et al. (2003) explore the extent to which stock market impound the information contained in order backlog for future earnings. Using a sample of 21,891 observations over 1981 to 1999, they employ the Mishkin (1983) framework to test market efficiency. Their results suggest that stock market

overweight the contribution of order backlog to future earnings. They also examine the reason for the mispricing of order backlog and find that analyst forecasts can correctly incorporate the information of order backlog in predicting future earnings. Finally, they suggest that stock market tend to place weight on order backlog information that has been incorporated in analyst forecasts.

Banker et al. (2000) also examine the relationship between nonfinancial performance and financial performance. They analyze 72 months time-series data from 18 hotels and use customer satisfaction and customer complaints as nonfinancial measures. They find that there is a long-term relationship between current period customer satisfaction and future financial performance as measure by operating profits. Their results suggest that nonfinancial measure provides incremental information about future financial performance. They further exploit the impact of including nonfinancial performance in incentive contracts and provide empirical evidence that both financial measures and nonfinancial performance measures have positive effect on the implementation of incentive contracts.

A large body of research uses the environmental indicators as nonfinancial performance measures. Barth and McNichols (1994) introduce environmental remediation costs into an accounting valuation model and employ seven environmental liability proxies as nonfinancial indicators. They explicitly examine value relevance of these nonfinancial measures and document a significant negative relation between environmental liabilities and share prices. Their valuation analysis reveals that environmental indicators provide explanatory power in explaining equity value.

A following study by Cormier and Magnan (1997) confirms the negative relation between environmental liabilities and market value of equity. Using Canadian data of 154 observations over the period 1986 to 1991, they examine the how market incorporate the information about environmental performance. They assess environmental performance by identifying a representative pollution measure, as computed by total pollution record relative to existing regulations. They find that market participants discount equity value for poor environmental performances, indicating the existence of environmental liabilities.

Hughes (2000) examines how market participants assess the valuation role

of toxic emissions, which is considered as a nonfinancial pollution measure. Based on a sample of electric utility firms, he integrates off-balance-sheet and environmental information into an accounting valuation model. He documents a negative relation between market value of common equity and toxic emissions for high-polluting utility firms that are targeted by Phase One of the 1990 Clean Air Act Amendments.[8] In contrast, he did not find the value relevance of this pollution measure for firms that are not affected by Phase One of the 1990 CAAA. His further analysis shows that this relation between equity value and pollution emissions varies by exogenous events across time, such as more stringent environmental legislation.

Coram and Monroe (2004) conduct a case study to assess how disclosure of nonfinancial information and assurance on this information affect stock prices. Their proxies for nonfinancial indicators are elements in the Balanced Scorecard framework. The results in their study suggest that disclosures of nonfinancial indicators have a significant effect on stock prices of participating accountants. They also provide experimental evidence that value relevance of assurance on nonfinancial information is context specific. Participants react to assurance on nonfinancial information only when the information is positive.

[8] Phase One of the 1990 CAAA (Clean Air Act Amendments).

Banker (2007) examines the effect of competition on the ability of nonfinancial measures to predict future financial performances. He draws data from more than 800 stores and uses employee satisfaction and customer satisfaction nonfinancial performances nonfinancial measures. His analyses indicate that both nonfinancial measures are positively associated with future profits for stores in urban locations with higher levels of competition. He also suggests that managers take information correlated with employee satisfaction and customer satisfaction into consideration together with financial performance measures.

2.3 Reliability of Nonfinancial Information

Nagar and Rajan (2001) analyze quarterly data from 11 manufacturing plants to examine sales implications of nonfinancial quality measures. They use defect rates and on-time deliveries to measure nonfinancial quality. Their results indicate that nonfinancial quality measures and financial quality measures contain differential information for future financial performances. They find that defect rates and on-time deliveries are positively associated with sales in the next quarter and external failure costs as proxy for nonfinancial quality measure

is negatively correlated with sales two quarter or three quarter ahead.

Vanstraelen et al. (2003) examine the effect of nonfinancial disclosure on accuracy and dispersion of financial analysts' earnings forecasts. They find that releases of forward-looking nonfinancial information help to lower forecast dispersions and improve accuracy of earnings forecasts. In contrast, they show that disclosures of historical nonfinancial information have no effect on either accuracy or dispersion of earnings forecasts.

Nichols et al. (2009) test how analysts and the market respond to the firms' release of nonfinancial information. They focus on firms that provide disclosures on product-related and business expansion activities during the period 2002 to 2008. Their results show that analyst forecast activities almost doubles at the disclosure date of nonfinancial information, indicating that analysts respond to issuance of product-related and business expansion information by providing more forecast reports. Moreover, they find that analysts provide more accurate and less dispersed forecasts associated with these nonfinancial disclosures, suggesting that nonfinancial data have credible implications for future financial information. Finally, they find that market's

reaction to nonfinancial information is concentrated on analyst revision date rather than the disclosure date, implying that market participants reply on analysts to extract information from nonfinancial disclosures.

Simpson (2010) assesses how analysts use nonfinancial information disclosures. For a sample of firms in the wireless industry over the period 1997 to 2007, she uses customer acquisition cost, market share, churn rate, average revenue per user, minutes of use per subscriber and subscriber base to proxy for nonfinancial indicators. Her analyses reveal that three among the six indicators, i.e. customer acquisition cost, average revenue per user and number of subscriber provide incremental information about future earnings. She also documents that analysts tend to underreact to the dissemination of the information, which is due to lack of systematic disclosures of nonfinancial information. She finally suggests that persistent disclosures of nonfinancial metrics across time should be enhanced to improve their usefulness in predicting future financial performances.

Using data from 31 countries over 1994 to 2007, Dhaliwal et al. (2012) conduct an international study to exploit the relationship between analyst

forecasts and the disclosure of nonfinancial information. The proxy for nonfinancial information in their study is corporate social responsibility (CSR) reports. Their results from the country level tests document a positive relation between issuance of CSR reports and analyst forecasts accuracy, indicating that analysts infer useful information from CSR disclosures to improve their earnings forecasts. They also find that this positive relation is stronger for countries and firms with more opaque information environment. They suggest disclosure of nonfinancial plays a complementary role to financial information.

Based on a large sample of U. S. firms over the period 2002 to 2010, Ma (2012) explicitly examines stock market reaction to the release of operations-related disclosures. He uses four proxies to measure market reactions: signed and unsigned abnormal returns, abnormal trading volatility and abnormal trading volume. He documents significant stock market responses following the release of voluntary operations-related disclosures, suggesting that investors incorporate the information contained in operations-related disclosures immediately after the disclosures. He also finds that the reactions are greater for firms in concentrated industries. Furthermore, he provides empirical evidence that stock market reactions to operations-related disclosures are greater that

those to other disclosures, such as earnings announcement, 10-K/Q filings, 8-K filings, and management forecasts. Finally, his results suggest that operations-related disclosures explain a greater amount of variations in quarterly returns than 10-K/Q filings or management forecasts.

2.4 Determinants of Nonfinancial Information

Based on a sample of 192 companies from Australian, Canadian and the United States, Robb et al. (2001) exploit underlying factors that determine disclosure choices of voluntary nonfinancial information. They identify a series of nonfinancial disclosures from annual reports according to the recommendations in the Database of Materials on Users' Needs for Information and AICPA Jenkins Committee report. After developing a list of six nonfinancial disclosures, they conduct a classification study to examine the relationship between firm characteristics and decision choices for the disclosures. They find that firms with greater size and global focus are more likely to disclosure higher levels of historical and forward-looking nonfinancial information.

Using data from three European countries, Vanstraelen (2003) et al. investigate the determinants of voluntary nonfinancial disclosure and analyze

the effect of nonfinancial disclosure on accuracy and dispersion of financial analysts' earnings forecasts. They identify a number of firm metrics, such as industry classification, firm size, country of domicile, degree of geographic dispersion, cross-listing and compliance with International Accounting Standards (IASs), and examine the effect of those metrics on disclosure decisions. They demonstrate that disclosure levels of nonfinancial information vary with industry classifications, firm sizes, geographic dispersions, cross-listings.

Nichols (2009) examines the determinants of firms' decisions to release nonfinancial information on to product-related and business expansions activities. Based on a large sample of 83,043 firm quarter observations from 2002 to 2008, he develops three proxies for proprietary costs of voluntary disclosure. He provides empirical evidence that proprietary costs play a key role on corporate decisions to issue product-related and business expansions disclosures. His results show that it is more likely to provide nonfinancial disclosures with weaker good news for firms faced with low level of proprietary costs. In contrast, firms provide product-related and business expansions disclosures with strong good news when the proprietary costs are high. He

further examines whether determinants of earnings guidance apply for nonfinancial disclosures. The results of his tests reveal that the number of analyst following, litigation risk and earnings volatility is positively associated with the likelihood of nonfinancial disclosures. And the positive relation is even stronger for nonfinancial disclosures.

Merkley (2010) investigates the impact of firm performance on decisions to provide voluntary disclosure in the context of R&D-related information. His sample comprises 20,990 10-K filings of firms that make investment in R&D over the period 1996 to 2007. He identifies R&D-related disclosures by constructing a measure based on the number of sentences that contain R&D-related content in 10-K filings. The content of R&D-related disclosures is further identified by categorizing sentences into three different subjects: competition, progress and facilities. His analyses indicate better financial performances as measured by higher concurrent earnings and market-based R&D payoff lead to lower level of R&D-related disclosures. He also finds that the negative relation between R&D-related disclosures and concurrent financial performance is more pronounced for firms with more emphasis on R&D and with more stringent outside monitoring.

2.5 Consequences of Nonfinancial Information

Dhaliwal et al. (2011) investigate firms' initiation of voluntary nonfinancial disclosure. For a sample of 294 firms from 1993 to 2007, they focus on voluntary disclosure of corporate social responsibility (CSR). Their analyses show that firms with a higher cost of equity capital in the previous year are more likely to initiate disclosure of CSR activities, suggesting that high cost of equity capital motives firms to publish CSR reports. They also provide empirical evidence that disclosing firms tend to raise equity capital following the initiations. They show that the amount of capital raised by the initiating firms is larger than that by non-initiating firms. They further exploit benefits associated with initiation of CSR activities. They find that firms that disclose CSR activities enjoy a reduction in future cost of capital. Moreover, the initiating firms are associated with more dedicated institutional investors and higher analyst coverage. Finally, they find that disclosure of CSR reports leads to lower absolute forecast errors and forecast dispersion.

2.6 Summary

In the absence of authoritative definition of nonfinancial information, a

large number of studies provide evidence that nonfinancial measures are value relevant and helpful in predicting future financial performance. Reliability tests suggest that nonfinancial information is incorporated into stock prices. Furthermore, nonfinancial disclosures enhance the value of analyst service.

Chapter 3 Determinants of operations-related disclosures

In this chapter, I examine the determinants of operations-related disclosures. Section 3.1 presents theory and predictions. Section 3.2 presents the model and methodology. Section 3.3 describes sample selection procedure and data sources. Section 3.4 reports the results. Section 3.5 summarizes this chapter.

3.1 Theory and predictions

Theory on voluntary disclosure assumes that managers have superior information on the firms' expected performance compared to outside investors. A large body of theoretical research (e.g., Grossman and Hart, 1980; Grossman, 1981; Verrecchia, 1983; Milgrom and Roberts, 1986) and empirical studies (e.g., Amihud and Mendelson, 1986; Leuz and Verrecchia, 2000; Guo, 2004; Dhaliwal et al, 2011) identify conditions under which firms voluntarily disclosure their private information. Healy and Palepu (2001) illustrate six forces that affect managers' decisions on voluntary disclosure for capital market reasons. In summary, managers have incentives to provide voluntary disclosure when raising external capital, when they are concerned about corporate control, and when they receive incentive-based compensation (Beyer el al., 2010).

In this study, I attempt to identify firm-level incentives by conjecturing certain firm characteristics that help to explain firms' decisions to voluntarily disclose operations-related information. Operations-related disclosures are sticky across time.[9] Therefore, I focus on factors that differentiate disclosure decisions instead of those initiate operations-related disclosures.[10] Since a firm's disclosure decisions are subject to a variety of considerations, the structure of empirical analyses in this thesis is based on a survey of the theoretical and empirical literatures rather than any particular model.

First, I expect that issuance of management earnings forecasts is positively associated with operations-related disclosures. Core (2001) argues that a firm's disclosure policy is endogenously determined by the same forces that shape the firm's governance structure and managerial incentives. Management earnings forecasts which represent a firm's general disclosure policy should be positively associated with other types of voluntary disclosures (Dhaliwal et al, 2011). As a result, firms that issue management earnings forecast are more likely to provide operations-related disclosures. Additionally, operations-related disclosures have

[9] Only 4% of the observations are the first-time standalone disclosures.
[10] Another reason for this study not to focus on initiation of operations-related disclosures is that the first-time standalone disclosures may be due to development of the database.

implications for earnings forecasts. On the one hand, operations-related disclosures can improve the credibility of management earnings forecasts if they signal good news. On the other hand, operations-related disclosures can provide a buffer effect for investors if management earnings forecasts signal bad news. Thus, I predict a positive relation between the likelihood of management earnings forecasts and that of operations-related disclosures.

Second, I expect a firm's financing activities to be positively associated with operations-related disclosures. Prior research (e.g., Frankel et al., 1995; Healy et al., 1999; Beyer et al., 2010) on voluntary disclosure suggests that to attract new capital is a primary motivation for managers to expand voluntary disclosure. Lang and Lundholm (2000) show that issuing firms significantly increase disclosure activities around their seasoned equity offerings. By disclosing more information prior to security offerings, managers can reduce information asymmetry in order to reduce costs of external financing. Marquardt and Wiedman (1998) document a greater frequency of voluntary disclosure and a reduction of information asymmetry nine months prior to equity offerings. In addition, Healy et al. (1999) provide empirical evidence that voluntary disclosure increases as the public financing increase. Hence, a firm with more

external financing structure is more likely to provide operations-related disclosures.

Third, I expect firm size to be positively associated with operations-related disclosures. Lang and Lundholm (1993) show that firms size can represent public pressure or financial resources. If firms are faced with more public pressure, investors would have more demand for information about the firm. Similarly, managers need to provide more disclosures to investors in order to attract more financial resources. In addition, prior literature (Chowand Wong-Boren, 1987; Kasznik and Lev, 1995) also provides evidence that firm size is positively related with voluntary disclosure. Therefore, a firm with greater size is more likely to provide operations-related disclosures.

Firms with greater growth opportunities are more likely to face financial constraints and need new resources in the near future. Further, growth firms tend to suffer more severe problem of information asymmetry, which could motivate managers to provide more disclosure in order to attract outside investors. Eng and Mak (2003) find that firms with more growth opportunities disclosure more information. Therefore, I expect growth firms are more likely to provide

operations-related disclosure.

I expect a firm's global focus [11] to be positively associated with operations-related disclosures. Firms with a global focus are subject to more disclosure regulations. There is abundant empirical evidence suggesting that firms with a global focus face greater pressure to provide more voluntary disclosures. For instance, Robb et al. (2001) find that firms with a global focus have stronger commitment to disclosure higher levels of historical and forward-looking nonfinancial information. A later study by Vanstraelen et al. (2003) also provides similar results. Dhaliwal et al. (2011) show that firms with a global focus, especially those having operating activities in emerging counties, have a higher likelihood to initiate nonfinancial voluntary disclosure.

I expect liquidity to be positively associated with operations-related disclosures. Economic theory suggests that voluntary disclosure reduces information asymmetry between managers and outsider investors. Moreover, disclosing more information mitigates the adverse selection problem among informed investors and uninformed investors. Therefore, a greater quantity of voluntary disclosures increases investors' willingness to trade, improving stock

[11] Firms have operations in foreign countries.

liquidity. For example, Diamond and Verrecchia (1991) document a negative relation between disclosure levels and information asymmetry. They suggest that higher disclosure generates more demand for securities, and thus improves liquidity in stocks. Botosan and Harris (2000) who investigate reasons to increase segment disclosure frequency report empirical evidence that voluntary disclosure is positively related to improved liquidity.

Prior literature suggests that firms' operating performance plays an important role in managers' decisions to make disclosure. Lev and Penman (1990) show that managers tend to provide more disclosures when firms experience better performances. Another study by Lang and Lundholm (1993) also find that disclosure increases as firm performance. However, Healy and Palepu (2001) interpret that the positive relation between disclosure and firm performance may be caused by a selection bias. Merkley (2012) suggests that firm performance is negatively related to qualitative disclosure. He argues that firms with better performance disclosure less because information asymmetry deceases as performance increases (Brown et al., 2009). Poor performances raise shareholders' concern about firms' future profitability and generate a greater demand of information. As a result, managers provide more qualitative

disclosure to explain current performance. In contrast, firms with strong performance may induce competition if they make more disclosure. Thus, the relationship between firm performance and operations-related disclosure may be either positive or negative.

Debt can play a monitoring role on corporate governance and mitigate the agency problem (Jensen and Meckling, 1976) between shareholders and bondholders. A stream of research argues that firms with a higher leverage ratio are required to disclosure more information (Lefwich et al., 1981). For example, Arya and Glover (1998) document a positive relation between debt and disclosures. However, another line of studies provide opposite prediction. They argue that debt as a mechanism to mitigate the agency problem between shareholders and managers (Jensen, 1986), reduce the need for voluntary disclosure. Eng and Mak (2003) point out firms with a lower debt ratio provide more voluntary disclosure, including financial and nonfinancial information. Hence, the relation between debt and operations-related disclosures is ambiguous.

I expect litigation risk to be one of the factors that determine

operations-related disclosures. Inadequate or untimely disclosure could cause legal actions against managers. To preempt potential litigation risk (Skinner, 1994; 1997), managers have incentives to increase voluntary disclosure. Miller and Piotroski (2000) find that managers in firms subject to higher litigation risk are more likely to disclose positive information. However, litigation could also discourage managers to make disclosure, especially forward-looking information. Baginski et al. (2002) report evidence that managers provide more voluntary disclosures in less litigious environment. Li (2009) also suggest that firms facing lower litigation risk disclosure more forward looking information. Thus, the effect of litigation risk on operations-related disclosures could be either positive or negative.

