Three essays on international capital markets

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CAPITAL MARKETS**

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NANYANG BUSINESS SCHOOL
2011**

**THREE ESSAYS ON INTERNATIONAL
CAPITAL MARKETS**

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TABLE OF CONTENTS

Acknowledgements.....	i
List of Tables	v
Summary	vi
 1 Mandatory IFRS Reporting and Analysts' Information	 1
1.1 Introduction.....	2
1.2 Hypotheses Development and Empirical Constructs.....	5
1.2.1 Hypotheses Development.....	5
1.2.2 Measuring Analysts' Information	10
1.2.3 Analyst Following and Other Analysts' Information Measures	14
1.3 Sample and Data	15
1.3.1 Sample Screening.....	15
1.3.2 Dependent Variables	16
1.3.3 Firm-Level Independent Variables	17
1.3.4 Country-Level Institutional Factors	18
1.3.5 Pairwise Correlation Analysis.....	19
1.4 Results.....	20
1.4.1 Analysts' Information Precision of Pre- and Post-IFRS Adoption	20
1.4.2 Multivariate Analysis	21
1.4.3 Subsample by Country's Institutional Factors	26
1.4.4 Conditional on the Level of Information Environment Prior to IFRS	29
1.4.5 Analysts Coverage and IPO Firms	31
1.5 Robustness	32
1.6 Conclusions.....	35
Appendix 1.....	37
References.....	38
 2 The Economic Consequences of Financial Reporting Frequency: International Evidence.....	 62
2.1 Introduction.....	63
2.2 Prior Literature and Research Questions	66
2.3 Data and Construction of Variables.....	70
2.3.1 Sample Screening.....	70

2.3.2	Financial Reporting Frequency	72
2.3.3	Stock Price Informativeness (Ψ)	72
2.3.4	Analyst Forecast Errors (FERR)	75
2.3.5	Liquidity Measure (LIQ).....	76
2.3.6	Tobin's Q (Q).....	77
2.3.7	Country-Level Characteristics	78
2.3.8	Firm-Level Characteristics.....	80
2.4	Effects of Financial Reporting Frequency	83
2.4.1	Financial Reporting Frequency and Information Environment	84
2.4.2	Financial Reporting Frequency and Liquidity	87
2.4.3	Financial Reporting Frequency and Firm Valuation.....	88
2.4.4	Endogeneity Issues.....	89
2.5	Robustness	90
2.6	Discussion	91
2.7	Conclusion	94
	Appendix 1.....	96
	References.....	97
3	Asset Liquidity and Stock Liquidity: International Evidence.....	116
3.1	Introduction.....	117
3.2	Hypotheses Development	121
3.3	Sample and Data	126
3.3.1	Sample Screening.....	126
3.3.2	Stock Liquidity (LIQ)	128
3.3.3	Analyst Forecast Errors (FERR)	129
3.3.4	Asset Liquidity	129
3.3.5	Firm-Level Independent Variables	131
3.3.6	Country-Level Institutional Factors	132
3.3.7	Pair-Wise Correlation Analysis.....	133
3.4	Results.....	134
3.4.1	Multivariate Analysis on Asset-Stock Liquidity Relationship.....	134
3.4.2	Information Asymmetry and the Asset-Stock Liquidity Relationship.....	137
3.4.3	Subsample by Country's Institutional Factors	139
3.5	Impact of IFRS Adoption.....	140

3.6	Robustness	144
3.7	Conclusions.....	148
	References.....	150

LIST OF TABLES

Table 1.1 Sample Selection and Sample Composition by Country	42
Table 1.2 Description of Variables	44
Table 1.3 Descriptive Statistics for Variables Used in Analysis	45
Table 1.4 Correlation Matrix	47
Table 1.5 Precision of Analyst Information Measures Before and After Mandatory IFRS Adoption	49
Table 1.6 Multivariate Analysis of Analyst Information and Following on Mandatory IFRS Adoption.....	50
Table 1.7 Analyst Information and Following on Mandatory IFRS Adoption – Subsample Analysis	54
Table 1.8 Change in Information Environment Conditional on the Pre-IFRS Information Environment.....	59
Table 1.9 Robustness Tests.....	61
 Table 2.1 Description of Variables	 103
Table 2.2 Summary Statistics of Information, Liquidity, and Firm Valuation Variables.....	104
Table 2.3 Summary Statistics for Firm-Level and Country-Level Characteristics	106
Table 2.4 Correlation Matrix	108
Table 2.5 Analysis of Financial Reporting Frequency on Price Informativeness, Analyst Forecast Errors, Liquidity, and Firm Valuation.....	110
Table 2.6 Robustness Test	111
 Table 3.1 Description of Variables	 153
Table 3.2 Summary Statistics of Asset and Stock Liquidity Measures	154
Table 3.3 Summary Statistics for Firm-Level Characteristics and Country-Level Institutional Factors.....	156
Table 3.4 Correlation Matrix	158
Table 3.5 Multivariate Analysis of Asset Liquidity on Stock Liquidity.....	159
Table 3.6 Multivariate Analysis of Asset Liquidity on Analysts' Information.....	160
Table 3.7 Asset Liquidity on Stock Liquidity -- Subsamples Analysis.....	162
Table 3.8 Impact of IFRS Adoption on Asset - Stock Liquidity Relationship	166
Table 3.9 Robustness Tests.....	170

SUMMARY

This dissertation contains three essays on international capital markets. The first essay examines the information environment of analysts in countries following the mandatory adoption of the International Financial Reporting Standards (IFRS). We examine the analysts' forecast precision across 18 countries before and after they mandated the adoption of the IFRS, relative to 12 countries that retained local accounting standards. Using empirical proxies suggested by Barron et al. (1998) model, we find that the precision of both common and private information in analyst forecasts increase after IFRS adoption. In order to invest more effort in private information discovery, analysts are reducing the firm coverage. Partitioning my sample, we find that the analysts' information improves more in countries with better shareholders' rights protection or in countries with higher disclosure ratings. My result is consistent with theories that posit that better accounting disclosure triggers new information generation by sophisticated information processors.

Essay two investigates the effects of financial reporting frequency on the stock information environment and liquidity across 40 countries between 1988-2007. Results suggest that higher financial reporting frequency improves the stock price informativeness, forecast accuracy, and stock liquidity. However, the effects are not uniform across countries. The improvements in the stock information environment and liquidity are greater in common law countries than in civil law countries. We also find that firm valuation is positively associated with financial reporting frequency. However, contrary to the results of information environment and liquidity, the improvement in firm valuation is weaker in common law countries than in civil law countries. The reason is

that the disclosure costs and litigation risk are higher in common law countries, and most of the benefits gained from the lower cost of capital are offset by additional disclosure costs. A country's underlying legal origin and its degree of shareholder protection also influence the consequences of a change in financial reporting frequency.

Essay three investigates the relationship between the liquidity of a firm's assets and the liquidity of its stock across 47 countries. We find a positive relationship between asset liquidity and stock liquidity. This finding is consistent with Gopalan, Kadan, and Pevzner (2010) where they document a positive relationship in the U.S. market. We further show that analyst forecast errors is negatively associated with asset liquidity. The results support the valuation uncertainty hypothesis, which states that liquid assets reduce information asymmetry among market participants, therefore improving stock liquidity. We also find that the relationship is weaker in common law countries, in countries with strong shareholder protection, or in countries with high accounting rating standards. The reason is that investors in these countries rely less on assets structure for firm valuation as they have other reliable firm information besides balance sheets. Using the mandatory International Financial Reporting Standards (IFRS) adoption as an exogenous event, we find that the relationship between asset and stock liquidity becomes weaker because of the better disclosure environment brought by the IFRS. But the weakening of the relationship only occurs in common law countries, in countries with strong shareholder protection, or in countries with high accounting rating standards.

1 Mandatory IFRS Reporting and Analysts' Information

Abstract

This study examines the information environment of analysts in countries following the mandatory adoption of the International Financial Reporting Standards (IFRS). We examine the analysts' forecast precision across 18 countries before and after they mandated the adoption of the IFRS, relative to 12 countries that retained local accounting standards. Using empirical proxies suggested by Barron et al. (1998) model, we find that the precision of both common and private information in analyst forecasts increase after IFRS adoption. In order to invest more effort in private information discovery, analysts are reducing the firm coverage. Partitioning my sample, we find that the analysts' information improves more in countries with better shareholders' rights protection or in countries with higher disclosure ratings. My result is consistent with theories that posit that better accounting disclosure triggers new information generation by sophisticated information processors.

1.1 Introduction

The adoption of the International Financial Reporting Standards (IFRS) in many countries around the world is one of the most important regulatory changes recently. Over 100 countries have recently moved to IFRS reporting, at least for publicly listed firms. The goal of IFRS is to achieve “harmonization” and “convergence” of financial reporting rules and regulations across countries. In contrast to local accounting rules, IFRS are a set of uniform rules that apply in the same way to all public companies in markets that adopt the standards. As a result of this most important regulatory change in accounting history, there is a growing body of literature that examines the disclosure quality and market-based benefits associated with the implementation of IFRS. Most of these studies conclude that both mandatory and voluntary IFRS improve reporting quality and bring positive market-based benefits (Leuz and Wysocki (2008)). However, little has been studied on the effects of analysts’ information and operation with the introduction of IFRS. To the best of our knowledge, our study is the first of its kind to test whether mandatory IFRS adoption is associated with changes in the information content of analysts’ forecasts.

To examine this research question, we use the model by Barron et al. (1998), or commonly known as the BKLS model, to estimate the information content of analysts’ forecasts. The BKLS model allows us to separate analysts’ information into common information among analysts and private information derived by individual analysts. We compare the information content of analysts’ forecasts across 18 countries before and after they have mandated the adoption of IFRS, relative to 12 countries that retained local accounting standards. The combined sample includes 19,817 firm-year observations from

5,085 unique firms. We conduct our tests using both univariate and multivariate firm-level analysis.

We find that the common information among analysts increase after mandatory IFRS adoption, consistent with the belief that IFRS enhances reporting and reporting quality. For the analysts' private information, there are two competing arguments about analysts' private information with the increase in a firm's public disclosure. One strand of studies (Kim and Verrecchia (1991)) argues that public information substitutes private information, therefore private information decreases after IFRS adoption with more information being disclosed publicly. Another strand of studies (Kim and Verrecchia (1997), Barron, Byard, and Kim (2002)) argues that enhanced disclosure could affect market participants' incentives to collect and trade on private information; thus more private information is being gathered and incorporated into analysts' forecasts. Our findings suggest the existence of private event-period information (Kim and Verrecchia (1997)) and the analysts' forecasts contain more private or idiosyncratic information after mandatory IFRS adoption.

The private information contained in the analysts' forecasts is not a natural outcome of IFRS adoption; analysts need to expense more effort on gathering, processing, and analyzing the higher quantity of public information and derive his or her private information. If analysts are spending more time on idiosyncratic information discovery, then they need to reduce the number of firms they cover due to constraints on their time and resources. Our results show that the firm-level analyst following reduces after IFRS adoption. This provides evidence that analysts are reducing their firm coverage in response to the changes in their workload.

Further tests suggest that the effects of mandatory IFRS adoption on analysts' information are not uniform across countries. The common and private information increase more in common law countries, in countries with strong shareholder protection, in countries with good accounting disclosure ratings, or in countries with high accounting standards ratings. One explanation is that many firms in countries with weak governance simply adopt an IFRS label in response to mandatory IFRS requirement (Daske et al. (2009)). The underlying disclosure is still weak compared to the committed IFRS adaptors. These results are different from studies on voluntary IFRS adoption where it is found that the effect is stronger in countries with weak institutional infrastructure (Leuz and Verrecchia (2000), Daske (2006), Kim and Shi (2009), Kim and Shi (2007)).

This study contributes to the growing literature on IFRS adoption. In particular, we contribute to the study of the mandatory adoption of IFRS and its effect on the information environment and operation of analysts. Given that financial analysts are one of the most important groups of market participants and users of financial statements, it is natural for us to explore the information environment of analysts with the adoption of IFRS. One argument is that since IFRS is providing more value-relevant information, analysts will be displaced because they add little value to financial statement analysis. However, our results show that better accounting disclosure triggers new information generation by sophisticated information processors, as suggested by Kim and Verrecchia (1997). Furthermore, we enrich the literature on international capital markets. A country's institutional infrastructure such as legal origin can shape the effectiveness of accounting standards and affect the quality of implementation.

The remainder of the paper is organized as follows: Section 1.2 develops the testable hypotheses and describes our key empirical constructs. Section 1.3 describes our sample and lists the firm-level and country-level control variables. The main empirical results on analysts' common information, private information, analyst following, and cross-country variation are presented in Section 1.4. We conduct further robustness checks in Section 1.5. Section 1.6 concludes the study.

1.2 Hypotheses Development and Empirical Constructs

Our study investigates the operational consequences of mandating IFRS for financial analysts. Specifically, we study the mix of common and private information in earnings forecasts made by the analysts before and after the IFRS adoption. Common information is obtained or inferred from official firm and management disclosure while private information is obtained by analysts' own information gathering and processing. Furthermore, we also study the analysts' coverage behavior in response to IFRS adoption, i.e. the trade-off between more firm coverage and more details but less firm coverage. There are several competing arguments on analysts' information and coverage decision with IFRS adoption.

1.2.1 Hypotheses Development

This paper primarily focuses on the operation of financial analysts with respect to the mandatory IFRS adoption. Specifically, we study the information generated and processed by financial analysts that are reflected in their earnings forecasts. Our analysis covers three aspects of the analysts operations. The first aspect studies the common

information obtained from the public domain. The second aspect studies the private information processed or inferred from analysts' own data gathering and analysis. The third aspect studies the analyst following for the firm in response to the change in competition level as a result of IFRS. Furthermore, we also study the cross-country variation of these effects with respect to IFRS adoption.

There is a growing body of literature that studies the economic consequences of mandatory IFRS adoption. Daske et al. (2008) give early but comprehensive evidence of stock market effect as a result of mandated IFRS. They study the impact of IFRS adoption in 26 countries on market liquidity, cost of equity capital, and firm valuation (Tobin's Q). They find that market liquidity, cost of equity, and firm valuation improve around the time of IFRS transition. However, the capital market benefits exist only in countries with strong institutional infrastructure, which provides incentives and enforcement on disclosures. Landsman, Maydew, and Thornock (2009) find that the information content, as measured by abnormal return volatility at earnings announcements, increases in countries that have mandated IFRS relative to those that have maintained domestic accounting standards. They further find that the increases in abnormal return volatility are concentrated in countries with civil law origin. Capkun et al. (2008) find that financial statements become more value relevant after mandatory IFRS adoption. Barth, Landsman, and Lang (2008) find that firms applying International Accounting Standards¹ from 21 countries show evidence of less earnings management, more timely loss recognition, and more value relevant financial reports. Overall, existing studies are consistent with the view that IFRS reporting improves disclosure and brings capital market benefits but the effects are shaped by a country's institutional

¹ International Accounting Standards (IAS) is a predecessor set of standards of IFRS.

infrastructure. Leuz and Wysocki (2008) give detailed reviews of recent IFRS-based literature.

Given the view that IFRS improves disclosure quality in general, it has an impact on the precision of common or public information. Brown, Preiato, and Tarca (2009) documents that the adoption of IFRS improves analysts' forecast accuracy. Their study provides evidence that analysts receive more information from a firm's disclosure after IFRS adoption. Furthermore, Ashbaugh and Pincus (2001) argue that with few measurement rules to deal with, analysts should be better in mastering the existing set. IFRS harmonizes the accounting differences across countries and makes financial statements and accounting figures more comparable across firms and countries. With the higher disclosure quality and analysts' ability to master single accounting standards, we state the first hypothesis as follows:

H1: The precision of common information reflected in analyst forecasts will be higher after IFRS adoption.

In the traditional view, the total amount of information of a firm is fixed but can be separated into common and private information. The common information simply substitutes for private information (Kim and Verrecchia (1991)), and the private information will decrease after IFRS adoption, given that IFRS improves common information disclosure. However, Kim and Verrecchia (1997) bring in the complementary relationship between common and private information. Specifically, they model three types of information around public announcements: (1) private information gathered in anticipation of the announcement (pre-announcement information); (2) public

information contained in the public announcement itself (value-relevant information); and (3) private event-period information. They define private event-period information as new information arising from interaction between information contained in the public announcement and private information gathered elsewhere that becomes useful only in conjunction with the announcement itself. Barron, Byard, and Kim (2002) provide the following example of private event-period information:

For example, consider two analysts. The first is a Certified Public Accountant who understands when and how specific accruals will reverse and affect future earnings. The second, a formal political economist, correctly expects that back-orders from a Brazilian customer will soon decline and increase earnings. Neither of these analysts can use his or her indirect knowledge in isolation. Yet both can combine their knowledge with reported earnings to produce “uniquely privately inferred information”.

The information contained in the earnings announcement enables analysts to capitalize on their private indirect information to draw new inferences regarding the value of the firm. Barron, Byard, and Kim (2002) provide empirical evidence that earnings announcements lead analysts to develop private event-period information, which is consistent with Kim and Verrecchia (1997). Barron, Harris, and Stanford (2005) provide further evidence that this type of information is sufficiently important to induce trading activity. We expect the interaction effect of common-private information will be stronger with IFRS; therefore the second hypothesis is stated as follows:

H2: The precision of private information reflected in analyst forecasts will be higher after IFRS adoption.

With the increase in common information, analysts would spend greater effort in search of private event-period information in order to keep their competitive edge. The analysts are constrained by their own time, capacity and resources. In order to cope with the increased workload, analysts may need to drop some coverage and focus on fewer firms with more in-depth analysis. If most analysts reduce their coverage in order to produce better forecasts, then from the firm level perspective, the number of analyst following at firm-level will decline after IFRS adoption. The third hypothesis is related to analyst following and is stated as follows:

H3: The analyst following of firms is lower after IFRS adoption.

There is a growing number of studies that investigate the link between countries' institutional infrastructure and financial reporting outcomes. Ball, Kothari, and Robin (2000), Hung (2000), Leuz, Nanda, and Wysocki (2003) document that the legal origin and shareholder protection regime of a country can affect a firm's incentive to provide disclosure and hence influence the quality of financial reporting as well as the market effect of these disclosures. Ball, Kothari, and Robin (2000) show that common law countries exhibit more timely loss recognition. Leuz, Nanda, and Wysocki (2003) examine the level of earnings management and the opaqueness of accounting earnings reported by firms from 31 countries. They show that the legal origin and shareholder protection are important determinants of reporting quality. More importantly, the legal origin and shareholder protection are still important even after controlling for accounting rules. An important message is that accounting rules are important but are not sufficient to describe accounting quality; the institutional factors are important for consideration as

well. Daske et al. (2008), Brown, Preiato, and Tarca (2009), Landsman, Maydew, and Thornock (2009), and many studies that examine the capital market effects of mandatory IFRS adoption find that the differential outcomes can be explained by countries' institution infrastructure. These studies find that the capital market effects (cost of capital, liquidity, firm valuation, earnings announcement information, etc) improve after mandatory IFRS adoption, and the improvement is stronger in countries with better investors protection regime. On the other hand, Kim and Shi (2009) find that the voluntary IFRS adoption has stronger price informativeness effect in countries with poor institutional infrastructure. They argue that voluntary IFRS adoption and country-level governance act as substitutes for each other; their argument is consistent with Doidge, Karolyi, and Stulz (2004) on the benefit of international cross-listing. Our focus is to study the effects of mandatory, instead of voluntary IFRS, adoption; therefore our hypothesis on the cross-country variation is as below:

H4: The improvements in analysts' information precision, both common and private, are greater in countries with better shareholder protection or disclosure standards.

1.2.2 Measuring Analysts' Information

We use the model by Barron et al. (1998), commonly known as BKLS model, to study the information environment faced by financial analysts. In this model, analysts possess both common (public) and private (idiosyncratic) information with the combined precision of these two types of information equal to the precision of analysts' total information. Common information arises from information available in the public domain

with respect to the firm, industry, and the macroeconomy. Private information refers to the insights developed by analysts through their individual efforts in research, data gathering, and information processing.

BKLS model is widely used in capital market research in recent years. Barron, Byard, and Kim (2002) is the first empirical implementation of BKLS model, they document that commonality of information among analysts decreases around earnings announcements and the private information contained in individual analysts' forecasts increases immediately after earnings announcements. In Barron, Harris, and Stanford (2005), they find that the increase of the private information after earnings announcements documented by Barron, Byard, and Kim (2002) is positively associated with trading volume. The finding is important because it is consistent with Kim and Verrecchia (1997) model that predicts private information inferred at the time of an earnings announcement (private event-period information) is associated with greater trading value. Barron, Byard, and Yu (2008) find that earnings surprises motivate analysts to reduce future forecast errors by improving their private information. Mohanram and Sunder (2006) use BKLS model to study the analyst behavior during Regulation Fair Disclosure (RegFD) period. They find that analysts are investing more effort in private information discovery after RegFD. Botosan, Plumlee, and Xie (2004) use BKLS model to study the association between the cost of equity capital and the quality of public and private information.

The BKLS model uses the information in the forecast errors and dispersion to draw inferences about individual analysts they possess at the time they report their forecasts. The forecast dispersion reflects error from the idiosyncratic information among

analysts, and a forecast error primary reflects information asymmetry between analysts and firms. BKLS model shows that analysts' common and private information precision can be inferred from their forecast dispersions and forecast errors. The precision of common information (h), precision of private information (s), and consensus among analysts (ρ) are measured as follows:

$$h = \frac{SE - \frac{D}{N}}{\left[\left(SE - \frac{D}{N}\right) + D\right]^2} \quad (1)$$

$$s = \frac{D}{\left[\left(SE - \frac{D}{N}\right) + D\right]^2} \quad (2)$$

$$\rho = \frac{\left(SE - \frac{D}{N}\right)}{\left(SE - \frac{D}{N}\right) + D} = \frac{h}{h + s} \quad (3)$$

where SE is the expected squared error in the mean forecast; D is the expected sample variance or dispersion among the forecasts, and N is the number of analysts making forecasts used in the BKLS estimation.

To estimate h and s using analysts' earnings forecast, we follow empirical implementation by Barron, Byard, and Kim (2002). We substitute ex post realized squared error ($\widehat{SE}$) and dispersion ($\widehat{D}$) for the expected values as follows:

$$\widehat{SE} = (A_{jt} - \bar{F}_{jt})^2 \quad (4)$$

$$\widehat{D} = \frac{1}{N_{jt} - 1} \sum_{i=1}^{N_{jt}} (F_{ijt} - \bar{F}_{jt})^2 \quad (5)$$

where A_{jt} is the actual earnings for firm j in year t , F_{ijt} is analyst i 's earnings forecast for firm j in year t , $\bar{F}_{jt}$ is the mean of forecasts for firm j in year t , and N_{jt} is the number of forecasts for firm j in year t . We also scale the forecasts and actual earnings by the mean of analysts' forecasts to make our measure cross-sectionally comparable.

Using realized values of SE and D can sometimes result in negative value for information precision measures. Specifically, the value of common information and correlation in equation (1) and (3) can be negative if $\widehat{SE} - \widehat{D}/N < 0$. We follow Barron, Byard, and Kim (2002) and include only SE in the numerator in equation (1) and (3) when $\widehat{SE} - \widehat{D}/N < 0$. They also show this approximation is valid.

The precision of common information (h) and the precision of private information (s) are highly skewed; we take logarithm transformation for our analysis. We also take logarithm transformation for total information precision ($h+s$) and analysts' consensus measure (ρ). We also try square roots transformation and the results are qualitatively similar to logarithm transformation. We run median regression with the raw information measures (h and s) in the robustness section.

$$COMMON = \log(1500 + h) \quad (6)$$

$$PRIVATE = \log(s) \quad (7)$$

$$TOTAL = \log(h + s) \quad (8)$$

$$CORR = \log(\rho) \quad (9)$$

1.2.3 Analyst Following and Other Analysts' Information Measures

Other than information measures introduced by BKLS, we also use two other conventional analysts' information measures, namely analysts' forecast errors and analysts' dispersion. These two measures are also used as information measures by Brown, Preiato, and Tarca (2009). However, neither of these measures distinguishes private information from common information. Therefore, our main focus is on BKLS measures. The analysts' forecast errors (FERR) are defined as the absolute value of the difference between announced earnings and the mean of forecast earnings scaled by the mean of analyst forecasts; analysts' dispersion (DISPERSION) is defined as the standard deviation of analysts' earnings forecasts scaled by the mean of analyst forecasts. Both measures are computed from the IBES detail database and require at least two analyst forecasts that are made before the annual earnings announcement date.

Finally, we also study the analyst following of the firm before and after IFRS adoption. We calculate the analyst following (FOLLOWING) as the number of analysts who announce annual earnings forecasts before the annual earnings announcement but within one year before the financial year end. We look at the entire IBES Detail and Stop files to ensure that we include all analysts in our calculation.

1.3 Sample and Data

1.3.1 Sample Screening

In Table 1.1, panel A presents a summary of the sample selection process and the final sample composition. We begin by identifying all countries that mandated adoption of IFRS in 2005 and all countries that retained domestic accounting standards during the sample period (2002-2007). Our primary source of the country list and the adoption date is Daske et al. (2008). We collect information on analyst forecasts from IBES International Detail file for the fiscal year 2002-2007. We further collect all the interim and annual earnings announcement dates from Bloomberg. We obtain stock returns and firm's accounting information from Datastream and Worldscope. Prior research suggests that analysts depend on earnings releases as a source of public information upon which to estimate and make new earnings forecasts. The analysts' private information may be triggered by such earnings announcements (Kim and Verrecchia (1997)). Therefore, we select annual earnings forecasts made during the 30-day period following the second quarterly or first semi-annual earnings announcement. We also require each firm to have at least two analyst earning forecasts during this 30-day window in order to estimate BKLS analysts' information precision measures. Following Fernandes and Ferreira (2008), we retain observations with equal to or greater than U.S. \$100 million in total assets in the previous year.

Our focus is to study analysts' information precision after mandatory IFRS adoption; therefore, we exclude firms that are coded as voluntary adopters in accordance with Daske et al. (2009) to avoid any confounding effects of incentives for firms to adopt IFRS before the mandated date. To avoid potential misclassification on IFRS adoption

made by Worldscope (Daske et al. (2009)), we remove firms that are located in a IFRS country but are coded as non-IFRS adopters. The firm-level reporting standards are obtained from Worldscope Field 07536. The description of Field 07536 is in Appendix 1. We also remove any newly listed firms during the sample period because new firms may have a different information environment. Finally, we require each country to have at least 20 unique firms during the sample period. The final sample consists of 19,817 firm-year annual earnings announcements for 5,085 unique firms across 30 countries.

From Table 1.1, panels B and C present the number of unique firms and firm-year by country. For IFRS adopting countries presented in panel B, U.K. contributes the highest number of unique firms and number of firm-years, with 360 unique firms and 1,504 firm-year observations. France and Australia contribute the second and third most unique firms and firm-year, with 879 and 689 firm-year observations respectively. Panel C presents the breakdown of unique firms and firm-year composition by country for non-IFRS adopting countries. U.S. contributes the highest number of unique firm and firm-year, with 1,926 unique firms and 8,403 firm-year observations. This is more than half of the non-IFRS samples. Japan and South Korea also have large numbers of samples for non-IFRS countries. We conduct a robustness test using samples without U.S. firm-year to avoid dominance of U.S. samples. We also conduct random sampling technique in the robustness section to give each country equal weight.

1.3.2 Dependent Variables

Table 1.2 summarizes all the variables and their descriptions used in the analysis. In Table 1.3, panel A presents the descriptive statistics for all dependent variables. The non-IFRS adopting countries seem to have better information precision measures— they

have higher precision of analysts' public and private information (h and s), lower forecast errors (FERR), and lower forecast dispersion (DISPERSION). The high information precision is driven by U.S. observations as the U.S. sample has higher information precision. In regression analysis, we control for country effect by inserting country dummies in multivariate analysis. The precision of analysts' information (h and s) are highly skewed; and we take logarithm transformation of h and s and named them COMMON and PRIVATE respectively, as discussed in Section 1.2. The construction of dependent variables is discussed in detail in Section 1.2.

1.3.3 Firm-Level Independent Variables

In Table 1.3, panel B presents the descriptive statistics of firm-level independent variables drawn from Datastream and Worldscope. Prior research suggests there is less analyst optimism for larger firms (Brown (1997)); therefore we include MV, the log of total market capitalization in U.S. dollars, to control for size effect. Matsumoto (2002) finds that growth firms have greater incentives to meet or beat the analysts' forecasts because growth firms suffer stronger market reaction to negative earnings surprises. We include book-to-market equity ratio (BM) to control for growth firms effects. We also include a leverage measure— total debt over total assets (LEVERAGE) — as a control for any incentives to manage earnings that are driven by debt constraints. Lys and Soo (1995) find that forecast accuracy increases with analyst following after controlling for firm-specific forecast difficulty. We control for analyst following (FOLLOWING) using the number of analysts whose annual forecasts appear in IBES.

Previous research suggests that longer-term earnings volatility and returns volatility are associated with less accurate forecasts (Kross, Ro, and Schroeder (1990),

Lim (2001)). Therefore, we include return volatility (RETVOL), which is the standard deviation of monthly stock returns over the preceding twelve months. Earnings volatility (EARNVOL) is the standard deviation of returns on equity for the preceding three years. We take log transformation for RETVOL and EARNVOL. Furthermore, loss firms and firms with bad news have different disclosing behavior, which has an impact on analysts' forecasts. Ertimur (2004) finds that loss firms are associated with greater information asymmetry. Skinner (1994) demonstrates that firms with bad news are likely to make more disclosures to avoid potential litigation. We control for these two factors through two indicator variables, DLOSS and DMISS. We define DLOSS to equal 1 if a firm reports a loss in a given year and 0 otherwise, and DMISS to equal 1 if a firm fails to meet the consensus forecast in a given year and 0 otherwise. Finally, TREND is a variable that takes a value from -3 to $+2$ based on the year relative to IFRS adoption. It is used to detrend the pattern around IFRS adoption.

1.3.4 Country-Level Institutional Factors

In Table 1.3, panel C presents the country institutional factors that are used in the subsample analysis. Recent studies show that the effects of higher accounting standards are subjected to a country's institutional factors. Ball, Robin, and Wu (2003) show that a country's legal enforcement mechanism and political environment are more important than respective accounting standards in explaining for the variation in accounting income. Using the IFRS adoption event, Daske et al. (2008) find that there are capital market benefits only in countries where firms have the incentive to be transparent and where legal enforcement is strong. Their results signify the importance of countries' enforcement regimes for the quality of financial reporting. Therefore, we are interested in

studying the effects of financial reporting frequency under different countries' institutional infrastructure. The variable of interest is the country's protection of shareholders. We employ the anti-self-dealing index (ANTI) compiled by Djankov et al. (2008) as a measure of a country's legal protection for minority shareholders. We also employ a country's legal origin as the proxy of shareholder protection because legal origin exerts a strong influence on legal rules that protect minority shareholders (Djankov et al. (2008)). We use the disclosure requirement index (DISREQ) compiled by La Porta, Lopez-De-Silanes, and Shleifer (2006) as the country-level disclosure level. We also use accounting rating standards (ACCSTD) compiled by La Porta et al. (1998). The DISREQ and ACCSTD indexes are measured before IFRS adoption. We also include the time series of a country's economics and stock market development measures in regression models without country or firm fixed effects. GDP per capital (GDPC) represents the general economic advancement of a country. The variance of GDP per capital growth for the past five years (GDPV) measures the stability of economic growth. The stock market development is measured by market capitalization of listed companies deflated by GDP (MCAP). We also include population to represent country size. The last four time series data are obtained from the World Bank's WDI database.

1.3.5 Pairwise Correlation Analysis

Table 1.4 presents the correlation matrix between all variables. The larger firms, growth firms (low BM), firms with low leverage and firms with low returns or earning volatility have better information quality reflected in analysts' forecasts. This can be observed from the correlation between analysts' information precision (COMMON, PRIVATE, and TOTAL) and analysts' forecasts characteristics (FERR, and DISPERSION) with firm-

level characteristics. On the country institutional factors, the common law is highly correlated with the anti-self-dealing index, disclosure requirement index, and accounting rating standards. The latter three measures could be outcomes of investor-oriented common law.

1.4 Results

We focus on three analysts' forecasts characteristics: (i) analysts' precision on public information (COMMON), (ii) analysts' precision on private information (PRIVATE), and (iii) firm's analyst following (FOLLOWING). First, we study the changes of these information measures before and after the IFRS adoption. Second, we carry out comprehensive multivariate analysis. We then split our sample according to the countries' institution infrastructure to study the differential effect. Further robustness checks are carried out in Section 1.5.

1.4.1 Analysts' Information Precision of Pre- and Post-IFRS Adoption

Table 1.5 compares the analysts' forecasts characteristics and information precision measures one year before and one year after the mandatory IFRS adoption. The pre-IFRS measures are estimated using analyst forecasts made for the fiscal year ended between 12/31/2004 and 12/30/2005. The post-IFRS measures are estimated using analyst forecasts made for the fiscal year ended between 12/31/2005 and 12/30/2006. The discussion focuses on means, but the same relations and inferences apply using medians. Comparing COMMON for firms in IFRS-adopting countries, we observe the mean increase from 1.428 to 1.861. PRIVATE also increases significantly from 1.026 in the

pre-IFRS period to 1.437 after IFRS adoption. Comparing with the mean, analysts' public and private information precision increase by 30% and 40% respectively after IFRS adoption, and the increase is about 15% of standard deviation for COMMON and 12% of standard deviation for PRIVATE. In other words, the increment in common and private information precision are similar in absolute and relative magnitudes. Since TOTAL is the summation of analysts' public and private information, it increases in the post-IFRS era. However, CORR— which is the ratio of public-to-total information precision — has no significant change before and after IFRS adoption. Finally, the firms in post-IFRS have lower analyst following: FOLLOWING decreases by about 2 to average 25.90 analyst following per firm.