Theoretical research provides mixed evidence on the relation between voluntary disclosure and financial reporting quality. For example, Dye (1985) uses the probability that a manager is privately informed to models information quality and documents a complementary relation between voluntary disclosure and information quality. However, Penno (1997) uses two countervailing forces to model disclosure decision and finds that higher information quality reduces the probability of being informed. Empirical work (Francis et al., 2008) argues

that the relation between voluntary disclosure and financial information quality depends on the measures of voluntary disclosure and information quality examined.

I expect industry competition to be one determinant of operations-related disclosures. Prior studies modeling the relation between competition and voluntary disclosure demonstrate that industry competition reduces disclosure incentives with the existence of proprietary costs (Verrecchia, 1983; Dye, 1985). They argue that proprietary costs increase as the levels of competition increase, therefore more intense competition leads to less disclosure. In contrast to their argument, more recent research (e.g., Wagenhofer, 1990; Verrecchia, 2001; Bertomer et al., 2007) suggests that disclosure decisions are not necessarily determined by an interior threshold such that managers release the private information if it exceeds the threshold (Beyer et al., 2010). For instance, Shin (2002) advances two types of strategic interaction settings that may lead to different disclosure decisions. He proposes that capacity competition [12] motivates firms to disclose more information while price competition[13] drives them to disclose less. Therefore, the relation between industry competition and

[12] Also know as Bertrand competition.
[13] Cournot competition.

operations-related disclosures may be either positive or negative, depending on the nature of industry competition.

To summarize, I expect that firms with higher probability to issue management earnings forecast, more public financing activities and global focus are more likely to provide operations-related disclosures. Further, the likelihood to make operations-related disclosures is expected to be higher for firms with larger size, higher liquidity and better growth opportunities. Finally, the effects of firm performance, leverage ratio, litigation risk, earnings quality and industry competition on operations-related disclosures are not clearly identified.

3.2 Methodology

3.2.1 Model specification

To identify factors that determine operations-related disclosures, I employ the following model:

$$\begin{aligned} Disclosure_{i,t} &= \alpha + \beta_1 CIG_{i,t} + \beta_2 Fin_{i,t-1} + \beta_3 Size_{i,t-1} + \beta_4 MTB_{i,t-1} \\ &+ \beta_5 Global_{i,t-1} + \beta_6 Liquidity_{i,t-1} + \beta_7 ROA_{i,t-1} + \beta_8 Lev_{i,t-1} + \beta_9 Litigate_{i,t-1} \\ &+ \beta_{10} EarnVol_{i,t-1} + \beta_{11} HHI_{i,t-1} + \varepsilon_{i,t} \end{aligned} \quad (1)$$

where:

$Disclosure_{i,t}$ = 1 if the firm issues an operation-related voluntary disclosure during the fiscal period, and 0 otherwise.

$CIG_{i,t}$ = 1 if the firm issues a management earnings forecast during the fiscal period, and 0 otherwise.

$Fin_{i,t-1}$ = Amount of debt or equity capital raised by the firm scaled by total asset, measured as the issuance of common stock and preferred shares (SSTK) minus the purchase of common stock and preferred shares (PRSTKC) plus the long-term debt issuance (DLTIS) minus the long-term debt reduction (DLTR).[14]

$Size_{i,t-1}$ = Natural log of total assets (AT).

$MTB_{i,t-1}$ = The ratio of market value (PRCC_F* CSHO) over book value (CEQ).

$Global_{i,t-1}$ = 1 if the company reports non-zero foreign income (PIFO).

$Liquidity_{i,t-1}$ = the ratio of the number of shares (CSHTR_F) traded over total shares outstanding (CSHO).

$ROA_{i,t-1}$ = Operating income before extra items (IB) divided by total assets (AT).

$Lev_{i,t-1}$ = The sum of long-term debt (DLTT) and short-term debt

[14] Variable name from COMPUSTAT or CRSP, following are the same.

(DLC) over total assets (AT).

$Litigate_{i,t-1}$ = 1 for all firms in the biotechnology (SIC codes of 2833-2836 and 8731-8734), computers (SIC codes of 3570-3577 and 7370-7374), electronics (SIC codes of 3600-3674), and retail (SIC codes of 5200-5961) industries, and 0 otherwise.

$EarnVol_{i,t-1}$ = standard deviation of quarterly earnings over 12 quarters ending in the current fiscal year, divided by median asset value for the period.

$HHI_{i,t-1}$ = the sum of squared sales (Sale) of all firms in the industry based on 4-digit SIC codes from COMPUSTAT.

Because the dependent, $Disclosure_{i,t}$, is a binary variable, I estimate Equation (1) with a Probit model. A firm may provide more than one operations-related disclosure during the fiscal year. If the identified factors exert influence on managers' disclosure decision, similar relations between disclosure frequencies and these factors are expected. To test this, I use $Freq_{i,t}$ as the dependent variable in Equation (1). $Freq_{i,t}$ is defined as the number of operations-related disclosures the firm issues during the fiscal year. I estimate this model with a Poisson regression.

3.2.2 Sample and data

Data on operations-related disclosures are from Capital IQ, maintained by Standard & Poor's. I focus on five categories and consider them as operations-related disclosures: client announcement, business expansion, product announcement, business reorganization or discontinued operations, and strategic alliance. These five categories of key developments reveal information about direct change of firms' structural operations. Unlike segment reporting, they are non-routine disclosures. Detailed definitions for each category of operations-related disclosure are provided in Appendix II. During the period 2003 to 2011, 400,856 operations-related disclosures are obtained for 66,300 firms.[15] Observations without company identifiers are excluded. To avoid overlapped disclosures, I drop observations that are not self-initiating and duplicate observations that are announced within a 3-day window. To address the issue of data interdependence, I retain only one disclosure for a firm in the same fiscal year.[16] After the above selection process, 14,029 observations for 3,453 firms that provide operations-related disclosures are obtained over 2003 to 2011.

[15] Although Capital IQ starts from 2002, my sample year begins in 2003 to employ the lead-lag approach.
[16] Expect the analyses of disclosure frequence.

Accounting variables come from COMPUSTAT. Management earnings forecast are drawn from the Corporate Investor Guidelines (CIG) by First Call. After merging the above three datasets, observations with missing control variables are excluded. Continuous variables are winsorized at the 1% and 99% levels to mitigate outliers. Finally, I exclude observations in the financial industry. The final sample in this study consists of 39,480 observations.[17]

Panel A of Table 1 describes the sample selection procedure for data from Capital IQ. Panel B presents the distributions of operations-related disclosures over year and type. There is an increasing trend for firms to make operations-related disclosures during 2003 to 2008. After that, the overall number of firms making operations-related disclosures maintains a relatively stable level. Panel C presents distributions over disclosure frequency. It is shown that about half of the disclosing firms make more than four operations-related disclosures every fiscal year. Panel D presents the distributions of operations-related disclosures over industry (2-digit SIC Code). The manufacturing industry (SIC Code: 20-30) has the largest proportion of firms providing operations-related disclosures while the agriculture industry (SIC

[17] 14,029 observations are firms with operations-related disclosures.

Code: 01-10) has the lowest proportion. Examples of operations-related disclosures are provided in Appendix III.

3.3 Results

3.3.1 Descriptive statistics

Panel A of Table 2 presents descriptive statistics of variables used in this study. The mean *Disclosure* is 0.3553, indicating that more than one third of the firms in the full sample make operations-related disclosures. The mean *Freq* 1.9286 implies that firms provide about 2 operations-related disclosures each year in the sample period. Consistent with previous studies (e.g., Nichols, 2009; Ma, 2012), these results suggest that operations-related disclosures are a common way that firms communicate information to the market.

[INSERT TABLE 2 ABOUT HERE]

Turning to the main control variables, *CIG* has a mean of 0.1267, implying that about 12.67% of firms issue management earnings forecasts in the sample. It supports the findings in Nichols (2009) that operations-related disclosures occur more frequently than management earnings forecasts. The

average (median) of *Fin* is 0.0858 (0.0026). The mean of *Global* is 0.3249. The mean (median) of *Size* is 5.2896 (5.2410), which is consistent with Dhaliwal et al (2012). The mean (median) of *ROA* is -0.0793 (0.0226). *MTB* and *Lev* have a mean (median) of 4.0178 (2.0428) and 0.1720 (0.1198) respectively, which are comparable to those reported in Ajinkya et al. (2005) and Dhaliwal et al (2012). The mean (median) of *Liquidity* is 1.4051 (0.7678). The mean of *Litigate* is 0.3293. The mean (median) of *EarnVol* is 0.0413 (0.0125), consistent with Ajinkya et al. (2005). The mean (median) of *HHI* is 0.2229 (0.1616), indicating a moderate concentration level in the sample.

Panel B of Table 2 presents mean comparisons of key variables for firms that provide operations-related disclosures and those that do not. It is shown that firms providing operations-related disclosures are more likely to issue management earnings forecasts *CIG* (Diff=0.025, p=0.0135) and lower *ROA* (Diff=-0.0231, p<0.001). Disclosing firms have significantly higher levels of *Liquidity* (Diff=0.3431, p<0.001) than non-disclosing firms. Those that have better growth opportunities *MTB* (Diff=0.3047, p<0.001) and higher levels of financing activities *Fin* (Diff=0.008, p=0.0205) are also more likely to disclose operations-related information.

Firms that provide operations-related disclosures have higher degree of *Lev* (Diff=0.0077, p=0.0556). The earnings quality (*EarnVol*) of disclosing firms are slightly better (Diff=0.0025, p=0.0864) than those non-disclosing firms. Contrary to earlier expectation, disclosing firms have smaller firm *Size* (Diff=-0.1163, p=0.0196).

Table 3 reports the correlation matrix for main variables used in this study. The lower left panel indicates the Pearson correlations. The upper right panel indicates the Spearman correlations. It is shown that *Disclosure* is positively correlated with *CIG*, supporting that there is a complementary relationship between operations-related disclosures and management earnings forecasts. Consistent with Dhaliwal et al. (2011), *Size* is positively correlated with *Disclosure*. Additionally, *Disclosure* is significantly positively correlated with *Liquidity*, *Fin*, *Global* and *MTB*. These are consistent with the findings in earlier studies (e.g., Healy et al., 1999; Botosan and Harris, 2000; Robb et al., 2001). The correlation between *Disclosure* and *ROA* is significantly negative (p<0.0001), which is consistent with Merkley (2012).

[INSERT TABLE 3 ABOUT HERE]

Disclosure is significantly and positively correlated with *Litigate*, supporting the finding in Miller and Piotroski (2000). Similarly, the correlation between *Disclosure* and *EarnVol* is positive at a significant level ($p<0.0001$). It is observed that *Disclosure* is positively correlated with *HHI*, consistent with the argument of proprietary costs (Verrecchia, 1983; Dye, 1985). The correlation between *Disclosure* and *Lev* is significantly negative, consistent with Eng and Mak (2003).

In summary, the correlations between *Disclosure* and firm characteristics are in the predicated direction and significant. It is noted that the univariate correlations should be interpreted with caution due to the problem of omitted variables.

3.3.2 Regression results

Table 4 presents the results of the Probit regression for Equation (1). It is shown that there is a positive association between *Disclosure* and *CIG*. The coefficient on *CIG* is 0.2496 and significant at $p<0.001$ level. It indicates that

firms issuing management earnings forecasts are more likely to provide operations-related disclosures. These results are consistent with the complementary relationship between different types of corporate disclosures (Hirschey et al. 2001; Dhaliwal et al, 2012).

[INSERT TABLE 4 ABOUT HERE]

Consistent with the notion that firms in need of more external financing tend to disclose more information, the coefficient on *Fin* is positive and significant (coefficient=0.1786, p<0.001). This suggests that the odds of providing operations-related disclosures will increase by 17.86% for one percentage of increase in financing activities, holding others constant. The positive and significant coefficient on *Liquidity* (coefficient=0.0917, p<0.001) posits that firms with higher levels of liquidity are associated with higher probability of operations-related disclosures. This positive relation between disclosure and liquidity is consistent with Botosan and Harris (2000). The estimates on *Global* (coefficient=0.0739, p=0.0230) and *MTB* (coefficient=0.0046, p<0.001) are positive and significant, suggesting that firms with a global focus and better growth opportunities are more likely to provide

operations-related disclosures.

Litigate is positively and significantly associated with *Disclosure* (coefficient=0.1449, p=0.008), indicating that firms subject to higher litigation risks have higher likelihood of operations-related disclosures. This finding is consistent with that in Miller and Piotroski (2000). The coefficient on *ROA* is negative and significant (coefficient=-0.2003, p<0.001), suggesting that there is a negative association between firms performance and disclosures (Merkley, 2012). The estimate on *Lev* is also negative and significant (coefficient=-0.3029, p<0.001), which supports the argument that debt reduces the need for voluntary disclosures (e.g., Eng and Mak, 2003; Dhaliwal et al, 2011).

The coefficient on *EarnVol* is negative and significant (coefficient=-0.3523, p<0.001) showing that firms with less earnings volatility are associated with more likelihood to provide operations-related disclosures. This finding is in line with the argument that firms with better reporting quality provide more disclosures (Waymire, 1985). The coefficient of *Size* is insignificant. However, the sign is positive as earlier expectation. The

association between *HHI* and *Disclosure* is not significant. This may due to the reason that Herfindahl index is not a proper measure that captures distinct dimensions of competition.[18] These results are consistent with those reported in prior research (e.g., Dhaliwal et al, 2011).

[INSERT TABLE 5 ABOUT HERE]

To evaluate another property of operations-related disclosures, I use *Freq* as the dependent and estimate the Poisson regression of Equation (1). The regression results are reported in Table 5. It is shown that firms with higher probability of issuing management earnings forecast, global focus and better growth opportunities have more frequent operations-related disclosures at significant levels ($p<0.001$). *Liquidity*, *Fin*, *Litigate* and *Size* are positively and significantly associated with the frequency of operations-related disclosures. The estimates of *ROA*, *Lev* and *EarnVol* are negative and significant, suggesting a negative association between firm performance, leverage degree and earnings volatility. Consistent with the result in Table 4, the coefficient on *HHI* remains insignificant.

[18] See Li (2010).

In summary, the estimates on determinants of operations-related disclosures are largely in predicted sign, consistent with my earlier expectation.

3.4 Sensitivity tests and additional analyses

3.4.1 Alternative proxies of earnings quality

Previous results demonstrate a negative association between operations-related disclosures and earnings volatility. As in Francis et al (2008), I use alternative proxy for earnings quality: *AA*, absolute value of abnormal accruals (Jones, 1991) and *AQ*, accruals quality (McNichols, 2002)[19]. Larger values of *AA* and *AQ* indicate poorer earnings quality. The results are reported in Table 6. I find no significant relation between operations-related disclosures and absolute value of abnormal accruals (*AA*). In Model (2), the estimate for accruals quality (*AQ*) is negative and marginally significant ($p<0.100$), consistent with that reported in Table 4.

[INSERT TABLE 6 ABOUT HERE]

3.4.2 Alternative measures of industry competition

In the above analyses, I use Herfindahl index to measure industry

[19] It is a modification of Dechow and Dichev's (2002) model.

competition. Previous studies argue that Herfindahl index is a poor proxy for competition (Karuna, 2007) and fails to capture different dimensions of competition which may exert distinct influences on disclosure decisions (Li, 2010). Hence, alternative proxies for industry competition are adopted to test the association between competition and operations-related disclosures. Following Li (2010), I use the number of firms in the industry (Ind_Obs), the four-firm concentration ratio (Ind_Con4) and the industry-average ratio of plant and equipment, research and development, and capital expenditures ($Ind\_Average$) to measure the degree of competition faced with firms.[20] As shown in Table 7, the estimates for industry competition remain insignificant.

[INSERT TABLE 7 ABOUT HERE]

3.5 Chapter Summary

This chapter examines the determinants of operations-related disclosures. In general, the results suggest that a firm that issues management earnings forecasts is more likely to provide operations-related disclosures. The probability of making operations-related disclosures is higher for the firms with more financing

[20] The four-four firm ration and number of firms measure existing competition while Ind_Average measures potent competition (Li, 2010).

activities and better growth opportunities. Firms with global focus, higher liquidity and litigation risks are also associated with more likelihood of operations-related disclosures. In contrast, firms with higher leverage, poor performance and earnings quality are less likely to provide operations-related disclosures.

Chapter 4 Consequences of operations-related disclosures

In this chapter, I investigate the consequences of operations-related disclosures. Section 4.1 develops hypotheses. Section 4.2 presents the models and methodologies. Section 4.3 describes sample selection procedure and data. Section 4.4 presents the results. Section 4.5 summarizes this chapter.

4.1 Theory and hypotheses development

4.1.1 The effect of operations-related disclosure on information asymmetry

Information asymmetry exists when groups of market participants are in possession of unbalanced amount of information. That is, informed investors have superior information to uninformed investors about the firm's value. As a result, uninformed investors are reluctant to trade with informed investors and protect themselves with a higher price against adverse selection (Beyer et al., 2010). Hence, information asymmetry is costly to firms, because it reduces market liquidity and increases costs of capital.

Economic theory suggests that increased disclosure is a potential solution to the information asymmetry problem. Diamond and Verrecchia (1991) develop a

model of trade and show that increased level of disclosure should reduce the likelihood of information asymmetries among informed investors and uninformed investors. Empirical studies provide evidence to support that higher levels of disclosure are negatively associated with proxies for information asymmetry. An earlier work by Welker (1995) finds that firms with higher disclosure rankings have lower bid-ask spreads. Petersen and Plenborg (2006) report a negative relation between disclosure levels and different proxies for information asymmetry.

Operations-related disclosures are an important way firms communicate with the market. Managers have incentives to reduce the information asymmetry between insiders and outsiders by releasing more information to the market. More disclosures can increase firm value by reducing costs of capital (Myers and Majluf, 1984) and improving the liquidity of the stock (Botosan and Harris, 2000). Additionally, managers can signal their talents by voluntarily disclosing private information (Trueman, 1986).

Firms that provide operations-related disclosures release information on the firms' fundamental operations to both informed and uninformed investors, which

enables market participants to have a better understanding of the firm's current operations and future prospects. As a result, operations-related disclosures reduce the information advantage of informed investors.

Operations-related disclosures can reduce investors' incentives to search for private information.[21] Verrecchia (1982) and Diamond (1985) suggest that investors have fewer incentives to acquire private information if firms disclose information publicly. While operations-related disclosures provide forward-looking information and the activities to search for private information are reduced, the probability of trading against a privately informed investors becomes lower.