We continue to examine a few conventional analyst forecasts characteristics. FERR decreases from 0.357 to lower value 0.253, which is about 10% improvement in forecast accuracy. The DISPERSION also decreases by 0.06 from 0.207 to 0.147, which is about 30% reduction in forecast dispersion. Finally, we also observe that firms have lower analyst following after the IFRS adoption. In summary, we observe better precision of common information, better precision of private information, and lower number of analyst following per firm after IFRS adoption. These three results from the univariate tests are consistent with our first three hypotheses predictions.

1.4.2 Multivariate Analysis

To test whether any improvement in analysts' information environment for firms in IFRS adopting countries is greater than that for firms in non-IFRS adopting countries after controlling for firm characteristics, we run the following regression model. We pool pre- and post-IFRS firm-year observations for IFRS and non-IFRS adopting countries.

$Information_{i,t}$

$$\begin{aligned}
&= \alpha + \beta_1 IFRS_{i,t} * POST_{i,t} + \beta_2 POST_{i,t} + \beta_3 MV_{i,t-1} + \beta_4 BM_{i,t-1} \quad (10) \\
&+ \beta_5 FOLLOWING_{i,t-1} + \beta_6 LEVERAGE_{i,t-1} + \beta_7 RETVOL_{i,t-1} \\
&+ \beta_8 EARNVOL_{i,t-1} + \beta_9 DLOSS_{i,t-1} + \beta_{10} DMISS_{i,t-1} \\
&+ \beta_{11} TREND_{i,t} + CountryDummies + IndustryDummies + \varepsilon
\end{aligned}$$

The dependent variable is one of the three analysts' information measures discussed previously: COMMON, PRIVATE, and FOLLOWING². The key variable of interest is IFRS*POST, which is an interaction term of two indicator variables and is equal to one for firm-year in IFRS adopting countries and with the fiscal year ended on or after 12/31/2005. POST is an indicator variable equal to one for firm-year with the fiscal year ended on or after 12/31/2005. All other firm-level characteristics variables are discussed in Section 1.3 and they are lagged by one year. We include both industry and country fixed effects in our regression analysis. On the alternate set of regression, we include firm fixed effect to study the within-firm variation. As country dummies or firm dummies subsume the IFRS dummy, we do not include the IFRS dummy whenever country or firm dummies are present in the model. We also conduct further analysis where country characteristics are included in lieu of fixed effect.

Turning first to COMMON, M1 in panel A of Table 1.6 indicates that the coefficient of interest, IFRS*POST, is 0.948, and is significantly positive. The coefficient

² If analyst following (FOLLOWING) is used as a dependent variable, we drop the lag analyst following from the independent variable list.

remains significant despite a slight drop in magnitude after the firm-level control variables are added in M2. Firm dummies are included in the models. In M3, we include industry dummies and country dummies; the coefficient is positively significant and has a value of 1.015. The result shows that the analysts' precision on public information is higher after IFRS adoption which is consistent with the univariate analysis and hypothesis H1.

In the regression for PRIVATE, M4 in Table 1.6 indicates that the coefficient of interest, IFRS*POST, is 0.721, and is significantly positive. The coefficient remains significant after the firm-level control variables are added in M5. After replacing the firm dummies with industry dummies and country dummies, the coefficient remains positive and significant in M6. The analysts' precision on private information is higher after IFRS adoption. This result is similar to univariate analysis and is consistent with hypothesis H2. While both public and private information precision increase after IFRS adoption, public information increases more in term of absolute magnitude and private information increase more in term of relative magnitude. When compared to the mean, our model predicts PRIVATE improves by 84% and COMMON improves by only 48%³. Of course, this is partly due to the fact that there is more COMMON even before the IFRS adoption – denominator effect. If compared to standard deviation, PRIVATE improves by 25% of standard deviation and COMMON improves by 21% of standard deviation⁴ after IFRS adoption.

³ The full sample mean is 1.850 for COMMON, and 1.047 for PRIVATE. The improvement is predicted by full model regression coefficients (M3 and M6). E.g. $0.885/1.850 = 48\%$; $0.880/1.047 = 84\%$

⁴ The full sample standard deviation is 3.481 for COMMON, and 4.200 for PRIVATE. The improvement is predicted by full model regression coefficients (M3 and M6).

M7-M9 analyze the analyst following, defined by the number of analysts who announce annual earnings forecasts one year prior to fiscal year end. In M7, we include firm dummies and the coefficient of IFES*POST is negatively significant and has a value of -1.960, which means the number of analyst following declines by about two in IFRS adopting countries compared to non-IFRS countries after the IFRS adoption period. The coefficients become more negative of -3.541 if we include firm control variables. In M9, we remove firm dummies but include country and industry dummies. The coefficient of IFRS*POST becomes -1.887. Consistent with our hypothesis H3, the number of analyst following for firms declines after IFRS adoption as compared to non-IFRS adoption countries. This provides some evidence that the analysts need to spend more effort in generating private information after IFRS adoption; therefore the firm level analyst coverage is reduced.

The coefficients of control variables in all models are consistent with our prediction. Growth firms have the incentive to provide more information to analysts. Firms that use more debt have low information precision. Firms with high returns or earning volatility have lower information precision. Firms with negative earnings or which miss the analyst forecast consensus also have lower information precision. The firm size coefficients are not significant in most cases.

In Table 1.6 at Panel B, we report the analysis for total information (TOTAL), analyst forecast errors (FERR), and forecast dispersion (DISP). Total information is simply the summation of private and public information; therefore, we expect the TOTAL increases after IFRS adoption. The coefficients of IFRS*POST are positive in M1-M3 of panel B. In addition to BLKS information measures, we also include two

conventional analyst information measures – forecast errors and forecast dispersion – in our analysis. From M4-M6, we observe the analyst forecast errors reduces after IFRS adoption which is evidenced by negative IFRS*POST coefficients. The analyst forecast dispersion also decreases in response to the IFRS adoption which is shown by negative coefficients of IFRS*POST in M7-M9. These findings are not new but they are consistent with previous literature such as Brown, Preiato, and Tarca (2009). While analyst forecast errors and dispersion show that information environment improves after IFRS, they do not distinguish between public and private information.

In Table 1.6 at panel C, we repeat the analysis as in Panel A with country characteristics included. We concentrate the discussion on M2, M4 and M6 which include firm- and country-level control variables. The coefficients of IFRS*POST remain significant and the results are consistent with our analysis in panel A. For the IFRS adopting countries, the COMMON information improves by 0.683 or 37% after the IFRS adoption, and the PRIVATE information improves by 0.425 or 41%. In M6, the result shows that the analyst following declines by approximately 5 after IFRS adoption. All coefficients except for M6 do not deviate much from the analysis with country fixed effect in panel A. In next sub-section, we study the cross-sectional variation by using sub-sample regression.

Overall, our multivariate analysis concludes that the information precision improves after the IFRS adoption. While both public and private information precisions increase after IFRS, private information increases more than public information. Furthermore, the improvement in information precision is accompanied by lower analyst following.

1.4.3 Subsample by Country's Institutional Factors

Having established the average link between information precision measures and IFRS adoption, we now turn to identifying how this link depends on a country's institutional infrastructure. As stated in the previous sections, an opaque country can benefit much more from IFRS adoption because these countries have more undisclosed information to be made public. On the other hand, an opaque country may implement a "label adoption" on IFRS standards but the underlying disclosure is still low (Daske et al. (2009)), therefore the effect of IFRS is minimal. In this sub-section, we carry out cross-country variation analysis by partitioning our sample. Specifically, we divide our sample into firms by country institutional factor and repeat our tests for the two subsamples.

In panel A of Table 1.7, we divide the sample by legal origin. Comparing coefficients of $IFRS*POST$ in M1 and M2, we find IFRS adoption has higher impact on analysts' public information (COMMON) in common law countries. The coefficient of $IFRS*POST$ is not significant for civil law countries, but is larger in magnitude and significant for common law countries. From $\Delta Coef$, we find that the coefficients are significantly different from each other across the two sub-samples. In M3 and M4, we repeat our estimates with analysts' private information (PRIVATE). The coefficient of $IFRS*POST$ is not significant for civil law countries, but is larger in magnitude and significant for common law countries. The results reveal that the analysts' private information precision increases more in common law countries than in civil law countries with IFRS adoption. The coefficients are significantly different across two sub-samples. Notice that IFRS adoption has multiple the impact on public and private information precision for common law countries as compared to civil law countries. We further

conduct the analysis of analyst following in M5 and M6. The analyst following decreases in both common and civil law countries after IFRS adoption, but the reduction is higher in civil law countries. This is surprising because we expect the analyst following will go in the opposite direction from private information generation. Nevertheless, it is likely that in civil law countries, analysts are unable to generate much private information despite putting in more effort.

In Table 1.7, at panel B, we repeat the analysis using the anti-self-dealing index as a proxy for shareholder protection. We divide our sample into firms with above and below median anti-self-dealing index. M1 and M2 show that IFRS adoption has a greater impact on analysts' public information in countries with a high anti-self-dealing index. M3 and M4 reveal that IFRS adoption has stipulated more analysts' private information in countries with a high anti-self-dealing index. The coefficients between M1 and M2, and M3 and M4 are significantly different — the magnitude is much larger in countries with a high anti-self-dealing index compared to countries with a low anti-self-dealing index. We further conduct the analysis on analyst following and find that the analyst following reduction is more severe in countries with a low anti-self-dealing index. The conclusion is similar to and consistent with sub-sample analysis using legal origin except the analyst following. The analyst following is reduced in both countries with high and low anti-self-dealing index, but the coefficients are not significantly different between these two group countries.

In Table 1.7, at panels C and D, we repeat the analysis using the sub-samples divided by the disclosure requirement index and accounting rating standards respectively. The disclosure requirement index is compiled by La Porta, Lopez-De-Silanes, and

Shleifer (2006), and the accounting rating standards are compiled by La Porta et al. (1998). The results are similar to panels A and B. The IFRS adoption has a greater impact on analysts' public information and private information in countries with high disclosure requirements or accounting rating standards. The magnitude difference is also in term of multiple in highly rated countries as compared to lowly rated countries. More importantly, the coefficients are not statistically significant for lowly rated countries. However, the results on the reduction of analyst following are not very consistent across different groups of countries.

Putting all panels in Table 1.7 as a whole, the highly rated countries benefit more from IFRS adoption in terms of analysts' information measures. The highly rated countries can be a common law country, a country with high shareholder protection, a country with high disclosure requirements, or a country with high accounting standards. As the analysts' forecasts contain more public (or common) and private information, such information will be reflected in stock prices because market participants are the users of analyst reports. The stock market will be efficient as more information is impounded into stock prices. On the other hand, analysts' forecasts also contain more public and private information after IFRS adoption despite the smaller magnitude in lowly rated countries. In some of our results, the analyst following is reduced more in lowly rated countries, implying that analysts in these countries are putting more effort but are only able to generate relatively little private information. The cross-country results are consistent with our prediction in hypothesis H4 that IFRS adoption countries with better shareholder protection or disclosure standards.

1.4.4 Conditional on the Level of Information Environment Prior to IFRS

In the analysis discussed in previous sections, we present the average change in information precision for the sample. If IFRS improves information precision, it is likely that the improvement is greatest for firms with low information precision prior to the adoption where these firms have more scope to improve their information precision. On the other hand, the firms with high prior information precision have little room for improvement because most information has been disclosed. We follow Begley, Cheng, and Gao (2009) to study the change in information precision conditional on information precision level prior to IFRS adoption.

We split the firms into three groups based on the level of COMMON or PRIVATE information in year before mandatory IFRS adoption (i.e. financial year ended on and prior 12/30/2005). High information environment group is firms in top quartile of sample in each country; low information environment group is firms in lower quartile of sample in each country; and medium information environment group is the firms in medium quartiles. For ease of interpretation, we use three indicator variables, DIH, DIM, and DIL, to represent these three groups, and we do not include intercept in our regression analysis. We regress the change in information precision from year 2005 (i.e. 12/31/2004-12/30/2005) to 2006 (i.e. 12/31/2005-12/30/2006) on these three information precision indicator variables and change in control variables:

$$\begin{aligned} & Information_{i,2006} - Information_{i,2005} \\ &= \beta_1 DIH_{i,2005} + \beta_2 DIM_{i,2005} + \beta_3 DIL_{i,2005} \\ &+ \beta (Control_{2005} - Control_{2004}) + \beta_4 \Delta Information_{i,2005} + \varepsilon \end{aligned} \tag{11}$$

The three indicator variables capture the information precision change for their respective group of firms during IFRS adoption. To control for the mean reversion of the information, we add the change in information between 2004 and 2005 as an independent variable (Begley, Cheng, and Gao (2009)).

Table 1.8 reports the multivariate analysis results for change in COMMON and change in PRIVATE, we run the regression separately for civil and common law countries in M1-M2 and M5-M6. We also analyze change of information from 2004 to 2006 (M3-M4, and M7-M8) which also show similar result as 2005-2006. Our result shows that the information precision improve more for low information precision firms and less or decrease for high information precision firms during the passage of IFRS adoption. However, the same phenomenon also occurs outside IFRS adoption period. We believe the mean reversion of the information is not well controlled despite of the control variable that tries to capture the “information momentum”. Therefore, we concentrate the interpretation on medium information firms which suffer less from mean reversion of the information.

We observe both COMMON and PRIVATE improve from 2005 to 2006 in medium information quality group but only in common law countries. For the change in COMMON, the coefficient of DIM is positive and significant in common law countries; but the coefficient is not significant in civil law countries. Similarly for the change in PRIVATE, the coefficient of DIM is positive and significant in common law countries; but the coefficient becomes insignificant in civil law countries. The improvement for the medium information quality firms is not observed outside IFRS adoption period. We repeat the analysis using information change from 2004 to 2006, skipping the year of

adoption, and the result is qualitative the same. Therefore, this evidences that IFRS improve information environment of firms in general.

1.4.5 Analysts Coverage and IPO Firms

Some argues that result that analyst coverage per firm varies can also be caused by the change in the number of firms over time in the sample. In another word, the explosion of newly listed firms with little or no analyst coverage in the sample period may explain the low analyst following in the post-IFRS era. This viewpoint raises two issues related to the new listing firms during the sample period. The first issue is the new firms which have lower analyst coverage enter into the analysis, resulting low analyst following per firm after IFRS adoption. This concern is addressed by removing the newly listed firms from the sample. The newly listed firms are actually excluded from our sample (see our sample selection process). The results show that the analyst following declines after IFRS adoption.

The second is issue is due to the increased opportunity for analysts brought by the newly listed firms. The new firms attract some analysts' attention, making analysts switch from seasoned firms to new firms. If the supply of the analysts does not keep up with the number of newly listed firms, then the analyst following per firm declines. During the sample period (2002-2007), there are a significant number of new firms, but the total number of analyst does not grow proportionally. In fact, the number of analyst remains at similar level throughout the sample period (2002-2007). The supply of analysts falls behind the demand; this is a valid explanation of the analyst coverage per firm decreases. Nevertheless, we include a TREND variable in the regression, TREND is a linear function of time which takes value of -3 to +2 around year 2005 (i.e. year2002 =

-3, year2003 = -2 to year 2007 = +2 with increment of 1). This variable removes the linear trend of analyst coverage per firm. I find the coefficient of TREND is negative and significant; the result confirms the downtrend of number of analyst per firm. Therefore, the IFRS*POST coefficient captures the shock to the analyst coverage per firm due to mandatory IFRS adoption.

Another discussion is the quality of analyst who exits from the firm coverage after the IFRS adoption. This mean that low quality analysts that used to covering many firms blindly cannot continue due to more precise information inputs which is accessible to ordinary investors. We expect the higher private information after IFRS adoption is derived from high quality analysts. To carry out the test empirically, we split the analysts into two groups for the year before IFRS adoption. The first group is analysts who continue to cover for the specific firm after IFRS; the second group is analysts who exit from the firm coverage after IFRS. We find that Continuing group makes smaller forecast errors than Exiting group in the year before IFRS. The difference is statistically significant. However, the higher forecast errors produced by Existing group of analysts is not unique for IFRS adoption period. We also find the same phenomenon for other years. Low quality analysts self-select to exit from the firm coverage. Nevertheless, we can confirm that low quality exiting analysts withdraw from the firm coverage.

1.5 Robustness

In this section, we perform extensive analysis to evaluate the robustness of our findings that analysts' public and private information precision increases after IFRS adoption.

First, we address concerns about the dominance of U.S. samples in our study. Second, we attend to the concerns that the results are driven by countries with large numbers of firm-year observations. Next, we examine whether our findings are sensitive to analyst forecasts releasing period. Finally, we consider alternate methods to address the skewness of analysts' public and private information (COMMON and PRIVATE). Due to space constraints, we only include results for the baseline model in Table 1.9. The dependent variables are COMMON, PRIVATE, and FOLLOWING.

In the main regression analysis, our sample includes firms from U.S. markets and they represent about 40% of the firm-year observations. The dominance of U.S. firms may raise concerns that the results are driven by the U.S. sample, although the U.S. sample is used as a "control" sample as the U.S. does not adopt IFRS mandatorily. In Table 1.9, M1-M3 replicate the baseline model of Table 1.6 after excluding the U.S. sample so that the key results are not affected by the U.S. sample. The magnitude of the coefficients of IFRS*POST is smaller compared to the results in Table 1.7. The t-statistics decrease due to the reduction in sample size. Nevertheless, the coefficients remain significant at 1% level.

Next, we use the random sampling technique to address the concern that the results are outweighed by large countries. We randomly select 100 samples from each and every country for every year. If the sample has less than 100 firms from each year, all samples from that country-year are retained. The regression results are presented in M4-M6. The results remain unchanged and the magnitude of the coefficients of IFRS*POST is comparable to results in Table 1.7. Both the common and private information show an increase, and the analyst following is reduced after IFRS adoption.

In our main analysis, we estimate COMMON and PRIVATE using annual earnings forecasts made during the 30-day period following the second quarterly or first semi-annual earnings announcement. According to Griffin, Hirschey, and Kelly (2008), although the earnings announcement dates recorded by Bloomberg are the most reliable data available, it still suffers from some data errors. Since there are no other reliable sources of earnings announcement dates for international firms, we use other definite periods for BKLS estimation. For the robustness, we estimate COMMON and PRIVATE using annual earnings forecasts made during 30-days prior to the fiscal year end. The reasons why we select this period are: the date is definite, and analysts could update their forecasts before fiscal year end as firms are releasing more information to the public. The results are reported in M7-M8, and the results remain largely unchanged. The magnitude of the coefficients are larger than those in Table 1.6. Our explanation is that the forecasts used in M7-M8 contain different information from those used in Table 1.6.

Our last robustness check is to conduct regression analysis using BKLS's h and s estimates. In our main analysis, we obtain logarithm transformation of h and s and relabel them as COMMON and PRIVATE because h and s are highly skewed. In M9-M10, we run the median regression using raw values of h and s instead of the logarithm transformed COMMON and PRIVATE. The OLS method produces mean estimates of the dependent variable, given certain values of the independent variables; median regression produces median estimates of the dependent variable. Estimating median instead of mean help us avoid the problem caused by skewness because median estimation is not affected by skewness. The results are similar to main regression analysis, both common (h) and private (s) information precision increase after IFRS adoption, and

analyst following decreases after IFRS adoption. Similar to our main regression, the median regression reveals that the common information precision increases more than private information precision.

1.6 Conclusions

This research studies the information environment of financial analysts after mandatory IFRS adoption around the world. As it is the most important regulatory change in international accounting history and financial analysts rely on firms' financial reporting to make their forecasts, we expect IFRS would change the information content of analysts' forecasts. We use the BKLS model to separate analysts' information into common information among analysts and private information derived by individual analysts. We compare the information content of analysts' forecasts across 18 countries before and after they have mandated the adoption of IFRS, relative to 12 countries that have retained local accounting standards.

We find that the common information among analysts increases after mandatory IFRS adoption, which is consistent with the belief that IFRS enhances reporting and reporting quality. More importantly, we also find that analysts' forecasts contain more private or idiosyncratic information after mandatory IFRS adoption. As the analysts need to spend effort to discover private information, we find that firm-level analyst following reduces after IFRS adoption. This provides evidence that analysts are reducing their firm coverage in response to the changes on their workload. The effects of mandatory IFRS adoption on analysts' information environment are not uniform across countries. The

common and private information increase more in common law countries, in countries with strong shareholder protection, in countries with good accounting disclosure ratings, or in countries with high accounting standards ratings.

This study contributes to the growing literature of mandatory IFRS adoption. Our results show that better accounting disclosure triggers new information generation by sophisticated information processors. Furthermore, we find that a country's institutional infrastructure such as legal origin can shape the effectiveness of accounting standards, leading to the differential quality of implementation of same standards across countries.

Appendix 1

Worldscope Description of Accounting Standards Followed (Field 07536)

Field 07536	Description
01	Local standards
02	International standards
03	US standards (GAAP)
04	Commonwealth countries standards
05	EEC standards
06	International standards and some EEC guidelines
07	Specific standards set by the group
08	Local standards with EEC and IASC guidelines
09	Not disclosed
10	Local standards with some EEC guidelines
11	Local standards inconsistency problems
12	International standards inconsistency problems
13	US standards inconsistency problems
14	Commonwealth standards inconsistency problems
15	EEC standards inconsistency problems
16	International standards and some EEC guidelines inconsistency problems
17	Local standards with some OECD guidelines
18	Local standards with some IASC guidelines
19	Local standards with OECD and IASC guidelines
20	US GAAP reclassified from local standards
21	Local standards with a certain reclassification for foreigners
22	Other
23	IFRS

Note: We follow Daske et al. (2009) to define '02' and '23' as full IFRS adoption.

References

- Ashbaugh, Hollis, and Morton Pincus, 2001, Domestic Accounting Standards, International Accounting Standards, and the Predictability of Earnings, *Journal of Accounting Research* 39, 417-434.
- Ball, Ray, S. P. Kothari, and Ashok Robin, 2000, The Effect of International Institutional Factors on Properties of Accounting Earnings, *Journal of Accounting and Economics* 29, 1-51.
- Ball, Ray, Ashok Robin, and Joanna Shuang Wu, 2003, Incentives versus Standards: Properties of Accounting Income in Four East Asian Countries, *Journal of Accounting and Economics* 36, 235-270.
- Barron, Orie E., Donal Byard, and Oliver Kim, 2002, Changes in Analysts' Information Around Earnings Announcements, *The Accounting Review* 77, 821.
- Barron, Orie E., Donal Byard, and Yong Yu, 2008, Earnings Surprises that Motivate Analysts to Reduce Average Forecast Error, *The Accounting Review* 83, 303.
- Barron, Orie E., David Harris, G., and Mary Stanford, 2005, Evidence That Investors Trade on Private Event-Period Information around Earnings Announcements, *The Accounting Review* 80, 403.
- Barron, Orie E., Oliver Kim, Steve C. Lim, and Douglas E. Stevens, 1998, Using Analysts' Forecasts to Measure Properties of Analysts' Information Environment, *The Accounting Review* 73, 421.
- Barth, Mary E., Wayne R. Landsman, and Mark H. Lang, 2008, International Accounting Standards and Accounting Quality, *Journal of Accounting Research* 46, 467-498.
- Barth, Mary E., Wayne R. Landsman, and Mark H. Lang, 2008, International Accounting Standards and Accounting Quality, *Journal of Accounting Research* 46, 467-498.
- Begley, Joy, Qiang Cheng, and Yanmin Gao, 2009, Changes in Analysts' Information Environment following the Sarbanes-Oxley Act and the Global Settlement, *Working Paper*.
- Botosan, Christine A., Marlene A. Plumlee, and Yuan Xie, 2004, The Role of Information Precision in Determining the Cost of Equity Capital, *Review of Accounting Studies* 9, 233-259.

- Brown, Philip R., John P. Preiato, and Ann Tarca, 2009, IFRS Adoption, Analysts and Institutional Setting, *SSRN eLibrary*.
- Capkun, Vedran, Anne Cazavan-Jeny, Thomas Jeanjean, and Lawrence A. Weiss, 2008, Earnings Management and Value Relevance During the Mandatory Transition from Local GAAPs to IFRS in Europe, *SSRN eLibrary*.
- Daske, Holger, 2006, Economic Benefits of Adopting IFRS or US-GAAP - Have the Expected Cost of Equity Capital Really Decreased?, *Journal of Business Finance & Accounting* 33, 329-373.
- Daske, Holger, Luzi Hail, Christian Leuz, and Rodrigo Verdi, 2008, Mandatory IFRS Reporting around the World: Early Evidence on the Economic Consequences, *Journal of Accounting Research* 46, 1085-1142.
- Daske, Holger, Luzi Hail, Christian Leuz, and Rodrigo S. Verdi, 2009, Adopting a Label: Heterogeneity in the Economic Consequences of IFRS Adoptions, *SSRN eLibrary*.
- Djankov, Simeon, Rafael La Porta, Florencio Lopez-de-Silanes, and Andrei Shleifer, 2008, The Law and Economics of Self-Dealing, *Journal of Financial Economics* 88, 430-465.
- Doidge, Craig, G. Andrew Karolyi, and René M. Stulz, 2004, Why are Foreign Firms Listed in the U.S. Worth More?, *Journal of Financial Economics* 71, 205-238.
- Ertimur, Yonca, 2004, Accounting Numbers and Information Asymmetry: Evidence from Loss Firms, *SSRN eLibrary*.
- Fernandes, Nuno, and Miguel A. Ferreira, 2008, Does International Cross-Listing Improve the Information Environment, *Journal of Financial Economics* 88, 216-244.
- Griffin, John M., Nicholas H. Hirschey, and Patrick J. Kelly, 2008, Why does the Reaction to News Announcements Vary across Countries?, *University of Texas at Austin Working Paper*.
- Hung, Mingyi, 2000, Accounting Standards and Value Relevance of Financial Statements: An International Analysis, *Journal of Accounting and Economics* 30, 401-420.
- Kim, Jeong-Bon V., and Shauna Shi, 2007, International Financial Reporting Standards, Institutional Infrastructures and Costs of Equity Capital around the World, *SSRN eLibrary*.

- Kim, Jeong-Bon V., and Shauna Shi, 2009, Enhanced Disclosures Via IFRS and Stock Price Synchronicity Around the World: Do Analyst Following and Institutional Infrastructure Matter?, *SSRN eLibrary*.
- Kim, Oliver, and Robert E. Verrecchia, 1991, Trading Volume and Price Reactions to Public Announcements, *Journal of Accounting Research* 29, 302-321.
- Kim, Oliver, and Robert E. Verrecchia, 1997, Pre-Announcement and Event-Period Private Information, *Journal of Accounting and Economics* 24, 395-419.
- Kross, William, Byung Ro, and Douglas Schroeder, 1990, Earnings Expectations: The Analysts' Information Advantage, *The Accounting Review* 65, 461-476.
- La Porta, Rafael, Florencio Lopez-De-Silanes, and Andrei Shleifer, 2006, What Works in Securities Laws?, *Journal of Finance* 61, 1-32.
- La Porta, Rafael, Florencio Lopez-de-Silanes, Andrei Shleifer, and Robert W. Vishny, 1998, Law and Finance, *The Journal of Political Economy* 106, 1113-1155.
- Landsman, Wayne R., Edward L. Maydew, and Jake Thornock, 2009, The Information Content of Annual Earnings Announcements and Mandatory Adoption of IFRS, *SSRN eLibrary*.
- Leuz, Christian, Dhananjay Nanda, and Peter D. Wysocki, 2003, Earnings Management and Investor Protection: An International Comparison, *Journal of Financial Economics* 69, 505-527.
- Leuz, Christian, and Robert E. Verrecchia, 2000, The Economic Consequences of Increased Disclosure, *Journal of Accounting Research* 38, 91-124.
- Leuz, Christian, and Peter D. Wysocki, 2008, Economic Consequences of Financial Reporting and Disclosure Regulation: A Review and Suggestions for Future Research, *SSRN eLibrary*.
- Lim, Terence, 2001, Rationality and Analysts' Forecast Bias, *Journal of Finance* 56, 369-385.
- Lys, Thomas, and Lisa Gilbert Soo, 1995, Analysts' Forecast Precision as a Response to Competition, *Journal of Accounting, Auditing & Finance* 10, 751-765.
- Matsumoto, Dawn A., 2002, Management's Incentives to Avoid Negative Earnings Surprises, *The Accounting Review* 77, 483.

Mohanram, Partha S., and Shyam V. Sunder, 2006, How Has Regulation FD Affected the Operations of Financial Analysts?*, *Contemporary Accounting Research* 23, 491-525.

Skinner, Douglas J., 1994, Why Firms Voluntarily Disclose Bad News, *Journal of Accounting Research* 32, 38-60.

Table 1.1 Sample Selection and Sample Composition by Country

The complete final sample is composed of 19,817 firm-year observations from 30 countries from 2002-2007 with analysts' forecasts data from IBES and second quarter or first semiannual earning announcement date from Bloomberg and after applying the data screens described below. The list of IFRS adopting countries is obtained from Daske et al. (2008).

Panel A: Sample Selection Criteria						
Criteria	IFRS Country			Non-IFRS Country		
	No. Country	Unique Firms	Firm-Years	No. Country	Unique Firms	Firm-Years
IBES analysts forecast with available return data from Datastream and earning announcement date from Bloomberg (2002-2007)	25	3,873	12,942	18	6,021	22,060
At least two analysts forecasts within 30 days after second quarter or first semiannual earning announcement	24	2,634	9,174	17	4,437	15,928
Total Assets greater than U.S. \$100MM	24	2,293	8,983	17	4,043	14,794
Exclude voluntary IFRS adoptions	24	2,282	7,928	17	4,014	14,718
Exclude IFRS coding errors (firm-years in adopted country coded as non-IFRS)	24	2,207	7,458	17	4,014	14,718
Excluded newly listed firms during the period of sample (2002-2007)	24	1,851	6,784	16	3,322	13,242
At least 20 unique firms per country	18	1,792	6,645	12	3,293	13,172
FINAL SAMPLE	18	1,792	6,645	12	3,293	13,172

Panel B: Sample Composition for IFRS Adopting Country

	Unique Firms	Firm-Years
Australia	177	689
Austria	20	46
Belgium	47	154
Denmark	54	170
Finland	57	257
France	205	879
Germany	168	462
Greece	39	120
Hong Kong	126	300
Ireland	27	99
Italy	87	322
Netherlands	71	341
Norway	56	215
South Africa	81	309
Spain	53	204
Sweden	73	323
Switzerland	91	251
UK	360	1,504
Total	1,792	6,645

Panel C: Sample Composition for Non-IFRS Adopting Country

	Unique Firms	Firm-Years
China	83	119
India	27	46
Indonesia	38	138
Japan	726	2,810
Malaysia	87	294
Mexico	21	55
New Zealand	27	74
South Korea	180	776
Taiwan	101	295
Thailand	43	94
Turkey	34	68
US	1,926	8,403
Total	3,293	13,172

Table 1.2 Description of Variables

This table describes all variables used in the analysis and their data sources.

Variable	Description	Source
COMMON	Log of precision of analysts' common or public information (h) from Barron et al. (1998) framework; estimated using analyst forecasts released within 30 days after second quarter or first semiannual earning announcement	IBES
PRIVATE	Log of precision of analysts' private or idiosyncratic information (s) from Barron et al. (1998) framework; estimated using analyst forecasts released within 30 days after second quarter or first semiannual earning announcement	IBES
TOTAL	Log of sum of analysts' common (h) and private (s) information	IBES
CORR	Log of commonality in analysts' information (ρ) from Barron et al. (1998) framework; estimated using analyst forecasts released within 30 days after second quarter or first semiannual earning announcement	IBES
FERR	Absolute value of the difference between announced earning and mean of forecast earnings scaled by mean of analyst forecasts	IBES
DISPERSION	Standard deviation of analysts' earnings forecasts scaled by mean of analyst forecasts	IBES
FOLLOWING	Number of analysts who announce annual earnings forecast within one year prior the financial year end	IBES
POST	Indicator variable equal to 1 for all firm-years with fiscal year ended on or after 12/31/2005	IBES
IFRS*POST	Indicator variable equal to 1 for IFRS adopting firm-years (firm-years in IFRS adopting countries and with fiscal year ended on or after 12/31/2005)	IBES
MV	Log of the market capitalization of firm in million US dollars	Datastream/Worldscope
BM	Book-to-market equity ratio	Datastream/Worldscope
LEVERAGE	Ratio of total debt over total asset	Datastream/Worldscope
RETVOL	Log of standard deviation of monthly stock returns over preceding twelve months	Datastream/Worldscope
EARNVOL	Log of standard deviation of return on equity over the preceding three years	Datastream/Worldscope
DLOSS	Indicator variable equal to 1 if the EPS is negative, zero otherwise	Datastream/Worldscope
DMISS	Indicator variable equal to 1 if the firm miss the mean earnings forecast, zero otherwise	IBES
TREND	Value takes -3 to +2 around year 2005, it is used to detrend the pattern around IFRS adoption	
LAW	Indicator variable equal to 1 if the legal origin of a country is Common Law, zero otherwise	Djankov et al. (2008)
ANTI	Anti-self-dealing index compiled by Djankov et al. (2008)	Djankov et al. (2008)
DISREQ	Disclosure requirement index compiled by La Porta, Lopez-de-Silanes, and Shleifer (2005)	LLS (2005)
ACCSTD	Accounting rating standards compiled by La Porta et al. (1998)	LLSV (1998)
GDPG	Log of GDP per capita	World Bank WDI
GDPV	Variance of GDP per capita growth for the past five years	World Bank WDI
MCAP	Market capitalization of listed companies deflated by GDP	World Bank WDI
POPULATION	Total population of country	World Bank WDI

Table 1.3 Descriptive Statistics for Variables Used in Analysis

This table presents the descriptive statistics of dependent variables (Panel A), firm-level independent variables (Panel B), and country-level institutional factors (Panel C). In Panel A: *h* is precision of analysts' common or public information estimated using Barron et al. (1998) framework. *s* is precision of analysts' private or idiosyncratic information (*s*) estimated using Barron et al. (1998) framework. *COMMON* is log of precision of analysts' common or public information (*h*). *PRIVATE* is log of precision of analysts' private or idiosyncratic information (*s*). *TOTAL* is log of sum of analysts' common (*h*) and private (*s*) information. *CORR* is log of commonality in analysts' information (*p*) estimated using Barron et al. (1998) framework. *FERR* (forecast errors) is absolute value of the difference between announced earnings and mean of forecast earnings scaled by mean of analyst forecasts. *DISPERSION* is standard deviation of analysts' earnings forecasts scaled by mean of analyst forecasts. *FOLLOWING* is number of analysts who announce annual earnings forecasts within one year prior the financial year end. In Panel B: *MV* is log of the market capitalization of firm in million US dollars. *BM* is book-to-market equity ratio. *Leverage* is ratio of total debt over total asset. *RETVOL* is log of standard deviation of monthly stock returns over preceding twelve months. *EARNVOL* is log of standard deviation of return on equity over the preceding three years. In Panel C: The legal origin, Anti-self-dealing index, disclosure requirement index, and accounting rating standards for sample countries are listed. All variables in Panel A and Panel B are winsorized at the 1st and 99th percentiles.

Panel A: Dependent Variables

	IFRS Adopting Country				Non-IFRS Adopting Country			
	Firm-Years	Mean	Median	Std	Firm-Years	Mean	Median	Std
<i>h</i> (common)	6,645	62.973	3.362	382.093	13,172	175.233	6.940	644.856
<i>s</i> (private)	6,645	208.680	4.798	1045.110	13,172	464.787	3.775	1835.715
<i>COMMON</i>	6,645	1.594	1.767	2.834	13,172	1.979	2.640	3.760
<i>PRIVATE</i>	6,645	1.260	1.568	3.554	13,172	0.940	1.329	4.402
<i>TOTAL</i>	6,645	2.780	2.890	2.754	13,172	2.966	3.536	3.724
<i>CORR</i>	6,645	-1.095	-0.471	1.431	13,172	-0.854	-0.223	1.352
<i>FERR</i>	6,645	0.329	0.107	0.678	13,172	0.276	0.081	0.630
<i>DISPERSION</i>	6,645	0.191	0.071	0.412	13,172	0.124	0.038	0.333
<i>FOLLOWING</i>	6,645	27.078	23.000	17.452	13,172	18.444	16.000	12.067

Panel B: Firm-level Independent Variables

	IFRS Adopting Country				Non-IFRS Adopting Country			
	Firm-Years	Mean	Median	Std	Firm-Years	Mean	Median	Std
<i>MV</i>	6,645	7.245	7.061	1.649	13,172	7.325	7.202	1.484
<i>BM</i>	6,575	0.590	0.495	0.413	12,963	0.602	0.503	0.427
<i>LEVERAGE</i>	6,645	0.243	0.240	0.164	13,162	0.226	0.197	0.193
<i>RETVOL</i>	6,641	-2.544	-2.585	0.483	13,159	-2.411	-2.429	0.523
<i>EARNVOL</i>	6,534	1.592	1.551	1.197	12,933	1.422	1.392	1.261

Panel C: Country-level Institutional Factors

IFRS Adopting Country				
	LAW	ANTI	DISREQ	ACCSTD
Australia	Common	0.757	0.75	75
Austria	Civil	0.213	0.25	54
Belgium	Civil	0.544	0.42	61
Denmark	Civil	0.463	0.58	62
Finland	Civil	0.457	0.50	77
France	Civil	0.379	0.75	69
Germany	Civil	0.282	0.42	62
Greece	Civil	0.217	0.33	55
Hong Kong	Common	0.963	0.92	69
Ireland	Common	0.789	0.67	
Italy	Civil	0.421	0.67	62
Netherlands	Civil	0.203	0.50	64
Norway	Civil	0.421	0.58	74
South Africa	Common	0.813	0.83	70
Spain	Civil	0.374	0.50	64
Sweden	Civil	0.333	0.58	83
Switzerland	Civil	0.267	0.67	68
UK	Common	0.950	0.83	78
Non-IFRS Adopting Country				
	LAW	ANTI	DISREQ	ACCSTD
China	Civil	0.763		
India	Common	0.579	0.92	57
Indonesia	Civil	0.653	0.50	
Japan	Civil	0.499	0.75	65
Malaysia	Common	0.950	0.92	76
Mexico	Civil	0.172	0.58	60
New Zealand	Common	0.950	0.67	70
South Korea	Civil	0.469	0.75	62
Taiwan	Civil	0.565	0.75	65
Thailand	Common	0.813	0.92	64
Turkey	Civil	0.429	0.50	51
US	Common	0.654	1.00	71

Table 1.4 Correlation Matrix

This table presents the Pearson correlation matrices for firm-level (Panel A) and country-level (Panel B) variables. COMMON is log of precision of analysts' common or public information (h) estimated using Barron et al. (1998) framework. PRIVATE is log of precision of analysts' private or idiosyncratic information (s) estimated using Barron et al. (1998) framework. TOTAL is log of sum of analysts' common (h) and private (s) information. CORR is log of commonality in analysts' information (ρ) estimated using Barron et al. (1998) framework. FERR (forecast errors) is absolute value of the difference between announced earnings and mean of forecast earnings scaled by mean of analyst forecasts. DISPERSION is standard deviation of analysts' earnings forecasts scaled by mean of analyst forecasts. FOLLOWING is number of analysts who announce annual earnings forecasts within one year prior the financial year end. MV is log of the market capitalization of firm in million US dollars. BM is book-to-market equity ratio. Leverage is ratio of total debt over total asset. RETVOL is log of standard deviation of monthly stock returns over preceding twelve months. EARNVOL is log of standard deviation of return on equity over the preceding three years. The legal origin, Anti-self-dealing index, disclosure requirement index, and accounting rating standards for sample countries are listed. All continuous variables in Panel A and Panel B are winsorized at the 1st and 99th percentiles. LAW is an indicator variable equal to 1 if the legal origin of a country is Common Law, and zero otherwise. ANTI is Anti-self-dealing index compiled by Djankov et al. (2006). DISREQ is disclosure requirement index compiled by La Porta, Lopez-de-Silanes, and Shleifer (2005). ACCSTD is accounting rating standards compiled by La Porta et al. (1998). IFRS*POST is an indicator variable equal to 1 for IFRS adopting firm-years (firm-years in IFRS adopting countries and with fiscal year ended on or after Dec 31, 2005).

Panel A: Correlation between Analyst Information Measures and Firm-level Characteristics

Variable	COMMON	PRIVATE	TOTAL	CORR	FERR	DISPERSION	FOLLOWING	MV	BM	LEVERAGE	RETVOL	EARNVOL
COMMON	1											
PRIVATE	0.627	1										
TOTAL	0.854	0.864	1									
CORR	0.287	-0.438	-0.214	1								
FERR	-0.381	-0.460	-0.480	0.198	1							
DISPERSION	-0.352	-0.204	-0.337	-0.071	0.642	1						
FOLLOWING	-0.123	0.027	-0.091	-0.119	-0.019	0.052	1					
MV	0.046	0.115	0.071	-0.073	-0.148	-0.101	0.599	1				
BM	-0.285	-0.252	-0.307	0.026	0.192	0.147	-0.091	-0.325	1			
LEVERAGE	-0.081	-0.040	-0.071	-0.027	0.084	0.088	0.039	0.052	0.068	1		
RETVOL	-0.158	-0.161	-0.186	0.042	0.201	0.190	-0.069	-0.330	0.098	-0.020	1	
EARNVOL	-0.117	-0.090	-0.123	0.000	0.193	0.192	0.045	-0.074	-0.097	0.144	0.383	1

Panel B: Correlation between Analyst Information Measures and Country-level Characteristics

Variable	COMMON	PRIVATE	TOTAL	CORR	FERR	DISPERSION	FOLLOWING	LAW	ANTI	DISREQ	ACCSTD	IFRS*POST
LAW	0.468	0.338	0.477	0.033	-0.086	-0.081	-0.192	1				
ANTI	0.191	0.145	0.198	0.006	-0.062	-0.049	-0.123	0.780	1			
DISREQ	0.334	0.202	0.327	0.063	-0.072	-0.091	-0.256	0.805	0.584	1		
ACCSTD	0.248	0.200	0.263	-0.007	-0.029	-0.010	-0.066	0.609	0.625	0.411	1	
IFRS*POST	-0.013	0.043	0.009	-0.062	-0.034	-0.003	0.135	-0.232	-0.184	-0.473	0.058	1

Table 1.5 Precision of Analyst Information Measures Before and After Mandatory IFRS Adoption

This table presents the precision of analyst information measures before and after IFRS adoption. There are 18 countries that adopt IFRS in 2005, the list of countries can be found in Table 1. The Pre-IFRS measures are estimated by using analyst forecasts made for fiscal year ended between 12/31/2004 and 12/30/2005; the Post-IFRS measures is estimated by using analyst forecasts made for fiscal year ended between 12/31/2005 and 12/30/2006. There are 1,011 observations in Pre-IFRS period, and 1,142 observations in Post-IFRS period. COMMON is log of precision of analysts' common or public information (h) estimated using Barron et al. (1998) framework. PRIVATE is log of precision of analysts' private or idiosyncratic information (s) estimated using Barron et al. (1998) framework. TOTAL is log of sum of analysts' common (h) and private (s) information. CORR is log of commonality in analysts' information (ρ) estimated using Barron et al. (1998) framework. FERR (forecast errors) is absolute value of the difference between announced earnings and mean of forecasted earnings scaled by mean of analyst forecasts. DISPERSION is standard deviation of analysts' earnings forecasts scaled by mean of analyst forecasts. FOLLOWING is number of analysts who announce annual earnings forecasts within one year prior the financial year end. All variables are winsorized at the 1st and 99th percentiles. p-values for means differences are calculated using pooled difference of means test. p-values for medians differences are calculated using Wilcoxon signed rank test.

Information Measures	Means				Medians			
	Pre-IFRS	Post-IFRS	Difference	p-value	Pre-IFRS	Post-IFRS	Difference	p-value
COMMON	1.428	1.861	0.433	0.000	1.645	1.980	0.335	0.001
PRIVATE	1.026	1.437	0.411	0.006	1.232	1.721	0.489	0.004
TOTAL	2.553	3.018	0.466	0.000	2.705	3.130	0.424	0.000
CORRELATION	-1.033	-1.066	-0.033	0.580	-0.438	-0.418	0.021	0.847
FERR	0.357	0.253	-0.104	0.000	0.131	0.091	-0.040	0.000
DISPERSION	0.207	0.147	-0.061	0.000	0.087	0.060	-0.027	0.000
FOLLOWING	27.764	25.899	-1.864	0.014	23.000	22.000	-1.000	0.028

Table 1.6 Multivariate Analysis of Analyst Information and Following on Mandatory IFRS Adoption

This table reports results from cross-country firm-level OLS regressions of analysts' information and analyst following on POST, IFRS*POST, and firm-level characteristics. POST is an indicator variable equal to 1 for firm-years with fiscal years ended on or after 12/31/2005. IFRS*POST is an interaction term equal to 1 for IFRS adopting firm-years (firm-years in IFRS adopting countries and with fiscal year ended on or after 12/31/2005). In panel A and B, either country fixed effect or firm fixed effect is included in the regression. Therefore, country or firm dummies are used in lieu of variable IFRS. In Panel C, country-level characteristics are controlled on top of industry fixed effect. There are six dependent variables: COMMON is log of precision of analysts' common or public information (h) estimated using Barron et al. (1998) framework; PRIVATE is log of precision of analysts' private or idiosyncratic information (s) estimated using Barron et al. (1998) framework; FOLLOWING is number of analysts who announce annual earnings forecasts within one year prior the financial year end; TOTAL is log of sum of analysts' common (h) and private (s) information; log (FERR) is log of analyst forecast errors; log (DISP) is log of analyst forecast dispersion. All firm-level characteristics control variables are lagged by one year: MV is log of the market capitalization of firm in million US dollars; BM is book-to-market equity ratio; LEVERAGE is ratio of total debt over total asset; RETVOL is log of standard deviation of monthly stock returns over preceding twelve months; EARNVOL is log of standard deviation of return on equity over the preceding three years; DLOSS is an indicator variable equal to 1 if the EPS is negative, zero otherwise; DMISS is an indicator variable equal to 1 if the firm miss the mean earnings forecast, zero otherwise; Trend takes value -3 to +2 around year 2005, it is used to detrend the pattern around IFRS adoption. All continuous variables are winsorized at the 1st and 99th percentiles. NObs is the number of observations. Intercept, industry, and country effects are not tabulated. Robust t-statistics are in parentheses. Sample period is 2002-2007.

Panel A: Multivariate Regression of analyst Information and Following with Country and Industry Fixed Effects or Firm Fixed Effect									
Variables	COMMON			PRIVATE			FOLLOWING		
	M1	M2	M3	M4	M5	M6	M7	M8	M9
IFRS*POST	0.914 (11.30)	0.889 (10.76)	0.885 (8.52)	0.721 (6.71)	0.702 (6.29)	0.880 (6.26)	-1.960 (-4.92)	-3.541 (-12.37)	-1.887 (-6.78)
POST	-0.324 (-7.21)	-0.428 (-6.25)	-0.348 (-4.25)	-0.063 (-1.02)	-0.396 (-3.90)	-0.257 (-2.12)	-0.903 (-5.77)	0.778 (4.27)	0.013 (0.10)
MV		-0.039 (-1.41)	-0.100 (-1.22)		0.092 (2.66)	-0.035 (-0.29)		6.879 (67.74)	3.776 (17.66)
BM		-0.784 (-11.47)	-0.520 (-3.66)		-0.889 (-9.78)	-0.316 (-1.71)		1.243 (4.35)	1.841 (5.39)
FOLLOWING		-0.008 (-2.97)	-0.006 (-1.27)		0.006 (1.89)	-0.009 (-1.32)			
LEVERAGE		-1.149 (-7.28)	-1.945 (-5.41)		-0.832 (-4.09)	-1.648 (-3.29)		-2.306 (-3.57)	2.833 (3.16)
RETVOL		-0.528 (-9.63)	-0.213 (-2.95)		-0.530 (-6.95)	-0.021 (-0.19)		2.414 (11.05)	0.797 (5.01)
EARNVOL		-0.267 (-13.08)	-0.106 (-3.72)		-0.269 (-9.42)	-0.029 (-0.67)		0.053 (0.64)	0.040 (0.62)
DLOSS		-1.356 (-18.90)	-1.007 (-10.13)		-1.228 (-12.49)	-0.938 (-6.76)		2.201 (8.51)	0.607 (3.32)
DMISS		-0.347 (-8.92)	-0.226 (-4.80)		-0.376 (-6.83)	-0.220 (-3.21)		0.300 (2.23)	0.114 (1.29)
TREND		-0.124 (-6.19)	-0.062 (-2.35)		-0.066 (-2.20)	0.016 (0.42)		-0.902 (-15.56)	-0.395 (-7.51)
Intercept	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm Effect	No	No	Yes	No	No	Yes	No	No	Yes
Industry Effect	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No
Country Effect	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No
NObs	19,808	17,130	17,137	19,808	17,130	17,137	19,808	18,920	18,929
Adj R-Sq	0.49	0.53	0.63	0.3	0.33	0.44	0.27	0.69	0.92

Panel B: Multivariate Regression of Analyst Total Information, Forecast Errors, and Forecast Dispersion									
Variables	TOTAL			log (FERR)			log (DISP)		
	M1	M2	M3	M4	M5	M6	M7	M8	M9
IFRS*POST	0.948 (12.37)	0.923 (12.01)	1.015 (10.67)	-0.433 (-8.92)	-0.379 (-7.72)	-0.431 (-6.92)	-0.513 (-12.63)	-0.461 (-11.58)	-0.442 (-8.92)
POST	-0.271 (-6.72)	-0.470 (-7.76)	-0.341 (-4.90)	-0.061 (-2.28)	0.210 (5.13)	0.136 (2.81)	0.052 (2.24)	0.210 (6.34)	0.162 (4.29)
MV		-0.012 (-0.44)	-0.116 (-1.51)		-0.120 (-8.75)	-0.178 (-3.51)		-0.054 (-4.52)	-0.131 (-3.05)
BM		-0.856 (-12.24)	-0.466 (-3.67)		0.533 (13.06)	0.203 (2.40)		0.413 (11.56)	0.265 (3.14)
FOLLOWING		-0.005 (-2.08)	-0.009 (-1.96)		0.003 (2.32)	0.004 (1.18)		0.011 (9.38)	0.004 (1.68)
LEVERAGE		-1.083 (-6.89)	-1.922 (-6.18)		0.462 (5.64)	1.010 (4.91)		0.512 (7.18)	1.082 (6.23)
RETVOL		-0.600 (-11.33)	-0.149 (-2.38)		0.408 (13.06)	0.070 (1.60)		0.445 (16.68)	0.190 (5.48)
EARNVOL		-0.270 (-13.52)	-0.066 (-2.55)		0.154 (13.02)	0.026 (1.48)		0.143 (14.36)	0.051 (3.59)
DLOSS		-1.355 (-18.97)	-1.005 (-10.31)		0.857 (18.88)	0.573 (9.02)		0.818 (20.23)	0.470 (8.30)
DMISS		-0.350 (-9.49)	-0.226 (-5.41)		0.239 (10.53)	0.162 (5.66)		0.215 (11.41)	0.157 (7.05)
TREND		-0.108 (-5.79)	-0.038 (-1.56)		0.026 (2.12)	-0.013 (-0.82)		0.055 (5.64)	0.026 (2.02)
Intercept	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm Effect	No	No	Yes	No	No	Yes	No	No	Yes
Industry Effect	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No
Country Effect	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No
NObs	19,817	19,808	17,130	19,817	19,808	17,130	19,817	19,808	18,920
Adj R-Sq	0.15	0.06	0.08	0.4	0.24	0.28	0.9	0.22	0.65

Panel C: Multivariate Regression of Analyst Information and Following with Country-level Characteristics						
Variables	COMMON		PRIVATE		FOLLOWING	
	M1	M2	M3	M4	M5	M6
IFRS*POST	0.226 (2.45)	0.683 (6.79)	0.012 (0.11)	0.425 (3.37)	-1.724 (-4.07)	-5.198 (-15.27)
IFRS	-0.452 (-4.21)	0.290 (1.53)	0.354 (3.04)	0.959 (4.76)	10.125 (17.54)	11.579 (16.95)
POST	0.118 (2.21)	0.163 (1.96)	0.389 (5.76)	0.282 (2.51)	-0.871 (-5.34)	3.054 (12.19)
MV		-0.326 (-8.18)		-0.228 (-5.22)		6.875 (60.79)
BM		-1.701 (-16.38)		-1.840 (-15.22)		1.255 (3.88)
FOLLOWING		0.006 (1.62)		0.026 (6.14)		
LEVERAGE		-0.821 (-3.59)		-0.486 (-1.85)		-2.109 (-2.92)
RETVOL		-0.759 (-9.90)		-0.770 (-8.42)		2.675 (10.54)
EARNVOL		-0.174 (-6.19)		-0.180 (-5.33)		0.159 (1.70)
DLOSS		-1.106 (-12.26)		-0.983 (-8.82)		2.124 (7.37)
DMISS		-0.638 (-12.87)		-0.668 (-10.62)		0.115 (0.75)
TREND		-0.363 (-15.24)		-0.284 (-8.72)		-0.962 (-14.16)
ANTI		0.629 (1.90)		0.948 (2.77)		-6.600 (-6.35)
GDPV		1.270 (13.03)		1.114 (9.99)		-1.225 (-3.11)
GDPC		-0.019 (-3.53)		0.005 (0.88)		0.417 (21.84)
MCAV		0.014 (13.15)		0.011 (10.06)		-0.012 (-3.36)
POPULATION		0.601 (9.09)		0.568 (8.27)		-0.945 (-3.93)
Intercept	Yes	Yes	Yes	Yes	Yes	Yes
Firm Effect	No	No	No	No	No	No
Industry Effect	Yes	Yes	Yes	Yes	Yes	Yes
Country Effect	No	No	No	No	No	No
NObs	19,808	16,924	19,808	16,924	19,808	18,639
Adj R-Sq	0.05	0.26	0.03	0.16	0.15	0.61

Table 1.7 Analyst Information and Following on Mandatory IFRS Adoption – Subsample Analysis

This table reports results from subsample OLS regressions of analysts' information and analyst following on POST, IFRS*POST, and control variables based on country's institutional factors. In Panel A, the samples are split into firms in common and civil law countries. In Panel B, samples are split into firms in above and below median level of country's anti-self-dealing index. In Panel C, samples are split into firms in above and below median level of country's disclosure requirement index. In Panel D, samples are split into firms in above and below median level of country's accounting rating standards. POST is an indicator variable equal to 1 for firm-years with fiscal years ended on or after 12/31/2005. IFRS*POST is an interaction term equal to 1 for IFRS adopting firm-years (firm-years in IFRS adopting countries and with fiscal year ended on or after 12/31/2005). Country dummies are used in lieu of variable IFRS. There are three dependent variables: COMMON is log of precision of analysts' common or public information (h) estimated using Barron et al. (1998) framework; PRIVATE is log of precision of analysts' private or idiosyncratic information (s) estimated using Barron et al. (1998) framework; FOLLOWING is number of analysts who announce annual earnings forecasts within one year prior the financial year end. All firm-level characteristics control variables are lagged by one year: MV is log of the market capitalization of firm in million US dollars; BM is book-to-market equity ratio; LEVERAGE is ratio of total debt over total asset; RETVOL is log of standard deviation of monthly stock returns over preceding twelve months; EARNVOL is log of standard deviation of return on equity over the preceding three years; DLOSS is an indicator variable equal to 1 if the EPS is negative, zero otherwise; DMISS is an indicator variable equal to 1 if the firm miss the mean earnings forecast, zero otherwise; Trend takes value -3 to +2 around year 2005, it is used to detrend the pattern around IFRS adoption. Coef represents the difference between the coefficients on IFRS*POST across the two subsamples. All continuous variables are winsorized at the 1st and 99th percentiles. NObs is the number of observations. Intercept, industry, and country effects are not tabulated. Robust t-statistics are in parentheses. Sample period is 2002-2007.

Panel A: Subsample by Legal Origin (Common Law vs Civil Law)						
Variables	COMMON		PRIVATE		FOLLOWING	
	Civil Law	Common Law	Civil Law	Common Law	Civil Law	Common Law
	M1	M2	M3	M4	M5	M6
IFRS*POST	0.156 (1.38)	1.290 (10.46)	0.120 (0.75)	1.086 (6.84)	-4.403 (-10.05)	-1.911 (-5.70)
POST	-0.270 (-2.73)	-0.351 (-3.91)	-0.375 (-2.48)	-0.290 (-2.18)	0.896 (2.91)	0.392 (1.76)
MV	-0.173 (-4.05)	-0.010 (-0.27)	0.083 (1.60)	0.081 (1.74)	8.258 (50.30)	6.154 (50.90)
BM	-0.705 (-7.83)	-0.899 (-8.81)	-0.818 (-7.07)	-0.966 (-6.79)	1.649 (3.94)	1.274 (3.25)
FOLLOWING	-0.007 (-1.97)	-0.006 (-1.60)	-0.002 (-0.48)	0.014 (2.75)		
LEVERAGE	-0.896 (-3.75)	-1.232 (-6.00)	-0.858 (-2.82)	-0.799 (-2.97)	-2.100 (-1.87)	-2.172 (-2.79)
RETVOL	-0.612 (-7.16)	-0.597 (-8.38)	-0.471 (-4.14)	-0.644 (-6.30)	1.630 (4.31)	2.474 (9.35)
EARNVOL	-0.215 (-6.71)	-0.290 (-11.18)	-0.239 (-5.29)	-0.279 (-7.51)	0.199 (1.33)	0.058 (0.62)
DLOSS	-1.735 (-15.45)	-1.157 (-12.81)	-1.677 (-11.48)	-0.999 (-7.85)	1.966 (4.06)	1.846 (6.29)
DMISS	-0.079 (-1.43)	-0.475 (-9.04)	-0.162 (-2.10)	-0.486 (-6.37)	0.388 (1.84)	0.194 (1.16)
TREND	0.017 (0.55)	-0.210 (-8.01)	0.032 (0.74)	-0.132 (-3.31)	-1.326 (-14.60)	-0.697 (-9.64)
Intercept	Yes	Yes	Yes	Yes	Yes	Yes
Industry Effect	Yes	Yes	Yes	Yes	Yes	Yes
Country Effect	Yes	Yes	Yes	Yes	Yes	Yes
NObs	6,547	10,583	6,547	10,583	7,614	11,306
Adj R-Sq	0.54	0.33	0.41	0.16	0.73	0.66
Δ Coef (IFRS*POST)		1.111 (6.66)		0.965 (4.28)		2.407 (4.41)

Panel B: Subsample by Anti-self-dealing Index (Low vs High ANTI index)						
Variables	COMMON		PRIVATE		FOLLOWING	
	Low ANTI	High ANTI	Low ANTI	High ANTI	Low ANTI	High ANTI
	Score	Score	Score	Score	Score	Score
	M1	M2	M3	M4	M5	M6
IFRS*POST	0.155 (1.34)	1.217 (10.05)	0.126 (0.75)	1.031 (6.68)	-4.771 (-10.61)	-1.663 (-5.07)
POST	-0.248 (-2.42)	-0.345 (-3.96)	-0.411 (-2.59)	-0.270 (-2.09)	1.165 (3.67)	0.322 (1.47)
MV	-0.173 (-3.88)	-0.005 (-0.14)	0.076 (1.42)	0.090 (2.00)	8.386 (49.15)	6.129 (51.66)
BM	-0.664 (-7.34)	-0.924 (-9.22)	-0.817 (-6.86)	-0.960 (-6.99)	1.660 (3.85)	1.311 (3.48)
FOLLOWING	-0.007 (-1.73)	-0.007 (-1.97)	-0.001 (-0.30)	0.012 (2.61)		
LEVERAGE	-0.873 (-3.43)	-1.200 (-6.05)	-0.812 (-2.50)	-0.801 (-3.09)	-2.720 (-2.24)	-1.707 (-2.26)
RETVOL	-0.605 (-6.92)	-0.583 (-8.39)	-0.442 (-3.74)	-0.634 (-6.40)	1.693 (4.25)	2.368 (9.23)
EARNVOL	-0.220 (-6.72)	-0.285 (-11.23)	-0.244 (-5.22)	-0.275 (-7.62)	0.171 (1.07)	0.069 (0.76)
DLOSS	-1.788 (-15.66)	-1.145 (-12.85)	-1.663 (-11.26)	-1.014 (-8.08)	2.115 (4.20)	1.770 (6.17)
DMISS	-0.080 (-1.39)	-0.458 (-8.99)	-0.186 (-2.30)	-0.464 (-6.31)	0.356 (1.61)	0.233 (1.44)
TREND	0.021 (0.66)	-0.206 (-8.03)	0.052 (1.15)	-0.137 (-3.50)	-1.343 (-14.10)	-0.733 (-10.45)
Intercept	Yes	Yes	Yes	Yes	Yes	Yes
Industry Effect	Yes	Yes	Yes	Yes	Yes	Yes
Country Effect	Yes	Yes	Yes	Yes	Yes	Yes
NObs	6,037	11,093	6,037	11,093	6,943	11,977
Adj R-Sq	0.55	0.36	0.41	0.17	0.74	0.66
Δ Coef		1.041		0.907		3.040
(IFRS*POST)		(6.25)		(3.99)		(5.54)

Panel C: Subsample by Disclosure Requirement Index (Low vs High DISREQ index)						
Variables	COMMON		PRIVATE		FOLLOWING	
	Low DISREQ	High DISREQ	Low DISREQ	High DISREQ	Low DISREQ	High DISREQ
	M1	M2	M3	M4	M5	M6
IFRS*POST	0.137 (0.43)	1.029 (10.75)	-0.240 (-0.66)	0.902 (6.93)	-1.624 (-1.41)	-3.101 (-9.42)
POST	-0.153 (-0.47)	-0.403 (-5.67)	0.391 (1.00)	-0.418 (-3.94)	0.758 (0.70)	0.405 (2.16)
MV	-0.090 (-1.16)	-0.048 (-1.64)	0.206 (1.98)	0.073 (1.99)	9.836 (39.61)	6.458 (60.16)
BM	-1.157 (-6.45)	-0.709 (-9.62)	-0.961 (-4.26)	-0.878 (-8.79)	4.846 (7.29)	0.504 (1.62)
FOLLOWING	-0.016 (-2.58)	-0.004 (-1.40)	-0.010 (-1.25)	0.010 (2.69)		
LEVERAGE	-1.098 (-3.21)	-1.121 (-6.50)	-1.054 (-2.17)	-0.805 (-3.63)	2.527 (1.41)	-2.519 (-3.75)
RETVOL	-0.710 (-5.10)	-0.525 (-8.87)	-0.496 (-2.59)	-0.541 (-6.54)	2.134 (3.65)	2.357 (10.26)
EARNVOL	-0.252 (-4.74)	-0.267 (-12.23)	-0.184 (-2.30)	-0.283 (-9.24)	0.165 (0.68)	0.052 (0.59)
DLOSS	-0.957 (-4.96)	-1.413 (-18.35)	-1.064 (-4.15)	-1.239 (-11.66)	2.427 (3.29)	2.171 (8.08)
DMISS	-0.070 (-0.71)	-0.388 (-9.22)	-0.082 (-0.59)	-0.416 (-6.97)	-0.412 (-1.18)	0.389 (2.74)
TREND	-0.098 (-1.50)	-0.130 (-6.11)	-0.186 (-2.20)	-0.059 (-1.83)	-2.092 (-12.97)	-0.757 (-12.36)
Intercept	Yes	Yes	Yes	Yes	Yes	Yes
Industry Effect	Yes	Yes	Yes	Yes	Yes	Yes
Country Effect	Yes	Yes	Yes	Yes	Yes	Yes
NObs	2,139	14,991	2,139	14,991	2,605	16,315
Adj R-Sq	0.38	0.54	0.25	0.34	0.78	0.68
Δ Coef (IFRS*POST)		0.894 (2.72)		1.160 (3.11)		2.551 (3.22)

Panel D: Subsample by Accounting Rating Standards (Low vs High ACCSTD standards)						
Variables	COMMON		PRIVATE		FOLLOWING	
	Low ACCSTD	High ACCSTD	Low ACCSTD	High ACCSTD	Low ACCSTD	High ACCSTD
	M1	M2	M3	M4	M5	M6
IFRS*POST	0.282 (1.47)	1.008 (10.72)	0.178 (0.72)	0.948 (7.47)	-6.092 (-7.13)	-2.946 (-9.58)
POST	-0.155 (-0.89)	-0.410 (-5.57)	-0.335 (-1.35)	-0.372 (-3.40)	2.010 (2.85)	0.526 (2.83)
MV	-0.121 (-1.89)	-0.051 (-1.69)	0.103 (1.16)	0.065 (1.73)	9.380 (36.42)	6.496 (60.63)
BM	-0.671 (-5.00)	-0.795 (-9.97)	-0.786 (-4.89)	-0.927 (-8.58)	1.334 (2.00)	1.682 (5.54)
FOLLOWING	-0.009 (-2.08)	-0.005 (-1.46)	-0.003 (-0.42)	0.011 (2.87)		
LEVERAGE	-1.001 (-3.10)	-1.083 (-6.24)	-0.883 (-1.90)	-0.772 (-3.46)	-1.270 (-0.66)	-2.270 (-3.41)
RETVOL	-0.412 (-3.06)	-0.569 (-9.51)	-0.249 (-1.39)	-0.599 (-7.20)	0.480 (0.74)	2.533 (11.24)
EARNVOL	-0.223 (-4.50)	-0.273 (-12.35)	-0.244 (-3.15)	-0.277 (-8.98)	0.262 (1.08)	0.049 (0.57)
DLOSS	-1.131 (-5.78)	-1.385 (-17.99)	-1.195 (-4.57)	-1.221 (-11.55)	0.924 (1.04)	2.190 (8.59)
DMISS	-0.082 (-0.89)	-0.392 (-9.21)	-0.126 (-0.98)	-0.419 (-6.94)	-0.416 (-1.06)	0.426 (3.11)
TREND	-0.041 (-0.78)	-0.138 (-6.36)	-0.099 (-1.24)	-0.072 (-2.24)	-1.383 (-7.24)	-0.838 (-14.17)
Intercept	Yes	Yes	Yes	Yes	Yes	Yes
Industry Effect	Yes	Yes	Yes	Yes	Yes	Yes
Country Effect	Yes	Yes	Yes	Yes	Yes	Yes
NObs	2,324	14,806	2,324	14,806	2,906	16,014
Adj R-Sq	0.71	0.48	0.53	0.30	0.73	0.68
Δ Coef (IFRS*POST)		0.760 (3.62)		0.828 (3.04)		3.009 (3.36)

Table 1.8 Change in Information Environment Conditional on the Pre-IFRS Information Environment

This table reports change in information environment during IFRS adoption period conditional on the pre-IFRS information environment level. There are two dependent variables: ΔCOMMON is change of log of precision of analysts' common or public information (h) estimated using Barron et al. (1998) framework; $\Delta\text{PRIVATE}$ is change of log of precision of analysts' private or idiosyncratic information (s) estimated using Barron et al. (1998) framework. We examine the change in information environment for firms with different level of information level prior to mandatory IFRS adoption (i.e. year ended on or before 12/30/2005) by creating three indicator variables: DIEH for firms in the top quartile of the sample distribution, DIEL for firms in the bottom quartile, and DIEM for the two middle quartiles. We do not include intercept in our regression in order to allow three indicators to represents three groups of firms. We include change of control variables; the definition of controls variables is contained in Table 1.2. We also include change of information environment prior to classification year. Both changes of 2005 to 2006 and 2004 to 2006 study the effect of mandatory IFRS adoption on information environment. We analyze sample for civil law and common law countries separately. NObs is the number of observations. Intercept is not included in the regression for ease of interpretation on coefficients. Robust t-statistics are in parentheses. Sample period is stated in the respective model header.