Based on the above arguments, I state the first hypothesis of this study as follows:

Hypothesis 1: Firms that provide operations-related disclosures are associated with lower degrees of information asymmetry.

4.1.2 The effect of operations-related disclosure on analyst following

Financial analysts play an important role in capital market through

[21] See Brown and Hillegeist (2007).

information collection and dissemination. Extant research that links voluntary disclosure with analysts following suggests that there could be a complementary or substitute relationship between the two. On one hand, voluntary disclosure can facilitate interpretation and dissemination of information, allowing analysts to create more valuable new information (Healy and Palepu, 2001). Studies by Lang and Lundholm (1996) and Francis et al. (1998) provide consistent evidence that firms with more disclosures are associated with higher analyst coverage. On the other hand, voluntary disclosure may preempt analysts' recommendations. Increased disclosures can reduce analysts' competitive advantage, which leads to a reduction of incentive to cover the firm. Healy et al. (1999) find that firms with higher ratings of disclosure have lower analyst coverage.

Bhushan (1989) suggests that the number of analyst following a firm is an equilibrium representing the interaction between the demand and supply functions for analyst service. He argues that the relation between voluntary disclosure and analysts following depends on how disclosure affects the demand and supply of analyst service.

Although operation-related disclosures have implications for future firm

performance, they usually do not provide exact estimates of future earnings. Investors could get different estimates due to distinct abilities to process the information.[22] Nichols (2009) documents positive abnormal returns triggered by disclosures of product-related information and business expansions. In other words, operations-related disclosures provide an opportunity for analysts to interpret the information with their expertise. And investors may rely on analysts' interpretations of nonfinancial information to trade on the market. Nichols and Wieland (2009) find that nonfinancial disclosures do not preempt analyst reports. Thus, operations-related disclosures may increase the demand for analyst service.

Operation-related disclosures enhance the value of analyst service by allowing them to provide more accurate reports. Extant research (e.g., Vanstraelen et al., 2003; Dhaliwal et al., 2012) provides evidence that firms releasing nonfinancial information are associated with higher forecast accuracy and less forecast dispersion. In addition, operation-related disclosures reduce the cost of gathering and processing information (Bhushan, 1989; Lang and Lundholm, 1993). Therefore, operations-related disclosures may increase the supply for analyst service. Nichols and Wieland (2009) document an increase of analyst activities at the date of nonfinancial disclosure.

[22] See Hirshleifer and Teoh (2003).

According to the above arguments, operations-related disclosures may increase both the demand for and supply of analyst service. Hence, more analysts following are expected for firms providing operation-related disclosures. I state the prediction formally as the following:

Hypothesis 2: Firms that provide operations-related disclosures are associated with more analysts following.

4.1.3 The effect of operations-related disclosure on institutional ownership

Institutional investors are sensitive to corporate disclosure practices.[23] However, the responses of institutional investors to disclosures are ambiguous. Theoretical models in disclosure predict that expanded disclosures are associated with an increased in institutional investor ownership (Healy et al., 1999). Empirical studies present evidence consistent with this prediction. For instance, Lang and Lundholm (1996) document an increase in institutional ownership for firms that provide more disclosures. Dhaliwal et al. (2011) indicate that there is a positive relation between nonfinancial disclosure and dedicated institutional investors. Research in this stream argues that more disclosures reduce

[23] See Bushee and Noe (2000).

information asymmetry, which brings about benefits to investors.[24] As a result, firms with more disclosures are more attractive for institutional investors.

In contrast, another line of research finds that there is a negative relation between institutional investor ownership and corporate disclosures. Tasker (1998) shows that firms holding conference calls are associated with lower institutional ownership. Bushee et al. (2003) provide similar results. Ajinkya et al. (2005) indicate that institutional ownership is negatively related to voluntary disclosure. Research in this line asserts that institutional investors are informed investors (Core, 2001; Ali et al, 2004) who have incentives to acquire private information and exploit opportunity to trade on the private information (Bushee et al., 2007). While expanded disclosures could serve as a substitute for collection of private information, profitable opportunities are eroded. Thus, institutional investors prefer firms with less disclosure.

The response of institutional investor ownership to operations-related disclosures mainly depends on whether the disclosures influence their potential opportunity for profitable trading (Bushee and Noe, 2000). Kim and Verrecchia

[24] There is evidence that increased disclosures improve liquidity (e.g. Healy et al., 1999) and reduce the costs of capital (e.g. Easley and O'Hara, 2004).

(1994) suggest that profit-making ability of informed investors lies in their superior ability to process the information and interpret the implications of disclosures. As argued above, operations-related disclosures usually do not provide estimates of future earnings. Institutional investors can analyze the information with their superior ability. In other words, firms that provide more disclosures may create profitable opportunities for institutional investors. Therefore, operations-related disclosures are likely to attract more institutional investors.

Moreover, firms that provide operations-related disclosures may reduce the price impact of trades. Expanded disclosures mitigate the problem of information asymmetry between the firm and investors, which leads to a reduction of price impact of trades (Diamond and Verrecchia, 1991). Institutional investors are more willing to invest in firms with lower price impacts (Gompers and Metrick, 1998). Hence, firms that provide operations-related disclosures may be associated with higher institutional investor ownership.

According to the arguments above, I expect that operations-related disclosures attract more institutional investors. This prediction is stated formally

as following hypothesis:

Hypothesis 3: Firms that provide operations-related disclosures are associated with higher institutional investor ownership.

4.2 Methodologies and Methods

In this section, I investigate the consequences of operations-related disclosures. Specifically, I examine the effect of operations-related disclosures on information asymmetry, analysts following and institutional investor ownership. Extant research (e.g. Ajinkya et al., 2005; Dhaliwal et al., 2011) shows that there can be endogenous relation and selection bias for contemporaneous analyses. To address these issues, I use the Heckman (1979)[25] two-stage regression analyses and the lead-lag approach.

4.2.1 Model for H1

To test the effect of operations-related disclosures on information asymmetry, I follow Heckman (1979) two-stage procedure. In the first stage, I estimate the Probit model of Equation (1) in which the likelihood of operations-related disclosures is regressed on a set of firm-specific variables. The inverse Mills ratio

[25] This approach mitigates selection bias due to unobservables (Tucker, 2010).

(IMR)[26] is derived from the first-stage regression. Then I include IMR as an additional control variable in the following second-stage regression.

According to previous studies (e.g. Welker, 1995; Leuz and Verrecchia, 2000; Ball et al., 2012), I use the relative bid-ask spreads as the proxy for information asymmetry. The model is specified as follows:

$$Spread_{i,t+1} = \alpha + \beta_1 Disclosure_{i,t} + \beta_2 Size_{i,t} + \beta_3 ROA_{i,t} + \beta_4 MTB_{i,t} + \beta_5 Lev_{i,t} + \beta_6 \mathrm{Re}tVol_{i,t} + \beta_7 Tvol_{i,t} + \beta_8 \mathrm{Pr}ice_{i,t} + \beta_9 Age_{i,t} + \varepsilon_{i,t} \quad (2)$$

where:

$Spread_{i,t+1}$ = average of the difference between closing ask and closing bid quotes scaled by the average of the ask and the bid.

$\mathrm{Re}tVol_{i,t}$ = daily stock return variance estimated over the fiscal period.

$Tvol_{i,t}$ = average monthly trading volume relative to total shares outstanding.

$\mathrm{Pr}ice_{i,t}$ = The closing price (PRCC_F) for the fiscal period.

$Age_{i,t}$ = the number of years after the firms' initial public offerings.

Other variables are defined as previously.

[26] It is the ratio of the probability density function (PDF) over the cumulative distribution function CDF).

The main variable of interest in Equation (2) is β_1, which measures the effect of operations-related disclosures on bid-ask spreads. The first hypothesis predicts this coefficient to be negative, indicating that firms providing operations-relation disclosure are associated with a reduction of bid-ask spread.

Following Kyle (1985) and Stoll (2000), I include stock return volatility ($\mathrm{Re}tVol_{i,t}$), trading volume ($Tvol_{i,t}$) and stock price ($\mathrm{Pr}ice_{i,t}$) as control variables. The coefficient for $\mathrm{Re}tVol_{i,t}$ is expected to be positive because stocks with higher volatility may be subject to a greater degree of information asymmetry. Prior research (e.g. Buskirk, 2012) finds that trading volume ($Tvol_{i,t}$) has a negative impact on information asymmetry. And the coefficient for $\mathrm{Pr}ice_{i,t}$ is also expected to be positive. As in Berger and Udell (1995), $Age_{i,t}$ is included as an additional control variable. Mature firms are expected to have lower information asymmetry. I also control for firm characteristics that may affect bid-ask spreads, such as $Size_{i,t}$, $ROA_{i,t}$, $MTB_{i,t}$ and $Lev_{i,t}$.

4.2.2 Model for H2

To examine the effect of operations-related disclosures on analysts

following, I estimate the following model which includes the IMR derived from the first-stage regression of Equation (1):

$$Ln(Analyst)_{i,t+1} = \alpha + \beta_1 Disclosure_{i,t} + \beta_2 Size_{i,t} + \beta_3 ROA_{i,t} + \beta_4 StdROE_{i,t} + \beta_5 \mathrm{Pr}ice_{i,t} + \beta_6 \mathrm{Re}tVol_{i,t} + \beta_7 RD_{i,t} + \varepsilon_{i,t} \quad (3)$$

where:

$Analyst_{i,t+1}$ = the number of analysts following the firm for the fiscal year.

$RD_{i,t}$ = research expense (XAD) scaled by total assets (AT).

$StdROE_{i,t}$ = the standard deviation of *ROE* over the fiscal period.

Other variables are defined as previously.

The coefficient on $Disclosure_{i,t}$ is the key variable of interest. It measures the influence of operations-related disclosures on analyst following. This coefficient is expected to be positive based on the second hypothesis in this study.

I refer to previous studies (e.g. Ali et al, 2007; Dhaliwal et al., 2011) and control for a number of control variables that may affect analyst coverage. $Size_{i,t}$ is expected to be positive because larger firms usually have a greater base

of brokerage (Bhushan, 1989). $ROA_{i,t}$ is included to control for firm profitability. $Price_{i,t}$, is expected to be positive as it is a proxy for brokerage commission rate (Brennan and Hughes, 1991). As in Bhushan (1989) and Dhaliwal et al. (2011), $RetVol_{i,t}$ and $StdROE_{i,t}$ are included to control levels of return volatility. $RD_{i,t}$ is used as a proxy for information asymmetry and its coefficient is expected to be positively associated with the dependent variable (Barth et al, 2001).

4.2.3 Model for H3

To examine the effect of operations-related disclosures on institutional investor ownership, I follow Bushee and Noe (2000) and Dhaliwal et al. (2011) to estimate the following model and include IMR as an additional control variable:

$$INST_{i,t+1} = \alpha + \beta_1 Disclosure_{i,t} + \beta_2 Size_{i,t} + \beta_3 MTB_{i,t} + \beta_4 Lev_{i,t} + \beta_5 DP_{i,t} + \beta_6 EP_{i,t} + \beta_7 SGR_{i,t} + \beta_8 SHRS_{i,t} + \beta_9 Mret_{i,t} + \beta_{10} Tvol_{i,t} + \beta_{11} Irisk_{i,t} + \varepsilon_{i,t} \quad (4)$$

where:

$INST_{i,t+1}$ = the percentage of institutional ownership.

$DP_{i,t}$ = the ratio of dividends to the market value of equity.

$EP_{i,t}$ = the ratio of income before extraordinary items (IB) to the market value.

$SGR_{i,t}$ = the percentage change in annual sales (sale).

$SHRS_{i,t}$ = the natural logarithm of shares outstanding.

$Mret_{i,t}$ = market-adjusted buy-and-hold stock return measured.

$Irisk_{i,t}$ = the logarithm of the standard deviation of the market-model.

Other variables are defined as previously.

The key variable of interest is β_1, measuring the effect of operations-related disclosures on institutional investor ownership. It is expected to be positive because firms providing operations-related disclosures are associated with more concentrated institutional ownership.

I control for a number of variables that are derived from prior research. $Size_{i,t}$ is expected to be positive because larger firms are assumed to be more attractive for institutional investors. Firm variables, such as $MTB_{i,t}$, $DP_{i,t}$, $EP_{i,t}$ and $SGR_{i,t}$, are included to capture fundamental growth and income (Bushee, 2001). Following Dhaliwal et al. (2011), I include $SHRS_{i,t}$ to control for equity issuance. $Mret_{i,t}$ is expected to be positive as it measures firm

performance (Bushee and Noe, 2000). Another control variable, $Tvol_{i,t}$, is included to control for liquidity. In addition, $Irisk_{i,t}$ is included to control for firm-specific risk.

4.3 Sample selection and data

Based on 39,480 firm-year observations for Equation (1), I refine the samples for the hypotheses in this chapter. Data for analysts following are drawn from I/B/E/S summary tape. Data for institutional ownership come from Thomson Financial Equity Ownership database. Stock returns data are collected from CRSP. I merge the above databases and exclude the observations in financial industry. After deleting observation without firm-specific control variables, I obtain 29,996, 8,297 and 11,283 firm-year observations for Equation (2)-(4) respectively over the sample period 2003-2011.

4.4 Results

4.4.1 Descriptive statistics

Table 8 reports descriptive statistics for the variables used in Equation (2) to (4). The mean (median) of *Spread* is 0.4140 (0.1892). The mean and median of institutional ownership (*INST*) is 48.62% and 51.40%, respectively.

Ajinkya et al. (2005) report a mean and median of 50.41% and 53.58% respectively for their control group. The mean (median) number of analyst following (*Analyst*) the firm is of 10.0314 (7.0000). These results are comparable to Ajinkya et al. (2005) who report a mean (median) of 9.69 (8.00).

[INSERT TABLE 8 ABOUT HERE]

Mean (median) Re*tvol* is 0.0013 (0.0008). The mean (median) of *Tvol* is 9.1402 (6.4566). The average (median) of Pr*ice* is 20.2358 (14.2300). Mean (median) *Age* is 15.1312 (10.0000). *StdROE* has a mean (median) of 0.0321 (0.0195). The average (median) of *RD* is 0.0705 (0.0332).

The average of *DP* is 0.0096. The mean (median) of *EP* is -0.0328 (0.0385). Mean (median) *SGR* is 0.1374 (0.0806). The mean (median) of *SHRS* is 10.3604 (10.2486). The average (median) of *Mret* is 0.0005 (0.0004). The mean (median) of *Irisk* is -3.6435 (-3.6625). In general, the distributional characteristics of the key variables are comparable to those reported in prior research (e.g., Ajinkya et al., 2005; Dhaliwal et al., 2011; Buskirk, 2012).

[INSERT TABLE 9 ABOUT HERE]

Pearson and Spearman correlation coefficients for the key variables are reported in the lower left panel and upper right panel of Table 9, respectively.[27] *Spread* is negatively correlated with *Disclosure* and *Freq* at significant levels ($p<0.0001$), which is consistent H1. The positive and significant correlations ($p<0.0001$) between *Analyst* and *Disclosure* suggest that operations-related disclosures triggers more analyst, supporting H2. *INST* is also positively correlated with *Disclosure* and *Freq*, indicating that firms with operations-related disclosures attract more institutional investors, consistent with H3.

4.4.2 Regression results for H1

The first hypothesis predicts that the level of information asymmetry is negatively associated with operations-related disclosures. Panel A of Table 10 shows the first-stage regression results of Equation (1). As shown in the panel, the significant estimates are consistent with those in Table 4. The Pseudo R-square is 7.2% with a sample of 266,96 observations, which is equal to those

[27] Only the key variables are reported for the sake of brevity.

in the second-stage regression. Panel B of Table 10 presents second-stage regression results of Equation (2). Standard errors are clustered at firm levels to account for cross-sectional correlation. Industry and year fixed effects are included.

[INSERT TABLE 10 ABOUT HERE]

The coefficient on the indicator variable *Disclosure* is negative and statistically significant (coefficient=-0.1209, t-statistics=-6.07) after controlling for the IMR and other determinants. It suggests that *Disclosure* of operations-related information has a negative and significant effect on bid-ask spreads. The magnitude indicates that bid-ask spreads are 12.09% lower for the firms that make operations-related disclosures than those that do not, holding other factors constant. These findings are consistent with the economic theory that disclosure reduces the level of information asymmetry (Diamond and Verrecchia, 1991) between informed investors and uninformed investors.

The coefficient on Re*tVol* is significantly positive (coefficient=2.7626, t-statistics=28.14), which suggests that the bid-ask spreads are higher for firms

with more volatile stock returns. The negative and significant coefficient on *Tvol* (coefficient=-0.0188, t-statistics=-12.11) indicates a negative association between trading volume and bid-ask spreads. These results are consistent with the findings in earlier work (e.g. Ball et al., 2012). As predicted, $Price_{i,t}$ (coefficient=0.0046, t-statistics=7.26) is positively related to *Spread*. The estimates on *Size*, *ROA*, and *MTB* are negative and statistically significant, suggesting that bid-ask spreads are negatively related to firm size, performance and growth opportunity. The coefficient on *Age* is positive and significant (coefficient=0.0091, t-statistics=10.96), showing that bid-ask spreads are larger for more mature firms. This estimate is in contrast to Berger and Udell (1995). However, it is possible that information asymmetry is more severe for mature firms due to the agency problem of free cash flows (Jensen, 1986). IMR is positive at the 1% level (coefficient=1.6980, t-statistics=18.69). The explanatory power of the model is quite high with the R-square statistics of 51.48%.

To summarize, the results of Table 10 show that the degree of information asymmetry is lower for firms with operations-related disclosures. These findings support the first hypothesis in this study.

4.4.3 Regression results for H2

Table 11 presents the association between operations-related disclosures and analyst following the firm. Panel A reports results for the first-stage regression. Panel B shows the multivariate regression of Equation (3) including the IMR as an additional control variable. Regressions have industry and year fixed effects. Standard errors are estimated clustering by firm.

[INSERT TABLE 11 ABOUT HERE]

As shown in the table, the coefficient on the indicator variable *Disclosure* is positive and statistically significant (coefficient=0.7862, t-statistics=2.74), suggesting that firms with operations-related disclosures attract more analysts to follow. These results are in line with the argument that firms' disclosures of nonfinancial information create opportunity for analysts to provide more valuable information. The positive association between analysts following and operations-related disclosures are consistent with prior research (e.g. Francis et al. 1998; Dhaliwal et al 2011).