Variables	Δ COMMON				Δ PRIVATE			
	2005 to 2006		2004 to 2006		2005 to 2006		2004 to 2006	
	Civil Law	Common Law	Civil Law	Common Law	Civil Law	Common Law	Civil Law	Common Law
	M1	M2	M3	M4	M5	M6	M7	M8
DIEH	-1.404 (-4.21)	-1.012 (-3.37)	-1.228 (-3.32)	-0.954 (-2.80)	-2.351 (-5.72)	-1.028 (-3.09)	-2.785 (-5.60)	-1.334 (-3.58)
DIEM	-0.243 (-1.05)	0.737 (4.01)	-0.476 (-1.64)	0.658 (2.57)	0.067 (0.18)	0.960 (4.11)	-0.473 (-1.03)	0.614 (1.97)
DIEL	1.680 (4.62)	2.748 (7.92)	0.926 (2.07)	2.829 (7.73)	2.576 (5.97)	3.881 (7.36)	2.556 (4.15)	4.743 (10.56)
Δ MV	1.189 (2.04)	0.008 (0.02)	0.830 (2.56)	-0.156 (-0.44)	1.722 (2.05)	-0.353 (-0.55)	1.466 (2.57)	-0.292 (-0.63)
Δ BM	0.353 (0.46)	1.200 (1.05)	0.068 (0.15)	0.462 (0.73)	1.919 (1.88)	0.385 (0.23)	1.179 (1.80)	-0.922 (-1.39)
Δ FOLLOWING	0.012 (0.35)	-0.006 (-0.15)	-0.010 (-0.47)	-0.005 (-0.19)	-0.045 (-1.17)	0.035 (0.74)	-0.024 (-0.99)	0.068 (2.25)
Δ LEVERAGE	-2.046 (-0.92)	-0.901 (-0.50)	-3.113 (-1.77)	-3.186 (-1.92)	-1.931 (-0.75)	0.364 (0.18)	-0.957 (-0.41)	-1.568 (-0.86)
Δ RETVOL	-0.494 (-1.76)	-0.366 (-1.20)	-0.189 (-0.60)	-0.678 (-2.29)	-0.202 (-0.48)	-0.106 (-0.30)	-0.399 (-0.97)	-0.287 (-0.78)
Δ EARNVOL	-0.130 (-0.87)	-0.147 (-0.87)	-0.342 (-2.46)	-0.205 (-1.81)	0.064 (0.32)	-0.109 (-0.64)	-0.053 (-0.31)	-0.142 (-1.06)
Δ DLOSS	-0.929 (-2.58)	-0.420 (-0.82)	-1.142 (-3.14)	0.304 (0.70)	-0.860 (-1.54)	-1.606 (-2.63)	-1.517 (-2.85)	-0.477 (-0.82)
Δ MISS	-0.098 (-0.42)	-0.319 (-1.25)	-0.201 (-1.02)	-0.113 (-0.58)	0.019 (0.07)	-0.008 (-0.02)	0.043 (0.16)	0.356 (1.43)
Δ INFORMATION	-0.256 (-3.80)	-0.180 (-2.98)	-0.508 (-7.47)	-0.295 (-4.60)	-0.270 (-5.28)	-0.201 (-3.15)	-0.225 (-3.91)	-0.203 (-3.36)
Intercept	No	No	No	No	No	No	No	No
NObs	343	283	299	269	343	283	299	269
Adj R-Sq	0.32	0.38	0.46	0.44	0.40	0.42	0.40	0.50

Table 1.9 Robustness Tests

This table presents the results of robustness tests of analysts' information and analyst following on POST, IFRS*POST, and control variables. In M1-M3, all US firm-years are excluded. In M4-M6, 100 samples from each and every country for every year are randomly selected to minimize the overweight of some countries. If the sample has less than 100 firms for a given country-year, all observations from that country-year are retained. In M7-M8, the COMMON and PRIVATE are estimated based on analyst forecasts issued within 30 days prior fiscal year end. In M9-M10, the median regression is used for the analysis. The COMMON and PRIVATE in M9-M10 median regression is raw score (i.e. not logarithm values). The definition of all variables is contained in Table 2. All continuous variables are winsorized at the 1st and 99th percentiles. NObs is the number of observations. Intercept, industry, and country effects are not tabulated. Robust t-statistics are in parentheses. Sample period is 2002-2007.

Variables	Without US Samples			Random Sample			30-day Prior Year End		Median Regression	
	COMMON	PRIVATE	FOLLOWING	COMMON	PRIVATE	FOLLOWING	COMMON	PRIVATE	h	s
	M1	M2	M3	M4	M5	M6	M7	M8	(common)	(private)
IFRS*POST	0.360 (3.76)	0.493 (3.69)	-2.865 (-8.04)	0.466 (3.82)	0.609 (3.61)	-3.696 (-7.83)	1.306 (8.84)	1.206 (6.96)	4.340 (3.96)	2.171 (4.54)
POST	-0.140 (-1.59)	-0.341 (-2.57)	0.980 (3.32)	-0.261 (-2.15)	-0.418 (-2.33)	1.691 (3.84)	-0.533 (-3.50)	-0.243 (-1.31)	-2.365 (-2.78)	-0.669 (-1.70)
MV	-0.216 (-6.25)	0.014 (0.33)	7.921 (56.68)	-0.146 (-3.89)	0.028 (0.57)	8.230 (56.21)	-0.035 (-0.81)	0.131 (2.53)	0.510 (1.51)	0.351 (1.93)
BM	-0.651 (-8.44)	-0.720 (-7.21)	1.297 (3.57)	-0.795 (-8.57)	-0.913 (-7.83)	1.256 (3.04)	-1.002 (-8.12)	-0.981 (-6.83)	-5.957 (-5.49)	-1.736 (-4.74)
FOLLOWING	-0.003 (-0.92)	0.005 (1.44)		-0.004 (-1.29)	0.005 (1.19)		-0.004 (-0.95)	0.008 (1.72)	-0.112 (-3.09)	0.001 (0.05)
LEVERAGE	-0.769 (-3.86)	-0.580 (-2.30)	-2.291 (-2.43)	-0.956 (-4.54)	-0.639 (-2.27)	-2.140 (-2.04)	-1.451 (-5.18)	-1.548 (-4.81)	-10.327 (-3.54)	-1.493 (-1.73)
RETVOL	-0.570 (-8.17)	-0.402 (-4.30)	1.277 (4.11)	-0.491 (-6.23)	-0.312 (-2.95)	1.556 (4.44)	-0.513 (-5.00)	-0.400 (-3.18)	-7.646 (-7.28)	-2.627 (-5.43)
EARNVOL	-0.261 (-9.95)	-0.276 (-7.56)	0.076 (0.63)	-0.268 (-8.99)	-0.261 (-6.31)	0.064 (0.47)	-0.245 (-6.27)	-0.249 (-5.44)	-2.183 (-5.80)	-0.619 (-4.24)
DLOSS	-1.711 (-17.93)	-1.854 (-14.60)	1.980 (4.98)	-1.415 (-12.47)	-1.617 (-10.40)	1.778 (3.75)	-0.831 (-6.21)	-0.979 (-5.90)	-10.340 (-5.21)	-2.598 (-4.72)
DMISS	-0.095 (-1.99)	-0.126 (-1.94)	0.453 (2.52)	-0.137 (-2.43)	-0.169 (-2.13)	0.518 (2.37)	-0.338 (-4.37)	-0.240 (-2.63)	-2.153 (-4.21)	-0.603 (-3.20)
TREND	0.001 (0.03)	0.023 (0.65)	-1.500 (-18.79)	-0.059 (-1.88)	-0.066 (-1.47)	-1.609 (-15.05)	-0.160 (-3.73)	-0.155 (-3.02)	-1.999 (-5.76)	-0.492 (-4.16)
Intercept	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
NObs	9,462	9,462	10,844	6,753	6,753	7,877	10,203	10,203	17,130	17,130
Adj R-Sq	0.56	0.42	0.71	0.55	0.39	0.71	0.46	0.37	0.43	0.43

2 The Economic Consequences of Financial Reporting

Frequency: International Evidence

Abstract

This study investigates the effects of financial reporting frequency on the stock information environment and liquidity across 40 countries between 1988-2007. Results suggest that higher financial reporting frequency improves the stock price informativeness, forecast accuracy, and stock liquidity. However, the effects are not uniform across countries. The improvements in the stock information environment and liquidity are greater in common law countries than in civil law countries. We also find that firm valuation is positively associated with financial reporting frequency. However, contrary to the results of information environment and liquidity, the improvement in firm valuation is weaker in common law countries than in civil law countries. The reason is that the disclosure costs and litigation risk are higher in common law countries, and most of the benefits gained from the lower cost of capital are offset by additional disclosure costs. A country's underlying legal origin and its degree of shareholder protection also influence the consequences of a change in financial reporting frequency.

2.1 Introduction

A common argument for mandatory disclosure is that it reduces information asymmetry by ensuring firms produce firm-specific information. If such firm-specific information is not disclosed but is kept as private information, those who spend resources to obtain the information are compensated (Grossman and Stiglitz (1980)). Jin and Myers (2006) show that the stock price is less informative as measured by R^2 in opaque countries. When a country increases its disclosure requirements, the stock price becomes more informative because more firm-specific information is disclosed and incorporated into the stock price. Lang and Lundholm (1993) find that firms with more informative disclosure policies have more accurate and less dispersed earnings forecasts. Furthermore, theoretical work by Diamond and Verrecchia (1991) show that increased disclosure reduces the cost of capital and improves liquidity. This has been shown empirically by Leuz and Verrecchia (2000), Healy, Hutton, and Palepu (1999), and Heflin, Shaw, and Wild (2005). Therefore, the effects of increased disclosure are more informative stock prices and more liquid stock markets.

In this study, we use financial reporting frequency as a measure of mandatory financial disclosure level. We choose reporting frequency because it is a regular and formal channel to disseminate material information to market participants. More importantly, it has cross-country variation as well as time series variation. The most common reporting frequencies are quarterly reporting (e.g. US and Canada) and semi-annual reporting (e.g. UK and Australia). Over time, a significant number of countries have increased their mandatory financial reporting frequency, mostly from semi-annual to quarterly frequency.

Specifically, we study the effects of financial reporting frequency on the stock information environment, stock liquidity, and firm valuation. We hypothesize that the higher the financial reporting frequency, the more material firm-specific information is conveyed to the markets. If the firm-specific information is transmitted to the stock market and investors act on the information, the stock price becomes more informative. Financial analysts also incorporate the additional information into their forecasts on the firm's future earnings, resulting in more accurate earnings forecasts. As a result of lower information asymmetry among market participants, the stock becomes more liquid (Diamond and Verrecchia (1991)). We expect the firm valuation to increase as a result of the lower cost of capital due to lower information asymmetry. Since a country's institutional factors have strong influence on the disclosure quality, we further hypothesize that the effects of financial reporting frequency depend on a country's institutional factors.

Our cross-country study includes 18,412 firms from 40 countries between 1988-2007. We augment the financial reporting frequency data from the Center for International Financial Analysis & Research (CIFAR) with our hand collected data. Our information measures are firm-specific variation as proposed by Roll (1988), and analyst forecast errors. The liquidity that we use in this study is a complement of zero return proportion introduced by Lesmond, Ogden, and Trzcinka (1999). We use the logarithm of Tobin's Q as a measure of firm valuation. As many prior studies have provided evidence that cross-country variation for the disclosure of policy implementation can be explained by legal origin or level of shareholder protection, we expect to observe non-uniform effects of mandatory disclosure on stock price informativeness, liquidity, and firm

valuation across countries. Therefore, we interact financial reporting frequency variable with a country's institutional factors to study cross-country variation. The country's institutional factors that we focus on are legal origin and anti-self-dealing index, as compiled by Djankov et al. (2008).

Our results show that higher financial reporting frequency improves a firm's information environment, stock liquidity, and firm valuation. Given that the financial reporting frequency is changed from semi-annual to quarterly, our results predict that the stock price informativeness increases by 12%; analyst forecast errors reduce by 3.8%; stock liquidity increases by 5.7%; and firm valuation increases by 26%. Moreover, the effects are not uniform across countries. In common law countries or countries with strong shareholder protection, financial reporting frequency has a stronger effect on a firm's information environment and liquidity, but financial reporting frequency exerts a weaker effect on firm valuation in the same countries. Our explanation is that the disclosure costs in common law countries or countries with strong shareholder protection are higher; therefore most of the benefits gained from the reduction in the cost of capital is offset by increased disclosure costs.

Our study contributes to the literature on mandatory disclosure. We provide positive evidence on capital market effects other than the cost of capital, namely stock price informativeness, stock liquidity, and firm valuation. We also shed light on the costs and benefits of financial disclosure. It is generally good to disclose more information and in a timely manner, but disclosure is costly and some of the benefits will be offset by the costs. Furthermore, we also document the cross-country variation of the effects of financial reporting frequency, which can be explained by a country's institutional factors.

We cover the prior literature and develop the research questions in Section 2.2. The sample selection and variable construction is described in Section 2.3. The main empirical results on information environment, liquidity, and firm valuation are presented in Section 2.4. Robustness tests are presented in Section 2.5. We further discuss and link all the empirical results in Section 2.6. Finally, we draw our conclusions in Section 2.7.

2.2 Prior Literature and Research Questions

Butler, Kraft, and Weiss (2007) document that higher financial reporting frequency leads to lower information asymmetry and lower cost of capital in the U.S. between 1950-1973. Using international data of more than 40 countries, Fu (2009) also documents that higher reporting frequency leads to lower cost of capital. In these two studies, the authors regard an increase in financial reporting frequency as an improvement in corporate financial disclosure. Traditionally, the literature on disclosure studies the costs and benefits of voluntary and mandatory disclosure. Voluntary disclosure often brings more firm-level capital market benefits than mandatory disclosure because of the firm's self-selection bias. Leuz and Wysocki (2008) provide comprehensive review on disclosure, including both voluntary and mandatory disclosure. This paper focuses on mandatory changes in disclosure requirements, namely the financial reporting frequency requirements mandated by stock exchanges or local security regulators. We are interested in studying further capital market outcomes of financial reporting frequency.

Jin and Myers (2006) examine the link between measures of corporate transparency and return synchronicity (inverse of stock price informativeness). They argue that in a more transparent environment, proportionately more firm-specific

information is revealed to outside investors. As a result, market-wide information accounts for a smaller proportion of the overall return variation, resulting in a lower return synchronicity. Using the IFRS adoption event, Kim and Shi (2008) find that stock price informativeness increases with enhanced disclosure. Lang and Lundholm (1993) find that firms with more informative disclosure policies have more accurate earnings forecasts and less dispersion in analyst forecasts. We state our first set of hypotheses as follows:

H1A: Stock price informativeness is positively associated with financial reporting frequency.

H1B: Analyst forecast errors is negatively associated with financial reporting frequency.

Corporate disclosure reduces the adverse selection problem and improves stock liquidity by leveling the playing field among market participants (Verrecchia (2001)). According to Leuz and Wysocki (2008), the effect is two-fold. First, more information in the public domain makes it harder and more costly for traders to become privately informed. As a result, the adverse selection cost becomes lower because fewer traders are likely to be privately informed. Second, more disclosure reduces the uncertainty about a firm's value, which in turn reduces the potential information advantage that an informed trader might have. Both effects reduce the price protection required by uninformed traders, hence increasing the stock liquidity. Using AIMR disclosure scores data, Welker (1995) finds that a better disclosure policy reduces bid-ask spread. Heflin, Shaw, and Wild (2005) also find that firms with higher disclosure ratings enjoy higher liquidity in

term of bid-ask spread and quoted depth. Healy, Hutton, and Palepu (1999) also find that liquidity improves after an increase in a firm's disclosure quality. We expect that the more frequent release of financial reporting will lead to higher stock liquidity.

H2: Stock liquidity is positively associated with financial reporting frequency.

Most prior research links firm valuation or cost of capital with adverse selection through liquidity. Illiquidity increases trading costs for investors and the required rate of return increases by per-period transaction cost (Amihud and Mendelson (1986)). In addition, Garleanu and Pedersen (2004) point out that adverse selection distorts investors' trading decisions and results in inefficient asset allocation, resulting in higher required rate of return. Merton (1987) provides a direct theoretical link between disclosure and cost of capital without reference to adverse selection and liquidity costs. The ideal market becomes more complete and its risk sharing becomes more efficient because of higher awareness of the firm through disclosure. Using financial reporting frequency data similar to this study, Fu (2009) finds that higher reporting frequency leads to lower cost of capital.

On the other hand, there is evidence that disclosure decreases the firm valuation or increases the cost of capital. The costs of disclosure are two-fold. The direct costs are straightforward and include preparation, certification, and dissemination of financial reports. Indirect costs include many perspectives and detailed disclosure may reveal proprietary information to competitors (Hayes and Lundholm (1996)). Greater disclosure to public investors could also be costly to existing financing relationships with banks (Rajan and Zingales (1998)). Gomes, Gorton, and Madureira (2007), and Bushee and

Leuz (2005) provide empirical evidence that mandatory disclosure could increase the cost of capital, especially for smaller firms. Botosan and Plumlee (2002) argue that more timely and frequent disclosure increases the cost of capital because it attracts a greater proportion of transient investors who trade aggressively on short-term earnings news. Such trading activities increase the volatility of stock returns and will increase the cost of capital if the additional risk is not diversifiable. Despite the potential disclosure costs, we believe that the benefits will outweigh the costs. Therefore, we state our third hypothesis as follows:

H3: Firm valuation is positively associated with financial reporting frequency.

There is a growing number of studies that investigate the link between countries' institutional infrastructure and financial reporting outcomes. Ball, Kothari, and Robin (2000), Hung (2000), Leuz, Nanda, and Wysocki (2003) document that the legal and shareholder protection regime of a country can affect a firm's incentive to provide disclosure and hence influence the quality of financial reporting as well as the market effect of these disclosures. Leuz, Nanda, and Wysocki (2003) examine the level of earnings management and the opaqueness of accounting earnings reported by firms from 31 countries. They show that the legal origin and shareholder protection are important determinants of reporting quality. Daske et al. (2008), Brown, Preiato, and Tarca (2009), Landsman, Maydew, and Thornock (2009), and many studies that examine the capital market effects of mandatory IFRS adoption find that the differential outcomes can be explained by countries' institution infrastructure. These studies find that the capital market effects (cost of capital, liquidity, firm valuation, earnings announcement

information, etc) improve after mandatory IFRS adoption, and the improvement is stronger in countries with better investor protection regime. In a recent study, Fernandes and Ferreira (2009) document that the enforcement of insider trading law turns private information into public information only in developed markets. Klapper and Love (2004) find that corporate governance improves a firm's operating performance and firm valuation, and this effect is stronger in countries with weak shareholder protection. Durnev and Kim (2005) also find that firm-level disclosure improves firm valuation, and the effect is stronger in countries with weak shareholder protection. Since many studies provide evidence of cross-country variation on the effects of disclosure, we expect to observe non-uniform effects of mandatory disclosure on stock price informativeness, liquidity, and firm valuation across countries.

H4: The capital market effects (firm information, stock liquidity, and firm valuation) resulting from financial reporting frequency are stronger in countries with stronger shareholder protection.

2.3 Data and Construction of Variables

2.3.1 Sample Screening

We select firms from countries that are covered by the Center for International Financial Analysis & Research (CIFAR) and Datastream. Our final sample includes 18,412 firms from 40 countries after applying the multiple screening procedures described below. The period of our study is 1988-2007. Out of 40 countries, 15 countries are of common law origin and 25 are of civil law origin. Table 2.1 summarizes the variables used in this

study and their sources. Table 2.2 lists the country coverage, starting with the date of data coverage, and the number of firms for each country in our study.

For stocks to be included in the sample, they should have market prices and accounting information such as market capitalization and book-to-market ratio at the end of the previous year. We use only stocks from major exchanges⁵ and include only common stocks with primary listings which are traded using the same currency as that of the listing country. Hence, Depository Receipts, Real Estate Investment Trust (REIT) and preferred stocks are excluded. On top of Datastream's equity flag, we further apply a comprehensive "name screening" compiled by Griffin, Kelly, and Nardari (2008) to remove non-common stocks that are wrongly labeled as common stocks by Datastream.

Ince and Porter (2006) caution about the data error in Datastream's return index. We follow their recommendation and set the daily return index to be missing if any returns⁶ above 100% are reversed the next day, and set the monthly return index to be missing if any of the returns above 300% are reversed the following month. Finally, we exclude penny stocks that are less than US\$0.50 at previous year end⁷.

Datastream fills the return index with the previous day's data if the stock is delisted or not traded. If a day's return index is the same as that of the previous day, then it produces zero return. We need to identify the delisting date and non-trading dates to produce reliable information and liquidity measures. We follow the methodology of Ince and Porter (2006) by observing the most recent dates that produce non-zero return in

⁵ Most countries have one major exchange, except US (NYSE, AMEX, NASDAQ), and China (Shanghai, Shenzhen).

⁶ Returns are calculated from Datastream's Return Index (RI) datatype using the following relation:
$$r_{j,t} = (RI_{j,t} / RI_{j,t-1}) - 1$$
. Datastream's RI assumes dividend reinvestment.

⁷ We also try US\$1 as an alternate cutoff and without price filter, the results are not affected. Lee (2010) uses US\$1 as a cutoff point when conducting his international liquidity study with the Datastream database.

reserve chronological order to identify the delisted firms and delisting dates. The latest non-zero return date is treated as the delisting date. Following Lesmond, Ogden, and Trzcinka (1999), we classify non-trading dates for a specific exchange if 90% or more of the stocks have zero return on that date. Observations recorded on non-trading dates and after delisting dates are removed.

2.3.2 Financial Reporting Frequency

The primary variable in our study is the financial reporting frequency mandated by the respective regulatory authority in each country. The Center for International Financial Analysis & Research (CIFAR (1989, 1991, 1993, 1995 1993, 1995)) provides a reporting frequency index that captures financial reporting requirements. The index measures the frequency of a country's financial reporting, with a score of 4 for quarterly reporting, 2 for semi-annual reporting, and so forth. Bushman, Piotroski, and Smith (2004), and DeFond, Hung, and Trezevant (2007) use this CIFAR index to capture the reporting frequency. However, CIFAR only provides frequency data for the 4 years and does not include changes in the frequency requirements after 1995. To obtain reporting frequency data after 1995, we search the websites of security exchanges and regulators for information on reporting frequency. If such information is not available, we then follow the data collection procedures of CIFAR to collect the reporting frequency data (see Appendix 1). We believe that we have the most complete data to date on financial reporting frequency requirements around the world.

2.3.3 Stock Price Informativeness (Ψ)

Roll (1988) first documents that a significant portion of stock return variation is not explained by general market movements and it is unrelated to public announcements. He

suggests that the firm-specific variation is induced by informed traders through the trading process. Therefore, a stock price contains more firm-specific information if it demonstrates high variation relative to the overall market. Durnev et al. (2003) find that high firm-specific return variation is associated with current stock return and future stock earnings. Durnev, Morck, and Yeung (2004) find that high firm-specific return variation is associated with efficiency of corporate investing. This evidence suggests that firm-specific variation is a measure of how quickly and accurately the information is incorporated into stock prices. Morck, Yeung, and Yu (2000), Jin and Myers (2006) carry out cross-country studies and conclude that firm-specific return variation is lower in emerging markets, in countries with less developed financial markets, or in countries with poor corporate governance.

We compute firm-specific stock return variation using the two-factor international model outlined by Morck, Yeung, and Yu (2000) to characterize the firm-specific information.

$$r_{j,t} = \alpha_{j,t} + \beta_1 r_{m,t} + \beta_2 r_{US,t} + \varepsilon_{j,t} \quad (1)$$

For each firm-year, we regress weekly excess returns of stock j on local market returns and US market returns⁸. Our source of stock return, domestic market return and US market returns is Datastream; and the one-month treasury risk-free rate is obtained from Ken French's website. Following Chan and Hameed (2006), we do not include industry return as an additional factor because some markets are dominated by a few

⁸ We use Wednesday-to-Wednesday weekly return for domestic market, and Tuesday-to-Tuesday weekly return for the US market.

industries or each industry contains only a few firms. The R^2 obtained from the above equation is synchronicity of stock return movement with market returns and $(1-R^2)$ is firm-specific variation unrelated to general market conditions. We require a minimum of 10 weekly returns for a stock in a year to compute R^2 . We then take the logistic transformation of $(1-R^2)$ for our study. The new variable Ψ measures firm-specific information relative to market-wide variation.

$$\Psi_j = \log\left(\frac{1 - R_j^2}{R_j^2}\right) \quad (2)$$

Our premise is that a high Ψ indicates that more firm-specific information is being incorporated into the stock price via the trading process. All traders, including both liquidity traders and informed traders, know the firm's public information; therefore the stock should reflect all the firm's public information if any trading occurs (semi-strong form of market efficiency). Furthermore, informed traders hold the firm's private information; therefore they can profit from their private information via trading. As both uninformed and informed traders trade based on their respective information, the stock price reflects both public and private information. The insiders are not necessarily firm insiders, but may be sophisticated information processors. The informed traders can be either the sophisticated information processor or company insider. Our objective is to study the relationship between stock price informativeness, Ψ , and the financial reporting frequency, and how the relationship is influenced by a country's institutional factors. The summary statistics for Ψ are shown in Table 2.2.

2.3.4 Analyst Forecast Errors (FERR)

The interim and annual financial reporting is considered the most formal and regular channel for firms to disclose their performance and future prospects to market participants. Holland (1998) argues that one objective of firm disclosure is to allow participants to understand the firm's performance and prospects, and participants are expected to interpret the information in a similar manner. Therefore, a higher degree of disclosure will not only decrease the information asymmetry between a firm's insider market participants but also among market participants. Simply put, an effective disclosure will reduce information asymmetry between firm insiders and outsiders, and will increase the consensus or common information among all market participants. Professional financial analysts form an important group of market participants and they produce one of the most important assessments of a firm's future earnings and value. Hence, enhanced disclosure will improve the forecast accuracy of analysts and increase the consensus among analysts, resulting in lower forecast errors and dispersion. Lang and Lundholm (1996) show that firms with more informative disclosure policies have more accurate earnings forecasts and less dispersion among analyst forecasts. We use analyst forecast errors as a proxy of a firm's information environment. The forecast errors are calculated as the difference between the actual and mean of earnings per share forecast. The number is deflated by mean earnings forecasts before the absolute value is taken. To alleviate the small denominator problem associated with low mean earnings forecasts, a minimal denominator of 0.02 is used. The summary statistics for FERR are shown in Table 2.2.

$$FERR = \left| \frac{MeanEPS - ActualEPS}{MeanEPS} \right| \quad (3)$$

2.3.5 Liquidity Measure (LIQ)

The most direct measure of illiquidity, Bid-Ask spread data, is incomplete or does not cover long time-series in international markets. To mitigate the volume data availability problem for international markets, Lesmond, Ogden, and Trzcinka (1999) propose a simple illiquidity measure derived from daily stock returns. They propose using the proportion of days with zero return out of total trading days in a given year (ZeroProportion) as a measure of illiquidity. The intuition is that arbitrageurs trade only if the value of accumulated information exceeds the marginal cost of trading; if trading costs are sizable, new information must accumulate for a longer time before investors engage in trading. Lesmond (2005) concludes that the ZeroProportion measure performs well in both within-country cross-sectional and cross-country analyses. It has been validated in both US and international markets (Lesmond (2005), Bekaert, Harvey, and Lundblad (2007), Goyenko, Holden, and Trzcinka (2009)). ZeroProportion is a measure of liquidity; we take the complement of ZeroProportion as the measure of illiquidity for our study (LIQ). The stock return data is obtained from Datastream. The summary statistics for LIQ are shown in Table 2.2.

$$LIQ_j = [1 - ZeroProportion_j] * 100\% \quad (4)$$

2.3.6 Tobin's Q (Q)

We adopt Tobin's Q as a measure of firm valuation to investigate the relationship between financial reporting frequency and firm valuation. Tobin's Q is a more comprehensive measure than the cost of capital because changes in firm valuation could mean changes in the cost of capital and/or changes in future cash flow. Fu (2009) documents that implied cost of capital decreases as financial reporting frequency increases. On one hand, greater disclosure can reduce expropriation opportunities or improve growth expectations, therefore increasing the expected future cash flow. On the other hand, greater disclosure lowers expected future cash flow due to the higher cost of disclosure. Tobin's Q captures the effects of both the cost of capital and expected future cash flow.

We follow Kaplan and Zingales (1997) to calculate Tobin's Q. Tobin's Q is calculated as the book value of total assets plus the market value of equity minus the book value of equity divided by total assets. Following Gompers, Ishii, and Metrick (2010), we take the logarithm of Tobin's Q because Tobin's Q is highly skewed.

$$Q = \log \left[\frac{TotalAssets + MV - Equity}{TotalAssets} \right] \quad (5)$$

Durnev and Kim (2005) document that better firm-level governance and disclosure lead to higher firm valuation, and the effect is stronger in countries with weak anti-director rights. La Porta et al. (2002) (or LLSV 2002) find that firms in common law

countries or in countries with better shareholder protection⁹ enjoy higher firm valuation as measured by Tobin's Q. Diamond and Verrecchia (1991) model the relation between commitment on disclosure and cost of capital. Botosan (1997) finds that higher disclosure reduces the cost of capital. Fu (2009) finds that higher financial reporting frequency is associated with lower cost of capital using international data. We expect the firm valuation will increase with financial reporting frequency because of lower cost of capital and/or higher expected cash flow. The summary statistics for Q are shown in Table 2.2.

2.3.7 Country-Level Characteristics

Recent studies show that the effects of higher accounting standards are subjected to a country's institutional factors. Ball, Robin, and Wu (2003) show that a country's legal enforcement mechanism and political environment are more important than respective accounting standards in explaining the variation in accounting income. Using the IFRS adoption event, Daske et al. (2008) find that capital-market benefits are manifested only in countries where firms have the incentive to be transparent and where legal enforcement is strong. Their results signify the importance of countries' enforcement regimes in the quality of financial reporting. Fernandes and Ferreira (2009) document the different price informativeness reactions in developed and emerging markets upon the implementation of insider trading laws. Therefore, we are interested in studying the effects of financial reporting frequency under different countries' institutional factors.

The variable of interest is a country's protection of shareholders. We employ the anti-self-dealing index (ANTI) compiled by Djankov et al. (2008) as a measure of a

⁹ They use Anti-Director Rights Index as a measure of shareholder protection. The Anti-Director Rights Index is a predecessor of the anti-self-dealing index used in this paper.

country's legal protection of shareholders. We also employ a country's legal origin as a proxy of shareholder protection because the legal origin exerts strong influence on legal rules that protect shareholders (Djankov et al. (2008)). We define LAW dummy equal to one if it is common law origin and zero otherwise. From Table 2.4, we observe that the correlation between legal origin and anti-self-dealing index is highly correlated with the correlation coefficient of 0.763.

We include other country-level structural variables that are applied in Morck, Yeung, and Yu (2000) to explain stock price co-movement. We use the logarithm of GDP per capita (GDPC) as a proxy for the level of economy development. The macroeconomic stability is measured by the variance of per capita GDP growth for the past five years (GDPC). The firm Herfindahl index (FHERF) is a measure of firm concentration, calculated using firm sales of each country in each year. The industry Herfindahl (IHERF) is a measure of the industry concentration of a country, calculated using industry sales of each country in each year. The country's geographical size is measured by the logarithm of land area in square kilometers (LAND). In addition, we include total market capitalization deflated by total GDP (MCAP) as proxy of stock market developments for a country. Using data on enforcement of insider trading regulations, Bhattacharya and Daouk (2002) document that firms' costs of capital decrease after the enforcement, and Fernandes and Ferreira (2009) find the stock price informativeness increases after enforcement of insider trading law. Therefore we include a dummy variable, INSLAW, that takes the value of one on and after the year of a country's first prosecution of insider trading. The sources of a country's institutional factors are the World Bank WDI database and Datastream. All country-level

characteristics are described in Table 2.1 and the summary statistics are reported in panel B of Table 2.3.

2.3.8 Firm-Level Characteristics

The stock price information environment and liquidity are affected by a firm's underlying economics. We employ eleven firm-level characteristics as control variables in our analyses: firm size in logarithm of market capitalization in million dollars (MV), logarithm of book-to-market equity ratio (BM), logarithm of stock price (PRICE), debt-to-equity ratio (LEV), investment opportunity proxied by two-year geometric net sales growth (INVOP), ratio of cash and short-term investment to total assets (CASH), world median Tobin's Q of firms in each industry (GLBQ), logarithm of average monthly trading volume in US dollars in the preceding twelve months (VOLUME), logarithm of standard deviation of monthly returns over one-year period (RETVOL), number of analyst following (ALYST), and percentage of insider shareholding (CLOSE). The firm-level characteristics are obtained from Datastream and Worldscope, except ALYST which is calculated from IBES. If a firm is not covered by IBES, we treat variable ALYST as missing instead of assigning the value zero. All firm-level characteristics are described in Table 2.1 and the summary statistics are reported in panel A of Table 2.3.

The actual numbers of firm-level characteristics that are included in the regression model is determined by the dependent variable. We have three categories of dependent variables, namely measures of information environment, liquidity, and firm valuation.

(i) Information Environment

We include six firm-level control variables when studying the effects of financial reporting frequency on a firm's information environment. We

include firm size (MV) because large firms may have the incentive to disclose more information to the public (Kim and Verrecchia (1991)). Piotroski and Roulstone (2004) also find that small firms are associated with lower stock price informativeness. We include book-to-market ratio (BM) because growth firms may have more information asymmetry in nature. We also include the capital structure measure (LEV) because high leverage firms may release more information due to disclosure requirements specified in the debenture. Lang, Lins, and Miller (2003) find that cross-listing improves analyst forecast accuracy, and Fernandes and Ferreira (2009) find that cross-listing in the US improves the stock price informativeness. Therefore we include the ADR dummy to indicate that the firms are cross-listed in the US exchange. Piotroski and Roulstone (2004), and Chan and Hameed (2006) find that firms with greater analyst coverage are associated with lower stock price informativeness; therefore we include analyst following (ALYST). We also expect insider holding (CLOSE) to have an impact on the firms' information environment.

(ii) Liquidity

We include nine firm-level control variables when studying the effects of financial reporting frequency on firm stock liquidity. We follow Stoll (2000) to include firm size, stock price, trading volume, and return volatility (MV, PRICE, VOLUME, and RETVOL). The rationale of these variables is based on inventory and order processing costs. Firm size and trading volume control

for costs of inventory and locating trade counterparty; stock price controls for discreteness effect and it also acts as a proxy for risk as lower-price stocks tend to be riskier. Ho and Stoll (1981) show that stock return variation is relevant in liquidity because the supplier of immediacy is not diversified with respect to the unwanted position. We further include book-to-market ratio (BM) and leverage (LEV) as proxies of firm risk. Foerster and Karolyi (1998) find improvements in liquidity for Canadian firms that are cross-listed in the US. Therefore we include the ADR dummy variable to indicate if the firms are cross-listed in the US exchange. We include analyst following (ALYST) because Roulstone (2003) finds that analyst following improves liquidity. Finally, we include insider stockholding (CLOSE) because it may impair liquidity due to high information asymmetry.

(iii) Firm Valuation

We include eight firm-level control variables when studying the effects of financial reporting frequency on firm valuation. We include firm size (MV), leverage (LEV), cash holding (CASH), and investment opportunity (INVOP) because these variables affect the value of a firm. We follow Doidge, Karolyi, and Stulz (2004) to include world median Tobin's Q for a firm's industry (GLBQ). Furthermore, they find that foreign companies that are cross-listed in the US exhibit a higher Tobin's Q. Therefore we include the ADR dummy in our model. Analyst following (ALYST) and insider shareholding (CLOSE)

affect the information environment; thus, they may have an effect on firm valuation.

2.4 Effects of Financial Reporting Frequency

We study three main economic consequences of financial reporting frequency: (i) information environment, (ii) liquidity, and (iii) firm valuation. We posit that higher financial reporting frequency improves the stock information environment, stock liquidity, and firm valuation. However, the magnitude of such improvements is not uniform across countries, and we examine the cross-country variation in the effects of financial reporting frequency. We pool all the firm-year observations and run the following regression with year fixed effect.

$$\begin{aligned} Var_t = & \alpha + \beta_1 RFREQ_t + \beta_2 LAW + \beta_3 RFREQ * LAW \\ & + \sum_i \beta_{ci} CountryVar_{i,t-1} + \sum_i \beta_{fi} FirmVar_{i,t-1} + \sum_i \beta_{yi} Year_i \end{aligned} \quad (6)$$

The dependent variable is one of the four measures of information environment, liquidity, and firm valuation. RFREQ is financial reporting frequency; LAW is a dummy variable that takes the value of one if the country's legal origin is common law and zero if it is civil law. The interaction term of reporting frequency and legal origin is added in selected models to study the cross-country variation. CountryVar and FirmVar are country-level and firm-level control variables. All variables are described in detail in Section 2.3. We use contemporaneous RFREQ because the informativeness and liquidity will change immediately as the result of RFREQ increases, but it will not introduce

hindsight bias as the new financial reporting frequency requirement is known at least one year before the change.

From Table 2.4, whereby the correlation between ANTI and LAW is also high (0.763), we include only one of them in any single model to avoid the problem of multicollinearity. The regression results are summarized in Tables 2.5, whereby we adopt four different dependents variables in our analysis and they are listed as column headers. We include legal origin dummy (LAW) in M1, and anti-self-dealing index (ANTI) in M3. In M2 and M4, we introduce the interaction term of legal origin dummy or anti-self-dealing index with financial reporting frequency. We adopt similar structure for all other dependent variables. In all regressions, we include firm-level characteristics, country-level characteristics, and year fixed effect. We do not report the coefficients of control variables in Table 2.5, but complete tables with coefficients of control variables are included in Appendix Table A1-A4.

2.4.1 Financial Reporting Frequency and Information Environment

We employ stock price informativeness (Ψ) and analyst forecast errors (FERR) as measures of a firm's information environment. In M1-M4 of Table 2.5, we report the regression results with stock price informativeness (Ψ) as the dependent variable. In all specifications, Ψ is positively associated with RFREQ. A firm's Ψ will increase by 0.210¹⁰ or 12% of the mean if RFREQ increases from semi-annual to quarterly frequency, *ceteris paribus*. Furthermore, countries with common law origin or high shareholder protection have a higher Ψ . These can be observed from the LAW and ANTI coefficients in models M1 and M3. From Appendix Table A1, Ψ is positively associated with GDPC

¹⁰ The change in Ψ is calculated by: 2×0.105 . 0.105 is the coefficient of RFREQ from model M1.

INSLAW, MCAP, and FHERF, and it is negatively associated with GDPV and IHERF¹¹. The signs of these country characteristics are largely consistent with previous studies such as Fernandes and Ferreira (2009) and Morck, Yeung, and Yu (2000).

The next interesting question is whether the relationship between Ψ and RFREQ is affected by a country's institutional factors. We introduce the interaction term into our regression models to find the answer. The interaction terms RFREQ*LAW and RFREQ*ANTI in models M2 and M4 reveal that RFREQ has a stronger effect on Ψ in common law countries or in countries with high shareholder protection.

Therefore, changing semi-annual reporting to quarterly reporting will increase Ψ by 0.302 for firms in common law countries, and by 0.142 in civil law countries¹². Similarly, changing semi-annual reporting to quarterly reporting will increase Ψ by 0.366 for firms in top quartile¹³ shareholder protection countries, and by 0.128 in bottom quartile shareholder protection countries. In summary, common law countries or countries with high shareholder protection enjoy higher stock price informativeness that results from increased financial reporting frequency.

We employ analyst forecast errors (FERR) as an additional measure of a firm's information environment and report the regression results in M5-M8 of Table 2.6. From model M5, FERR is negatively associated with RFREQ, meaning the forecast errors reduces with higher financial reporting frequency. A firm's FERR will decrease by

¹¹ FHERF and IHERF are highly correlated; their signs may change when both are included in a single model.

¹² The change in Ψ is calculated by using coefficients from M2 of Table 2.5.

¹³ The change in Ψ is calculated by using coefficients from M4 of Table 2.5. For our sample countries, the top quartile anti-self-dealing index is 0.73, and the bottom quartile is 0.33. For comparison purpose, the mean anti-self-dealing index is 0.76 for common law countries, and 0.39 for civil law countries.

0.038¹⁴ or 3.8% of the mean if RFREQ increases from semi-annual to quarterly frequency, *ceteris paribus*. The coefficient is also negatively significant in M7 if we replace the legal origin dummy with anti-self-dealing index. Furthermore, countries with common law origin or high shareholder protection have a lower FERR. These can be observed from negative LAW and ANTI coefficients in models M5 and M7.

The positive coefficients of RFREQ in M6 and M8 need to be interpreted together with negative-signed interaction term, and the results are consistent with our expectation. The interactions terms in models M6 and M8 reveal that the relationship between FERR and RFREQ is affected by a country's institutional factors. The FERR reduction due to higher RFREQ is stronger in common law countries or countries with high shareholder protection. Numerical calculation reveals that the positive value of RFREQ is offset by the negative interaction term.

From Appendix Table A2, FERR is negatively associated with LAW, ANTI, GDPC, MCAP, and FHERF, and it is positively associated with GDPV, INSLAW, and IHERF. The signs of RFREQ and these country characteristics are consistent with results that use Ψ as the information measure. The conclusions are consistent with our study that uses Ψ as the information measure. Both information measures (Ψ and FERR) confirm that the improvement is stronger in common law countries or in countries with strong shareholder protection.

¹⁴ The change in FERR is calculated by: $2*(-0.019)$. -0.019 is the coefficient of RFREQ from model M5 of Table 2.5.

2.4.2 Financial Reporting Frequency and Liquidity

We employ the proportion of non-zero return days out of all trading days as a measure of liquidity (LIQ). In M9-M12 of Table 2.5, we report the regression results with stock liquidity (LIQ) as the dependent variable. In all specifications, LIQ is positively associated with RFREQ. A firm's LIQ will increase by 4.46¹⁵ or 5.7% of the mean if RFREQ increases from semi-annual to quarterly frequency, *ceteris paribus*.

Following the previous structure, the next interesting analysis is whether the relationship between LIQ and RFREQ is affected by a country's institutional factors. The interaction terms RFREQ*LAW and RFREQ*ANTI in models M10 and M12 reveal that RFREQ has a stronger effect on LIQ in common law countries or in countries with high shareholder protection. Our model M10 predicts that changing semi-annual reporting to quarterly reporting increases LIQ by 8.03 for firms in common law countries, and by 2.10 in civil law countries. Similarly, M12 predicts that changing semi-annual reporting to quarterly reporting increases LIQ by 3.55 for firms in the top quartile¹⁶ of shareholder protection countries, and by 1.25 in bottom-quartile shareholder protection countries.

From Appendix Table A3, LIQ is positively associated with RFREQ. After controlling for firm characteristics, LIQ is positively associated with LAND, and it is negatively associated with GDPV, INSLAW, MCAP and FHERF. For the firm-level characteristics, LIQ is positively associated with MV, BM, LEV, VOLUME, and RETVOL, and it is negatively associated with ADR, ALYST, and CLOSE. The liquidity is related to firm characteristics because of the probability of locating trade counterparty

¹⁵ The change in LIQ is calculated by: 2×2.231 . 2.231 is the coefficient of RFREQ from model M5. The increase in liquidity means the number of non-zero return trading days will be increased by 2.99%.

¹⁶ For our sample countries, the top quartile anti-self-dealing index is 0.73, and the bottom quartile is 0.33.

(inventory cost) and information asymmetry between insiders and outsiders. The only surprising sign is the negative sign of ALYST, but both the MV and ALYST coefficients become positive once we add the interaction of ALYST and MV. The interaction term has a negative coefficient, which means more analyst coverage does not create additional stock liquidity for large firm.

In summary, common law countries or countries with high shareholder protection enjoy higher liquidity that results from increased financial reporting frequency. The effect of financial reporting frequency on stock liquidity is very much similar to its effect on the stock information environment.

2.4.3 Financial Reporting Frequency and Firm Valuation

According to literature on accounting disclosure, a firm's cost of capital decreases and its value increases with higher disclosure¹⁷. We employ the logarithm of Tobin's Q (Q) as a measure of firm valuation. In M13-M16 of Table 2.5, we report the regression results with firm valuation (Q) as the dependent variable. According to M13, a firm's logarithm Tobin's Q increases by 0.09¹⁸ or 26% of mean if RFREQ increases from semi-annual to quarterly frequency, *ceteris paribus*. Our results also reveal that countries with common law origin or high shareholder protection have a higher Q. The higher firm valuation can be explained by the lower cost of capital in countries with common law origin or stronger shareholder protection. The lower cost of capital can be due to a lower risk of expropriation (Claessens et al. (2002)) or lower agency cost (Jensen and Meckling (1976)). This result is similar to that of Hail and Leuz (2006) where they find the cost of

¹⁷ Some of this literature is discussed in Section 2.

¹⁸ The change in Q is calculated by: 2×0.044 . 0.044 is the coefficient of RFREQ in M13.

capital is lower in countries with stricter disclosure requirements and stronger enforcement mechanisms.

Following previous structures, interaction terms $RFREQ*Law$ and $RFREQ*ANTI$ in models M14 and M16 reveal that $RFREQ$ has a weaker effect on Q in common law countries or countries with high shareholder protection. Therefore, M14 of Table 2.8 predicts that changing semi-annual reporting to quarterly reporting increases Q by only 0.018 for firms in common law countries, and by 0.136 in civil law countries. Similarly, M16 predicts that changing semi-annual reporting to quarterly reporting increases Q by 0.101 for firms in the top quartile¹⁹ shareholder protection countries, and by 0.153 in the bottom quartile shareholder protection countries. While the Tobin's Q in these two types of countries increases, the improvement is stronger in common law countries and in countries with strong shareholder protection. This result does not seem to be consistent with our previous results whereby $RFREQ$ has stronger effects on information and liquidity in common law or strong shareholder protection countries. We offer some explanations in Section 2.6.

2.4.4 Endogeneity Issues

We argue that a change in financial reporting frequency is an exogenous shock to firms because it is set by relevant regulators, which is an external party. However, some argue that the overall economic environment and market development may induce an increase in financial reporting frequency. Furthermore, regulators may observe the overall performance of firms before deciding whether to increase the financial reporting frequency.

¹⁹ For our sample countries, the top quartile anti-self-dealing index is 0.73, and the bottom quartile is 0.33.

We attempt to identify the causal relationship between financial reporting frequency and the information environment, stock liquidity, or firm valuation using a system of simultaneous equations. However, it is difficult to find a good instrumental variable for the simultaneous equations. Most of the country characteristics cannot be used as an instrumental variable because any legal or country performance-related measures may affect both the capital market effect and financial reporting frequency. The firm characteristics can affect both market measures and financial reporting frequency, especially the price-base measures such as MV and BM. We carry out the study using leverage (LEV) as an instrumental variable and find that stock price informativeness and liquidity are affected by financial reporting frequency but not another way. Nevertheless, we admit that leverage is not a good instrumental variable. We believe that the financial reporting frequency requirement is largely exogenous and individual firm indicators have little influence on the regulators' decisions.

2.5 Robustness

Our international data consist of firms from 40 countries including US firms. As the US alone makes up about 35% of our firm-year observations, we perform a robustness test to show that our results are not driven by the US data. We remove all US observations and run all analyses. We report the results of models with legal origin dummy and its interaction term with financial reporting frequency in Table 2.6; the results are qualitatively similar if we replace legal origin dummy with anti-self-dealing index. The dependent variable is Ψ for M1-M2, FERR for M3-M4, LIQ for M5-M6, and Q for M7-M8. The coefficients for RFREQ are consistent with our previous results, except for the

positive coefficient in M3 (FERR). In all models except M3, higher reporting frequency is positively associated with price informativeness, liquidity, and firm valuation. In common law countries, the stocks have higher price informativeness, lower forecast errors, lower liquidity, and higher firm valuation (M1, M3, M5, and M7). The interaction term (RFREQ*LAW) is significant in M2, M4, M6, and M8. Therefore, we can draw similar conclusions that RFREQ has a stronger effect on price informativeness and liquidity in common law countries, but it has a weaker effect on firm valuation. These conclusions are similar to our full-sample analyses, except for the forecast errors.

2.6 Discussion

Previous literature on law and finance argues that a country's legal origin is an important determinant of its strategy for protecting investors. La Porta et al. (1997) and La Porta et al. (1998) find that there are systematic differences among various legal origins in the protection of both shareholders and creditors through corporate and bankruptcy laws. La Porta, Lopez-De-Silanes, and Shleifer (2006) find that such protection also comes from the regulation of security issuance through security laws. Djankov et al. (2008) attribute the high shareholder protection (anti-self-dealing index) to the common law system. They comment that the common law system offers higher shareholder protection than the civil law system, and these two country institutional factors are highly correlated. Therefore, we discuss the differential effects of financial reporting frequency on common and civil law countries; the same conclusion can be obtained if the common/civil law is replaced by the shareholder protection index.

Our results show that the financial reporting frequency improves a firm's information environment, liquidity, and firm valuation. Moreover, the effects are not uniform across countries. In countries with strong shareholder protection as well as common law countries, financial reporting frequency has a stronger effect on a firm's information environment and liquidity, but it exerts a weaker effect on firm valuation in the same countries.

The common law system typically places greater emphasis on public information and ex ante disclosure than the civil law system (Ball, Kothari, and Robin (2000), Djankov et al. (2008)). Therefore, the disclosure quality in common law countries is generally higher. Because the high quality disclosure requires more effort to prepare, it has higher preparation costs than the low quality costs. If the financial reporting frequency is higher, the information set disclosed to the market participants is more recent and timelier. Under such circumstances, the firm-specific information is incorporated timelier into the stock price and we observe higher stock price informativeness. Analysts also benefit from more frequent disclosure and they are able to incorporate the firm's latest financial information into their forecasts. If the newly disclosed information is value relevant, the analyst forecast errors will be reduced. However, the effects are not uniform across countries, and we attribute the differential effects to the differential disclosure quality. In common law countries (or countries with high shareholder protection) where the disclosure quality is high, the effects of higher reporting frequency on price informativeness and forecast errors are stronger. In civil law countries (or countries with weak shareholder protection), the higher reporting frequency

increases the price informativeness and improves analyst forecasts by a smaller magnitude.

We also observe a similar effect on liquidity. Higher reporting frequency increases liquidity and the effect is stronger in common law countries. The effect of liquidity is consistent with the results of firm information. This consistency is expected because liquidity is linked to information (Easley and O'Hara (2004)). In this case, higher stock price informativeness reduces information asymmetry among market participants. Therefore the transaction cost is lower because of lower information risk and inventory costs. Similar to the stock price informativeness and analyst forecast errors, the differential effect on liquidity can be attributed to disclosure quality caused by a country's legal origin and shareholder protection.

Firm valuation, as measured by Tobin's Q, also increases with higher financial reporting frequency. This result is consistent with a study by Fu (2009), which documents that the cost of capital is negatively associated with financial reporting frequency²⁰. However, our cross-country results of firm valuation are not consistent with his results on the cost of capital. We find that the improvement in firm valuation resulting from reporting frequency is weaker in common law countries, whereas Fu (2009) finds that the improvement in the cost of capital is stronger in common law countries. We explain this discrepancy by the direct costs of disclosure and litigation risk faced by firms. Firm valuation (Tobin's Q) has two major aspects: expected future cash flow and cost of capital. For Fu (2009) finding that the cost of capital is more greatly reduced in common law countries, the most likely explanation lies in the expected future cash flow. In

²⁰ Fu (2009) uses four measures of implied cost of capital.

unreported analysis, we use returns on assets (ROA) as a proxy of cash flow and run multivariate regression. We find that ROA is positively correlated with reporting frequency in civil law countries, but the correlation becomes negative in common law countries. The results provide evidence that additional disclosure is costly and the cost is reflected in ROA. Previous studies such as Bushee and Leuz (2005) also find that certain disclosure is costly and the costs outweigh the benefits, despite the positive capital market effects such as liquidity. Furthermore, the costs can be additional litigation risk face by firms, as Djankov et al. (2008) mention that proving of wrongdoing is much easier in common law countries. Our results are not consistent with those of Botosan and Plumlee (2002) where they argue that timelier and more frequent disclosure increases the cost of capital because of the volatility increasing effect. Nevertheless, the additional reporting frequency in common law countries is still desirable because the increase in firm valuation is significant despite the small increment.

2.7 Conclusion

Our cross-country study includes 18,412 firms from 40 countries from 1988-2007. We study the effects of financial reporting frequency on the stock information environment (price informativeness and analyst forecast errors), liquidity, and firm valuation. We find that an increase in financial reporting frequency improves the stock information environment, liquidity, and firm valuation. However, the magnitude of improvements of similar policy implementation depends on a country's protection of shareholders (common/civil law, anti-self-dealing index). The underlying institutional factors of a country have significant influence on the policy outcome. The effects on the stock

information environment and liquidity are stronger in common law countries or countries with better shareholder protection. However, such stronger effects do not translate into higher firm valuation. In fact, civil law countries or countries with low shareholder protection enjoy stronger firm valuation improvements from increased financial reporting frequency. We account for this phenomenon by the cost of disclosure. In common law countries, the quality of disclosure is higher and timelier; therefore, additional reporting requirements are costly and most of the benefits arising from the lower cost of capital are offset by the additional costs.

Appendix 1

Procedures Used to Collect Data on Financial Reporting Frequency

1. Search the website of security exchanges and regulators using terms including “interim”, “quarterly”, “semi-annual”, “half-year”, “disclosure regulation”, “listing requirement”, “security law”, “financial report”, etc. at <http://www.mondovisione.com>. Try to find the regulations or laws on financial reporting frequency for specific country and specific year.
2. Search the keywords including country name and "interim reporting frequency", "quarterly report", "semiannual report", "disclosure regulation", "listing rules" or "security law", etc in Google.
3. If there is no such information found on the websites of security exchanges or regulators, we then search the sample firms listed in CIFAR (1993) on Factiva for reporting frequency. We search 10 to 20 leading firms in each country. The minimum interim plus annual reporting frequency is taken as the mandatory reporting frequency for the country.

A missing value is treated if the frequency cannot be identified through CIFAR (1989, 1991, 1993, and 1995) and the sources mentioned above.

References

- Amihud, Yakov, and Haim Mendelson, 1986, Asset Pricing and the Bid-Ask Spread, *Journal of Financial Economics* 17, 223-249.
- Ball, Ray, S. P. Kothari, and Ashok Robin, 2000, The Effect of International Institutional Factors on Properties of Accounting Earnings, *Journal of Accounting and Economics* 29, 1-51.
- Ball, Ray, Ashok Robin, and Joanna Shuang Wu, 2003, Incentives versus Standards: Properties of Accounting Income in Four East Asian Countries, *Journal of Accounting and Economics* 36, 235-270.
- Bekaert, Geert, Campbell R. Harvey, and Christian Lundblad, 2007, Liquidity and Expected Returns: Lessons from Emerging Markets, *Review of Financial Studies* 20, 1783-1831.
- Bhattacharya, Utpal, and Hazem Daouk, 2002, The World Price of Insider Trading, *Journal of Finance* 57, 75-108.
- Botosan, Christine A., 1997, Disclosure Level and the Cost of Equity Capital, *The Accounting Review* 72, 323.
- Botosan, Christine A., and Marlene A. Plumlee, 2002, A Re-examination of Disclosure Level and the Expected Cost of Equity Capital, *Journal of Accounting Research* 40, 21-40.
- Brown, Philip R., John P. Preiato, and Ann Tarca, 2009, Mandatory IFRS and Properties of Analysts Forecasts: How Much Does Enforcement Matter?, *SSRN eLibrary*.
- Bushee, Brian J., and Christian Leuz, 2005, Economic Consequences of SEC Disclosure Regulation: Evidence from the OTC Bulletin Board, *Journal of Accounting and Economics* 39, 233-264.
- Bushman, Robert M., Joseph D. Piotroski, and Abbie J. Smith, 2004, What Determines Corporate Transparency?, *Journal of Accounting Research* 42, 207-252.
- Butler, Marty, Arthur Kraft, and Ira S. Weiss, 2007, The Effect of Reporting Frequency on the Timeliness of Earnings: The Cases of Voluntary and Mandatory Interim Reports, *Journal of Accounting and Economics* 43, 181-217.

- Chan, Kalok, and Allaudeen Hameed, 2006, Stock Price Synchronicity and Analyst Soverage in Emerging Markets, *Journal of Financial Economics* 80, 115-147.
- CIFAR, 1989, 1991, 1993, 1995, Center for International Financial Analysis & Research, *International Accounting and Auditing Trends* CIFAR Publications, Inc., Princeton, NJ.
- Claessens, Stijn, Djankov Simeon, Joseph P. H. Fan, and Larry H. P. Lang, 2002, Disentangling the Incentive and Entrenchment Effects of Large Shareholdings, *Journal of Finance* 57, 2741-2771.
- Daske, Holger, Luzi Hail, Christian Leuz, and Rodrigo Verdi, 2008, Mandatory IFRS Reporting around the World: Early Evidence on the Economic Consequences, *Journal of Accounting Research* 46, 1085-1142.
- DeFond, Mark, Mingyi Hung, and Robert Trezevant, 2007, Investor Protection and the Information Content of Annual Earnings Announcements: International Evidence, *Journal of Accounting and Economics* 43, 37-67.
- Diamond, Douglas W., and Robert E. Verrecchia, 1991, Disclosure, Liquidity, and the Cost of Capital, *Journal of Finance* 46, 1325-1359.
- Djankov, Simeon, Rafael La Porta, Florencio Lopez-de-Silanes, and Andrei Shleifer, 2008, The Law and Economics of Self-Dealing, *Journal of Financial Economics* 88, 430-465.
- Doidge, Craig, G. Andrew Karolyi, and René M. Stulz, 2004, Why are Foreign Firms Listed in the U.S. Worth More?, *Journal of Financial Economics* 71, 205-238.
- Durnev, Art, and E. Han Kim, 2005, To Steal or Not to Steal: Firm Attributes, Legal Environment, and Valuation, *Journal of Finance* 60, 1461-1493.
- Durnev, Art, Randall Morck, and Bernard Yeung, 2004, Value-Enhancing Capital Budgeting and Firm-specific Stock Return Variation, *Journal of Finance* 59, 65-105.
- Durnev, Art, Randall Morck, Bernard Yeung, and Paul Zarowin, 2003, Does Greater Firm-Specific Return Variation Mean More or Less Informed Stock Pricing?, *Journal of Accounting Research* 41, 797-836.
- Easley, David, and Maureen O'Hara, 2004, Information and the Cost of Capital, *Journal of Finance* 59, 1553-1583.

- Fernandes, Nuno, and Miguel A. Ferreira, 2009, Insider Trading Laws and Stock Price Informativeness, *Review of Financial Studies* 22, 1845-1887.
- Foerster, Stephen R., and G. Andrew Karolyi, 1998, Multimarket Trading and Liquidity: A Transaction Data Analysis of Canada-US Interlistings, *Journal of International Financial Markets, Institutions and Money* 8, 393-412.
- Fu, Renhui, 2009, The Effect of Mandatory Interim Reporting Frequency on the Cost of Capital Around the World, Working Paper, Nanyang Technological University.
- Garleanu, Nicolae, and Lasse Heje Pedersen, 2004, Adverse Selection and the Required Return, *Review of Financial Studies* 17, 643-665.
- Gomes, Armando, Gary Gorton, and Leonardo Madureira, 2007, SEC Regulation Fair Disclosure, Information, and the Cost of Capital, *Journal of Corporate Finance* 13, 300-334.
- Gompers, Paul A., Joy Ishii, and Andrew Metrick, 2010, Extreme Governance: An Analysis of Dual-Class Firms in the United States, *Review of Financial Studies* 23, 1051-1088.
- Goyenko, Ruslan Y., Craig W. Holden, and Charles A. Trzcinka, 2009, Do liquidity measures measure liquidity?, *Journal of Financial Economics* 92, 153-181.
- Griffin, John M., Patrick J. Kelly, and Federico Nardari, 2008, Are Emerging Markets More Profitable? Implications for Comparing Weak and Semi-Strong Form Efficiency, Working Paper, University of Texas-Austin.
- Grossman, Sanford J., and Joseph E. Stiglitz, 1980, On the Impossibility of Informationally Efficient Markets, *The American Economic Review* 70, 393-408.
- Hail, Luzi, and Christian Leuz, 2006, International Differences in the Cost of Equity Capital: Do Legal Institutions and Securities Regulation Matter?, *Journal of Accounting Research* 44, 485-531.
- Hayes, Rachel M., and Russell Lundholm, 1996, Segment Reporting to the Capital Market in the Presence of a Competitor, *Journal of Accounting Research* 34, 261-279.
- Healy, Paul M., Amy P. Hutton, and Krishna G. Palepu, 1999, Stock Performance and Intermediation Changes Surrounding Sustained Increases in Disclosure, *Contemporary Accounting Research* 16, 485-520.

- Heflin, Frank L., Kenneth W. Shaw, and John J. Wild, 2005, Disclosure Policy and Market Liquidity: Impact of Depth Quotes and Order Sizes, *Contemporary Accounting Research* 22, 829-865.
- Ho, Thomas, and Hans R. Stoll, 1981, Optimal Dealer Pricing under Transactions and Return Uncertainty, *Journal of Financial Economics* 9, 47-73.
- Holland, John B., 1998, Private Disclosure and Financial Reporting, *Accounting & Business Research* 28, 255-269.
- Hung, Mingyi, 2000, Accounting Standards and Value Relevance of Financial Statements: An International Analysis, *Journal of Accounting and Economics* 30, 401-420.
- Ince, Ozgur S., and R. Burt Porter, 2006, Individual Equity Return Data from Thomson Datastream: Handle with Care!, *Journal of Financial Research* 29, 463-479.
- Jensen, Michael C., and William H. Meckling, 1976, Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure, *Journal of Financial Economics* 3, 305-360.
- Jin, Li, and Stewart C. Myers, 2006, R2 Around the World: New Theory and New Tests, *Journal of Financial Economics* 79, 257-292.
- Kaplan, Steven N., and Luigi Zingales, 1997, Do Investment-Cash Flow Sensitivities Provide Useful Measures of Financing Constraints?, *Quarterly Journal of Economics* 112, 169-215.
- Kim, Jeong-Bon V., and Shauna Shi, 2008, Enhanced Disclosures Via IFRS and Stock Price Synchronicity Around the World: Do Analyst Following and Institutional Infrastructure Matter?, *SSRN eLibrary*.
- Kim, Oliver, and Robert E. Verrecchia, 1991, Trading Volume and Price Reactions to Public Announcements, *Journal of Accounting Research* 29, 302-321.
- Klapper, Leora F., and Inessa Love, 2004, Corporate Governance, Investor Protection, and Performance in Emerging Markets, *Journal of Corporate Finance* 10, 703-728.
- La Porta, Rafael, Florencio Lopez-De-Silanes, and Andrei Shleifer, 2006, What Works in Securities Laws?, *Journal of Finance* 61, 1-32.
- La Porta, Rafael, Florencio Lopez-De-Silanes, Andrei Shleifer, and Robert Vishny, 2002, Investor Protection and Corporate Valuation, *Journal of Finance* 57, 1147-1170.

- La Porta, Rafael, Florencio Lopez-De-Silanes, Andrei Shleifer, and Robert W. Vishny, 1997, Legal Determinants of External Finance, *Journal of Finance* 52, 1131-1150.
- La Porta, Rafael, Florencio Lopez-de-Silanes, Andrei Shleifer, and Robert W. Vishny, 1998, Law and finance, *Journal of Political Economy* 106, 1113.
- Landsman, Wayne R., Edward L. Maydew, and Jake Thornock, 2009, The Information Content of Annual Earnings Announcements and Mandatory Adoption of IFRS, *SSRN eLibrary*.
- Lang, Mark H., Karl V. Lins, and Darius P. Miller, 2003, ADRs, Analysts, and Accuracy: Does Cross Listing in the United States Improve a Firm's Information Environment and Increase Market Value?, *Journal of Accounting Research* 41, 317-345.
- Lang, Mark H., and Russell J. Lundholm, 1996, Corporate Disclosure Policy and Analyst Behavior, *The Accounting Review* 71, 467-492.
- Lang, Mark, and Russell Lundholm, 1993, Cross-Sectional Determinants of Analyst Ratings of Corporate Disclosures, *Journal of Accounting Research* 31, 246-271.
- Lee, Kuan-Hui, 2010, The World Price of Liquidity Risk, *Journal of Financial Economics*, *Forthcoming*.
- Lesmond, David A., 2005, Liquidity of emerging markets, *Journal of Financial Economics* 77, 411-452.
- Lesmond, David A., Joseph P. Ogden, and Charles A. Trzcinka, 1999, A new estimate of transaction costs, *Review of Financial Studies* 12, 1113-1141.
- Leuz, Christian, Dhananjay Nanda, and Peter D. Wysocki, 2003, Earnings Management and Investor Protection: An International Comparison, *Journal of Financial Economics* 69, 505-527.
- Leuz, Christian, and Robert E. Verrecchia, 2000, The Economic Consequences of Increased Disclosure, *Journal of Accounting Research* 38, 91-124.
- Leuz, Christian, and Peter D. Wysocki, 2008, Economic Consequences of Financial Reporting and Disclosure Regulation: A Review and Suggestions for Future Research, *SSRN eLibrary*.
- Merton, Robert C., 1987, A Simple Model of Capital Market Equilibrium with Incomplete Information, *Journal of Finance* 42, 483-510.

- Morck, Randall, Bernard Yeung, and Wayne Yu, 2000, The Information Content of Stock Markets: Why do Emerging Markets Have Synchronous Stock Price Movements?, *Journal of Financial Economics* 58, 215-260.
- Piotroski, Joseph D., and Darren T. Roulstone, 2004, The Influence of Analysts, Institutional Investors, and Insiders on the Incorporation of Market, Industry, and Firm-Specific Information into Stock Prices, *The Accounting Review* 79, 1119-1151.
- Rajan, Raghuram G., and Luigi Zingales, 1998, Which Capitalism? Lessons from the East Asian Crisis, *Journal of Applied Corporate Finance* 11, 40-48.
- Roll, Richard, 1988, R^2 , *Journal of Finance* 43, 541-566.
- Roulstone, Darren T., 2003, Analyst Following and Market Liquidity, *Contemporary Accounting Research* 20, 551-578.
- Stoll, Hans R., 2000, Friction, *Journal of Finance* 55, 1478-1514.
- Verrecchia, Robert E., 2001, Essays on Disclosure, *Journal of Accounting and Economics* 32, 97-180.
- Welker, Michael, 1995, Disclosure Policy, Information Asymmetry, and Liquidity in Equity Markets, *Contemporary Accounting Research* 11, 801.