The coefficient on *Size* is positive at the 1% level (coefficient=2.9811,

t-statistics=19.48), consistent with Bhushan (1989) who suggests that demand for analyst service increases with firm size. *ROA* (coefficient=11.7485, t-statistics=12.41) is significantly and positively associated with *Analyst* , indicating that firms with better performance are more attractive for analysts. The coefficient on *RD* is also positive and significant (coefficient=16.3009, t-statistics=7.45) showing that the number of analyst following increases as the expenses of research and development go up. These results are similar to those in Dhaliwal et al (2011). The coefficient on *StdROE* is statistically significant (coefficient=6.1622, t-statistics=2.66), consistent with the notion that opportunity for exploiting private information is greater for firms with more volatile earnings. The estimates for Pr*ice* (coefficient=0.0014, t-statistics=0.13) and Re*tVol* (coefficient=-0.6507, t-statistics=-0.64) are not significant at conventional levels, suggesting insignificant effect of stock price and return volatility on *Analyst* .

In summary, regression results in Table 11 support the second hypothesis in this study. They demonstrate a positive association between analysts following the firm and operations-related disclosures.

4.4.4 Regression results for H3

The section examines how operations-related disclosures are related to institutional investor ownership. Panel A of Table 12 reports the results of estimating the likelihood of operations-related disclosures. The results of the second-stage regression with IMR for Equation (4) are presented in Panel B. Standard errors are clustered at the firm level.

[INSERT TABLE 12 ABOUT HERE]

The positive and statistically significant coefficient on the indicator variable *Disclosure* (coefficient=2.9139, t-statistics=3.71) shows that firms with operations-related disclosures are associated with higher institutional investor ownership. Consistent with the conclusions in prior research (e.g., Lang and Lundholm, 1996; Healy et al., 1999), these results suggest that institutional investors tend to invest in firms with more transparent disclosure environment.

The coefficient on *Size* is insignificantly (coefficient=-0.0687, t-statistics=-0.13). The estimate on *MTB* is significant and positive (coefficient=1.8060, t-statistics=2.23) suggests that institutional investors prefer

firms with better growth opportunity. A significantly positive relation is detected between *Lev* (coefficient=8.4106, t-statistics=3.09) and *INST*. The estimate coefficient for *DP* (coefficient=-2.0726, t-statistics=-9.96) is negative while *EP* (coefficient=13.8726, t-statistics=11.51) is positively associated with *INST*. The coefficient on *SGR* (coefficient=-0.9977, t-statistics=-1.20) is not significantly different from zero, consistent with Dhaliwal et al (2011). *SHRS* has a significant and positive estimate (coefficient=5.3868, t-statistics=9.19), suggesting a positive association with institutional ownership. The estimates for *Mret* (coefficient=7.1022, t-statistics=5.77) and *Tvol* (coefficient=0.2646, t-statistics=3.01) are significantly positive, implying that institutional investors prefer stocks with higher returns and liquidity. The coefficients on *Irisk* (coefficient=-21.4424, t-statistics=-18.36) is significantly negative, which suggest that stocks with lower idiosyncratic risks attract more institutional investors.

In all, the results in Table 12 demonstrate a positive relation between disclosures of operations-related information and institutional investor ownership. These results support the prediction in Hypothesis 3.

4.5 Sensitivity tests and additional analyses

A series of sensitivity tests are conducted to examine the robustness of the results in this study.

4.5.1 Propensity score matching method

This section uses the propensity score matching method (Rosenbaum and Rubin, 1983; Smith and Todd, 2001; Tucker, 2010) to test the consequences of operations-related disclosures in order to mitigate the problem of selection bias[28] and multicollinearity. First, I focus on the observations with all firm characteristics available and divide them into two groups: those that provide operations-related disclosures and those that do not. Next, I estimate the Probit regression of Equation (1) and produce a predicted probability of disclosure for each firm. Then, each disclosing firm is matched with one non-disclosing firm of the same industry and fiscal year by the closest predicted probability. Finally, I re-estimate Equations (2)-(4) to analyze the effects of operations-related disclosures on information asymmetry, analyst following and institutional investor ownership.

[28] The propensity score matching method controls for selection bias due to observables (Tucker, 2010; Lennox et al., 2012).

[INSERT TABLE 13 ABOUT HERE]

Table 13 presents the results of the association between operations-related disclosures and bid-ask spreads using this matching method. It is shown that a sample of 15400 firm-year observations satisfy the matching criteria for Equation (2). The negative and significant coefficient on *Disclosure* (coefficient=-0.1013, t-statistics=-4.22) implies that the negative relationship between operations-related disclosures and bid-ask spreads still remains. The estimates for control variables *Size*, *ROA*, *MTB*, *Lev*, Re*tVol*, *Tvol*, Pr*ice* and *Age* are significant and comparable to those reported earlier. These results support the conjecture that firms providing operations-related disclosures experience lower levels of information asymmetry.

[INSERT TABLE 14 ABOUT HERE]

Table 14 shows that the matching procedure results in a sample of 6,440 firm-year observations to test the effect of operations-related disclosures on analysts following. *Disclosure* appears to be positively (coefficient=0.0298, t-statistics=3.07) associated with *Analyst*, suggesting that more financial

analysts are attracted by firms with operations-related disclosures. The control variables *Size*, *StdROE*, *RD* and *Price* are significantly positive. The results in this table indicate that the positive relationship between operations-related disclosures and analyst following remain unchanged after adopting the matching sample approach.

[INSERT TABLE 15 ABOUT HERE]

Table 15 reports results for the effect of operations-related disclosures on institutional investor ownership for the matching sample. As shown in the table, the coefficient on the indicator variable *Disclosure* is positive at a statistically significant at the 1% level (coefficient=3.6767, t-statistics=3.45). It suggests that operations-related disclosures have a positive impact on investment decision of institutional investors. The control variables, *MTB*, *DP* and *Irisk* are negatively associated with *INST*. The estimates for *Lev*, *SHRS*, *Mret* and *Tvol* are significantly positive. The coefficients on *Size*, *EP* and *SGR* are insignificant.

4.5.2 Firm fixed effects analyses

To mitigate the potential problem of omitted variables that are correlated with the disclosure decisions, I replicate the analyses for the effects of operations-related disclosures using firm fixed effects research design (Lennox et al., 2012). In addition, I use the logarithmic transformation[29] of *Freq* as the key independent variable and estimate Equation (2) to (5) to test the consequences of disclosure frequency. Regression results with clustered standard errors at the firm level are reported below.

[INSERT TABLE 16 ABOUT HERE]

Table 16 presents results for the effect of operations-related disclosures on bid-ask spreads. It is shown that the coefficient on the indicator variable *Disclosure* is negative and statistically significant (coefficient=-0.0229, t-statistics=-2.14). This coefficient suggests that firms with operations-related disclosures are associated with lower levels of bid-ask spreads. The estimate on *Freq* is negative and marginally significant (coefficient=-0.0021, t-statistics=-1.91), showing that the bid-ask spreads decreases as operations-related disclosures become more frequent. The firm characteristics control variables *Size*, *ROA*, *MTB*, *Lev*, Re*tVol*, *Tvol* and *Age* are

[29] As the frequency of operations-related disclosures is a count variable rather than a continuous variable.

significant and of the predicted signs. Although the coefficient on $Price$ is insignificant, it is in predicted direction. The R-square statistics are persistent at 28.37%. These results are consistent with my findings in the previous section.

[INSERT TABLE 17 ABOUT HERE]

Table 17 shows the effect of operations-related disclosures on analysts following with firm fixed effects. The coefficient on *Disclosure* is significantly positive (coefficient=0.0644, t-statistics=3.06), which suggests that firms providing operations-related disclosures trigger more analysts following. The positive and significant estimate on the natural logarithm of *Freq* (coefficient=0.0044, t-statistics=2.33) suggests that analysts following the firm increase with the frequency of operations-related disclosures. This result provides further support for H2. The estimates for control variables *Size*, *ROA*, $Retvar$, $Price$ and *RD* are significant and comparable with those previously reported. The coefficient on *StdROE* is marginally significant. The overall results in this table provide additional evidence of the positive association between operations-related disclosures and analyst following.

[INSERT TABLE 18 ABOUT HERE]

Table 18 reports the results for the association between operations-related disclosures and institutional investor ownership. The coefficient on *Disclosure* is positive and statistically significant (coefficient=1.0421, t-statistics=2.66), consistent with the previous findings that firms with operations-related disclosures attract higher institutional investor ownership. It is shown that the coefficient on *Freq* is insignificant. However, the sign is in predicted direction. The estimates for controls variables *Size*, *MTB*, *DP*, *Mret* and *Tvol* are positive and statistically significant. *Irisk* is negatively associated with *INST*. These results suggest that the positive relationship between operations-related disclosures and institutional ownership still holds using the firm fixed effects design.

4.5.3 Alternative proxy of information asymmetry

The analyses above use the bid-ask spreads as the proxy of information asymmetry. To mitigate the problem of measurement error, I adopt another proxy for information asymmetry: stock illiquidity (*Illiquidity*). According to Amihud (2002), *Illiquidity* is defined as the average ratio of daily absolute

return to the trading volume on the day. The results for the effect of operations-related disclosures on stock illiquidity are reported below. Regressions with fixed effect are estimated. Standard errors are clustered at the firm level.

[INSERT TABLE 19 ABOUT HERE]

It is shown that the estimate coefficient for *Disclosure* in Table 19 is significantly negative (coefficient=-0.0498, t-statistics=-2.06), indicating that firms providing operations-related disclosures reduce stock illiquidity for investors. The coefficients for control variables, *Size*, *MTB* and *Tvol* are significant and negative while *Price* significantly positive. The estimates for *Lev* and *RetVol* are positive and significant. *ROA* and *Age* are not significant.

[INSERT TABLE 20 ABOUT HERE]

In Table 20, the coefficient on *Ln*(*Freq*) is also negative at the 5% level (coefficient=-0.0051, t-statistics=-2.07), which suggests that as firms provide

more frequent operations-related disclosures, stocks have higher liquidity for investors. The estimates for control variables are comparable to those reported in Panel A.

Overall, the results in Table 19 and Table 20 are consistent with my previous findings. They provide further evidence that firms with operations-related disclosures are associated with lower degree of information asymmetry.

4.5.4 Tests to control for reverse causality

The results from the primary analyses show that operations-related disclosures are positively associated with analysts following and institutional ownership. It can be inferred that firms making operations-related disclosures attract more financial analysts and institutional investors. However, prior literature suggests that financial analysts and institutional investor have incentives to encourage firms to provide more disclosure (Ajinkya et al., 2005). Therefore, the problems of endogenous relation and reverse causality arise. To address these issues, I identify a sample of observations that have no analysts following in the previous year to disclosure and a sample of observations that

have no institutional ownership.[30] Then I perform replications with the reduced samples for Equation (3) and (4) respectively.

[INSERT TABLE 21 ABOUT HERE]

Table 21 presents the regression results of operations-related disclosures on analysts following for observations without analysts in the preceding year. It is shown that the sample shrinks to 452 firm-year observations. As expected, the estimate coefficient for *Disclosure* is significant and positive (coefficient=0.1924, t-statistics=2.57). *Freq* is also significantly positive (coefficient=0.0362, t-statistics=2.97). These results support the findings that firms that make operations-related disclosures trigger more financial analysts than those that do not. More frequent operations-related disclosures also leads to more analysts following.

[INSERT TABLE 22 ABOUT HERE]

Table 22 reports the regression results of operations-related disclosures on

[30] Observations with missing values for analysts are treated as no analysts following (Hong et al., 2000) and observations with missing values for institutional ownership are treated as no institutional ownership (Piotroski and Roulstone, 2004).

institutional ownership for observations without institutional investors in the preceding year. As shown in the table, a sample of 733 firm-year observations is obtained. The coefficient on *Disclosure* is significantly positive (coefficient=13.2164, t-statistics=5.44). The coefficient on *Freq* is insignificantly. Nevertheless, the overall results are in line with those reported in Panel B of Table 12 and Table 18.

To sum up, the results from the sensitivity tests are qualitatively the same with the findings reported previously. They also provide further support for the predictions in this study.

4.5.5 Tests for potential links

The results from above analyses indicate that firms with operations-related disclosures are associated with lower degree of information asymmetry. Moreover, firms that provide operations-related disclosures attract higher analyst coverage. In this section, I propose that analyst following be a potential mechanism linking operations-related disclosures and information asymmetry.

Financial analysts are important intermediaries in the capital market. They

collect information from all sources, including public and private. After analyzing the information with superior ability, financial analysts produce new valuable information and disseminate the new information to investors. Thereby, more information regarding the firms that are followed by financial analysts is available for investors (Chung et al, 1995). Previous studies provide empirical evidence that greater analyst coverage results in an improvement in dissemination of information (e.g. Hong et al, 2000; Griffin and Lemmon 2002). A more recent study by Bowen et al (2007) also suggests that higher analyst coverage reduces the levels of information asymmetry. Given the negative relation between information asymmetry and operations-related disclosures, I predict that the negative effect is more pronounced for firms with higher analyst coverage.

To test this prediction, I partition the sample into two groups: subsamples with the number of analysts following above median and subsamples with the number of analysts following below median. Then I conduct similar analyses in Table 17. Regressions of Equation (2) are estimated with fixed effects. Standard errors are cluster to the firm level. The results are presented in Table 23.

[INSERT TABLE 23 ABOUT HERE]

Model (1) analyzes the effect of operations-related disclosures on bid-ask spreads for firms with the number of analysts following above median. Model (2) analyzes the effect of operations-related disclosures on bid-ask spreads for firms with the number of analysts following below median. The coefficient on *Disclosure* (coefficient=-0.0107, t-statistics=-2.16) in Model (1) is negative and significant at the 5% level, which suggests firms with operations-related disclosures experience a 1.07% lower spreads in this subsample. In contrast, the coefficient on the indicator variable *Disclosure* (coefficient=-0.0016, t-statistics=-0.09) is insignificant in Model (2), indicating that there is no significant difference in spreads for this subsample. The estimates for characteristics control variables in the two groups are qualitatively the same and comparable to those in Table 17.

The results of Table 23 suggest that the negative effect of operations-related disclosures on information asymmetry is more pronounced for firms with more analysts following, consistent with earlier proposition. More importantly, they provide evidence that firms that provide operations-related disclosures reduce

information asymmetry by the dissemination role of financial analysts. These results also provide further support for Hypothesis 1.

4.5.6 Additional analyses for consequences of operations-related disclosures

In this section, I perform additional analyses to investigate the consequences associated with operations-related disclosures. Specifically, the effects of operations-related disclosures on forecast dispersion, forecast errors, sales growth and costs of debt are examined. Similar to previous analyses, I control for firm fixed effects.[31] Standard errors are adjusted for clustering at the firm level.

[INSERT TABLE 24 ABOUT HERE]

Table 24 presents the results for the effect of operations-related disclosures on forecast dispersions and forecast errors. Following Dhaliwal et al. (2011), forecast dispersion (FD) is defined as the average of the standard deviation of analysts forecasts deflated by stock price over the fiscal year. Forecast errors (FE) is defined to be the absolute value of the average of difference between

[31] Results from the two-stage regression analyses are qualitatively similar to those reported using firm fixed effects.

actual earnings minus mean forecast, deflated by stock price over the fiscal year. As reported in the table, the R-square statistics range from 17.92% to 24.13% with a sample of 8915 observations. In Model (1), the coefficient on *Disclosure* is insignificant. In Model (2), *Freq* has a significant and negative coefficient (coefficient=-0.0001, t-statistics=-2.41), implying that firms with more frequent operations-related disclosures are associated with a reduction in forecast dispersion. The coefficients on *Disclosure* and *Freq* are insignificant in Model (3) and Model (4), which suggest no significant improvement in forecast accuracy for firms that make operations-related disclosures.

[INSERT TABLE 25 ABOUT HERE]

To examine whether operations-related disclosures are associated with proprietary costs, I test the effect of operations-related disclosures on sales growth. Table 25 presents the regression results. Sales growth (*SGR*) is defined as the percentage change in annual sales. The firms-specific characteristics and additional control variables that might be correlated with sales are included: research and development expense (*RD*), plant and equipment (*PPE*) and

capital expenditure (CE). It is reported that the estimates of *Disclosure* and *Freq* are insignificant, showing no significant impact on sales growth for operations-related disclosures.

[INSERT TABLE 26 ABOUT HERE]

To see whether operations-related disclosure related to costs of capital, I analyze the effect of operations-related disclosures on costs of debt. Table 26 reports the results. The dependent variable is *Debt*, which is defined to be interest expense divided by the average of total debt at the beginning and the end of the fiscal year. As shown in the table, the coefficient for *Disclosure* and *Freq* are insignificant. The results suggest insignificant relation between operations-related disclosures and costs of debt.

4.5.7 Additional tests for robustness checks

In this section, I conduct additional tests to examine the components of operations-related disclosures, time variation, the change level and industry variation of operations-related disclosures.

[INSERT TABLE 27 ABOUT HERE]

Table 27 examines the effect of each category of disclosures. The independent of interest is *Type*, which equals 1 if the firm makes one disclosure on business expansion, business reorganization, client announcements, product announcements and strategic alliances in Model (1) - (5) respectively. Observations of other four categories of disclosures are excluded when I examine one category of the disclosure.

The results are reported in Table 27 of the Appendix in this sheet and the revised dissertation. As shown in Panel A of the table, the estimate on *Type* is significant and negative in Model (3), suggesting that firms that provide operations-related disclosures are associated with lower degree of information asymmetry. The coefficients are in the predicted direction in other four models. Panel B suggests that disclosures on business expansion, business reorganization, client announcements and product announcements lead to an increase in analysts following. In Panel C, the estimate in Model (1) and Model (3) is significantly positive, implying that disclosures on business and client announcements are positively associated with institutional ownership.

In sum, the effects of client announcements are significant on information asymmetry, analysts following and institutional ownership, suggesting that client announcements are the most important type of operations-related disclosures. The significant effects of business expansion on analysts following and institutional investor ownership suggest that business expansions are important disclosures as well.

[INSERT TABLE 28 ABOUT HERE]

Table 28 examines operations-related disclosures during the period of financial crisis. I include an indicator variable, *Crisis*, which equals one if the fiscal period falls within the year 2007-2009, and the interaction term *Disclosure*Crisis* as an additional control variables in the regression.

As shown in the table, estimates on *Disclosure* are significant and positive estimates in all panels. The interaction term are not significant in Panels A and B. In Panel C, the coefficient on the interaction term is significantly positive, suggesting that the positive relation between operations-related disclosures and

institutional ownership is stronger during the period of financial crisis.

To address the concern about endogeneity, I also include the lag dependent variable in the models to indicate the change of operations-related disclosures. The results are untabulated as they are qualitatively the same after controlling for the lag dependent variable: $Disclosure\_lag$. To be specific, the estimates on *Disclosure* is significantly negative in Panel A, suggesting firms with operations-related disclosures are associated with lower degree of information asymmetry. In Panel B and C, the estimates on *Disclosure* are significant and positive, indicating that firms with operations-related disclosures associated with more analysts following and higher institutional ownership. In sum, the results are robust under this robustness check.

[INSERT TABLE 29 ABOUT HERE]

Finally, I examine the industry variations of operations-related disclosures. First of all, I investigate the effect of operations-related disclosures for manufacturing firms by including the industry dummies. Based on the classification in Panel D of Table1, I further partition the samples in

manufacturing industry into two groups: SIC code between 2000-3000 and 3100-3900. $Z1$ is a dummy variable that equals to one if the firm is in manufacturing industry with SIC between 2000-3000; and zero otherwise. $Z2$ is a dummy variable that equals to one if the firm is in manufacturing industry with SIC between 3100-3900; and zero otherwise. The results are reported in Table 29.

The estimates on *Disclosure* are significant across the panels, suggesting that the results are robust under different industry classifications. In Panel A, $Z1$ is marginally significant and negative, consistent with the prediction. $Z2$ is insignificant but with the right sign. In Panel B, $Z1$ is insignificant and $Z2$ is significant and positive. In Panel C, both $Z1$ and $Z2$ are significantly positively. These results suggest that manufacturing firms with operations-related disclosures are associated with lower degree of information asymmetry, more analysts following and higher institutional ownership, consistent with my hypotheses.

[INSERT TABLE 30 ABOUT HERE]

Then I examine the effect of operations-related disclosures based on the sample of non- manufacturing industry. The results are reported in Table 30. In Panel A, the coefficient on *Disclosure* is insignificant but with the predicted sign. In Panel B and C, *Disclosure* are significant and positive, indicating that firms with operations-related disclosure are associated with more analysts following and institutional investor ownership. In general, these results are consistent with the overall findings and they suggest that the results are not driven by certain industry

4.6 Chapter Summary

This chapter examines the consequences associated with operations-related disclosures. The results from the two-stage regression support the argument that operations-related disclosures reduce the levels of information asymmetry. Furthermore, the results also show that firms with operations-related disclosures are associated with more analysts following and higher institutional ownership. Finally, the negative relation between operations-related disclosures and information asymmetry is more pronounced for the samples with more financial analysts. Additional analyses suggest that the overall results are robust to a number of sensitivity tests.

Chapter 5 Conclusions

This chapter concludes the dissertation. Section 5.1 summarizes the findings. Section 5.2 points out limitations and suggests opportunities for future research.

5.1 Summary

This study investigates the determinants and consequences of operations-related disclosures. I examine the factors that may influence corporate decisions of operations-related disclosures based on a sample of 39480 firm-year observations spanning from 2003 to 2011. I find that firms issuing management earnings forecasts and subject to higher litigation risks are more likely to release operations-related information. The result implies a complementary relation between different types of corporate disclosures (Amir and Lev, 1996; Hirschey et al., 2001). Furthermore, the likelihood for firms to provide operations-related disclosures is greater for firms with global focus, better growth opportunities, more financing activities and higher liquidity. In contrast, firms that have higher profitability, more debts and worse earnings quality are less likely to provide operations-related disclosures. Contrary to Li

(2010), I find no significant relation between industry competition and the probability of operations-related disclosures.

I explicitly examine the effects of operations-related disclosures on bid-ask spreads, analyst following and institutional investor ownership. The analyses reveal that firms that provide operations-related disclosures are associated with lower bid-ask spreads. The regression results provide empirical evidence that operations-related disclosures leads to a reduction of information asymmetry among investors. Moreover, firms that provide operations-related disclosures trigger more analysts following, which support the argument that nonfinancial disclosures do not preempt analysts' recommendations (Nichols and Wieland, 2009). In addition, firms with operations-related disclosure attract more institutional investors. These results are consistent with the findings in previous studies (e.g. Dhaliwal et al, 2011). Finally, the frequency of operations-related disclosures is negatively associated with information asymmetry and positively associated with analyst following and institutional ownership.

Additional analyses suggest that the effect of operations-related disclosures on information asymmetry is more pronounced for subsamples with more

analysts (firms with the number of analysts above median). This indicates that the dissemination role of financial analysts may be an underlying mechanism that links operations-related disclosures and the degree of information asymmetry.

5.2 Limitations and opportunities for future research

This study is subject to some limitations. First, I may fail to capture all the factors that influence corporate decisions for operations-related disclosures. Although every effort is made, the issue of endogeneity can arise as a result of omitted variables. Second, my analyses rely on empirical models suggested by prior research (e.g. Lang and Lundholm, 1993; Dhaliwal et al, 2011). The selection of control variables is inevitably subjective, due to lack of complete theory for the models. To alleviate this concern, I use common measures for the selected variables. Finally, this study is limited to certain operations-related disclosure metrics: disclosure decision and disclosure frequency. I do not probe deeper into other metrics.

As discussed above, one avenue for future research would be to investigate other properties of operations-related disclosures. There is a broad set of

disclosure metrics: horizons, timing, and news contents (good news versus bad news) et al. For example, is there a cluster of operations-related disclosures around earnings announcements? When and why do firms make operations-related disclosures that incorporate good (bad) news? Therefore, more comprehensive research in this area would provide further insights into corporate disclosure policies.

There are consequential costs and other benefits associated with operations-related disclosures. For instance, operations-related disclosures are forward-looking information in nature. It is possible that firms with operations-related disclosures are subject to higher litigation risks (Sinner, 1994). Prior research (Botosan, 1997) suggests that more disclosures would results in a decrease of equity costs. How do firms trade off between the costs and benefits? And these issues are left for future research.

Appendix Ⅰ: Definitions of Variables

Variables	Definitions and Measurements
AA	The absolute value of the accruals based on Jones (1991).
Age	The number of years after the firm's IPO.
Analyst	The number of analysts following the firm for the fiscal period.
AQ	Accrual quality based on McNichols (2002).
Audit	1 if the firm is audited by the big four auditing companies, and 0 otherwise.
CE	Capital expenditures (CAPX) scaled by total assets (AT).
CIG	1 if the firm issues a management earnings forecast during the fiscal period, and 0 otherwise.
Debt	Interest expense (XINT) divided by the average of total long-term debt (DLTT) and short-term debt (DLC) at the beginning and the end of the fiscal period.
Disc	The qualitative (Disclosure) or quantitative (Freq) measure of operations-related disclosures.
Disclosure	1 if the firm issued an operation-related voluntary disclosure during the fiscal period, and 0 otherwise.
Dispersion	Average of the standard deviation of analyst forecasts deflated by stock price over the fiscal period.
DP	The ratio of dividends to the market value of equity.
EarnVol	The standard deviation of quarterly earnings over 12 quarters ending in the current fiscal year, divided by median asset value for the period
EP	The ratio of income before extraordinary items (IB) to the market value.
EPS	Earnings Per Share (Basic) Excluding Extraordinary Items (EPSPX) for the fiscal period.
FD	The average of the standard deviation of analyst forecasts deflated by stock price over the fiscal year.
FE	The absolute value of the average of difference between actual earnings minus mean forecast, deflated by stock price over the fiscal year.
Fin	Amount of debt or equity capital raised by the firm scaled by total asset, measured as the issuance of common stock and preferred shares (SSTK) minus the purchase of common stock and preferred shares (PRSTKC) plus the long-term debt issuance (DLTIS) minus the long-term debt reduction (DLTR).

Freq	The number of operation-related voluntary disclosure the firm issues during the fiscal period.
Global	1 if the company reports non-zero foreign income (PIFO), and 0 otherwise.
HHI	the sum of squared sales (Sale) of all firms in the industry based on 4-digit SIC codes from COMPUSTAT.
Illiquidity	The average ratio of the daily absolute return to the (dollar) trading volume on that day.
IMR	The inverse mills ratio from the first-stage regression of Equation (1).
INST	The percentage of Institutional ownership.
Irisk	The logarithm of the standard deviation of the market-model residuals calculated from the daily stock returns.
Lev	The sum of long-term debt (DLTT) and short-term debt (DLC) over total assets (AT).
Liquidity	The ratio of the number of shares (CSHTR_F) traded over total shares outstanding (CSHO).
Litigate	1 for all firms in the biotechnology (2833-2836 and 8731-8734), computers (3570-3577 and 7370-7374), electronics (3600-3674), and retail (5200-5961) industries, and 0 otherwise.
Mret	Market-adjusted buy-and-hold stock return measured.
MTB	The ratio of market value over book value (CEQ). Market value is stock price (PRCC_F) at fiscal year end multiple by number of stocks outstanding (CSHO).
PPE	Property, plant and equipment (PPE) scaled by total assets (AT).
Price	The closing price (PRCC_F) for fiscal period.
RD	Research Expense (XAD) scaled by total assets (AT).
RetVol	Daily stock return variance estimated over the fiscal period, multiplied by 100.
ROA	Operating income before extra items (IB) divided by total assets (AT).
SGR	The percentage change in annual sales.
SHRS	The natural logarithm of shares outstanding.
Size	Natural log of total assets (AT).
Spread	The average of the difference between closing ask and closing bid quotes scaled by the average of the ask and the bid.
StdROE	The standard deviation of *ROE* over the fiscal period.
Tvol	Average monthly trading volume relative to total shares outstanding.

Appendix II: Definitions of Operations-related Disclosures

This appendix provides detailed definitions for each category of operations-related disclosures.[32]

Business Expansions: The growth of a company, usually by means of increasing their current operations through internal growth, like entering into new markets with existing products, opening a new branch, establishing a new division, increasing production capacity, or investing additional capital in the current business. Growth by acquisition is not covered in this event type.

Business Reorganization: An announcement that a company is combining or separating organizational units. Does not cover closure of a unit or facility (see Discontinued Operations/Downsizing) or opening of a new unit of facility (see Business Expansion).

Discontinued Operations/Downsizings: Phasing out of a product line, closing of an individual facility, such as a plant, branch, division or subsidiary, or a reduction in the work force of a company.

Client Announcements: An announcement of the beginning, ending or change in a relationships between a corporation and their clients or potential future clients.

Product Related Announcements: Announcements pertaining to the introduction, change, improvement, or discontinuation of a company's product or services. This includes all announcements from the research to final launch of the product and any enhancements to the product after launching.

Strategic Alliances: An agreement between two or more entities stating that the involved parties will collaborate in some way to achieve a common goal. This includes events where two or more companies are in discussions to form an alliance.

[32] From the website of CAPITALIQ: https://www.capitaliq.com.

Appendix III: Examples of Operations-related Disclosures

Date	Type	Company	Situations	Sources
Dec-16-2011	Business Expansions	General Motors Company (NYSE:GM)	General Motors Company will invest $68 million to prepare the Oshawa Assembly Plant to build the next-generation Chevrolet Impala, securing approximately 350 jobs. Combined with the recent investment to support the launch of the Cadillac XTS in 2012, GM is committing $185 million to Oshawa, which will create or retain approximately 750 jobs. The next-generation Chevrolet Impala is GM's fifth new product commitment to Canada since 2009. In order to meet customer demand and maximize the flexibility of GM's manufacturing operations, the next-generation Chevrolet Impala will be built at both the Oshawa Assembly Plant and the Detroit-Hamtramck Assembly Plant.	Targeted News Service

Mar-25-2006	Discontinued Operations/Downsizings	Motors Liquidation Company	General Motors Corporation announced it plans to eliminate 30,000 jobs and shutter a dozen plants by 2008. The dramatic buyout plan announced this week -- open to all 113,000 of the company's hourly workers -- may do much to move the company toward that goal. For many younger employees with less than 10 years on the job, the buyout may seem quite attractive: $70,000 in cash. Those with more than 10 years of seniority will receive $140,000 for leaving. Other than accrued pension benefits, workers choosing lump-sum buyouts will receive no other health or retirement benefits. For older employees, GM is offering a menu of early-retirement plans. For example, anyone eligible to retire with 30 years of service, retroactive to Oct. 1 last year, will receive full retirement benefits and a lump sum payout of $35,000.	KRTBN Knight-Ridder Tribune Business News

Dec-19-2011	Client Announcements	The Boeing Company (NYSE:BA)	Boeing Co. has announced an aircraft order received from FedEx Express. FedEx Express is ordering 27 Boeing 767-300 Freighters and is exercising existing options for two supplementary 777 Freighters.	Travel Business Review
Dec-31-2011	Product-Related Announcements	General Motors Company (NYSE:GM)	General Motors Company said that it will recall nearly 4,300 of its 2012 Chevrolet Sonics to check for missing brake pads. During warranty service on a Sonic that was part of a car rental fleet, it was discovered that a brake pad was missing. The company said the problem is expected to exist in very few cars and there are no known crashes or injuries related to the issue. A missing pad could require longer stopping distance and contribute to a crash. The recall involves 4,296 of GM's 2012 Sonics sold in the U.S. and produced between June 2 and Nov. 21, 2011. The affected models are from the automaker's Orion Township	Detroit Free Press (Michigan)

			assembly plant. Dealers will inspect the front brakes for missing inner or outer pads and, if a pad is missing, install new pads. If needed, a new brake caliper or brake rotor, or both, will also be installed. Affected customers will receive dealer letters beginning Jan. 14. The number of cars recalled is small, but the embarrassment that some cars lack such a fundamental part is a setback for GM and the UAW. Both are seeking to prove that workers at a union plant in the U.S. can build a small car profitably.	
Dec-20-2011	Strategic Alliances	IBM	BNP Paribas and International Business Machines Corp. Extend Infrastructure Services Agreement for Six Years	PR Newswire

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Table 1 Sample Selection Procedure and Sample Distribution (2003-2011)

This table presents sample selection procedure and sample distributions for data from Capital IQ. Panel A details the sample selection procedure. Panel B presents sample distribution over time and type. Panel C and Panel D presents sample distributions over frequency and industry.

Panel A Sample Selection Procedure

Procedure	Firm-years	Firms
Number of operations-related disclosure	400,856	66,300
Less:		
Observations without identifiers	(184,443)	(60,762)
Observations that are not self-initiating	(63,529)	(408)
Overlapped disclosures during the 3-day window	(28,681)	(0)
Multiple disclosures for the same fiscal period	(99,721)	(0)
Observations with extreme values	(3,727)	(476)
Observations with data unavailability	(5,057)	(599)
Observations in financial industry	(1,669)	(602)
Final observations with operations-related disclosures	14,029	3,453

Panel B Distribution of Operations-Related disclosure over time and type

Year	Business Expansions	Business Reorganization	Client Announcement	Product Announcement	Strategic Alliances	Disclosures	Firm
2003	446	297	1,909	1,973	111	4,736	1,054
2004	892	278	2,418	2,783	177	6,548	1,223
2005	1,191	326	2,600	3,305	189	7,611	1,373
2006	1,418	347	2,514	3,651	238	8,168	1,468
2007	1,728	473	2,848	4,229	275	9,553	1,629
2008	1,897	885	3,125	5,792	294	11,993	1,859
2009	1,509	924	2,894	5,378	278	10,983	1,821
2010	1,459	392	2,668	5,682	259	10,460	1,816
2011	1,769	356	2,304	6,139	244	10,812	1,786
Total	12,309	4,278	23,280	38,932	2,065	80,864	14,029

Panel C Distribution of Operations-Related Disclosure over Frequency

Frequency	1	2	3	4	5	6-10	Above 10	Total
N	3,201	2,206	1,561	1,257	1,021	2,818	1,965	14,029
Percentage	22.82%	15.72%	11.13%	8.96%	7.28%	20.09%	14.01%	100%

Panel D Distribution of Operations-Related Disclosure over 2-digit SIC

2-digit SIC Code	Industries	Firm-years	Firms
01-09	Agriculture, forestry and fishing	35	11
10-14	Mining	1,951	571
15-17	Construction	129	36
20-39	Manufacturing	7,050	1,623
40-49	Transportation and public utilities	747	203
50-51	Wholesale trade	395	113
52-59	Retail trade	963	209
70-89	Services	2,695	659
99	Nonclassifiable establishments	64	28

Table 2 Summary Statistics
This table presents summary statistics for main variables. Panel A reports the descriptive statistics and Panel B shows mean comparisons.

Panel A Descriptive statistics of main variables

Variable	Mean	Median	Minimum	25th Pctl	75th Pctl	Maximum	Std Dev
Disclosure	0.3553	0	0	0	1	1	0.4786
Freq	1.9286	0	0	0	2	23	4.0953
Size	5.2896	5.241	-0.3798	3.5867	6.9468	10.9386	2.4135
MTB	4.0178	2.0428	0.2028	1.2094	3.6659	61.786	7.7446
ROA	-0.0793	0.0226	-2.0747	-0.0844	0.0717	0.3285	0.3429
Lev	0.172	0.1198	0	0.0001	0.2898	0.7108	0.1837
Fin	0.0858	0.0026	-0.2807	-0.0211	0.0849	1.2437	0.2465
Global	0.3249	0	0	0	1	1	0.4683
Liquidity	1.4051	0.7678	0.0046	0.277	1.9044	9.1236	1.6963
Litigate	0.3293	0	0	0	1	1	0.47
EarnVol	0.0413	0.0125	0.0008	0.0054	0.0328	0.6846	0.0938
CIG	0.1267	0	0	0	0	1	0.3326
HHI	0.2229	0.1616	0.0493	0.0987	0.2806	0.9377	0.1813

Panel B Mean Comparisons

Variable	Mean(D=0)	Mean(D=1)	Diff (1-0)	t Value
Size	6.367	6.2507	-0.1163**	-2.33
MTB	2.738	3.0427	0.3047***	5.00
ROA	0.0061	-0.017	-0.0231***	-4.90
Lev	0.1689	0.1766	0.0077*	1.91
Fin	0.0093	0.0173	0.008**	2.32
Global	0.5352	0.5356	0.0004	0.03
Liquidity	1.7841	2.1272	0.3431***	6.44
Litigate	0.3542	0.3659	0.0117	1.05
EarnVol	0.022	0.0245	0.0025*	1.72
CIG	0.2748	0.3007	0.0259**	2.47
HHI	0.2277	0.2253	-0.0024	-0.57

Table 3 Correlation Matrix
This table presents Pearson correlations for main variables. The lower left panel reports the Pearson correlations. The upper right panel reports the Spearman correlations.