Table 2.1 Description of Variables

This table describes all variables used in the analysis and their data sources.

Variable	Description	Source
RFREQ	Number of financial reporting required by regulatory or security exchange in a year. The frequency includes both interm and annual financial reporting.	CIFAR and manual collection
Ψ (PSI)	Logistic transformed firm-specific stock return variation ($1-R^2$). R^2 is obtained by running regression of weekly stock return on domestic and US stock markets returns using one year data	Datastream/Worldscope
FERR	Absolute value of the difference between announced earnings and mean of forecast earnings scaled by mean of analyst forecasts	IBES
LIQ	Annual percentage of non-zero return days out of total trading days	Datastream/Worldscope
Q	Logarithm of Tobin's Q. Tobin's Q is defined as book value of total assets plus market value of equity minus the book value of equity divided by total assets	Datastream/Worldscope
MV	Logarithm of the market capitalization of firm in million US dollars	Datastream/Worldscope
BM	Logarithm of book-to-market equity ratio	Datastream/Worldscope
PRICE	Logarithm of stock price in US dollars	Datastream/Worldscope
LEV	Ratio of total debt over total asset	Datastream/Worldscope
VOLUME	Logarithm of average monthly trading volume in US dollars over preceding twelve months	Datastream/Worldscope
RETVOL	Logarithm of standard deviation of monthly stock returns over preceding twelve months	Datastream/Worldscope
INVOP	Two-year geometric net sales growth	Datastream/Worldscope
CASH	Ratio of cash and short term investment to total assets	Datastream/Worldscope
GLBQ	World median Tobin's Q of firms in each ICB industry classification	Datastream/Worldscope
ADR	Indicator variable equal to 1 on and after the year that the firm is cross-listed in US stock exchange	Datastream/Worldscope
ALYST	Number of financial analysts who follow the firm	IBES
CLOSE	Percentage of shares held by insiders and controlling shareholdings	Datastream/Worldscope
LAW	Indicator variable equal to 1 if the legal origin of a country is common law, zero if the legal origin is civil law	Djankov et al. (2008)
ANTI	Anti-self-dealing index compiled by Djankov et al. (2008)	Djankov et al. (2008)
GDPG	Logarithm of GDP per capita in US dollars	World Bank WDI
GDPV	Variance of GDP per capita growth for the past five years	World Bank WDI
INSLAW	Indicator variable that takes value of 1 on and after the year of country's first prosecution of insider trading	Fernandes and Ferreira (2009)
LAND	Logarithm of the geographic size of a country measured in square kilometers	World Bank WDI
MCAP	Market capitalization of listed companies deflated by GDP	World Bank WDI
FHERF	Firm Herfindahl index of country j, defined as for $H_j = \sum_i h_{i,j}^2$ where $h_{i,j}$ is the sales of firm i as a percentage of the total sales of all country j firms	Datastream/Worldscope
IHERF	Industry Herfindahl index of country j, defined as for $H_j = \sum_k h_{k,j}^2$ where $h_{k,j}$ is the combined value of the sales of all country j firms in industry k as a percentage of those of all country j firms	Datastream/Worldscope

Table 2.2 Summary Statistics of Information, Liquidity, and Firm Valuation Variables

This table presents the time series means, median, and standard deviations of key variables of interest, together with the starting year of the sample period, and number of unique firms (NFirms). RFREQ is financial reporting frequency. Ψ is the logistic transformed firm-specific stock return variation and is a measure of stock price informativeness. FERR (analyst forecast errors) is absolute value of the difference between announced earnings and mean of forecast earnings scaled mean of analyst forecasts. LIQ (liquidity) is percentage of trading days with non-zero returns out of all of trading days in a year. Q is the logarithm of Tobin's Q where Tobin's Q is sum of total assets plus market value of equity minus book value of equity divided by total assets. There are 40 countries in the sample. All continuous variables are winsorized at the 1st and 99th percentiles. Sample period is 1988 to 2007.

Country	Year	NFirms	RFREQ	Ψ			FERR		
			Mean	Mean	Median	Std	Mean	Median	Std
Argentina	1989	60	3.37	1.237	0.784	1.773	0.679	0.168	1.587
Australia	1988	386	2.00	1.144	1.027	1.117	0.178	0.056	0.506
Austria	1990	87	2.67	1.669	1.447	1.468	0.593	0.196	1.222
Belgium	1988	136	2.35	1.678	1.561	1.303	0.580	0.175	1.233
Brazil	1991	78	3.69	1.294	0.854	1.659	0.879	0.189	2.070
Canada	1988	765	4.00	2.006	1.853	1.348	0.441	0.096	1.067
Chile	1990	91	2.33	1.716	1.495	1.474	0.276	0.135	0.512
China	1992	850	2.81	0.667	0.478	1.192	0.197	0.108	0.334
Denmark	1988	161	2.00	2.030	1.874	1.310	0.629	0.181	1.393
Finland	1988	117	3.45	2.071	1.925	1.493	0.460	0.154	0.903
France	1988	850	3.30	2.382	2.287	1.465	0.636	0.159	1.395
Germany	1990	912	3.44	2.187	2.086	1.402	0.902	0.250	1.765
Greece	1989	275	2.74	1.187	1.015	1.184	0.693	0.308	1.235
Hong Kong	1988	95	2.00	0.870	0.664	1.351	0.145	0.060	0.371
India	1990	829	3.22	1.337	1.163	1.152	0.298	0.133	0.703
Ireland	1990	37	2.00	1.450	1.430	1.411	0.216	0.070	0.569
Israel	1990	362	4.00	1.553	1.306	1.378	0.690	0.250	1.440
Italy	1988	237	3.30	1.166	1.075	1.163	0.638	0.195	1.292
Japan	1988	2,665	2.00	1.290	1.145	1.162	0.584	0.158	1.412
Luxembourg	1992	31	1.44	2.634	2.521	1.513	0.463	0.113	1.084
Malaysia	1988	427	2.85	0.865	0.657	1.273	0.257	0.109	0.542
Mexico	1990	84	4.00	0.789	0.493	1.406	0.576	0.167	1.310
Netherlands	1988	121	2.40	1.661	1.502	1.279	0.432	0.089	1.125
New Zealand	1988	56	2.00	0.951	0.862	0.949	0.207	0.076	0.453
Norway	1988	167	3.70	1.793	1.591	1.416	0.787	0.204	1.552
Pakistan	1990	117	3.44	2.507	2.500	1.640	0.303	0.158	0.539
Philippines	1988	38	3.25	1.799	1.868	1.775	0.368	0.127	1.102
Portugal	1989	58	3.00	1.672	1.466	1.378	0.671	0.217	1.539
Singapore	1988	80	2.50	1.027	0.853	1.256	0.277	0.089	0.742
South Africa	1988	144	2.00	1.232	1.022	1.303	0.231	0.072	0.684
South Korea	1990	670	3.11	1.584	1.456	1.326	1.265	0.418	2.193
Spain	1988	110	3.10	1.235	1.071	1.276	0.421	0.112	0.950
Sri Lanka	1988	88	3.00	2.721	2.857	1.700	0.200	0.146	0.184
Sweden	1994	291	3.36	1.443	1.291	1.263	0.694	0.144	1.615
Switzerland	1988	210	2.00	1.720	1.590	1.310	0.527	0.141	1.254
Taiwan	1988	418	4.00	0.486	0.390	1.046	0.414	0.151	0.996
Thailand	1988	453	3.10	2.069	1.989	1.616	0.713	0.189	1.638
Turkey	1989	284	3.37	0.599	0.432	1.115	0.697	0.266	1.376
UK	1988	1,103	2.00	1.862	1.724	1.381	0.275	0.071	0.810
US	1988	4,469	4.00	2.216	2.054	1.390	0.250	0.042	0.815
All Countries		18,412	2.90	1.749	1.577	1.409	0.443	0.093	1.176

Country	LIQ			Q		
	Mean	Median	Std	Mean	Median	Std
Argentina	59.379	69.008	32.121	0.075	0.062	0.335
Australia	85.007	100.000	24.491	0.496	0.352	0.520
Austria	60.873	69.478	32.797	0.147	0.050	0.423
Belgium	69.483	78.782	26.555	0.197	0.092	0.429
Brazil	44.008	26.210	41.530	0.119	0.012	0.569
Canada	79.750	83.730	18.177	0.401	0.262	0.553
Chile	38.409	26.908	34.317	0.312	0.218	0.584
China	96.012	96.680	4.648	1.107	1.072	0.486
Denmark	47.287	44.444	30.382	0.149	0.021	0.406
Finland	72.471	79.920	23.003	0.279	0.144	0.479
France	67.423	79.921	30.797	0.270	0.167	0.452
Germany	71.868	82.879	27.515	0.281	0.170	0.481
Greece	85.718	90.361	17.441	0.353	0.214	0.530
Hong Kong	85.733	90.688	16.036	0.418	0.253	0.600
India	82.939	95.200	21.650	0.564	0.450	0.581
Ireland	93.376	100.000	17.347	0.370	0.274	0.416
Israel	65.500	68.421	27.705	0.261	0.133	0.387
Italy	89.412	94.048	13.606	0.237	0.135	0.345
Japan	80.306	87.398	19.028	0.186	0.122	0.394
Luxembourg	45.981	46.640	37.199	0.127	0.019	0.601
Malaysia	73.985	77.821	18.782	0.556	0.487	0.563
Mexico	80.732	95.785	31.042	0.179	0.166	0.385
Netherlands	78.686	86.354	21.391	0.349	0.237	0.457
New Zealand	69.194	74.603	20.548	0.511	0.404	0.495
Norway	58.531	67.871	30.926	0.315	0.154	0.500
Pakistan	47.686	43.600	35.433	0.506	0.458	0.459
Philippines	36.897	25.000	33.431	0.221	0.137	0.376
Portugal	59.910	71.976	34.187	0.099	0.042	0.310
Singapore	76.829	80.769	22.453	0.290	0.167	0.468
South Africa	65.339	75.200	29.758	0.386	0.342	0.434
South Korea	88.284	90.909	9.954	-0.097	-0.102	0.342
Spain	81.317	90.400	21.604	0.249	0.148	0.388
Sri Lanka	24.315	11.957	27.211	0.085	0.040	0.317
Sweden	79.686	84.264	15.487	0.435	0.299	0.546
Switzerland	65.907	75.299	28.425	0.161	0.046	0.442
Taiwan	88.640	90.000	7.017	0.767	0.734	0.445
Thailand	51.810	61.686	37.064	0.407	0.311	0.530
Turkey	80.551	82.937	11.217	0.327	0.234	0.467
UK	62.003	62.451	29.317	0.434	0.357	0.520
US	86.289	92.032	15.479	0.442	0.280	0.544
All Countries	78.312	87.200	23.922	0.330	0.198	0.512

Table 2.3 Summary Statistics for Firm-Level and Country-Level Characteristics

This table presents the time series means of firm-specific (Panel A) and country-specific (Panel B) variables for a sample of 40 countries. NFirms is number of firms. MV is the logarithm of the market capitalization of firm in million US dollars. BM is the logarithm of book-to-market equity ratio. PRICE is the logarithm of stock price in US dollars. LEV is the ratio of total debt over total asset. INVOP is investment opportunities measured by two-year geometric average of annual net sales growth. CASH is ratio of cash and short term investment to total assets. GLBQ is median Tobin's Q of firms in each ICB industrial classification. RETVOL is the logarithm of standard deviation of monthly stock returns estimated using one year data. VOLUME is the logarithm of average monthly trading volume in US dollars estimated using one year data. ALYST is the number of financial analysts who follow the firm. CLOSE is the fraction of shares held by insiders and controlling shareholders. Law states the legal origin of a country that is either common or civil law. Insider Law is the year of a country's first prosecution of insider trading. ANTI is the anti-self-dealing index compiled by Djankov et al. (2008). GDPC is the logarithm of gross domestic product per capita in US dollars. GDPV is the variance of GDP per capita growth for the past five years. LAND is the logarithm of the geographic size of a country measured in square kilometers. MCAP is a proxy for a country's stock market development estimated by the ratio of a country's total market capitalization to its GDP. FHERF is the firm Herfindahl index calculated using individual firm sales in each year. IHERF is the industry Herfindahl index calculated using industry sales in each year. The sample period is 1988 to 2007.

Panel A: Firm-Level Characteristics												
Country	NFirms	MV	BM	PRICE	LEV	INVOP	CASH	GLBQ	RETVOL	VOLUME	ALYST	CLOSE
Argentina	60	5.371	-0.154	1.742	0.290	-0.142	0.060	1.223	-1.971	14.739	13.675	62.296
Australia	386	6.129	-0.838	1.408	0.211	-0.273	0.117	1.233	-2.656	16.274	14.599	34.191
Austria	87	4.730	-0.176	3.850	0.262	-0.171	0.112	1.149	-2.687	14.590	8.598	58.646
Belgium	136	5.082	-0.359	4.207	0.242	-0.201	0.133	1.223	-2.663	15.063	10.344	51.609
Brazil	78	5.029	0.006	2.657	0.258	-0.132	0.147	1.167	-2.215	15.473	13.856	69.555
Canada	765	5.335	-0.634	2.119	0.198	-0.310	0.161	1.301	-2.316	15.693	17.946	28.227
Chile	91	4.954	-0.448	2.692	0.184	-0.182	0.071	1.219	-2.602	13.676	5.895	60.618
China	850	5.908	-1.746	0.819	0.209	-0.337	0.238	1.291	-2.221	18.318	4.464	61.217
Denmark	161	4.028	-0.169	3.951	0.225	-0.102	0.156	1.200	-2.712	14.868	8.523	32.533
Finland	117	5.112	-0.398	2.524	0.257	-0.134	0.139	1.242	-2.416	15.654	13.663	35.294
France	850	4.517	-0.546	3.589	0.222	-0.165	0.154	1.248	-2.318	14.132	16.729	57.478
Germany	912	4.754	-0.620	3.493	0.201	-0.224	0.159	1.272	-2.320	13.797	14.823	56.600
Greece	275	4.299	-0.715	1.928	0.226	-0.201	0.102	1.197	-2.020	15.327	7.161	60.526
Hong Kong	95	7.658	-0.736	1.214	0.144	-0.150	0.186	1.205	-2.477	18.085	33.571	50.756
India	829	4.557	-0.895	1.762	0.258	-0.242	0.082	1.292	-1.925	15.058	8.908	52.833
Ireland	37	6.515	-0.841	1.863	0.238	-0.201	0.197	1.233	-2.565	17.158	10.168	26.205
Israel	362	3.814	-0.450	1.846	0.258	-0.165	0.157	1.205	-2.104	12.817	4.895	60.554
Italy	237	6.108	-0.572	1.951	0.243	-0.196	0.147	1.188	-2.551	16.707	14.641	50.358
Japan	2,665	5.889	-0.446	2.221	0.236	-0.072	0.182	1.250	-2.374	15.935	5.643	44.217
Luxembourg	31	4.265	-0.110	3.641	0.135	-0.289	0.135	1.128	-2.793	11.884	6.167	58.554
Malaysia	427	5.425	-1.166	1.131	0.173	-0.239	0.154	1.251	-2.164	16.438	20.719	52.776
Mexico	84	6.617	-0.289	1.289	0.217	-0.189	0.106	1.200	-2.372	16.919	18.147	60.894
Netherlands	121	5.512	-0.670	3.162	0.214	-0.128	0.110	1.249	-2.553	16.956	20.336	42.992
New Zealand	56	5.409	-0.857	1.115	0.278	-0.190	0.057	1.293	-2.744	15.274	10.436	52.044
Norway	167	4.783	-0.448	2.512	0.287	-0.235	0.201	1.257	-2.407	15.484	11.169	40.091
Pakistan	117	4.118	-0.986	1.310	0.184	-0.146	0.174	1.284	-2.250	13.208	4.063	63.449
Philippines	38	4.877	-0.475	1.947	0.180	-0.097	0.140	1.165	-2.301	14.934	16.851	68.171
Portugal	58	4.084	-0.253	2.178	0.316	-0.164	0.056	1.217	-2.535	14.364	11.120	54.687
Singapore	80	6.678	-0.498	1.387	0.161	-0.150	0.192	1.264	-2.515	16.915	27.118	51.590
South Africa	144	6.235	-0.700	1.918	0.124	-0.157	0.127	1.202	-2.402	16.320	7.953	47.104
South Korea	670	4.146	0.375	2.594	0.299	-0.150	0.126	1.207	-1.997	16.229	8.467	34.698
Spain	110	6.305	-0.541	3.187	0.249	-0.162	0.080	1.201	-2.567	17.632	20.426	46.557
Sri Lanka	88	1.930	-0.216	1.382	0.307	-0.264	0.105	1.135	-2.264	15.318	4.636	26.753
Sweden	291	5.053	-0.725	2.244	0.198	-0.226	0.176	1.287	-2.301	16.111	11.729	35.767
Switzerland	210	5.384	-0.174	5.541	0.240	-0.121	0.171	1.240	-2.659	16.471	12.886	44.142
Taiwan	418	6.373	-1.330	1.035	0.145	-0.324	0.228	1.437	-2.004	19.016	8.648	29.909
Thailand	453	4.690	-0.853	1.558	0.285	-0.165	0.102	1.214	-2.350	15.565	9.433	51.468
Turkey	284	4.067	-0.614	3.396	0.199	-0.191	0.125	1.159	-1.607	18.438	9.602	65.197
UK	1,103	5.730	-0.855	1.582	0.177	-0.234	0.148	1.269	-2.495	17.106	12.965	26.373
US	4,469	5.696	-0.745	2.760	0.208	-0.210	0.182	1.304	-2.279	17.110	10.404	25.367
All Countries	18,412	5.362	-0.598	2.525	0.221	-0.175	0.163	1.264	-2.307	16.229	10.595	36.992

Panel B: Country-Level Characteristics									
Country	Law	Insider Law	ANTI	GDPG	GDPV	LAND	MCAP	FHERF	IHERF
Argentina	Civil	1995	0.342	9.166	44.835	14.822	0.135	0.147	0.273
Australia	Common	1996	0.757	10.173	2.499	15.854	0.594	0.041	0.211
Austria	Civil		0.213	10.313	1.646	11.320	0.120	0.085	0.193
Belgium	Civil	1994	0.544	10.225	1.726	10.317	0.254	0.103	0.218
Brazil	Civil	1978	0.274	8.977	5.027	15.951	8.204	0.240	0.352
Canada	Common	1976	0.642	10.293	3.230	16.023	0.450	0.027	0.189
Chile	Civil	1996	0.625	9.153	6.614	13.526	0.808	0.049	0.152
China	Civil		0.763	7.776	6.520	16.048	0.186	0.280	0.343
Denmark	Civil	1996	0.463	10.278	2.474	10.655	0.279	0.088	0.249
Finland	Civil	1993	0.457	10.113	7.460	12.627	0.639	0.076	0.220
France	Civil	1975	0.379	10.200	1.400	13.218	0.436	0.029	0.150
Germany	Civil	1995	0.282	10.235	1.929	12.762	0.293	0.036	0.182
Greece	Civil	1996	0.217	10.049	2.918	11.767	0.267	0.088	0.272
Hong Kong	Common	1994	0.963	10.239	14.683	6.949	2.006	0.085	0.224
India	Common	1998	0.579	7.363	4.353	14.905	0.311	0.067	0.223
Ireland	Common		0.789	10.156	6.222	11.140	0.385	0.113	0.300
Israel	Common	1989	0.725	9.924	6.315	9.982	0.454	0.084	0.233
Italy	Civil	1996	0.421	10.147	1.377	12.592	0.186	0.093	0.209
Japan	Civil	1990	0.499	10.219	2.578	12.806	0.711	0.010	0.232
Luxembourg	Civil		0.283	10.954	6.339	7.859	0.574	0.323	0.401
Malaysia	Common	1996	0.950	9.092	16.470	12.702	1.212	0.024	0.166
Mexico	Civil		0.172	9.224	10.203	14.480	0.165	0.054	0.219
Netherlands	Civil	1994	0.203	10.293	1.319	10.431	0.688	0.144	0.251
New Zealand	Common		0.950	9.957	3.736	12.498	0.195	0.172	0.267
Norway	Civil	1990	0.421	10.574	1.972	12.626	0.249	0.175	0.236
Pakistan	Common		0.408	7.546	2.854	13.555	0.149	0.121	0.248
Philippines	Civil		0.215	7.838	9.620	12.605	0.279	0.169	0.266
Portugal	Civil		0.444	9.776	4.624	11.424	0.205	0.119	0.216
Singapore	Common	1978	1.000	10.352	16.312	6.513	1.325	0.060	0.293
South Africa	Common		0.813	8.946	3.347	14.010	0.621	0.043	0.210
South Korea	Civil	1988	0.469	9.648	14.092	11.500	0.393	0.031	0.213
Spain	Civil	1998	0.374	10.012	1.997	13.121	0.328	0.070	0.192
Sri Lanka	Common	1996	0.392	7.860	1.907	11.076	0.125	0.093	0.271
Sweden	Civil	1990	0.333	10.234	3.416	12.925	0.700	0.052	0.241
Switzerland	Civil	1995	0.267	10.408	2.256	10.597	1.344	0.079	0.259
Taiwan	Civil	1989	0.565	9.859	5.874	10.486	0.886	0.161	0.332
Thailand	Common	1993	0.813	8.572	17.316	13.144	0.811	0.040	0.282
Turkey	Civil	1996	0.429	9.032	23.524	13.554	0.169	0.099	0.313
UK	Common	1981	0.950	10.165	1.828	12.396	0.877	0.033	0.164
US	Common	1961	0.654	10.478	1.728	16.030	0.746	0.008	0.138

Table 2.4 Correlation Matrix

This table presents the Pearson correlation matrices for firm-level (Panel A) and country-level (Panel B) variables. Ψ is the logistic transformed firm-specific stock return variation and is a measure of stock price informativeness. FERR (analyst forecast errors) is absolute value of the difference between announced earning and mean of forecast earning scaled mean of analyst forecasts. LIQ (liquidity) is percentage of trading days with non-zero returns out of all of trading days in a year. Q is the logarithm of Tobin's Q where Tobin's Q is sum of total assets plus market value of equity minus book value of equity divided by total assets. MV is the logarithm of the market capitalization of firm in million US dollars. BM is the logarithm of book-to-market equity ratio. PRICE is the logarithm of stock price in US dollars. LEVERAGE is the ratio of total debt over total asset. INVOP is investment opportunities measured by two-year geometric average of annual net sales growth. CASH is ratio of cash and short term investment to total assets. GLBQ is median Tobin's Q of firms in each ICB industrial classification. RETVOL is the logarithm of standard deviation of monthly stock returns estimated using one year data. VOLUME is the logarithm of average monthly trading volume in US dollars estimated using one year data. ALYST is the number of financial analysts who follow the firm. CLOSE is the fraction of shares held by insiders and controlling shareholders. RFREQ is financial reporting frequency. LAW is an indicator variable equal to 1 if the legal origin of a country is common law, zero if the legal origin is civil law. ANTI is the anti-self-dealing index compiled by Djankov et al. (2008). GDPC is the logarithm of gross domestic product per capita in US dollars. GDPV is the variance of GDP per capita growth for the past five years. INSLAW is an indicator variable that takes value of one on and after the year of country first prosecution of insider trading. LAND is the logarithm of the geographic size of a country measured in square kilometers. MCAP is a proxy for a country's stock market development estimated by the ratio of a country's total market capitalization to its GDP. FHERF is the firm Herfindahl index calculated using individual firm sales in each year. IHERF is the industry Herfindahl index calculated using industry sales in each year. The sample period is 1988 to 2007.

Panel A: Correlation Matrix for Firm-Level Variables																
Variable	RFREQ	Ψ	FERR	LIQ	Q	MV	BM	PRICE	LEV	INVOP	CASH	GLBQ	RETVOL	VOLUME	ALYST	CLOSE
RFREQ	1															
Ψ	0.175	1														
FERR	-0.034	0.057	1													
LIQ	0.160	-0.343	-0.077	1												
Q	0.117	-0.023	-0.131	0.184	1											
MV	-0.043	-0.433	-0.196	0.502	0.222	1										
BM	-0.068	0.095	0.111	-0.184	-0.747	-0.347	1									
P	0.033	-0.040	-0.115	0.041	0.094	0.272	-0.140	1								
LEV	-0.023	-0.046	0.091	0.025	-0.181	0.048	0.047	-0.048	1							
INVOP	-0.091	-0.014	0.017	-0.056	-0.146	-0.014	0.154	-0.028	0.027	1						
CASH	0.012	0.031	-0.010	0.062	0.312	-0.040	-0.217	0.003	-0.374	-0.110	1					
GLBQ	0.040	-0.006	0.004	0.119	0.301	0.055	-0.292	0.024	-0.106	-0.115	0.268	1				
RETVOL	0.113	0.033	0.143	0.146	0.151	-0.205	-0.138	-0.183	-0.010	-0.126	0.216	0.197	1			
VOLUME	0.028	-0.415	-0.178	0.604	0.265	0.754	-0.328	0.327	0.023	-0.059	0.018	0.136	0.021	1		
ALYSE	0.129	-0.261	-0.104	0.274	0.131	0.640	-0.164	0.206	0.033	0.015	-0.086	0.017	-0.124	0.570	1	
CLOSE	-0.150	0.071	0.092	-0.264	-0.070	-0.260	0.067	-0.031	0.010	0.008	-0.006	-0.065	0.054	-0.400	-0.209	1

Panel B: Correlation Matrix for Interim Reporting Frequency and Country-Level Variables														
Variable	RFReq	Ψ	FERR	LIQ	Q	LAW	ANTI	GDPG	GDPV	INSLAW	LAND	MCAP	FHERF	IHERF
LAW	0.374	0.165	-0.163	0.067	0.212	1								
ANTI	-0.008	0.036	-0.134	0.025	0.175	0.763	1							
GDPG	0.130	0.132	-0.045	0.113	-0.063	0.002	-0.030	1						
GDPV	0.076	-0.089	0.075	-0.014	-0.112	-0.120	-0.040	-0.269	1					
INSLAW	0.328	0.061	0.005	0.136	-0.009	0.063	0.095	0.322	-0.057	1				
LAND	0.495	0.153	-0.115	0.216	0.196	0.622	0.324	0.090	-0.180	0.116	1			
MCAP	-0.003	0.022	-0.085	0.109	0.062	0.124	0.146	0.134	-0.068	0.086	0.044	1		
FHERF	-0.139	-0.095	0.044	-0.161	-0.024	-0.237	-0.207	-0.284	0.158	-0.224	-0.370	0.000	1	
IHERF	-0.478	-0.199	0.104	-0.156	-0.112	-0.436	-0.259	-0.339	0.262	-0.325	-0.514	-0.032	0.616	1

Table 2.5 Analysis of Financial Reporting Frequency on Price Informativeness, Analyst Forecast Errors, Liquidity, and Firm Valuation

This table reports coefficient of cross-country firm-level regressions of stock price informativeness (Ψ), analyst forecast errors (FERR), stock liquidity (LIQ), and logarithm of Tobin's Q (Q) on firm- and country-level characteristics. RFREQ is financial reporting frequency. LAW is an indicator variable equal to 1 if the legal origin of a country is common law, zero if the legal origin is civil law. ANTI is the anti-self-dealing index compiled by Djankov et al. (2008). The definition of other variable acronyms is contained in Table 2.1. Firm-level and country-level characteristics are included but the coefficients are not shown. Full results are included as appendix of this paper NObs is the number of observations. Intercept, year and country effects are not tabulated. Robust t-statistics are in parentheses. Sample period is 1988-2007.

Variables	Ψ				FERR			
	M1	M2	M3	M4	M5	M6	M7	M8
RFREQ	0.105 (12.30)	0.071 (6.79)	0.124 (13.70)	-0.034 (-1.45)	-0.019 (-2.45)	0.020 (1.74)	-0.043 (-5.52)	0.112 (4.87)
LAW	0.272 (11.79)	0.051 (1.11)			-0.204 (-12.72)	0.007 (0.15)		
RFREQ*LAW		0.080 (5.16)				-0.075 (-5.22)		
ANTI			0.376 (8.20)	-0.343 (-3.24)			-0.382 (-10.37)	0.294 (3.10)
RFREQ*ANTI				0.297 (7.28)				-0.257 (-7.72)
Firm Controls	Included				Included			
Country Controls	Included				Included			
Intercept	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
NObs	89,272	89,272	89,272	89,272	76,651	76,651	76,651	76,651
Adj R-Sq	0.340	0.340	0.340	0.340	0.070	0.070	0.070	0.070

Variables	LIQ				Q			
	M9	M10	M11	M12	M13	M14	M15	M16
RFREQ	2.231 (12.96)	1.048 (5.65)	1.220 (6.49)	-0.323 (-0.68)	0.044 (8.45)	0.068 (11.67)	0.064 (11.79)	0.098 (7.17)
LAW	-5.113 (-9.94)	-13.623 (-10.88)			0.189 (14.48)	0.350 (11.34)		
RFREQ*LAW		2.968 (7.82)				-0.059 (-5.77)		
ANTI			-18.472 (-16.77)	-25.634 (-10.08)			0.348 (12.46)	0.505 (7.45)
RFREQ*ANTI				2.876 (3.24)				-0.065 (-2.58)
Firm Control	Included				Included			
Country Control	Included				Included			
Intercept	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
NObs	84,850	84,850	84,850	84,850	77,384	77,384	77,384	77,384
Adj R-Sq	0.450	0.460	0.460	0.460	0.340	0.350	0.340	0.340

Table 2.6 Robustness Test

This table presents the results of robustness test and reports coefficients of two main regression models of Table 2.5. M1-M8 below show those using non-US sample. The dependent variables are Ψ , FERR, LIQ, and Q. RFREQ is financial reporting frequency. LAW is an indicator variable equal to 1 if the legal origin of a country is common law, zero if the legal origin is civil law. The definition of other variable acronyms is contained in Table 2.1. NObs is the number of observations. Intercept, year and country effects are not tabulated. Robust t-statistics are in parentheses. Sample period is 1988-2007.

Variable	Non-US Markets							
	Ψ		FERR		LIQ		Q	
	M1	M2	M3	M4	M5	M6	M7	M8
RFREQ	0.115 (11.90)	0.082 (7.70)	0.025 (2.62)	0.043 (3.55)	1.487 (8.80)	0.849 (4.53)	0.045 (8.33)	0.060 (10.28)
LAW	0.287 (12.24)	-0.053 (-1.00)	-0.165 (-9.37)	-0.035 (-0.73)	-6.900 (-13.30)	-13.625 (-10.63)	0.202 (14.91)	0.366 (11.15)
RFREQ*LAW		0.132 (7.11)		-0.049 (-3.02)		2.525 (6.31)		-0.065 (-5.61)
GDPG	0.373 (23.48)	0.394 (24.56)	-0.005 (-0.33)	-0.011 (-0.74)	-1.210 (-3.67)	-0.789 (-2.50)	-0.091 (-8.11)	-0.102 (-9.09)
GDPV	-0.017 (-17.29)	-0.016 (-16.56)	-0.001 (-0.79)	-0.001 (-0.63)	-0.116 (-5.92)	-0.102 (-5.01)	-0.005 (-9.00)	-0.005 (-9.58)
INSLAW	0.089 (2.49)	0.099 (2.76)	0.026 (0.93)	0.022 (0.77)	-2.918 (-3.13)	-3.029 (-3.21)	-0.012 (-0.66)	-0.016 (-0.91)
LAND	-0.008 (-1.02)	-0.014 (-1.85)	-0.009 (-1.80)	-0.008 (-1.59)	0.395 (2.36)	0.283 (1.63)	0.019 (4.19)	0.022 (4.86)
MCAP	0.187 (8.35)	0.186 (8.37)	-0.001 (-0.05)	-0.000 (-0.02)	-1.636 (-4.76)	-1.612 (-4.69)	0.072 (5.72)	0.071 (5.66)
FHERF	2.041 (6.82)	2.449 (8.03)	-1.557 (-6.71)	-1.764 (-7.22)	-46.920 (-7.63)	-38.209 (-6.16)	2.130 (12.02)	1.937 (10.78)
IHERF	-4.988 (-23.77)	-5.328 (-24.78)	0.318 (1.71)	0.453 (2.37)	7.161 (1.59)	0.356 (0.08)	-0.429 (-3.65)	-0.266 (-2.24)
MV	-0.296 (-48.92)	-0.297 (-49.57)	-0.156 (-24.02)	-0.155 (-23.96)	2.546 (17.01)	2.505 (16.77)	0.081 (25.38)	0.081 (25.47)
BM	-0.078 (-7.92)	-0.083 (-8.45)	0.078 (6.61)	0.081 (6.76)	1.138 (6.32)	1.014 (5.55)		
PRICE					-1.096 (-9.53)	-1.224 (-10.50)		
LEV	-0.086 (-2.36)	-0.090 (-2.48)	0.960 (18.82)	0.964 (18.88)	0.947 (1.36)	0.820 (1.18)	-0.199 (-9.16)	-0.194 (-8.90)
VOLUME					2.838 (22.56)	2.887 (23.08)		
RETVOL					4.166 (17.58)	4.172 (17.54)		
INVOP							-0.096 (-9.66)	-0.095 (-9.54)
CASH							0.702 (19.29)	0.706 (19.41)
GLBQ							0.314 (16.17)	0.317 (16.35)
ADR	0.359 (4.29)	0.378 (4.55)	0.078 (1.80)	0.074 (1.76)	-4.446 (-3.14)	-4.093 (-2.69)	-0.123 (-3.72)	-0.133 (-3.96)
ALYST	-0.002 (-3.10)	-0.002 (-3.04)	0.002 (2.29)	0.001 (2.16)	-0.049 (-4.08)	-0.048 (-4.01)	-0.002 (-4.83)	-0.002 (-4.74)
CLOSE	0.005 (15.51)	0.005 (15.40)	-0.001 (-3.15)	-0.001 (-3.08)	-0.028 (-4.03)	-0.027 (-3.90)	0.001 (6.34)	0.001 (6.50)
Intercept	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
NObs	55,018	55,018	43,938	43,938	50,898	50,898	49,351	49,351
Adj R-Sq	0.330	0.330	0.070	0.070	0.410	0.410	0.310	0.320

Table A1 Analysis of Financial Reporting Frequency on Price Informativeness

This table reports coefficient of cross-country firm-level regressions of stock price informativeness (Ψ) on firm- and country-level characteristics. RFREQ is financial reporting frequency. LAW is an indicator variable equal to 1 if the legal origin of a country is common law, zero if the legal origin is civil law. ANTI is the anti-self-dealing index compiled by Djankov et al. (2008). The definition of other variable acronyms is contained in Table 2.1. NObs is the number of observations. Intercept, year and country effects are not tabulated. Robust t-statistics are in parentheses. Sample period is 1988-2007.