	Disclosure	Freq	CIG	Size	MTB	ROA	Lev	Fin	Global	Liquidity	Litigate	EarnVol	HHI
Disclosure	1.0000	0.9694	0.0827	0.0336	0.1065	-0.0402	-0.0586	0.0275	0.0883	0.1944	0.1066	0.0144	-0.0177
		<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	0.0043	0.0004
Freq	0.6343	1.0000	0.0918	0.0517	0.1239	-0.0438	-0.0734	0.0321	0.1138	0.2162	0.1337	0.0128	-0.0282
	<.0001		<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	0.0113	<.0001
CIG	0.0827	0.1148	1.0000	0.2932	0.0834	0.2111	0.0912	-0.1460	0.2125	0.2885	0.0304	-0.1967	0.1064
	<.0001	<.0001		<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
Size	0.0379	0.1401	0.2779	1.0000	-0.0520	0.4081	0.3946	-0.2595	0.3502	0.4356	-0.0795	-0.4798	-0.0238
	<.0001	<.0001	<.0001		<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
MTB	0.0386	0.0205	-0.0292	-0.2258	1.0000	0.1018	-0.0607	0.2024	0.0217	0.1391	0.1066	0.0739	-0.0689
	<.0001	<.0001	<.0001	<.0001		<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
ROA	-0.0458	-0.0091	0.1423	0.4385	-0.3638	1.0000	0.0378	-0.3167	0.1553	0.1944	-0.0620	-0.3926	0.0687
	<.0001	0.0710	<.0001	<.0001	<.0001		<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
Lev	-0.0603	-0.0730	0.0598	0.3274	0.0593	0.0835	1.0000	-0.0762	0.0404	0.0429	-0.1978	-0.1745	0.0227
	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001		<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
Fin	0.0404	0.0137	-0.1337	-0.3269	0.2973	-0.4726	-0.0820	1.0000	-0.1784	-0.0742	-0.0036	0.2098	-0.1325
	<.0001	0.0065	<.0001	<.0001	<.0001	<.0001	<.0001		<.0001	<.0001	0.4701	<.0001	<.0001
Global	0.0883	0.1648	0.2125	0.3446	-0.0702	0.1558	0.0056	-0.1877	1.0000	0.2997	0.0726	-0.1929	0.0799
	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	0.2646	<.0001		<.0001	<.0001	<.0001	<.0001
Liquidity	0.1594	0.1945	0.1953	0.3226	-0.0218	0.1159	0.0432	-0.0872	0.2351	1.0000	0.1240	-0.1627	-0.0204
	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001		<.0001	<.0001	<.0001
Litigate	0.1066	0.1558	0.0304	-0.0710	0.0444	-0.0932	-0.1916	0.0126	0.0726	0.1291	1.0000	0.1011	-0.1552
	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	0.0120	<.0001	<.0001		<.0001	<.0001
EarnVol	0.0014	-0.0212	-0.1038	-0.3508	0.2845	-0.4819	-0.0781	0.2965	-0.1337	-0.0836	0.0386	1.0000	-0.0688
	0.7763	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001		<.0001
HHI	-0.0232	-0.0255	0.0816	-0.0251	-0.0217	0.0495	0.0107	-0.0931	0.0607	-0.0328	-0.1471	-0.0281	1.0000
	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	0.0332	<.0001	<.0001	<.0001	<.0001	<.0001	

Table 4 Regression Results for Determinants of Operations-Related Disclosure

This table presents results for the following Probit regression:

$$Disclosure_{i,t} = \alpha + \beta_1 Cig_{i,t} + \beta_2 Fin_{i,t-1} + \beta_3 Size_{i,t-1} + \beta_4 MTB_{i,t-1} + \beta_5 Global_{i,t-1} + \beta_6 Liquidity_{i,t-1} + \beta_7 ROA_{i,t-1} + \beta_8 Lev_{i,t-1} + \beta_9 Litigate_{i,t-1} + \beta_{10} EarnVol_{i,t-1} + \beta_{11} HHI_{i,t-1} + \varepsilon_{i,t}$$

Standard errors are adjusted for clustering at the firm level. Year and industry dummies are included. Significances at the 10%, 5% and 1% levels in two-tailed tests are indicated by *, ** and *** respectively. The definitions and measurements of all variables are provided in the appendix I.

Variables	Predicted sign	Estimate	Z value
Intercept		-0.9065***	-6.38
Cig	+	0.2496***	5.83
Fin	+	0.1786***	4.68
Size	+	0.0129	1.56
MTB	+	0.0046***	3.58
Global	+	0.0739**	2.28
Liquidity	+	0.0917***	11.53
ROA	?	-0.2003***	-6.23
Lev	?	-0.3029***	-4.01
Litigate	?	0.1449***	2.66
EarnVol	?	-0.3523***	-3.83
HHI	?	-0.0672	-0.73
Pseudo R^2		0.0690	
N (Disclosure=1)		14,029	
N		39,480	

Table 5 Poisson Regression Results for Frequency of Operations-Related Disclosure

This table presents results for the following Poisson regression:

$$Freq_{i,t} = \alpha + \beta_1 Cig_{i,t} + \beta_2 Fin_{i,t-1} + \beta_3 Size_{i,t-1} + \beta_4 MTB_{i,t-1} + \beta_5 Global_{i,t-1} + \beta_6 Liquidity_{i,t-1} + \beta_7 ROA_{i,t-1} + \beta_8 Lev_{i,t-1} + \beta_9 Litigate_{i,t-1} + \beta_{10} EarnVol_{i,t-1} + \beta_{11} HHI_{i,t-1} + \varepsilon_{i,t}$$

Standard errors are adjusted for clustering at the firm level. Year and industry dummies are included. Significances at the 10%, 5% and 1% levels in two-tailed tests are indicated by *, ** and *** respectively. The definitions and measurements of all variables are provided in the appendix I.

Variables	Predicted sign	Estimate	Z value
Intercept		-1.5555***	-5.01
Cig	+	0.3379***	5.36
Fin	+	0.3571***	7.18
Size	+	0.1545***	10.54
MTB	+	0.0089***	5.24
Global	+	0.2142***	4.34
Liquidity	+	0.0954***	9.89
ROA	?	-0.3780***	-9.01
Lev	?	-1.0414***	-7.80
Litigate	?	0.5613***	6.50
EarnVol	?	-0.3880***	-2.79
HHI	?	-0.1212	-0.85
Pseudo R^2		0.1626	
N (Disclosure=1)		14,029	
N		39,480	

Table 6 Alternative proxies for earnings quality

This table presents results for Equation (1) with alternative proxies for earnings quality:

$$Disclosure_{i,t} = \alpha + \beta_1 Cig_{i,t} + \beta_2 Fin_{i,t-1} + \beta_3 Size_{i,t-1} + \beta_4 MTB_{i,t-1} + \beta_5 Global_{i,t-1} + \beta_6 Liquidity_{i,t-1} + \beta_7 ROA_{i,t-1} + \beta_8 Lev_{i,t-1} + \beta_9 Litigate_{i,t-1} + \beta_{10} EarnVol_{i,t-1} + \beta_{11} HHI_{i,t-1} + \varepsilon_{i,t}$$

AA is absolute value of abnormal accruals in Model (1). AQ is accruals quality in Model (2). Standard errors are adjusted for clustering at the firm level. Year dummies are included. Significances at the 10%, 5% and 1% levels in two-tailed tests are indicated by *, ** and *** respectively. The definitions and measurements of all variables are provided in the appendix I.

	Model (1)		Model (2)	
Variables	Estimate	Z value	Estimate	Z value
Intercept	-0.8971***	-6.24	-0.8974***	-6.10
Cig	0.2380***	5.45	0.2331***	5.36
Fin	0.1948***	4.68	0.1935***	4.47
Size	0.0156*	1.84	0.0182**	2.11
MTB	0.0069***	4.46	0.0063***	4.05
Global	0.0752**	2.28	0.0704**	2.13
Liquidity	0.0913***	11.25	0.0903***	11.06
ROA	-0.1710***	-4.95	-0.1751***	-4.79
Lev	-0.3566***	-4.50	-0.3595***	-4.48
Litigate	0.1323**	2.36	0.1262**	2.24
AA	-0.0005	-0.14		
AQ			-0.0287*	-1.85
HHI	-0.0457	-0.49	-0.0535	-0.56
Pseudo R^2	0.0678		0.0687	
N	36,910		36,505	

Table 7 Alternative proxies for industry competition

This table presents results for Equation (1) with alternative proxies for industry competition. *Ind _ Obs* is the number of firms within the industry in Model (1). *Ind _ Con*4 is the four-firm ratio in Model (2). *Ind _ Average* is the industry-average of plant and equipment, research and development, and capital expenditures in Model (3). Standard errors are adjusted for clustering at the firm level. Year dummies are included. Significances at the 10%, 5% and 1% levels in two-tailed tests are indicated by *, ** and *** respectively. The definitions and measurements of all variables are provided in the appendix I.

	Model (1)		Model (2)		Model (3)	
Variables	Estimate	Z value	Estimate	Z value	Estimate	Z value
Intercept	-1.1479***	-7.39	-0.9455***	-5.82	-0.9314***	-7.12
Cig	0.2502***	5.74	0.2431***	5.57	0.2438***	5.59
Fin	0.1800***	4.66	0.1869***	4.84	0.1865***	4.83
Size	0.0123	1.47	0.0124	1.48	0.0123	1.48
MTB	0.0045***	3.46	0.0045***	3.45	0.0045***	3.45
Global	0.0625*	1.89	0.0615*	1.87	0.0613*	1.86
Liquidity	0.0907***	11.15	0.0921***	11.34	0.0920***	11.30
ROA	-0.1948***	-6.01	-0.1986***	-6.14	-0.1982***	-6.12
Lev	-0.3141***	-4.04	-0.3313***	-4.27	-0.3298***	-4.25
Litigate	0.0724	1.17	0.1444**	2.59	0.1371**	2.12
EarnVol	-0.3736***	-4.04	-0.3661***	-3.95	-0.3667***	-3.96
Ind_Obs	0.0488	1.06				
Ind_Con4			0.0153	0.16		
Ind_Average					0.0002	0.19
Pseudo R^2	0.0673		0.0667		0.0667	
N	37,549		37,549		37,549	

Table 8 Summary Statistics for variables of consequences

This table presents summary statistics for variables.

Variable	Mean	Median	Minimum	25th Pctl	75th Pctl	Maximum	STD
Spread	0.4140	0.1892	0.0113	0.0959	0.4511	3.2815	0.5806
Analyst	1.8463	1.9459	0.0000	1.0986	2.6391	3.6636	0.9856
INST	48.6224	51.4002	0.0453	19.9939	76.1978	98.2297	30.555
Disclosure	0.4510	0.0000	0.0000	0.0000	1.0000	1.0000	0.4976
Freq	3.3466	0.0000	0.0000	0.0000	4.0000	34.0000	6.2965
Size	6.5815	6.3124	2.5951	4.9409	8.0444	11.6550	2.0960
ROA	-0.0028	0.0449	-0.8227	-0.0143	0.0848	0.2544	0.1767
MTB	3.3625	2.4245	0.4264	1.5783	3.8703	22.0365	3.2663
Lev	0.1593	0.1245	0.0000	0.0023	0.2612	0.6520	0.1629
RetVol	0.0013	0.0008	0.0001	0.0004	0.0016	0.0097	0.0016
TVol	9.1402	6.4566	0.3269	3.1218	11.6946	55.3871	9.2729
Price	20.2358	14.23	0.56	5.75	28.63	95.6	19.3676
Age	15.1312	10	0	5	20	79	15.0485
StdROE	0.0321	0.0195	0.0024	0.0109	0.0373	0.2238	0.037
RD	0.0745	0.0385	0.0000	0.0102	0.1018	0.5588	0.0992
DP	0.0096	0	0	0	0.0128	0.1045	0.0185
EP	-0.0328	0.0385	-1.7866	-0.0166	0.0637	0.2345	0.2654
SGR	0.1374	0.0806	-0.6308	-0.0246	0.2109	2.483	0.3832
SHRS	10.3604	10.2486	7.2726	9.3847	11.196	14.3217	1.4331
MRet	0.0005	0.0004	-0.0043	-0.0005	0.0014	0.0075	0.0019
Irisk	-3.6435	-3.6625	-4.7764	-4.0243	-3.2789	-2.2942	0.5309

Table 9 Correlation matrix for consequences

The lower left panel reports the Pearson correlations. The upper right panel reports the Spearman correlations.

	Spread	Analyst	INST	Disclosure	Freq
Spread	1.0000	-0.6908	-0.5057	-0.0594	-0.1080
		<.0001	<.0001	<.0001	<.0001
Analyst	-0.5486	1.0000	0.5006	0.1213	0.1954
	<.0001		<.0001	<.0001	<.0001
INST	-0.4272	0.5157	1.0000	0.1383	0.1731
	<.0001	<.0001		<.0001	<.0001
Disclosure	-0.0208	0.1233	0.1429	1.0000	0.9439
	0.0875	<.0001	<.0001		<.0001
Freq	-0.1147	0.2863	0.1923	0.5865	1.0000
	<.0001	<.0001	<.0001	<.0001	

Table 10 The Effect of Operations-Related Disclosures on Bid-ask Spreads

Panel A Results of the first-stage probit regression

$$Disclosure_{i,t} = \alpha + \beta_1 Cig_{i,t} + \beta_2 Fin_{i,t-1} + \beta_3 Size_{i,t-1} + \beta_4 MTB_{i,t-1} + \beta_5 Global_{i,t-1} + \beta_6 Liquidity_{i,t-1} + \beta_7 ROA_{i,t-1} + \beta_8 Lev_{i,t-1} + \beta_9 Litigate_{i,t-1} + \beta_{10} EarnVol_{i,t-1} + \beta_{11} HHI_{i,t-1} + \varepsilon_{i,t}$$

Variables	Estimate	z
Intercept	-0.7436***	-2.96
Cig	0.2319***	5.26
Fin	-0.0840	-1.39
Size	0.0072	0.65
MTB	0.0217***	5.54
Global	0.0945***	2.59
Liquidity	0.0921***	10.83
ROA	-0.5679***	-8.72
Lev	-0.4032***	-4.16
Litigate	0.0972	1.52
EarnVol	-0.2231	-0.94
HHI	0.0354	0.32
Pseudo R^2	0.0720	
N	26,696	

Panel B Results for the second-stage regression with inverse mills ratio

$$Spread_{i,t+1} = \alpha + \beta_1 Disclosure_{i,t} + \beta_2 Size_{i,t} + \beta_3 ROA_{i,t} + \beta_4 MTB_{i,t} + \beta_5 Lev_{i,t} + \beta_6 \mathrm{Re}tVol_{i,t} + \beta_7 Tvol_{i,t} + \beta_8 \mathrm{Pr}ice_{i,t} + \beta_9 Age_{i,t} + \varepsilon_{i,t}$$

Standard errors are adjusted for clustering at the firm level. Year and industry dummies are included. Significances at the 10%, 5% and 1% levels in two-tailed tests are indicated by *, ** and *** respectively. The definitions and measurements of all variables are provided in the appendix I.

Variables	Estimate	t Value
Intercept	0.8186***	2.78
Disclosure	-0.1209***	-6.07
Size	-0.2906***	-30.64
ROA	-0.9288***	-13.02
MTB	-0.0287***	-9.09
Lev	0.5469***	7.05
RetVol	2.7626***	28.14
TVol	-0.0188***	-12.11
Price	0.0046***	7.26
Age	0.0091***	10.96
IMR	1.6980***	18.69
R^2	0.5163	
N	26,696	

Table 11 The Effect of Operations-Related Disclosure on Analysts Following

Panel A Results of the first-stage probit regression

$$Disclosure_{i,t} = \alpha + \beta_1 Cig_{i,t} + \beta_2 Fin_{i,t-1} + \beta_3 Size_{i,t-1} + \beta_4 MTB_{i,t-1} + \beta_5 Global_{i,t-1} + \beta_6 Liquidity_{i,t-1} + \beta_7 ROA_{i,t-1} + \beta_8 Lev_{i,t-1} + \beta_9 Litigate_{i,t-1} + \beta_{10} EarnVol_{i,t-1} + \beta_{11} HHI_{i,t-1} + \varepsilon_{i,t}$$

Variables	Estimate	z
Intercept	-0.1662	-0.40
Cig	0.1245**	2.06
Fin	-0.0674	-0.53
Size	-0.0204	-0.97
MTB	0.0287***	3.24
Global	0.1641**	2.45
Liquidity	0.0826***	5.51
ROA	-0.6961***	-4.68
Lev	-0.3396*	-1.75
Litigate	0.0238	0.21
EarnVol	-0.2584	-0.49
HHI	0.0659	0.35
Pseudo R^2	0.0711	
N	8,297	

Panel B Results for the second-stage regression with inverse mills ratio

$$Ln(Analyst)_{i,t+1} = \alpha + \beta_1 Disclosure_{i,t} + \beta_2 Size_{i,t} + \beta_3 ROA_{i,t} + \beta_4 StdROE_{i,t} + \beta_5 \mathrm{Pr}ice_{i,t} + \beta_6 \mathrm{Re}tVol_{i,t} + \beta_7 RD_{i,t} + \varepsilon_{i,t}$$

Standard errors are adjusted for clustering at the firm level. Year and industry dummies are included. Significances at the 10%, 5% and 1% levels in two-tailed tests are indicated by *, ** and *** respectively. The definitions and measurements of all variables are provided in the appendix I.

Variables	Estimate	t Value
Intercept	0.0497	0.02
Disclosure	0.7862***	2.74
Size	2.9811***	19.48
ROA	11.7485***	12.41
StdROE	6.1622***	2.66
Price	0.0014	0.13
RetVol	-0.6507	-0.64
RD	16.3009***	7.45
IMR	-23.6209***	-20.03
R^2	0.5673	
N	8,297	

Table 12 The Effect of Operations-Related Disclosure on Institutional Ownership

Panel A Results of the first-stage probit regression

$$Disclosure_{i,t} = \alpha + \beta_1 Cig_{i,t} + \beta_2 Fin_{i,t-1} + \beta_3 Size_{i,t-1} + \beta_4 MTB_{i,t-1} + \beta_5 Global_{i,t-1} + \beta_6 Liquidity_{i,t-1} + \beta_7 ROA_{i,t-1} + \beta_8 Lev_{i,t-1} + \beta_9 Litigate_{i,t-1} + \beta_{10} EarnVol_{i,t-1} + \beta_{11} HHI_{i,t-1} + \varepsilon_{i,t}$$

Variables	Estimate	z
Intercept	-0.5694*	-1.77
Cig	0.1968***	3.40
Fin	0.0638	0.44
Size	-0.0131	-0.82
MTB	0.0196***	2.75
Global	0.1481***	2.70
Liquidity	0.1159***	8.11
ROA	-0.5352***	-4.81
Lev	-0.0641	-0.42
Litigate	-0.0022	-0.02
EarnVol	0.2129	0.49
HHI	-0.0010	-0.01
Pseudo R^2	0.0800	
N	11,283	

Panel B Results for the second-stage regression with inverse mills ratio

$$INST_{i,t+1} = \alpha + \beta_1 Disclosure_{i,t} + \beta_2 Size_{i,t} + \beta_3 MTB_{i,t} + \beta_4 Lev_{i,t} + \beta_5 DP_{i,t} + \beta_6 EP_{i,t} + \beta_7 SGR_{i,t} + \beta_8 SHRS_{i,t} + \beta_9 Mret_{i,t} + \beta_{10} Tvol_{i,t} + \beta_{11} Irisk_{i,t} + \varepsilon_{i,t}$$

Standard errors are adjusted for clustering at the firm level. Year and industry dummies are included. Significances at the 10%, 5% and 1% levels in two-tailed tests are indicated by *, ** and *** respectively. The definitions and measurements of all variables are provided in the appendix I.

Variables	Estimate	t Value
Intercept	-79.3204***	-9.78
Disclosure	2.9139***	3.71
Size	-0.0687	-0.13
MTB	1.8060**	2.23
Lev	8.4106***	3.09
DP	-2.0726***	-9.96
EP	13.8726***	11.51
SGR	-0.9977	-1.20
SHRS	5.3868***	9.19
MRet	7.1022***	5.77
TVol	0.2646***	3.01
Irisk	-21.4424***	-18.36
IMR	54.1078***	19.10
R^2	0.5063	
N	11,283	

Table 13 The Effect of Operations-Related Disclosures on Bid-ask Spreads

This table presents results regression using propensity score matching method:

$$Spread_{i,t+1} = \alpha + \beta_1 Disclosure_{i,t} + \beta_2 Size_{i,t} + \beta_3 Roa_{i,t} + \beta_4 MTB_{i,t} + \beta_5 Lev_{i,t} + \beta_6 \mathrm{Re}tVol_{i,t} + \beta_7 Tvol_{i,t} + \beta_8 \mathrm{Pr}ice_{i,t} + \beta_9 Age_{i,t} + \varepsilon_{i,t}$$

Standard errors are adjusted for clustering at the firm level. Year and industry dummies are included. Significances at the 10%, 5% and 1% levels in two-tailed tests are indicated by *, ** and *** respectively. The definitions and measurements of all variables are provided in the appendix I.

Variables	Estimate	t Value
Intercept	2.4368***	28.35
Disclosure	-0.1013***	-4.22
Size	-0.2995***	-26.22
ROA	-0.4820***	-6.21
MTB	-0.0648***	-15.46
Lev	1.0050***	11.24
RetVol	2.8907***	22.65
TVol	-0.0402***	-24.59
Price	0.0064***	8.90
Age	0.0070***	7.98
R^2	0.5199	
N	15,400	

Table 14 The Effect of Operations-Related Disclosure on Analysts Following

This table presents results regression using propensity score matching method:

$$Ln(Analyst)_{i,t+1} = \alpha + \beta_1 Disclosure_{i,t} + \beta_2 Size_{i,t} + \beta_3 ROA_{i,t} + \beta_4 StdROE_{i,t} + \beta_5 \mathrm{Pr}ice_{i,t} + \beta_6 \mathrm{Re}tVol_{i,t} + \beta_7 RD_{i,t} + \varepsilon_{i,t}$$

Standard errors are adjusted for clustering at the firm level. Year and industry dummies are included. Significances at the 10%, 5% and 1% levels in two-tailed tests are indicated by *, ** and *** respectively. The definitions and measurements of all variables are provided in the appendix I.

Variables	Estimate	t Value
Intercept	1.4895	0.78
Disclosure	0.0298***	3.07
Size	0.0529***	13.80
ROA	-3.6227	-0.79
StdROE	0.0625***	3.31
Price	0.1767***	6.47
RetVol	-0.0002	-0.66
RD	0.2426***	3.06
R^2	0.1761	
N	6,440	

Table 15 The Effect of Operations-Related Disclosure on Institutional Ownership

This table presents results regression using propensity score matching method:

$$INST_{i,t+1} = \alpha + \beta_1 Disclosure_{i,t} + \beta_2 Size_{i,t} + \beta_3 MTB_{i,t} + \beta_4 Lev_{i,t} + \beta_5 DP_{i,t} + \beta_6 EP_{i,t} + \beta_7 SGR_{i,t} + \beta_8 SHRS_{i,t} + \beta_9 Mret_{i,t} + \beta_{10} Tvol_{i,t} + \beta_{11} Irisk_{i,t} + \varepsilon_{i,t}$$

Standard errors are adjusted for clustering at the firm level. Year and industry dummies are included. Significances at the 10%, 5% and 1% levels in two-tailed tests are indicated by *, ** and *** respectively. The definitions and measurements of all variables are provided in the appendix I.

Variables	Estimate	t Value
Intercept	-142.7722***	-11.65
Disclosure	3.6767***	3.45
Size	-1.2242	-1.40
MTB	-0.8259***	-3.93
Lev	10.1405***	2.65
DP	-2.7270***	-7.53
EP	2.1301	1.37
SGR	-1.8743	-1.55
SHRS	7.0398***	7.42
MRet	7.1890***	4.11
TVol	0.8992***	10.88
Irisk	-25.0698***	-15.07
R^2	0.4292	
N	7,512	

Table 16 The Effect of Operations-Related Disclosures on Bid-ask Spreads

This table presents results for the following regression with firm fixed effects:

$$Spread_{i,t+1} = \alpha + \beta_1 Disclosure_{i,t} + \beta_2 Size_{i,t} + \beta_3 Roa_{i,t} + \beta_4 MTB_{i,t} + \beta_5 Lev_{i,t} + \beta_6 \mathrm{Re}tVol_{i,t} + \beta_7 Tvol_{i,t} + \beta_8 \mathrm{Pr}ice_{i,t} + \beta_9 Age_{i,t} + \varepsilon_{i,t}$$

Standard errors are adjusted for clustering at the firm level. Year dummies are included. Significances at the 10%, 5% and 1% levels in two-tailed tests are indicated by *, ** and *** respectively. The definitions and measurements of all variables are provided in the appendix I.

	(1)		(2)	
Variables	Estimate	t Value	Estimate	t Value
Intercept	1.8720***	16.89	1.8787***	16.89
Disclosure	-0.0229**	-2.14		
Freq			-0.0021*	-1.91
Size	-0.2250***	-18.36	-0.2250***	-18.35
ROA	-0.4342***	-13.42	-0.4344***	-13.43
MTB	-0.0279***	-16.14	-0.0279***	-16.15
Lev	0.6342***	15.01	0.6340***	15
RetVol	0.5439***	13.17	54.2605***	13.15
Tvol	-0.0145***	-23.54	-0.0145***	-23.55
Price	0.0004	1.43	0.0004	1.44
Age	0.0103**	2.16	0.0098**	2.03
R^2	0.2837		0.2837	
N	31,721		31,721	

Table 17 The Effect of Operations-Related Disclosures on Analysts Following

This table presents results for the following regression with firm fixed effects:

$$Ln(Analyst)_{i,t+1} = \alpha + \beta_1 Disclosure_{i,t} + \beta_2 Size_{i,t} + \beta_3 ROA_{i,t} + \beta_4 StdROE_{i,t} + \beta_5 \mathrm{Pr}ice_{i,t} + \beta_6 \mathrm{Re}tVol_{i,t} + \beta_7 RD_{i,t} + \varepsilon_{i,t}$$

Standard errors are adjusted for clustering at the firm level. Year dummies are included. Significances at the 10%, 5% and 1% levels in two-tailed tests are indicated by *, ** and *** respectively. The definitions and measurements of all variables are provided in the appendix I.

	(1)		(2)	
Variables	Estimate	t Value	Estimate	t Value
Intercept	-0.8394***	-4.64	-0.8204***	-4.55
Disclosure	0.0644***	3.06		
Freq			0.0044**	2.33
Size	0.3931***	15.52	0.3923***	15.51
ROA	0.2050***	3.32	0.2037***	3.29
StdROE	0.2867*	1.65	0.2852	1.64
Price	0.0045***	7.31	0.0045***	7.34
Retvol	-0.3868***	-4.41	-0.3813***	-4.34
RD	0.4604**	2.41	0.4485**	2.35
R^2	0.294		0.2942	
N	9,913		9,913	

Table 18 The Effect of Operations-Related Disclosures on Institutional Ownership

This table presents results for the following regression with firm fixed effects:

$$INST_{i,t+1} = \alpha + \beta_1 Disclosure_{i,t} + \beta_2 Size_{i,t} + \beta_3 MTB_{i,t} + \beta_4 Lev_{i,t} + \beta_5 DP_{i,t} + \beta_6 EP_{i,t} + \beta_7 SGR_{i,t} + \beta_8 SHRS_{i,t} + \beta_9 Mret_{i,t} + \beta_{10} Tvol_{i,t} + \beta_{11} Irisk_{i,t} + \varepsilon_{i,t}$$

Standard errors are adjusted for clustering at the firm level. Year dummies are included. Significances at the 10%, 5% and 1% levels in two-tailed tests are indicated by *, ** and *** respectively. The definitions and measurements of all variables are provided in the appendix I.

	(1)		(2)	
Variables	Estimate	t Value	Estimate	t Value
Intercept	-8.8665	-1.47	-8.7197	-1.44
Disclosure	1.0114***	2.57		
Freq			0.0270	0.56
Size	6.4679***	11.91	6.4786***	11.92
MTB	0.4117***	6.34	0.4125***	6.33
Lev	-11.2578***	-6.35	-11.2696***	-6.35
DP	-5.3683	-0.60	-5.3449	-0.60
EP	3.3865***	5.72	3.3733***	5.70
SGR	-0.6779**	-2.02	-0.6747**	-2.01
SHRS	0.2717	0.50	0.2935	0.54
Mret	3.9260***	6.61	3.9289***	6.60
Tvol	0.1676***	5.39	0.1693***	5.43
Irisk	-4.1259***	-7.35	-4.0921***	-7.30
R^2	0.1733		0.1707	
N	13,694		13,694	

Table 19 The Effect of Operations-Related Disclosures on stock illiquidity

This table presents results for the following regression with firm fixed effects:

$$Illiquidity_{i,t+1} = \alpha + \beta_1 Disclosure_{i,t} + \beta_2 Size_{i,t} + \beta_3 ROA_{i,t} + \beta_4 MTB_{i,t} + \beta_5 Lev_{i,t} + \beta_6 \mathrm{Re}tVol_{i,t} + \beta_7 Tvol_{i,t} + \beta_8 \mathrm{Pr}ice_{i,t} + \beta_9 Age_{i,t} + \varepsilon_{i,t}$$

Standard errors are adjusted for clustering at the firm level. Year dummies are included. Significances at the 10%, 5% and 1% levels in two-tailed tests are indicated by *, ** and *** respectively. The definitions and measurements of all variables are provided in the appendix I.

Variables	Estimate	t Value
Intercept	4.1507***	14.50
Disclosure	-0.0498**	-2.06
Size	-0.4780***	-13.40
ROA	-0.0983	-1.35
MTB	-0.0296***	-7.94
Lev	0.9281***	9.13
RetVol	1.1753***	12.00
Tvol	-0.0079***	-4.45
Price	0.0074***	8.18
Age	-0.0173	-1.45
R^2	0.1528	
N	33,550	

Table 20 The Effect of Frequency of Operations-Related Disclosures on stock illiquidity

This table presents results for the following regression with firm fixed effects:

$$Illiquidity_{i,t+1} = \alpha + \beta_1 Ln(Freq)_{i,t} + \beta_2 Size_{i,t} + \beta_3 ROA_{i,t} + \beta_4 MTB_{i,t} + \beta_5 Lev_{i,t} + \beta_6 \mathrm{Re}tVol_{i,t} + \beta_7 Tvol_{i,t} + \beta_8 \mathrm{Pr}ice_{i,t} + \beta_9 Age_{i,t} + \varepsilon_{i,t}$$

Standard errors are adjusted for clustering at the firm level. Year dummies are included. Significances at the 10%, 5% and 1% levels in two-tailed tests are indicated by *, ** and *** respectively. The definitions and measurements of all variables are provided in the appendix I.

Variables	Estimate	t Value
Intercept	4.1683***	14.57
Freq	-0.0051**	-2.07
Size	-0.4778***	-13.38
ROA	-0.0987	-1.35
MTB	-0.0296***	-7.94
Lev	0.9277***	9.12
RetVol	1.1743***	11.99
Tvol	-0.0079***	-4.46
Price	0.0074***	8.19
Age	-0.0187	-1.57
R^2	0.1500	
N	33,550	

Table 21 The effect of operations-related disclosures on analyst following for reduced sample

This table presents results for the following regression with firm fixed effects:

$$Ln(Analyst)_{i,t+1} = \alpha + \beta_1 Disclosure_{i,t} + \beta_2 Size_{i,t} + \beta_3 ROA_{i,t} + \beta_4 StdROE_{i,t} + \beta_5 \mathrm{Pr}ice_{i,t} + \beta_6 \mathrm{Re}tVol_{i,t} + \beta_7 RD_{i,t} + \varepsilon_{i,t}$$

Standard errors are adjusted for clustering at the firm level. Year dummies are included. Significances at the 10%, 5% and 1% levels in two-tailed tests are indicated by *, ** and *** respectively. The definitions and measurements of all variables are provided in the appendix I.

	(1)		(2)	
Variables	Estimate	t Value	Estimate	t Value
Intercept	-0.2701	-0.43	-0.2384	-0.39
Disclosure	0.1924**	2.57		
Freq			0.0362***	2.97
Size	0.1433***	4.48	0.1389***	4.36
ROA	0.0938	0.64	0.0842	0.57
StdROE	1.0325	1.40	0.9755	1.31
Price	-0.0023	-0.68	-0.0019	-0.57
RetVol	-26.6320**	-2.28	-22.9950**	-2.03
RD	0.4406	1.54	0.3534	1.29
R^2	0.2345		0.2416	
N	452		452	

Table 22 The effect of operations-related disclosures on institutional ownership for reduced sample

This table presents results for the following regression with firm fixed effects:

$$INST_{i,t+1} = \alpha + \beta_1 Disclosure_{i,t} + \beta_2 Size_{i,t} + \beta_3 MTB_{i,t} + \beta_4 Lev_{i,t} + \beta_5 DP_{i,t} + \beta_6 EP_{i,t} + \beta_7 SGR_{i,t} + \beta_8 SHRS_{i,t} + \beta_9 Mret_{i,t} + \beta_{10} Tvol_{i,t} + \beta_{11} Irisk_{i,t} + \varepsilon_{i,t}$$

Standard errors are adjusted for clustering at the firm level. Year dummies are included. Significances at the 10%, 5% and 1% levels in two-tailed tests are indicated by *, ** and *** respectively. The definitions and measurements of all variables are provided in the appendix I.

	(1)		(2)	
Variables	Estimate	t Value	Estimate	t Value
Intercept	-176.17***	-8.23	-177.89***	-8.22
Disclosure	13.2164***	5.44		
Freq			0.27685	1.03
Size	-3.0219**	-2.26	-3.4059**	-2.5
MTB	-0.1852	-0.49	-0.2885	-0.76
Lev	12.9468*	1.72	13.7575*	1.81
DP	-3.5697***	-3.38	-3.6002***	-3.28
EP	10.6943*	1.92	10.7662**	2
SGR	-0.5395	-0.16	-1.0261	-0.3
SHRS	5.0921***	4.00	5.8221***	4.42
MRet	3.7275	0.57	423.166	0.64
TVol	1.0093***	6.24	1.0740***	6.39
Irisk	-43.3580***	-10.02	-43.5670***	-9.91
R^2	0.5056		0.4853	
N	733		733	

Table 23 The Effect of Operations-Related Disclosures on Bid-ask Spreads for subsamples

This table presents results for the following regression with firm fixed effects:

$$Spread_{i,t+1} = \alpha + \beta_1 Disclosure_{i,t} + \beta_2 Size_{i,t} + \beta_3 ROA_{i,t} + \beta_4 MTB_{i,t} + \beta_5 Lev_{i,t} + \beta_6 \mathrm{Re}tVol_{i,t} + \beta_7 Tvol_{i,t} + \beta_8 \mathrm{Pr}ice_{i,t} + \beta_9 Age_{i,t} + \varepsilon_{i,t}$$

Standard errors are adjusted for clustering at the firm level. Year dummies are included. Significances at the 10%, 5% and 1% levels in two-tailed tests are indicated by *, ** and *** respectively. The definitions and measurements of all variables are provided in the appendix I.