Variables	M1	M2	M3	M4	M5	M6	M7	M8
RFREQ	0.148 (11.68)	0.249 (36.66)	0.149 (20.12)	0.269 (41.30)	0.105 (12.30)	0.071 (6.79)	0.124 (13.70)	-0.034 (-1.45)
LAW			0.545 (34.30)		0.272 (11.79)	0.051 (1.11)		
RFREQ*LAW						0.080 (5.16)		
ANTI				0.994 (23.47)			0.376 (8.20)	-0.343 (-3.24)
RFREQ*ANTI								0.297 (7.28)
GDPG					0.350 (24.42)	0.341 (24.32)	0.330 (22.54)	0.317 (22.27)
GDPV					-0.017 (-17.49)	-0.016 (-17.45)	-0.017 (-17.42)	-0.018 (-19.02)
INSLAW					0.291 (8.83)	0.301 (9.12)	0.298 (8.83)	0.315 (9.32)
LAND					-0.013 (-1.89)	-0.024 (-3.34)	0.017 (3.22)	0.002 (0.26)
MCAP					0.135 (6.50)	0.119 (5.67)	0.208 (10.62)	0.172 (8.70)
FHERF					1.899 (6.38)	2.185 (7.25)	2.685 (9.24)	2.918 (9.96)
IHERF					-5.107 (-25.73)	-5.225 (-26.28)	-5.534 (-28.81)	-5.671 (-29.77)
MV	-0.326 (-69.09)	-0.310 (-56.78)	-0.312 (-59.93)	-0.310 (-57.49)	-0.326 (-67.87)	-0.329 (-68.73)	-0.329 (-67.93)	-0.331 (-68.73)
BM	-0.050 (-6.65)	-0.123 (-14.37)	-0.058 (-7.19)	-0.084 (-10.08)	-0.054 (-7.06)	-0.058 (-7.52)	-0.058 (-7.45)	-0.063 (-8.02)
LEV	-0.010 (-0.36)	-0.185 (-5.57)	-0.065 (-2.04)	-0.109 (-3.35)	-0.012 (-0.42)	-0.014 (-0.48)	-0.022 (-0.77)	-0.024 (-0.84)
ADR	0.312 (4.11)	0.191 (2.07)	0.196 (2.10)	0.193 (2.27)	0.349 (4.24)	0.361 (4.44)	0.346 (4.20)	0.362 (4.50)
ALYST	0.003 (5.65)	-0.002 (-3.06)	0.000 (0.27)	-0.001 (-1.65)	0.002 (3.46)	0.002 (4.20)	0.002 (3.79)	0.003 (4.63)
CLOSE	0.005 (21.07)	-0.002 (-5.92)	0.002 (6.13)	0.000 (1.38)	0.004 (16.67)	0.004 (16.80)	0.004 (15.51)	0.004 (15.95)
Intercept	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country	Yes	No	No	No	No	No	No	No
NObs	89,272	89,272	89,272	89,272	89,272	89,272	89,272	89,272
Adj R-Sq	0.360	0.260	0.290	0.280	0.340	0.340	0.340	0.340

Table A2 Analysis of Financial Reporting Frequency on Analyst Forecast Errors

This table reports coefficient of cross-country firm-level regressions of analyst forecast errors (FERR) on firm- and country-level characteristics. RFREQ is financial reporting frequency. LAW is an indicator variable equal to 1 if the legal origin of a country is common law, zero if the legal origin is civil law. ANTI is the anti-self-dealing index compiled by Djankov et al. (2008). The definition of other variable acronyms is contained in Table 2.1. NObs is the number of observations. Intercept, year and country effects are not tabulated. Robust t-statistics are in parentheses. Sample period is 1988-2007.

Variables	M1	M2	M3	M4	M5	M6	M7	M8
RFREQ	-0.033 (-2.38)	-0.064 (-10.81)	-0.033 (-5.51)	-0.082 (-13.70)	-0.019 (-2.45)	0.020 (1.74)	-0.043 (-5.52)	0.112 (4.87)
LAW			-0.255 (-18.95)		-0.204 (-12.72)	0.007 (0.15)		
RFREQ*LAW						-0.075 (-5.22)		
ANTI				-0.447 (-13.79)			-0.382 (-10.37)	0.294 (3.10)
RFREQ*ANTI								-0.257 (-7.72)
GDPC					-0.038 (-3.37)	-0.028 (-2.49)	-0.049 (-4.14)	-0.042 (-3.56)
GDPV					0.001 (1.02)	0.002 (1.34)	0.001 (1.18)	0.003 (2.30)
INSLAW					0.067 (2.56)	0.057 (2.17)	0.082 (3.13)	0.061 (2.31)
LAND					-0.020 (-4.79)	-0.013 (-2.97)	-0.036 (-9.02)	-0.029 (-7.13)
MCAP					-0.059 (-4.56)	-0.047 (-3.62)	-0.094 (-7.38)	-0.075 (-6.02)
FHERF					-1.555 (-6.74)	-1.883 (-7.91)	-1.870 (-7.97)	-2.309 (-9.45)
IHERF					0.594 (3.32)	0.725 (4.01)	0.671 (3.72)	0.937 (5.11)
MV	-0.143 (-28.95)	-0.138 (-30.06)	-0.149 (-32.34)	-0.147 (-31.69)	-0.148 (-31.11)	-0.145 (-30.55)	-0.145 (-30.48)	-0.141 (-29.98)
BM	0.060 (6.96)	0.097 (11.08)	0.070 (8.04)	0.083 (9.50)	0.063 (7.32)	0.067 (7.76)	0.067 (7.76)	0.072 (8.32)
LEV	0.693 (19.81)	0.773 (21.10)	0.703 (19.92)	0.732 (20.41)	0.692 (19.86)	0.695 (19.96)	0.701 (20.04)	0.707 (20.19)
ADR	0.017 (0.39)	0.050 (1.74)	0.036 (0.91)	0.042 (1.22)	0.010 (0.24)	0.003 (0.07)	0.010 (0.26)	0.001 (0.03)
ALYST	0.002 (4.22)	0.004 (7.93)	0.004 (7.68)	0.004 (8.50)	0.004 (7.08)	0.003 (6.09)	0.003 (6.43)	0.003 (5.24)
CLOSE	-0.001 (-3.98)	0.001 (5.64)	-0.000 (-0.69)	0.001 (2.57)	-0.001 (-2.13)	-0.001 (-2.20)	-0.000 (-1.67)	-0.000 (-1.75)
Intercept	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country	Yes	No	No	No	No	No	No	No
NObs	76,651	76,651	76,651	76,651	76,651	76,651	76,651	76,651
Adj R-Sq	0.070	0.060	0.070	0.060	0.070	0.070	0.070	0.070

Table A3 Analysis of Interim Reporting Frequency on Liquidity

This table reports coefficient of cross-country firm-level regressions of stock liquidity (LIQ) on firm- and country-level characteristics. RFREQ is financial reporting frequency. LAW is an indicator variable equal to 1 if the legal origin of a country is common law, zero if the legal origin is civil law. ANTI is the anti-self-dealing index compiled by Djankov et al. (2008). The definition of other variable acronyms is contained in Table 2.1. NObs is the number of observations. Intercept, year and country effects are not tabulated. Robust t-statistics are in parentheses. Sample period is 1988-2007.

Variables	M1	M2	M3	M4	M5	M6	M7	M8
RFREQ	-2.430 (-11.34)	2.103 (18.94)	2.730 (19.65)	2.106 (19.39)	2.231 (12.96)	1.048 (5.65)	1.220 (6.49)	-0.323 (-0.68)
LAW			-2.889 (-10.89)		-5.113 (-9.94)	-13.623 (-10.88)		
RFREQ*LAW						2.968 (7.82)		
ANTI				-13.855 (-17.67)			-18.472 (-16.77)	-25.634 (-10.08)
RFREQ*ANTI								2.876 (3.24)
GDPG					0.209 (0.73)	-0.024 (-0.09)	0.156 (0.57)	0.060 (0.22)
GDPV					-0.082 (-4.48)	-0.071 (-3.73)	-0.025 (-1.38)	-0.033 (-1.82)
INSLAW					-4.619 (-5.03)	-4.710 (-4.99)	-4.310 (-4.73)	-4.296 (-4.68)
LAND					0.775 (5.10)	0.408 (2.43)	0.448 (3.70)	0.314 (2.31)
MCAP					-0.381 (-1.20)	-0.834 (-2.66)	-0.024 (-0.09)	-0.335 (-1.17)
FHERF					-50.054 (-8.00)	-37.299 (-6.00)	-58.212 (-10.28)	-55.253 (-9.78)
IHERF					3.340 (0.78)	-1.530 (-0.35)	-7.789 (-1.92)	-9.425 (-2.31)
MV	1.831 (17.62)	2.594 (22.14)	2.587 (22.11)	2.626 (22.44)	2.108 (18.65)	2.107 (18.62)	2.198 (19.36)	2.220 (19.44)
BM	0.178 (1.61)	1.330 (10.78)	0.938 (7.91)	0.688 (5.87)	0.728 (6.09)	0.555 (4.56)	0.497 (4.15)	0.450 (3.69)
PRICE	-1.305 (-14.03)	-0.364 (-3.39)	-0.628 (-5.96)	-1.132 (-10.58)	-0.714 (-7.04)	-0.929 (-9.13)	-1.234 (-11.91)	-1.282 (-12.51)
LEV	-0.417 (-1.05)	0.920 (2.01)	0.226 (0.50)	-0.322 (-0.72)	0.346 (0.79)	0.214 (0.49)	0.054 (0.12)	0.025 (0.06)
VOLUME	2.731 (30.94)	2.265 (25.62)	2.359 (26.30)	2.454 (27.22)	2.459 (26.42)	2.431 (25.99)	2.519 (27.07)	2.489 (26.22)
RETVOL	3.001 (20.74)	4.148 (25.22)	3.916 (24.27)	3.718 (23.01)	3.540 (22.81)	3.459 (22.25)	3.355 (21.60)	3.379 (21.72)
ADR	1.065 (0.60)	-0.655 (-0.77)	-0.722 (-0.71)	-0.872 (-0.75)	-1.002 (-0.81)	-0.586 (-0.42)	-0.998 (-0.73)	-0.852 (-0.61)
ALYST	-0.104 (-12.18)	-0.153 (-18.79)	-0.166 (-19.62)	-0.169 (-19.93)	-0.092 (-10.94)	-0.076 (-8.85)	-0.096 (-11.41)	-0.092 (-10.65)
CLOSE	-0.037 (-9.32)	-0.022 (-4.97)	-0.037 (-8.14)	-0.043 (-9.76)	-0.024 (-5.26)	-0.022 (-4.94)	-0.026 (-5.87)	-0.025 (-5.75)
Intercept	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country	Yes	No	No	No	No	No	No	No
NObs	84,850	84,850	84,850	84,850	84,850	84,850	84,850	84,850
Adj R-Sq	0.530	0.430	0.430	0.450	0.450	0.460	0.460	0.460

Table A4 Analysis of Financial Reporting Frequency on Firm's Valuation

This table reports coefficient of cross-country firm-level regressions of logarithm of Tobin's Q (Q) on firm- and country-level characteristics. RFREQ is financial reporting frequency. LAW is an indicator variable equal to 1 if the legal origin of a country is common law, zero if the legal origin is civil law. ANTI is the anti-self-dealing index compiled by Djankov et al. (2008). The definition of other variable acronyms is contained in Table 2.1. NObs is the number of observations. Intercept, year and country effects are not tabulated. Robust t-statistics are in parentheses. Sample period is 1988-2007.

Variables	M1	M2	M3	M4	M5	M6	M7	M8
RFREQ	0.029 (5.21)	0.086 (21.20)	0.043 (10.41)	0.094 (24.08)	0.044 (8.45)	0.068 (11.67)	0.064 (11.79)	0.098 (7.17)
LAW			0.227 (25.53)		0.189 (14.48)	0.350 (11.34)		
RFREQ*LAW						-0.059 (-5.77)		
ANTI				0.467 (18.67)			0.348 (12.46)	0.505 (7.45)
RFREQ*ANTI								-0.065 (-2.58)
GDPG					-0.111 (-11.12)	-0.104 (-10.17)	-0.118 (-11.59)	-0.115 (-11.15)
GDPV					-0.005 (-9.49)	-0.005 (-9.56)	-0.005 (-10.48)	-0.005 (-9.82)
INSLAW					-0.003 (-0.17)	-0.011 (-0.62)	-0.010 (-0.57)	-0.014 (-0.79)
LAND					0.012 (2.91)	0.021 (4.75)	0.031 (9.23)	0.035 (9.34)
MCAP					0.050 (4.28)	0.060 (5.20)	0.086 (7.46)	0.094 (8.06)
FHERF					2.235 (12.65)	2.035 (11.44)	2.751 (15.85)	2.703 (15.46)
IHERF					-0.455 (-4.14)	-0.374 (-3.43)	-0.608 (-5.78)	-0.580 (-5.49)
MV	0.095 (33.67)	0.090 (31.87)	0.083 (31.00)	0.086 (31.20)	0.090 (32.33)	0.091 (33.02)	0.088 (31.69)	0.089 (32.01)
LEV	-0.341 (-18.68)	-0.446 (-23.28)	-0.382 (-20.77)	-0.400 (-21.42)	-0.361 (-19.87)	-0.355 (-19.49)	-0.366 (-20.06)	-0.364 (-19.90)
INVOP	-0.059 (-8.59)	-0.097 (-13.36)	-0.075 (-10.71)	-0.081 (-11.46)	-0.065 (-9.45)	-0.063 (-9.09)	-0.067 (-9.64)	-0.066 (-9.54)
CASH	0.743 (30.67)	0.642 (25.49)	0.681 (27.86)	0.664 (26.90)	0.732 (29.94)	0.738 (30.13)	0.725 (29.62)	0.727 (29.68)
GLBQ	0.262 (19.01)	0.284 (18.76)	0.264 (18.13)	0.278 (18.78)	0.263 (18.60)	0.266 (18.82)	0.266 (18.76)	0.267 (18.81)
ADR	-0.134 (-4.01)	-0.146 (-3.18)	-0.137 (-3.87)	-0.140 (-3.66)	-0.152 (-4.53)	-0.161 (-4.76)	-0.153 (-4.59)	-0.157 (-4.70)
ALYST	-0.003 (-7.61)	-0.002 (-4.96)	-0.001 (-2.10)	-0.001 (-3.41)	-0.002 (-6.26)	-0.003 (-6.99)	-0.002 (-5.81)	-0.002 (-6.06)
CLOSE	0.001 (5.28)	-0.000 (-0.66)	0.001 (8.45)	0.001 (5.75)	0.001 (5.37)	0.001 (5.20)	0.001 (4.72)	0.001 (4.55)
Intercept	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country	Yes	No	No	No	No	No	No	No
NObs	77,384	77,384	77,384	77,384	77,384	77,384	77,384	77,384
Adj R-Sq	0.360	0.290	0.330	0.310	0.340	0.350	0.340	0.340

3 Asset Liquidity and Stock Liquidity: International Evidence

Abstract

This study investigates the relationship between the liquidity of a firm's assets and the liquidity of its stock across 47 countries. We find a positive relationship between asset liquidity and stock liquidity. This finding is consistent with Gopalan, Kadan, and Pevzner (2010) where they document a positive relationship in the U.S. market. We further show that analyst forecast errors is negatively associated with asset liquidity. The results support the valuation uncertainty hypothesis, which states that liquid assets reduce information asymmetry among market participants, therefore improving stock liquidity. We also find that the relationship is weaker in common law countries, in countries with strong shareholder protection, or in countries with high accounting rating standards. The reason is that investors in these countries rely less on assets structure for firm valuation as they have other reliable firm information besides balance sheets. Using the mandatory International Financial Reporting Standards (IFRS) adoption as an exogenous event, we find that the relationship between asset and stock liquidity becomes weaker because of the better disclosure environment brought by the IFRS. But the weakening of the relationship only occurs in common law countries, in countries with strong shareholder protection, or in countries with high accounting rating standards.

3.1 Introduction

Liquidity is widely studied in finance literature, but almost all studies on liquidity concentrate on the liquidity of stocks. This paper studies another aspect of liquidity – the asset liquidity of firms. A firm can be viewed as a collection or portfolio of assets; therefore the liquidity of its real assets can be measured just like other real or financial assets. A firm issues stocks with its assets and growth options as backup; the stock liquidity could be influenced by a firm's underlying assets structure. In this paper, we study the link between a firm's asset liquidity and its stock liquidity in the international setting.

Gopalan, Kadan, and Pevzner (2010) model the relationship of asset liquidity and stock liquidity. Their model shows an ambiguous relationship because of two contradictory and competing theories. According to Kothari, Laguerre, and Leone (2002), and Aboody and Lev (2000), growth options are harder to be valued than fixed assets, and fixed assets are harder to be valued than cash or its equivalent. Naturally, liquid assets are easier to be valued because of lower information asymmetry; hence the adverse selection cost of firms with high liquid assets is low. Therefore, the valuation uncertainty hypothesis predicts a positive relationship between asset and stock liquidity because of low uncertainty on a firm's valuation (Kyle (1985)). On the other hand, firm with liquid assets may be faced with higher uncertainty on the deployment of its liquid assets. Hence, the investment uncertainty hypothesis predicts a negative relationship between asset and stock liquidity.

The most direct measure of illiquidity, Bid-Ask spread data, is incomplete or does not cover long time-series in international markets. To mitigate the volume data

availability problem for international markets, Lesmond, Ogden, and Trzcinka (1999) propose a simple illiquidity measure derived from daily stock returns. They propose using the proportion of days with zero return out of total trading days in a given year (ZeroProportion) as a measure of illiquidity. The intuition is that arbitrageurs trade only if the value of accumulated information exceeds the marginal cost of trading; if trading costs are sizable, new information must accumulate for a longer time before investors engage in trading. We also use the trading cost estimated using the model outlined in Lesmond, Ogden, and Trzcinka (1999) and price impact proposed by Amihud (2002) as robustness checks.

To measure asset liquidity, we follow Gopalan, Kadan, and Pevzner (2010) in constructing asset liquidity measures. We sort a firm's assets based on their liquidity and assign a liquidity score of between zero and one to each asset class. We then obtain a weighted liquidity score for each firm, and we normalize the weighted score by the lagged total assets of the firm. The approach of measuring asset liquidity is in the same spirit as Berger and Bouwman (2009). Using this method, we have three alternative measures of weight asset liquidity. All three asset liquidity measures are similar to Gopalan, Kadan, and Pevzner (2010).

Our empirical results support the valuation uncertainty hypothesis over the investment uncertainty hypothesis. The finding is consistent with Gopalan, Kadan, and Pevzner (2010) empirics on U.S. data. We document a positive association between asset liquidity and stock liquidity in international capital markets. We carry out the tests by using multivariate regression analysis with a combination of different fixed effects. The inclusion of firm fixed effect allows us to study within-firm variation; and the inclusion

of country, industry, and year fixed effects allows us to observe the across-firms variation. The positive asset-stock liquidity relationship exists within firms and across firms. We also show further evidence of valuation uncertainty by using analyst forecasts on earnings. If the cash or equivalent holding of a firm increases by one standard deviation, its liquidity will improve by about 1%. The improvement in stock liquidity is significant because about 90% of the liquidity spread are order processing and inventory costs, which are fixed costs in nature (Huang and Stoll (1997)). This 1% improvement is considerable given that it stems predominantly from the reduction of the adverse selection component. Our test results further show that the asset liquidity is negatively correlated to analyst forecast errors. This provides further evidence that firms with illiquid assets have higher valuation uncertainty. Nevertheless, the asset liquidity is not subsumed by analyst forecast errors although both measures represent information asymmetry.

Further tests suggest that the asset-stock liquidity relationship is not uniform across countries. In common law countries or countries with strong shareholder protection, the asset-stock liquidity relationship appears to be weaker. The asset-stock liquidity is also weaker in countries with strong accounting rating standards. Our explanation is that the disclosure quality is good in these countries (Ball, Kothari, and Robin (2000)), and investors rely less on the assets structure to value the firm. The cross-country variation results also support the valuation uncertainty hypothesis.

Next, we study the structural change on the asset-stock liquidity relationship around the IFRS adoption. A comprehensive study by Daske et al. (2008) finds that the IFRS improves capital market effects including liquidity, market liquidity, cost of equity,

and firm valuation after IFRS adoption²¹, but such capital market improvements only exist in countries with strong shareholder protection. We expect to find the asset-stock liquidity relationship reducing after IFRS adoption because of higher disclosure quality. Our initial results show that there is no significant structural change on the relationship of asset-stock liquidity around IFRS adoption. We then partition the samples according to legal origin, shareholder protection regime, or accounting rating standards. The subsample analysis reveals that the asset-stock liquidity relationship reduces after IFRS adoption only in common law countries, countries with strong shareholder protection, or countries with high accounting rating standards. The results are consistent with Daske et al. (2008) where they find the capital market effects improve after IFRS adoption, but only in countries with strong shareholder protection. The explanation is the civil law countries or countries with low shareholder protection are merely “adopting an IFRS label”, as mentioned by Daske et al. (2009).

This paper contributes to the study of the link between corporate finance and market microstructure. Specifically, we provide evidence of the consequences of corporate cash holdings in the capital markets. Furthermore, we also document the cross-country variation, which can be explained by institutional factors. We add to the growing literature on cash holding of firms in international capital markets (Dittmar, Mahrt-Smith, and Servaes (2003), Pinkowitz, Stulz, and Williamson (2006), and Kalcheva and Lins (2007)). Our study differs from the aforementioned as we focus on the consequences – rather than the determinants – of liquid assets holding.

²¹ Leuz and Wysocki (2008) give a detailed review of recent IFRS-based literature.

The remainder of the paper is organized as follows: Section 3.2 develops the testable hypotheses. Section 3.3 describes our sample and provides the list of firm-level and country-level variables, including our key empirical constructs. The main empirical results on asset liquidity and stock liquidity, including cross-country variation, are presented in Section 3.4. Section 3.5 explores the structural change on asset-stock liquidity relationship after IFRS adoption. We conduct further robustness checks in Section 3.6. Section 3.7 concludes the study.

3.2 Hypotheses Development

A large body of microstructure work suggests that stock liquidity is affected by three factors. The liquidity consumers must compensate liquidity providers for the order processing costs incurred. Secondly, Amihud (2002), Demsetz (1968), Ho and Stoll (1981) model the inventory holding costs incurred by liquidity suppliers. Thirdly, Copeland and Galai (1983), and Glosten and Milgrom (1985) emphasize the adverse selection cost faced by liquidity providers in the presence of informed traders. While the first two costs are affected by the firm's non-information market factor, the adverse selection cost is mainly affected by the firm's information environment. The adverse selection cost is due to information asymmetry on the firm's value between informed and uninformed traders (Kyle (1985)).

Cash, and its equivalent, is easier to be valued than fixed assets, and fixed assets are easier to be valued than growth options (Kothari, Laguerre, and Leone (2002)). Therefore, asset liquidity affects the valuation process and creates information

asymmetry if someone has better access to a firm's information. Hence, the valuation uncertainty hypothesis predicts a positive relationship between asset and stock liquidity. On the other hand, the investment uncertainty hypothesis is due to the uncertain usage of liquid assets. Myers and Rajan (1998) argue that firms with liquid assets are in a better position to finance illiquid projects. Similarly, liquid assets can be easily redeployed or even expropriated. Therefore, liquid assets create more uncertainty on the redeployment. The investment uncertainty hypothesis, therefore, predicts a negative relationship between asset and stock liquidity.

Gopalan, Kadan, and Pevzner (2010) include both valuation uncertainty and investment uncertainty in their model. Their model shows that the relationship of asset-stock liquidity is ambiguous due to the two competing hypotheses. However, their empirical study shows that valuation uncertainty dominates over investment uncertainty, and shows a positive relationship between asset and stock liquidity for the U.S. firms. We are interested to investigate the relationship of asset-stock liquidity in the international setting. We do not predict valuation uncertainty hypothesis over investment uncertainty hypothesis. Therefore, we state our first hypothesis in both null and alternate forms and allow the question to be answered by our empirical tests.

H1₀: The stock liquidity of a firm is positively correlated to its asset liquidity
(Valuation Uncertainty Hypothesis).

H1_a: The stock liquidity of a firm is negatively correlated to its asset liquidity
(Investment Uncertainty Hypothesis).

There is a growing number of studies that investigate the link between countries' institutional infrastructure and financial reporting outcomes. Ball, Kothari, and Robin (2000), Hung (2000), Leuz, Nanda, and Wysocki (2003) document that the legal origin and shareholder protection regime of a country can affect a firm's incentive to provide disclosure and hence influence the quality of financial reporting as well as the market effect of these disclosures. Ball, Kothari, and Robin (2000) show that common law countries exhibit more timely loss recognition. Leuz, Nanda, and Wysocki (2003) examine the level of earnings management and the opaqueness of accounting earnings reported by firms from 31 countries. They show that the legal origin and shareholder protection are important determinants of reporting quality. More importantly, the legal origin and shareholder protection are still important even after controlling for accounting rules. An important message is that accounting rules are important but are not sufficient to describe accounting quality; the institutional factors are important for consideration as well.

The common law system typically places greater emphasis on public information and ex ante disclosure than the civil law system (Djankov et al. (2008)), and the disclosure quality in common law countries is generally higher in civil law countries (Ball, Kothari, and Robin (2000)). The higher disclosure quality in countries with high shareholder protection reduces the information asymmetry between corporate insiders and outside investors. Beside legal origin, we also introduce measures of shareholder protection and disclosure quality in our study because these measures are related to information asymmetry between corporate insiders and outsiders. Countries with strong shareholder protection restrict the expropriation of corporate assets by insiders, therefore

reducing the information asymmetry between corporate insiders and outside investors. Furthermore, accounting standards or disclosure quality plays a role in reducing information asymmetry because outsiders rely more on a firm's corporate disclosure, including financial statements, to value the firm.

If the information asymmetry is reduced, the adverse selection cost is also reduced because of less probable emergence of informed traders taking advantage of uninformed traders (Kyle (1985)). The valuation uncertainty hypothesis predicts a weaker but positive asset-stock liquidity relationship in countries with better shareholder protection. On the other hand, the investment uncertainty hypothesis states that there is more uncertainty in the deployment of liquid assets in countries with weaker shareholder protection. Therefore, the investment uncertainty hypothesis predicts a negative but stronger asset-stock liquidity relationship in countries with weak shareholder protection. These two hypotheses predict different signs on the asset-stock liquidity relationship. Since we predict the dominance of valuation uncertainty over investment uncertainty in H1, we hypothesize the cross-country variation of asset-stock liquidity relationship as follows:

H2: The relationship between asset liquidity and stock liquidity is stronger in countries with weak shareholder protection or weak accounting rating standards.

The adoption of the International Financial Reporting Standards (IFRS) in many countries around the world is one of the most important regulatory changes recently. The IFRS is a set of uniform rules that apply in the same way to all public companies in

markets that have adopted the standards. Most studies on IFRS adoption conclude that the IFRS improves reporting quality and brings positive market-based benefits (Leuz and Wysocki (2008)). Since IFRS adoption brings structural changes in information asymmetry among market participants, the asset-stock liquidity relationship also changes. As the disclosure quality improves, it is expected that the asset-stock liquidity relationship becomes weaker after IFRS adoption. Daske et al. (2008) find that market liquidity, cost of equity, and firm valuation increase around the time of mandatory IFRS transition. However, the capital market benefits exist only in countries with strong institutional infrastructure that provides incentives and enforcement on disclosures. Daske et al. (2008), Preiato, Brown, and Tarca (2009), Landsman, Maydew, and Thornock (2009), and many other studies that examine the capital market effects of mandatory IFRS adoption find that the differential outcomes can be explained by the countries' institutional infrastructure. All these research studies document that the improvement in capital markets, brought about by mandatory IFRS adoption, is stronger in countries with better shareholder protection regimes. We state our hypotheses on the asset-stock liquidity relationship changes around the mandatory IFRS adoption and the changes are not uniform.

H3A: The relationship between asset liquidity and stock liquidity becomes weaker after the IFRS adoption.

H3B: The relationship between asset liquidity and stock liquidity becomes weaker after the IFRS adoption, and the reduction is larger in countries with stronger shareholder protection or higher accounting rating standards.

3.3 Sample and Data

In this section, we discuss our data and sample selection. We also discuss all variables used in the study. The description of the variables and their sources are summarized in Table 3.1.

3.3.1 Sample Screening

We select firms from countries that are covered by Datastream and Worldscope during 1996-2007. We start our sample from 1996 because Datastream expands the small firm coverage in 1995, and we need one year of lag data for control variables. For stock to be included in the sample, it should have market price and accounting information such as market capitalization and book-to-market ratio at the end of the previous year. Furthermore, we must be able to compute assets and stock liquidity measures. We use only stocks from major exchanges, except for China and the U.S.²² We include only common stocks with primary listings and are traded using the same currency as that of the listing country; hence, Depository Receipts, Real Estate Investment Trust (REIT), and preferred stocks are excluded. On top of Datastream's equity flag, we further apply a comprehensive "name screening" compiled by Griffin, Kelly, and Nardari (2009) to remove non-common stocks that are wrongly labeled as common stocks by Datastream. Finally, we exclude penny stocks that are less than US\$0.50 at previous year end²³.

The final sample consists of 126,340 firm-year observations for 17,574 unique firms across 47 countries. The U.S., Japan, China, and the U.K. contribute the highest

²² Most countries have one major exchange, except U.S. (NYSE, AMEX, NASDAQ), and China (Shanghai, Shenzhen).

²³ We also try US\$1 as an alternate cutoff filter and the results are not affected. Lee (2010) uses US\$1 as a cutoff point when conducting his international liquidity study with the Datastream database.

number of unique firms and number of firm-years, with more than 1,000 unique firms and more than 7,000 firm-year observations for each of these four countries. We conduct a robustness test using samples without U.S. firm-year to avoid dominance of the U.S. samples. We also use the random sampling technique in the robustness section to give each country equal weight. Table 3.2 lists the country coverage and number of firms for each country in our study.

Ince and Porter (2006) caution about the data error in Datastream's return index. We follow their recommendation and set the daily return index to be missing if any returns²⁴ above 100% are reversed the next day, and set the monthly return index to be missing if any of the returns above 300% are reversed the following month. Datastream fills the return index with the previous day's data if the stock is delisted or not traded. If a day's return index is the same as that of the previous day, then it produces zero return. We need to identify the delisting date and non-trading dates to produce reliable information and liquidity measures. We follow the methodology of Ince and Porter (2006) by observing the most recent dates that produce non-zero return in reverse chronological order to identify the delisted firms and delisting dates. The latest non-zero return date is treated as the delisting date. Following Lesmond, Ogden, and Trzcinka (1999), we classify non-trading dates for a specific exchange if 90% or more of the stocks have zero return on that date. Observations recorded on non-trading dates and after delisting dates are removed.

²⁴ Returns are calculated from Datastream's Return Index (RI) datatype using the following relation: $r_{j,t} = (RI_{j,t} / RI_{t,t-1}) - 1$. Datastream's RI assumes dividend reinvestment.

3.3.2 Stock Liquidity (LIQ)

The most direct measure of illiquidity, Bid-Ask spread data, is incomplete or does not cover long-term series in international markets. To mitigate the volume data availability problem for international markets, Lesmond, Ogden, and Trzcinka (1999) propose a simple illiquidity measure derived from daily stock returns. They propose using the proportion of days with zero return out of total trading days in a given year (ZeroProportion) as a measure of illiquidity. The intuition is that arbitrageurs trade only if the value of accumulated information exceeds the marginal cost of trading; if trading costs are sizable, new information must accumulate for a longer time before investors engage in trading. Lesmond (2005) concludes that the ZeroProportion measure performs well in both within-country cross-sectional and cross-country analyses. It has been validated in both US and international markets (Lesmond (2005), Bekaert, Harvey, and Lundblad (2007), Goyenko, Holden, and Trzcinka (2009)). ZeroProportion is a measure of illiquidity; we take the complement of ZeroProportion as the measure of liquidity for our study (LIQ). The stock return data is obtained from Datastream. The summary statistics for LIQ are shown in Table 3.2.

$$LIQ_i = [1 - ZeroProportion_i] * 100\% \quad (1)$$

We also use the original measure proposed by Lesmond, Ogden, and Trzcinka (1999) in the robustness section. This measure is an estimate of trading costs spread using ZeroProportion data with maximum likelihood method. We call this annual measure LOT. We further test the hypotheses using Amihud (2002) price impact measure in robustness section.