Variables	Above Analyst Median		Below Analyst Median	
	Estimate	t Value	Estimate	t Value
Intercept	0.4217***	4.78	1.0873***	3.69
Disclosure	-0.0107**	-2.16	-0.0016	-0.09
Size	-0.0521***	-5.36	-0.2363***	-7.88
ROA	-0.1347***	-3.53	-0.6000***	-8.09
MTB	-0.0079***	-5.61	-0.0356***	-9.37
Lev	0.2051***	5.45	0.6675***	7.71
RetVol	0.5432***	5.59	0.9156***	8.81
Tvol	-0.0055***	-7.97	-0.0144***	-11.37
Price	-0.0001	-0.46	-0.0001	-0.06
Age	0.0057*	1.96	0.0410***	3.24
R^2	0.3130		0.3675	
N	7,196		8,290	

Table 24 The Effect of Operations-Related Disclosure on forecast dispersions and forecast errors

This table presents results for the following regression with firm fixed effects:

$$Dispersion_{i,t+1} = \alpha + \beta_1 Disc_{i,t} + \beta_2 Size_{i,t} + \beta_3 StdROE_{i,t} + \beta_4 EPS_{i,t} + \beta_5 RD_{i,t} + \beta_6 ROA_{i,t} + \varepsilon_{i,t}$$

$Disc_{i,t}$ is $Disclosure_{i,t}$ in model (1) and $Freq_{i,t}$ in model (2). Standard errors are adjusted for clustering at the firm level. Year and industry dummies are included. Significances at the 10%, 5% and 1% levels in two-tailed tests are indicated by *, ** and *** respectively. The definitions and measurements of all variables are provided in the appendix I.

	Model (1) *FD*	Model (2) *FD*	Model (3) *FE*	Model (4) *FE*
Intercept	0.0223***	0.0225***	0.0274***	0.0272***
	(6.08)	(6.10)	(2.90)	(2.88)
Disclosure	-0.0001		-0.0009	
	(-0.18)		(-0.87)	
Freq		-0.0001**		-0.0001
		(-2.41)		(-1.22)
Size	-0.0020***	-0.0020***	-0.0015	-0.0015
	(-4.15)	(-4.12)	(-1.21)	(-1.20)
StdROE	0.0217***	0.0217***	0.0818***	0.0819***
	(3.92)	(3.93)	(5.65)	(5.66)
EPS	-0.0006***	-0.0006***	-0.0020***	-0.0020***
	(-3.69)	(-3.73)	(-4.70)	(-4.71)
RD	-0.0111*	-0.0109	-0.0213	-0.0209
	(-1.89)	(-1.85)	(-1.45)	(-1.43)
ROA	-0.0227***	-0.0227***	-0.0356***	-0.0356***
	(-8.33)	(-8.33)	(-4.68)	(-4.68)
R^2	0.2413	0.2402	0.1795	0.1792
N	8,915	8,915	8,915	8,915

Table 25 The Effect of Operations-Related Disclosure on sales growth

This table presents results for the following regression with firm fixed effects:

$$SGR_{i,t+1} = \alpha + \beta_1 Disc_{i,t} + \beta_2 Size_{i,t} + \beta_3 ROA_{i,t} + \beta_4 MTB_{i,t} + \beta_5 Lev_{i,t} + \beta_6 PPE_{i,t} + \beta_7 RD_{i,t} + \beta_8 CE_{i,t} + \beta_9 Age_{i,t} + \varepsilon_{i,t}$$

$Disc_{i,t}$ is $Disclosure_{i,t}$ in model (1) and $Freq_{i,t}$ in model (2). Standard errors are adjusted for clustering at the firm level. Year and industry dummies are included. Significances at the 10%, 5% and 1% levels in two-tailed tests are indicated by *, ** and *** respectively. The definitions and measurements of all variables are provided in the appendix I.

	Model (1)		Model (2)	
Variables	Estimate	t Value	Estimate	t Value
Intercept	1.1748***	6.10	1.1696***	6.06
Disclosure	-0.0067	-0.53		
Freq			0.0009	0.64
Size	-0.1218***	-8.90	-0.1223***	-8.95
ROA	-0.4139***	-9.22	-0.4132***	-9.19
MTB	0.0044***	3.34	0.0044***	3.34
Lev	-0.1186***	-2.84	-0.1185***	-2.84
PPE	-0.4104***	-4.15	-0.4109***	-4.16
RD	-0.7763***	-5.29	-0.7784***	-5.32
CE	0.2426	1.46	0.2390	1.44
Age	-0.0087	-1.00	-0.0085	-0.98
R^2	0.0185		0.0185	
N	21,420		21,420	

Table 26 The Effect of Operations-Related Disclosure on costs of debt

This table presents results for the following regression with firm fixed effects:

$$Debt_{i,t+1} = \alpha + \beta_1 Disc_{i,t} + \beta_2 Size_{i,t} + \beta_3 ROA_{i,t} + \beta_4 MTB_{i,t} + \beta_5 Lev_{i,t} + \beta_6 PPE_{i,t} + \beta_7 CF_{i,t} + \beta_8 Audit_{i,t} + \beta_9 Age_{i,t} + \varepsilon_{i,t}$$

$Disc_{i,t}$ is $Disclosure_{i,t}$ in model (1) and $Freq_{i,t}$ in model (2). Standard errors are adjusted for clustering at the firm level. Year and industry dummies are included. Significances at the 10%, 5% and 1% levels in two-tailed tests are indicated by *, ** and *** respectively. The definitions and measurements of all variables are provided in the appendix I.

	Model (1)		Model (2)	
Variables	Estimate	t Value	Estimate	t Value
Intercept	-0.5967***	-2.63	-0.5917***	-2.60
Disclosure	0.0120	1.24		
Freq			-0.0008	-0.52
Size	-0.0395***	-4.05	-0.0389***	-4.01
ROA	-0.0576	-1.49	-0.0588	-1.52
MTB	-0.0006	-0.45	-0.0006	-0.44
Lev	0.0338	0.77	0.0337	0.77
PPE	-0.0426	-0.76	-0.0414	-0.74
CF	0.0250	0.46	0.0247	0.46
Audit	-0.0220	-1.39	-0.0218	-1.38
Age	0.0033	0.32	0.0032	0.31
R^2	0.0122		0.0122	
N	25,894		25,894	

Table 27 The Effect of different types of Operations-Related Disclosures

This table presents results for the effect of different types of Operations-Related Disclosures with firm fixed effects. *Type* is a dummy that equals 1 if the firm makes one disclosure on business expansion, business reorganization, client announcements, product announcements and strategic alliances in Model (1) - (5) respectively. Standard errors are adjusted for clustering at the firm level. Year dummies are included. Significances at the 10%, 5% and 1% levels in two-tailed tests are indicated by *, ** and *** respectively. The definitions and measurements of all variables are provided in the appendix.

Panel A The Effect of different types of Operations-Related Disclosures on Bid-ask Spreads

	Model (1)		Model (2)		Model (3)		Model (4)		Model (5)	
	Business Expansion		Business Reorganization		Client Announcement		Product Announcement		Strategic Alliances	
Variable	Estimate	t Value	Estimate	t Value	Estimate	t Value	Estimate	t Value	Estimate	t Value
Intercept	1.8269***	14.24	1.8728***	13.78	2.0294***	16.17	1.9417***	15.29	2.1105***	14.33
Type	-0.0091	-0.62	-0.0060	-0.30	-0.0364**	-2.21	-0.0177	-0.91	-0.0188	-0.66
Size	-0.2070***	-13.97	-0.2165	-14.32	-0.2357***	-16.59	-0.2196***	-15.55	-0.2451***	-15.50
ROA	-0.4911***	-10.93	-0.4889***	-10.82	-0.4526***	-11.10	-0.4430***	-11.74	-0.0018*	-1.73
MTB	-0.0259***	-11.62	-0.0270***	-11.93	-0.0292***	-13.45	-0.0278***	-13.95	-0.0282***	-11.82
Lev	0.6179***	11.78	0.6319***	11.63	0.6414***	12.78	0.6181***	12.44	0.7449***	13.45
RetVol	0.4965***	9.60	0.4699***	9.10	0.5228***	10.66	0.5282***	10.68	0.5549***	10.52
Tvol	-0.0140***	-19.26	-0.0140***	-18.70	-0.0148***	-20.81	-0.0145***	-20.33	-0.0147***	-19.00
Price	0.0001	0.24	0.0000*	-0.09	0.0001	0.27	0.0001	0.36	-0.0006	-1.41
Age	0.0082	1.55	0.0097	1.71	0.0080	1.54	0.0062	1.12	0.0072	1.14
R^2	0.4460		0.4348		0.4566		0.4563		0.4359	
N	22,115		21,166		23,624		24,508		20,424	

Panel B The Effect of different types of Operations-Related Disclosures on Analysts Following

	Model (1) Business Expansion		Model (2) Business Reorganization		Model (3) Client Announcement		Model (4) Product Announcement		Model (5) Strategic Alliances	
Variable	Estimate	t Value	Estimate	t Value	Estimate	t Value	Estimate	t Value	Estimate	t Value
Intercept	-12.8337***	-6.19	-12.0322***	-5.84	-12.2515***	-6.35	-14.9294***	-7.22	-11.1835***	-5.21
Type	0.9715***	3.91	0.4575*	1.89	0.4247*	1.88	0.4557**	1.94	-0.0246	-0.04
Size	3.3142***	11.25	3.1544***	10.75	3.1958***	11.52	3.6162***	12.43	3.0302***	9.94
ROA	1.6950***	2.82	1.6091***	2.67	1.3964***	2.65	0.8062*	1.66	1.6261***	2.69
StdROE	2.8877*	1.80	3.2530*	1.91	3.1115**	2.09	1.5557	1.07	2.4274	1.42
Price	0.0328***	5.05	0.0337***	5.00	0.0428***	6.59	0.0519 ***	6.43	0.0352***	5.10
RetVol	-1.3376*	-1.74	-1.5471**	-2.03	-0.7732	-1.09	-0.8504	-1.26	-1.1866	-1.51
RD	4.6372**	2.26	4.2771**	2.07	3.1475	1.53	5.2029***	3.18	4.5311**	2.14
R^2	0.2829		0.2712		0.2838		0.2994		0.2568	
N	6,120		5,815		6,654		7,132		5,472	

Panel C The Effect of different types of Operations-Related Disclosures on Institutional Ownership

	Model (1)		Model (2)		Model (3)		Model (4)		Model (5)	
	Business Expansion		Business Reorganization		Client Announcement		Product Announcement		Strategic Alliances	
Variable	Estimate	t Value	Estimate	t Value	Estimate	t Value	Estimate	t Value	Estimate	t Value
Intercept	-8.6382	-1.23	-9.7761	-1.34	-14.6919**	-2.14	-10.0115	-1.47	-11.6696	-1.60
Type	1.5715***	2.59	0.8578	1.32	1.3213**	2.10	1.0644	1.33	0.2190	0.21
Size	6.5640***	9.81	6.6872***	9.62	6.2921***	10.02	6.6962***	10.17	6.7294***	9.40
MTB	0.3915***	4.60	0.3923***	4.29	0.4123***	4.83	0.4361***	5.33	0.3977***	4.27
Lev	-12.6947***	-6.12	-11.7483***	-5.46	-9.6517***	-4.92	-11.3057***	-5.66	-12.1724***	-5.67
DP	-1.7872	-0.19	0.2885	0.03	5.3812	0.54	-3.4286	-0.33	-2.5305	-0.25
EP	3.1029*	3.72	3.5533***	4.37	3.5570***	4.52	3.1216***	4.24	3.4928***	4.03
SGR	-0.8063	-1.72	-0.8346*	-1.78	-0.3385	-0.78	-0.8254*	-1.93	-0.8234*	-1.72
SHRS	0.3796***	0.62	0.3127	0.50	0.8125	1.36	0.2572	0.43	0.4857	0.78
Mret	4.2016***	5.20	3.7715***	4.57	4.7596***	6.75	3.9103***	5.32	3.6772***	4.40
Tvol	0.1692***	4.37	0.1699***	4.20	0.1983***	5.03	0.1620***	4.40	0.1617***	4.01
Irisk	-3.0436***	-4.52	-3.3112***	-4.82	-4.1463***	-6.44	-3.7123***	-5.71	-3.0936***	-4.47
R^2	0.1159		0.1095		0.1388		0.1355		0.0933	
N	8,993		8,702		9,904		10,034		8,321	

Table 28 Time Variation of Operations-Related Disclosures

This table presents results for the effect of different types of Operations-Related Disclosures with firm fixed effects. *Crisis* is an indicator variable that equals one if the fiscal period falls within the year 2007-2009. Standard errors are adjusted for clustering at the firm level. Year dummies are included. Significances at the 10%, 5% and 1% levels in two-tailed tests are indicated by *, ** and *** respectively. The definitions and measurements of all variables are provided in the appendix.

Panel A The effect on Bid-ask Spreads

Variable	Estimate	t Value
Intercept	1.8731***	16.91
Disclosure	-0.0282**	-2.49
Crisis	0.1821***	11.42
Disclosure* Crisis	0.0160	1.25
Size	-0.2251***	-18.36
ROA	-0.4340***	-13.41
MTB	-0.0279***	-16.15
Lev	0.6343***	15.01
RetVol	0.5445***	13.18
Tvol	-0.0145***	-23.54
Price	-0.0004	-1.44
Age	0.0104**	2.18
R^2	0.4581	
N	31,721	

Panel B The effect on Analysts following

Variable	Estimate	t Value
Intercept	-16.2272***	-9.20
Disclosure	0.4370*	2.67
Crisis	-0.9500***	-4.95
Disclosure* Crisis	0.0846	0.54
Size	3.8326***	15.20
ROA	0.7942*	1.81
StdROE	3.1908***	2.62
Price	-0.0451***	-6.97
RetVol	-0.9929*	-1.69
RD	5.1093***	3.47
R^2	0.3151	
N	9,913	

Panel C The effect on Institutional Ownership

Variable	Estimate	t Value
Intercept	-6.2315	-1.03
Disclosure	0.7873*	1.85
Crisis	3.3309***	7.64
Disclosure* Crisis	0.8940**	2.14
Size	6.5910***	11.85
MTB	0.4338***	6.60
Lev	-11.6969***	-6.47
DP	1.1381	0.13
EP	3.4846***	5.76
SGR	-0.7523**	-2.10
SHRS	0.0256	0.05
Mret	3.6877***	6.11
Tvol	0.1803***	5.59
Irisk	-3.8858***	-6.83
R^2	0.1722	
N	13,694	

Table 29 Industry Variation of Operations-Related Disclosures

This table presents results for the effect operations-related disclosures with industry dummies. Z1 is a dummy variable that equals to one if the firm is in manufacturing industry with SIC between 2000-3000; and zero otherwise. Z2 is a dummy variable that equals to one if the firm is in manufacturing industry with SIC between 3100-3900; and zero otherwise. Standard errors are adjusted for clustering at the firm level. Year dummies are included. Significances at the 10%, 5% and 1% levels in two-tailed tests are indicated by *, ** and *** respectively. The definitions and measurements of all variables are provided in the appendix.

Panel A The effect on Bid-ask Spreads

Variables	Estimate	t Value
Intercept	1.9397***	22.10
Disclosure	-0.0963***	-8.70
Size	-0.1945***	-36.95
ROA	-0.2890***	-9.54
MTB	-0.0277***	-18.11
Lev	0.5493***	15.07
RetVol	1.4323***	32.58
TVol	-0.0209***	-31.84
Price	-0.0009**	-2.27
Age	0.0039***	9.26
Z1	-0.1398*	-1.66
Z2	-0.1029	-1.23
R^2	0.4971	
N	31721	

Panel B The effect on Analysts following

Parameter	Estimate	t Value
Intercept	-0.2823***	-2.59
Disclosure	0.2280***	7.45
Size	0.2521***	17.21
ROA	0.5894***	5.82
STDROE	1.0597***	3.77
Price	0.0051***	4.73
RetVol	-0.7366***	-5.96
RD	2.3594***	11.11
Z1	-0.0796	-0.86
Z2	0.1462***	2.73
R^2	0.3710	
N	9913	

Panel C The effect on Institutional Ownership

Parameter	Estimate	t Value
Intercept	-137.6665***	-22.38
Disclosure	4.2782***	4.93
Size	-3.4992***	-6.07
MTB	-0.8811***	-6.84
Lev	12.9406***	4.40
DP	-3.1388***	-13.47
EP	3.6988***	3.49
SGR	-1.7405**	-2.51
SHRS	9.0332***	14.87
MRet	6.6806***	5.98
TVol	0.9518***	13.42
Irisk	-28.2706***	-23.03
Z1	3.9351*	1.72
Z2	5.2631***	3.21
R^2	0.3728	
N	13302	

Table 30 Results of regressions for non-Manufacture Industries

This table presents results for the effect operations-related disclosures with firm fixed effects based on sample of non-Manufacture firms. Standard errors are adjusted for clustering at the firm level. Year dummies are included. Significances at the 10%, 5% and 1% levels in two-tailed tests are indicated by *, ** and *** respectively. The definitions and measurements of all variables are provided in the appendix.

Panel A The effect on Bid-ask Spreads

Parameter	Estimate	t Value
Intercept	1.9901***	13.99
Disclosure	-0.0214	-1.55
Size	-0.2084***	-12.58
ROA	-0.5129***	-10.62
MTB	-0.0228***	-10.25
Lev	0.5874***	9.96
RetVol	0.6555***	10.57
TVol	-0.0132***	-16.23
Price	-0.0001	-0.28
Age	-0.0027	-0.40
R^2	0.4640	
N	15605	

Panel B The effect on Analysts following

Parameter	Estimate	t Value
Intercept	-17.5324***	-5.94
Disclosure	0.8084***	3.20
Size	4.1525***	9.85
ROA	1.6085**	2.10
STDROE	2.0188	0.80
Price	0.0308***	2.59
RetVol	-2.1258*	-1.76
RD	10.9268***	2.87
R^2	0.2965	
N	3349	

Panel C The effect on Institutional Ownership

Parameter	Estimate	t Value
Intercept	-11.4846	-1.28
Disclosure	1.1902**	2.02
Size	6.8214***	7.85
MTB	0.3542***	3.46
Lev	-10.4526***	-3.53
DP	-12.2988	-0.96
EP	2.4612***	2.66
SGR	0.1354	0.25
SHRS	0.4597	0.56
MRet	3.1653***	3.56
TVol	0.1381***	3.14
Irisk	-3.3574***	-3.97
R^2	0.1639	
N	5780	