3.3.3 Analyst Forecast Errors (FERR)

We also use analyst forecast errors as a proxy of information asymmetry to carry out our hypotheses testing. Since liquid assets are easier to be valued, high asset liquidity will decrease the information asymmetry between a firm's insiders and market participants. Among the market participants, professional financial analysts produce the most important assessment of a firm's future earnings and value. Hence, high asset liquidity is associated with a low degree of forecast errors. Forecast errors is measured every fiscal year for each firm using annual forecasts. It is calculated as the difference between actual and mean of earnings per share forecast. The number is deflated by mean earnings forecasts before the absolute value is taken. To alleviate the small denominator problem associated with low mean earnings forecasts, a minimal denominator of 0.02 is used. The summary statistics for FERR are shown in Table 3.2.

$$FERR = \left| \frac{MeanEPS - ActualEPS}{MeanEPS} \right| \quad (2)$$

3.3.4 Asset Liquidity

The main independent variable is the measure of asset liquidity. We follow Gopalan, Kadan, and Pevzner (2010) in constructing asset liquidity measures. The approach of measuring asset liquidity is in the same spirit as Berger and Bouwman (2009). We assign liquidity scores between zero and one to book assets based on their level of liquidity. We calculate the total asset liquidity score using the proportion of each asset on the book as weight. Using this method, we have three alternate measures of weighted asset liquidity

(WAL). All three asset liquidity measures are similar to Gopalan, Kadan, and Pevzner (2010).

The first measure of asset liquidity assigns a liquidity score of one to cash and cash equivalent, and a score of zero to all other assets. This is simply the ratio of cash and cash equivalent to the lagged value of assets. This measure is crude and assumes assets other than cash have no liquidity. The second asset liquidity measure assigns a liquidity score of 0.5 to non-cash current assets, because non-cash current assets are the second most liquid assets after cash, and can be converted into cash quickly at low cost. Our third asset liquidity measure looks further into long-lived assets. Long-lived assets can be classified into tangible and non-tangible assets. Tangible assets such as property, plant, and equipment are more liquid than non-tangible assets such as goodwill. Following this liquidity hierarchy, the third asset liquidity measure assigns a liquidity score of one to cash and cash equivalent, 0.75 to non-cash current assets, 0.5 to tangible fixed assets, and zero to non-tangible assets. Specifically, the three weighted asset liquidity (WAL) measures for firm i in year t are given by equations (3) – (5).

$$WAL1_{i,t} = \frac{Cash \& \ Equivalents_{i,t}}{Total \ Assets_{i,t-1}} \times 1 + \frac{Other \ Assets_{i,t}}{Total \ Assets_{i,t-1}} \times 0 \quad (3)$$

$$WAL2_{i,t} = \frac{Cash \& \ Equivalents_{i,t}}{Total \ Assets_{i,t-1}} \times 1 + \frac{Non \ Cash \ CA_{i,t}}{Total \ Assets_{i,t-1}} \times 0.5 \\ + \frac{Other \ Assets_{i,t}}{Total \ Assets_{i,t-1}} \times 0 \quad (4)$$

$$\begin{aligned}
WAL3_{i,t} = & \frac{Cash \& Equivalents_{i,t}}{Total Assets_{i,t-1}} \times 1 + \frac{Non Cash CA_{i,t}}{Total Assets_{i,t-1}} \times 0.75 \\
& + \frac{Tangible FA_{i,t}}{Total Assets_{i,t-1}} \times 0.5 + \frac{Other Assets_{i,t}}{Total Assets_{i,t-1}} \times 0
\end{aligned} \tag{5}$$

The summary statistics for WAL are shown in Table 3.2. Portugal, Czech Republic, New Zealand, and Venezuela are countries with the lowest liquid assets ratio. Firms in the U.S., Norway, Hong Kong, Taiwan, and Turkey have a higher ratio of liquid assets on the book. The actual ranking of the asset liquidity depends on the measures used (WAL1 - WAL3). The worldwide mean of WAL1, WAL2, and WAL3 are 0.188, 0.385, and 0.708 respectively. Comparing their means with medians, all three asset liquidity measures are slightly positively skewed. From the correlation matrix in Table 3.4, the three asset liquidity measures are highly correlated.

3.3.5 Firm-Level Independent Variables

Table 3.3 presents the descriptive statistics of firm-level independent variables drawn from Datastream and Worldscope. Prior research by Stoll (2000) suggests that stock liquidity is affected by a firm's size because of costs of inventory and locating trade counterparty. Therefore we include MV — the log of total market capitalization in U.S. dollars — to control for size effect. Stoll (2000) also suggests that liquidity is affected by stock price level because of the discreteness effect, and it also acts as a proxy for risk as lower price stocks tend to be riskier. Therefore, we include PRICE — the log of stock price in U.S. dollars — to control for the discrete tick size effect. We include book-to-market equity ratio (BM) and capital expenditure (CAPEX) to control for growth firms

effects. We also include a capital structure measure — total debt over total assets (LEVERAGE) — as a control for any incentives to disclose additional firm information that is driven by debt constraints. We control the quality of the firm's earnings using normalized accrual measures used by Sloan (1996). We include return on assets (ROA) and annual buy and hold abnormal return during the previous year (BHAR) to control for firm operating and stock price performances. Finally, we include return volatility (RETVOL), which is the standard deviation of the monthly stock return over the preceding twelve months. In the analysis whereby analyst forecast errors (FERR) is used as a dependent variable, we include the number of analyst following (FOLLOWING) as an additional control variable.

3.3.6 Country-Level Institutional Factors

Table 3.3 also presents the country institutional factors that are used in the subsample analysis. Recent studies show that the effects of higher accounting standards are subjected to a country's institutional factors. Ball, Robin, and Wu (2003) show that a country's legal enforcement mechanism and political environment are more important than respective accounting standards in explaining the variation in accounting income. Using the IFRS adoption event, Daske et al. (2008) find that capital market benefits are manifested only in countries where firms have the incentive to be transparent and where legal enforcement is strong. Their results signify the importance of countries' enforcement regimes for the quality of financial reporting. Therefore, we are interested in studying the cross-country variation in asset-stock liquidity relationships. The variable of interest is a country's protection of shareholders and its accounting standards. We also use a country's legal origin as a proxy of shareholder protection because legal origin

exerts a strong influence on legal rules that protect minority shareholders (Djankov et al. (2008)). We also employ the anti-self-dealing index (ANTI), compiled by Djankov et al. (2008), as an alternate measure of a country's legal protection for shareholders. We use accounting rating standards, compiled by La Porta et al. (1998), as a measure of accounting or disclosure quality.

3.3.7 Pair-Wise Correlation Analysis

Table 3.4 presents the correlation matrix between all variables. The larger firms and firms with high stock prices have better stock liquidity. This may be due to the low information asymmetry in large firms and lower trading costs with high stock prices. Growth firms and highly levered firms also enjoy high stock liquidity. This is consistent with prior literature: Matsumoto (2002) finds that growth firms have greater incentives to reduce their information asymmetry; otherwise growth firms suffer stronger market reaction to negative earnings surprise. Also, highly levered firms have the incentive or are required to disclose more information about the firm to the public to reduce their cost of debt or to comply with the debt covenants. Notice that the LIQ is highly negatively correlated with LOT because the latter is a measure of illiquidity (trading cost). All three asset liquidity measures are highly correlated with each other. On the country institutional factors, the common law dummy is highly correlated with the anti-self-dealing index (ANTI). The anti-self-dealing index could be an outcome of investor-oriented common law (Djankov et al. (2008)). The accounting rating standards (ACCSTD) are moderately correlated to legal origin and the anti-self-dealing index. The coefficients of correlation are 0.475 and 0.460 respectively.

3.4 Results

We employ three different measures of weighted asset liquidity (WAL) to study the asset-stock liquidity relationship. We posit that higher asset liquidity improves stock liquidity. However, the relationship may not be uniform across countries, and we show that a country's shareholder protection or legal origin affects the strength of the relationship. We further study the analyst forecast error and find it is negatively correlated to asset liquidity. However, we also show that asset liquidity is not subsumed by analyst forecast errors. Final robustness checks are carried out in Section 3.5.

3.4.1 Multivariate Analysis on Asset-Stock Liquidity Relationship

We start our empirical study by running multivariate regression to test the association between asset liquidity and stock liquidity. We pool all the firm-year observations and run the following regression with two sets of possible fixed effects. The first set of fixed effects are: country, industry, and year effects; therefore, the liquidity variation due to country development or governance, liquidity time trend, and industry factors are controlled. The second set of fixed effect is firm effect. The firm fixed effect controls for firm-level invariant factors such as corporate governance and disclosure policy. Our main focus is to study the relationship between asset and stock liquidity.

$$\begin{aligned} LIQ_{i,t} = & \alpha + \beta_1 WAL_{i,t} + \beta_2 MV_{i,t-1} + \beta_3 BM_{i,t-1} + \beta_4 PRICE_{i,t-1} \\ & + \beta_5 LEVERAGE_{i,t-1} + \beta_6 ACCRUAL_{i,t-1} + \beta_7 RETVOL_{i,t-1} \\ & + \beta_8 CAPEX_{i,t-1} + \beta_9 ROA_{i,t-1} + \beta_{10} BHAR_{i,t-1} \\ & + FixedEffectDummies + \varepsilon_{i,t} \end{aligned} \quad (6)$$

The dependent variable is the stock liquidity measure (LIQ). The key variable of interest is WAL, which is one of the weighted asset liquidity measures specified in Section 3.3. The valuation uncertainty hypothesis predicts a positive β_1 , while the investment uncertainty hypothesis predicts a negative β_1 . We present most of our results with all three WAL measures. All other firm-level characteristics variables are discussed in Section 3.3, and they are lagged by one year. We include country, industry, and year fixed effects in our regression analysis to study the cross-sectional effect; on the alternate set of regression, we include firm fixed effect to study the within-firm variation effect.

The results are presented in Table 3.5. M1-M3 report the results with WAL1 as an asset liquidity measure. M1 presents results without firm characteristics as control variables but with firm fixed effect. M2 adds the firm characteristics on top of the firm fixed effect. M3 reports the results with firm control variables and country, industry, and year fixed effects. We repeat the analysis with WAL2 and WAL3 as asset liquidity measures in M4-M6 and M7-M9 respectively. All WAL coefficients are positive and significant; this is the strong evidence showing that stock liquidity is positively associated with asset liquidity. We focus our results interpretation for M1-M3; M4-M9 can be interpreted in a similar manner. M1 analyzes the within-firm variation by including the firm fixed effect. The coefficient of WAL1 is 1.948, if the cash or equivalent holding increases by one standard deviation (24.2% compared to its previous year total assets), the proportion of non-zero return trading days will increase by 0.47% or the liquidity will improve by 0.6%²⁵. In M2, firm-level characteristics are controlled, and the coefficient increases to 2.124. In M3, the fixed effect is replaced by country, industry, and year fixed

²⁵ The change of liquidity is $1.948 \times 0.242 = 0.47$, where 1.948 is the coefficient of WAL1 from the regression, and 0.242 is the assumed change of WAL1 (i.e. one standard deviation). The mean of LIQ is 82.302, therefore the increment of 0.47 represents 0.6% improvement..

effects to study cross-sectional variation. The coefficient of WAL is now 1.992²⁶; if the cash or equivalent holding increases by one standard deviation, the stock liquidity will improve by 0.6%. The stock liquidity has low standard deviation, and the improvement represents about one-tenth of the standard deviation. The improvement in stock liquidity may be low, but this result is not surprising because stock liquidity also contains the order processing cost and inventory cost, which are fixed costs in nature. The asset liquidity affects mainly the adverse selection component of stock liquidity, which is about 10% of the bid-ask spread in the U.S. data (Huang and Stoll (1997)). Therefore, a 0.6% improvement is considerable, given that this improvement stems predominantly from the reduction of the adverse selection component. Using WAL2 and WAL3 gives similar trends and results; all these results are consistent with hypothesis H1₀ that predicts the positive correlation between stock liquidity and asset liquidity (Valuation Uncertainty Hypothesis).

The coefficients of control variables in the models are consistent with our prediction. Large firms have better liquidity due to larger investor base and shares outstanding. Value firms (high BM) have less information asymmetry and therefore they enjoy higher stock liquidity. The stock price is negatively associated with liquidity; the high stock price reduces liquidity given that the firm size is controlled. Firm size and stock price are moderately correlated at a value of 0.406; therefore, the coefficients of stock price and firm size may not be reliable due to multicollinearity problems. The sign of leverage depends on the fixed effects included; it is negative for within-firm study, and becomes positive for cross-sectional study. Accrual, return volatility, and return on assets

²⁶ The change of m liquidity is $1.992 \times 0.242 = 0.48.048$. The mean of LIQ is 82.302, therefore the increment of 0.47 represents 0.6% improvement

are positively associated with liquidity. Overall, our multivariate analysis concludes that higher asset liquidity increases stock liquidity.

3.4.2 Information Asymmetry and the Asset-Stock Liquidity Relationship

To further test whether the asset-stock liquidity relationship is induced by information asymmetry or valuation uncertainty, we conduct multivariate analysis on analyst forecast error and asset liquidity measures. Analyst forecast error (FERR) is a proxy of information asymmetry or valuation uncertainty. We pool all the firm-years observations and run the following regression with two sets of possible fixed effects. The models are very much similar to equation (6) as specified for the liquidity analysis. The dependent variable is FERR; we remove stock price (PRICE) from the model and include analyst following (FOLLOWING) as the control variable.

$$\begin{aligned}
 FERR_{i,t} = & \alpha + \beta_1 WAL_{i,t} + \beta_2 MV_{i,t-1} + \beta_3 BM_{i,t-1} + \beta_4 LEVERAGE_{i,t-1} \\
 & + \beta_5 ACCRUAL_{i,t-1} + \beta_6 RETVOL_{i,t-1} + \beta_7 FOLLOWING_{i,t-1} \\
 & + \beta_8 CAPEX_{i,t-1} + \beta_9 ROA_{i,t-1} + \beta_{10} BHAR_{i,t-1} \\
 & + FixedEffectDummies + \varepsilon_{i,t}
 \end{aligned} \tag{7}$$

The key variable of interest is WAL, which is one of the weighted asset liquidity measures specified in Section 3.3. All other firm-level characteristics variables are discussed in Section 3.3 and they are lagged by one year. We include country, industry, and year fixed effects in our regression analysis to study the cross-sectional effect; on the alternate set of regression, we include firm fixed effect to study the within-firm variation

effect. The valuation uncertainty hypothesis predicts a negative β_1 , while the investment uncertainty hypothesis predicts a positive β_1 .

The results are presented in panel A of Table 3.6; the structure is similar to Table 3.5. M1-M3 report the results with WAL1 as the asset liquidity measure. M1 presents results without firm characteristics as control variables but with the firm fixed effect; M2 adds the firm characteristics on top of the firm fixed effect; M3 reports results with firm control variables and country, industry, and year fixed effects. We repeat the analysis with WAL2 and WAL3 as asset liquidity measures in M4-M6 and M7-M9 respectively. All WAL coefficients are negative and significant; the results show strong evidence that analyst forecast error is negatively associated with asset liquidity. M1 analyzes the within-firm variation by including the firm fixed effect. The coefficient of WAL1 is -0.255, if the cash or equivalent holding increases by one standard deviation, or 24%, compared to its previous year's total assets. The forecast errors will decrease by 12%²⁷. In M2, firm-level characteristics are controlled, and the coefficient is -0.102. In M3, the fixed effect is replaced by country, industry, and year fixed effects to study the cross-sectional variation. The coefficient of WAL is now -0.155. Using WAL2 and WAL3 gives similar trends and results and all these results are consistent with our valuation uncertainty hypothesis (H_{10}) but not consistent with investment uncertainty hypothesis (H_{1a}). The multivariate analysis concludes that higher asset liquidity decreases analyst forecast errors.

²⁷ The change of forecast errors is $-0.102 \times 0.242 = -0.061$. -0.102 is the coefficient of WAL1 from regression, and 0.242 is the assumed change of liquidity (i.e. one standard deviation). The mean of forecast errors is 0.506, change of -0.061 in forecast errors represents 12% of improvement.

In Table 3.6, panel B presents the regression results that are similar to Table 3.5 using equation (6) but with contemporaneous analyst forecast error added as an additional control variable. The motivation is that our asset-stock liquidity results support the valuation uncertainty hypothesis, which is driven by information asymmetry, and we would like to investigate whether asset liquidity is subsumed by analyst forecast errors. The results show that the magnitudes and t-statistics of the WAL coefficients are reduced after forecast errors is added; the reduction in magnitudes and significance suggests that some of the information asymmetry effect, for which asset liquidity acts as a proxy, is subsumed by analyst forecast errors. Nevertheless, most of the coefficients remain positive and statistically significant. The effect of asset liquidity on stock liquidity is not fully subsumed by analyst forecast errors.

3.4.3 Subsample by Country's Institutional Factors

Having established the average link between stock liquidity and asset liquidity, we now turn to identifying how this link depends on a country's institutional infrastructure. As stated in the previous section, in a country with good governance or shareholder protection, investors may rely less on a firm's assets structure for valuation. Therefore, the asset-stock liquidity relation will be weaker in countries with strong governance but stronger in countries with weak governance. In this sub-section, we carry out cross-country variation by partitioning. Specifically, we divide our sample into firms by legal origin (LAW), anti-self-dealing index (ANTI), or accounting rating standards (ACCSTD), and repeat our tests in the two subsamples.

In Table 3.7, panel A divides the sample by legal origin. Comparing coefficients of WAL1 in M1 and M2, we find the asset-stock liquidity relationship is weaker in

common law countries. The coefficients of WAL1 are 3.751 for the sample of civil law countries, and 1.834 for the sample of common law countries. From ΔCoef , we find that the coefficients are significantly different from each other across the two subsamples. In M3 and M4, we repeat our estimates for the second asset liquidity measure, WAL2, and we carry out the same analysis again for WAL3 in M5 and M6. In all the analyses, the coefficients of WAL are higher in civil law countries compared to common law countries, and the differences are significant. In panel B, we divide our sample into firms with above and below median anti-self-dealing index. For all three different measures of asset liquidity, the asset-stock liquidity relationship is stronger in countries with weaker shareholder protection. The differences are significant in all cases. In panel C, we divide our sample into firms with above and below median accounting rating standards. The asset-stock liquidity relationship is stronger in countries with weaker accounting quality.

In summary, the asset-stock relationship is stronger in civil law countries, in countries with weak shareholder protection, or in countries with weak accounting rating standards. The reason is that outside investors rely more on a firm's assets structure for firm valuation in situations where information asymmetry is high. The results are consistent with our valuation uncertainty hypothesis and cross-country hypothesis.

3.5 Impact of IFRS Adoption

In the previous section, we document the relationship between asset liquidity and stock liquidity, and show that our empirical evidence supports the valuation uncertainty hypothesis. If there is a structural change in the information environment, then the asset-

stock liquidity relationship will be changed. In this section, we identify the adoption of IFRS as a structural change in the information environment. We compare the asset-stock liquidity relationship before and after the IFRS adoption through multivariate regression analysis. Section 3.2 provides a review of IFRS adoption and its consequences. Overall, existing studies are consistent with the view that IFRS reporting improves disclosure and brings capital market benefits, but the effects are shaped by a country's institutional infrastructure.

If IFRS reduces the information asymmetry and valuation uncertainty, then the asset-stock liquidity will be weaker after IFRS adoption. We conduct our analysis to test for the third stated hypothesis: the relationship between stock liquidity and asset liquidity becomes weaker after IFRS adoption. Furthermore, we split our sample according to a country's institutional infrastructure such as legal origin, shareholder protection, and accounting rating standards to analyze the differential effects of IFRS on asset-stock liquidity.

We identify all countries that have mandated the adoption of IFRS in 2005 and all countries that have retained domestic accounting standards during the sample period (1996-2007). We expect a structural break in 2005 for firms in IFRS-adopting countries. Our primary source of country list and the adoption date is Daske et al. (2008). We exclude firms that are coded as voluntary adopters in accordance with Daske et al. (2009) to avoid any confounding effects of incentives for firms to voluntarily adopt IFRS before the mandated date. To avoid potential misclassification on IFRS adoption made by Worldscope (Daske et al. (2009)), we remove firms that are located in a IFRS-adopting country but are coded as non-IFRS adopters. The firm-level reporting standards are

obtained from Worldscope Field 07536. We pool all the firm-years observations and run the following regression, which is similar to our main regression model (6).

$$\begin{aligned}
LIQ_{i,t} = & \alpha + \beta_1 WAL_{i,t} + \beta_2 POSTIFRS * WAL_{i,t} + \beta_3 POSTIFRS_{i,t} \\
& + \beta_4 MV_{i,t-1} + \beta_5 BM_{i,t-1} + \beta_6 PRICE_{i,t-1} + \beta_7 LEVERAGE_{i,t-1} \\
& + \beta_8 ACCRUAL_{i,t-1} + \beta_9 RETVOL_{i,t-1} + \beta_{10} CAPEX_{i,t-1} \\
& + \beta_{11} ROA_{i,t-1} + \beta_{12} BHAR_{i,t-1} + FixedEffectDummies + \varepsilon_{i,t}
\end{aligned} \tag{8}$$

We define an indicator variable POSTIFRS, which is equal to one for IFRS-adopting firm-year observations, i.e. firm-year in IFRS-adopting countries with fiscal year ended on or after 12/31/2005. We focus our interpretation on the coefficient of interaction effect, POSTIFRS*WAL.

In Table 3.8, panel A reports the results of the regression model (8). The results with all three different asset liquidity measures are presented. However, some of the coefficients of the interaction term are insignificant. The coefficient in M2 is marginally significant but the sign is inconsistent. Only the coefficients in M4, M7, and M8 are positive and significant. We do not obtain the expected results from panel A to support the hypothesis on asset-stock liquidity relation change with respect to IFRS adoption (H3).

Previous research shows that there are differential capital market effects for IFRS adoption across countries. Therefore, we split our sample by legal origin, anti-self-dealing index, and accounting rating standards and perform the same analysis again. The

fourth hypothesis states that the impact of mandatory IFRS adoption shall be greater in common law countries, in countries with high shareholder protection, or in countries with high accounting rating standards because these countries are serious adopters, as compared to “label adopters” in civil law countries or countries with low shareholder protection (Daske et al. (2009)).

In Table 3.8, panels B — D present the results of the subsample analysis on the impact of mandatory IFRS adoption. Panel A splits the sample by legal origin (LAW), panel B by anti-self-dealing index (ANTI) median, and panel C by accounting rating standards. While the results of all three WAL are presented, we focus on the analysis of WAL3 since it is the finest measure of asset liquidity. The results are qualitatively similar across different asset liquidity measures.

Comparing the coefficients of WAL3 in M5 and M6 of panel B, the coefficient of POSTIFRS*WAL is lower in common law countries than in civil law countries, and the difference is significant. This interaction term reflects the change in the asset-stock liquidity relationship after IFRS adoption. The relationship becomes weaker in common law countries after IFRS adoption. On the other hand, the relationship becomes stronger in civil law countries but is statistically insignificant. In M5 and M6 of panel C, the sample is split by ANTI. Similarly, the coefficient of interaction term POSTIFRS*WAL is negative and significant in high ANTI countries, whereas it is not significant in low ANTI countries. The difference of the coefficients is significant. In M5 and M6 of panel D, the sample is split by ACCSTD. Similar to LAW and ANTI, the coefficient of interaction term POSTIFRS*WAL is negative and significant in high ACCSTD countries,

whereas it is not significant in low ACCSTD countries. The difference of the coefficients is significant.

The results on countries with good shareholder protection (common law or high ANTI) are consistent with our expectation that the asset-stock liquidity relationship is reduced after IFRS adoption because the financial information environment is improved. However, we do not observe the reduction of asset-stock liquidity relationship in countries with weak shareholder protection. This is not surprising because previous research has documented that the IFRS brings little or no capital market benefit in countries with low shareholder protection. The different effects of IFRS adoption across two subsamples account for the inconclusive results of full sample regression in panel A.

This section provides some evidence that stock liquidity is affected by asset liquidity due to information asymmetry. When there is an exogenous shock, in our case, the mandatory IFRS adoption improves the information environment; the stock liquidity is less sensitive to asset liquidity after IFRS adoption. But the reduction of sensitivity only occurs in common law countries, in countries with strong shareholder protection, or in countries with high accounting rating standards. The reason is that the civil law countries or countries with low shareholder protection are merely adopting the IFRS in name rather than in substance (Daske et al. (2009)).

3.6 Robustness

In this section, we perform an extensive analysis to evaluate the robustness of our finding that stock liquidity is affected by asset liquidity. First, we use an alternate measure of

price-based stock liquidity. Second, we employ Amihud (2002) as measure of volume-based stock liquidity. Third, we address concerns about the dominance of U.S. samples in our study. Fourth, we attend to the concern that the results are driven by countries with large numbers of firm-year observations. Finally, we remove newly listed firms during our sample period. In panel B, we conduct robustness checks on the analysis of the impact of IFRS by removing the newly listed firms from our sample. To conserve space, we only include the results of using WAL3 as an asset liquidity measure. The results of using WAL1 and WAL2 as asset liquidity measures are qualitatively similar to WAL3.

In most part of our study, we use LIQ, which is the proportion of non-zero return trading days out of total trading days in a year, as the stock liquidity measure. The original measure proposed by Lesmond, Ogden, and Trzcinka (1999) is the trading cost spread estimated using ZeroProportion data with maximum likelihood method. We call this annual measure LOT. LOT is the original illiquidity measure proposed by Lesmond, Ogden, and Trzcinka (1999) but LIQ has gained popularity because of its simplicity, ease of estimation, and high correlation with LOT. As LOT is an illiquidity measure, we expect the sign of the regression coefficient of WAL to be reverse from our main results. In Table 3.9, M1 and M2 in panel A report the results of our main analysis using LOT as the dependent variable. The coefficients of WAL are negative and significant. In other words, these results are consistent with our finding that stock liquidity is positively associated with asset liquidity.

In Table 3.9, M3 and M4 in panel A report the results of our main analysis using Amihud (2002) illiquidity measure. Amihud (2002) is the yearly median of the daily absolute stock return divided by US\$ trading volume. The coefficients of WAL are

negative and significant; these results are consistent with our price-based liquidity measure. Lesmond (2005) finds that price-based liquidity measures perform better than volume-based liquidity measure at representing cross-country liquidity effects. Furthermore, Bekaert, Harvey, and Lundblad (2007) point out that the quality and availability of volume data is poor for emerging market.

Our main sample includes firms from U.S. markets and they represent about 25% of the firm-year observations. Given that Gopalan, Kadan, and Pevzner (2010) document the positive asset-stock liquidity relationship for U.S. samples, the dominance of U.S. firms may raise concerns that the results are driven by the U.S. sample. M5 and M6 replicate the baseline model of Table 3.5, and the results are not affected by either the inclusion or exclusion of the U.S. sample. The magnitudes of the coefficients of WAL without the U.S. sample are comparable to our main results in Table 3.5. The t-statistics are reduced due to the reduction in sample size. Nevertheless, the coefficients are still significant at 1% level.

Next, we use the random sampling technique to address the concern that the results are overweighed by countries with large numbers of observations. We randomly select 100 samples from each and every country for every year. If the sample has less than 100 firms for each country-year, all samples from that country-year are retained. The regression results are presented in M7 and M8. The results remain unchanged and the magnitudes of the coefficients of WAL become larger than our main results in Table 3.5.

It is possible that newly listed firms have a different information environment from seasoned firms, and the results can be influenced by the newly listed firms. In M9 and M10, we exclude all newly listed firms for the period of 1996-2007 and repeat the

analysis. The firm-year sample size is reduced from 92,674 to 63,871 as there are many new firms during the twelve-year period. Nevertheless, the results remain consistent with our previous finding after removing the newly listed firms. The coefficients of WAL in M9 and M10 are significant at 1% level.

In panel B of Table 3.9, we remove newly listed firms during the sample period and analyze the impact of IFRS adoption. We omit the results of the full regression model because they are inconclusive as in our main analysis in panel A of Table 3.8. We present the results from the subsample analysis after removing newly listed firms. The samples are partitioned according to legal origin, anti-self-dealing index, and accounting rating standards. The coefficient of POSTIFRS*WAL in civil law countries is insignificant. On the other hand, the coefficient in common law countries is negative and significant, meaning the mandatory IFRS adoption reduces the asset-stock liquidity relationship only in common law countries. The difference in these two coefficients is significant. The results of the subsample analysis using the anti-self-dealing index or accounting rating standards are also consistent with our main analysis. The coefficient of POSTIFRS*WAL is insignificant (M3 and M5) in countries with low shareholder protection (ANTI) or low accounting rating standards (ACCSTD), but the coefficients are negative and significant (M4 and M6) in countries with high shareholder protection (ANTI) or high accounting rating standards (ACCSTD). The coefficients are significantly different across two subsamples, as in our main analysis. Overall, our results are robust for many of the alternative sample specifications.

Another concern regarding the valuation uncertainty hypothesis is that it can be interpreted in the line of financial distress effects. The cash poor firms suffer from not

only trading illiquidity but also high costs of external finance which is a typical financial distress situation that give rise to a positive relationship between WAL1 (cash holdings) and stock. To address the concern that distress firms give rise to a positive relationship between cash holding and stock liquidity, we remove distress firms and replicate the analysis. The stock liquidity remains positive and significant to asset liquidity. We use two proxies of distress risk to filter out distress firms. First is a measure of likelihood of bankruptcy proposed by Ohlson (1980) (O-score); second is negative earnings reported by the firms. We remove either firms in the top quintile of O-score for each country in every year, or firms that report negative earnings during the year. The results are not affected by the distress firms.

3.7 Conclusions

This research studies the relationship between asset liquidity and stock liquidity. The stock liquidity is affected by adverse selection costs due to information asymmetry among market participants. On one hand, the liquid real assets are easier to be valued, therefore reducing information asymmetry. On the other hand, liquid assets can be easily reinvested into illiquid assets or expropriated by controlling managers, creating more uncertainty in the future state of liquid assets. The stock liquidity drops whenever the future benefit uncertainty increases (Kyle (1985)). This research study establishes the relationship between asset and stock liquidity in international capital markets. We find that asset liquidity and stock liquidity are positively associated. Furthermore, there exists cross-country variation in the relationship. The relationship is stronger in civil law countries, in countries with weak shareholder protection, or in countries with weak

accounting rating standards. The reason is that the investors in these countries rely more heavily on a firm's assets structure for firm valuation.

We also use the mandatory IFRS adoption in 2005 to study the structural change on the asset-stock liquidity. We predict the asset-stock liquidity relationship is reduced after IFRS adoption because of the higher quality disclosure brought by IFRS. We do find a reduction in the relationship, but only in countries with strong shareholder protection or high accounting rating standards. This is not surprising because a lot of literature on the IFRS, such as Daske et al. (2008), also documents the differential capital markets benefits. Most of the studies find the capital market benefits improve more in countries with strong shareholder protection.

This paper contributes to the study of the link between corporate finance and market microstructure. Specifically, we provide evidence on the consequences of corporate assets holding in capital markets. Furthermore, we also document the cross-country variation, which can be explained by institutional factors. We add to the growing literature on cash holding of firms in international capital markets such as Dittmar, Mahrt-Smith, and Servaes (2003), Pinkowitz, Stulz, and Williamson (2006), and Kalcheva and Lins (2007).

References

- Aboody, David, and Baruch Lev, 2000, Information Asymmetry, R&D, and Insider Gains, *Journal of Finance* 55, 2747-2766.
- Amihud, Yakov, 2002, Illiquidity and Stock Returns: Cross-Section and Time-Series Effects, *Journal of Financial Markets* 5, 31-56.
- Ball, Ray, S. P. Kothari, and Ashok Robin, 2000, The Effect of International Institutional Factors on Properties of Accounting Earnings, *Journal of Accounting and Economics* 29, 1-51.
- Ball, Ray, Ashok Robin, and Joanna Shuang Wu, 2003, Incentives versus Standards: Properties of Accounting Income in Four East Asian Countries, *Journal of Accounting and Economics* 36, 235-270.
- Bekaert, Geert, Campbell R. Harvey, and Christian Lundblad, 2007, Liquidity and Expected Returns: Lessons from Emerging Markets, *Review Financial Studies* 20, 1783-1831.
- Berger, Allen N., and Christa H. S. Bouwman, 2009, Bank Liquidity Creation, *Review Financial Studies* 22, 3779-3837.
- Copeland, Thomas E., and Dan Galai, 1983, Information Effects on the Bid-Ask Spread, *Journal of Finance* 38, 1457-1469.
- Daske, Holger, Luzi Hail, Christian Leuz, and Rodrigo Verdi, 2008, Mandatory IFRS Reporting around the World: Early Evidence on the Economic Consequences, *Journal of Accounting Research* 46, 1085-1142.
- Daske, Holger, Luzi Hail, Christian Leuz, and Rodrigo S. Verdi, 2009, Adopting a Label: Heterogeneity in the Economic Consequences of IFRS Adoptions, *SSRN eLibrary*.
- Demsetz, Harold, 1968, The Cost of Transacting, *Quarterly Journal of Economics* 82, 33-53.
- Dittmar, Amy, Jan Mahrt-Smith, and Henri Servaes, 2003, International Corporate Governance and Corporate Cash Holdings, *The Journal of Financial and Quantitative Analysis* 38, 111-133.

- Djankov, Simeon, Rafael La Porta, Florencio Lopez-de-Silanes, and Andrei Shleifer, 2008, The Law and Economics of Self-Dealing, *Journal of Financial Economics* 88, 430-465.
- Glosten, Lawrence R., and Paul R. Milgrom, 1985, Bid, Ask and Transaction Prices in a Specialist Market with Heterogeneously Informed Traders, *Journal of Financial Economics* 14, 71-100.
- Gopalan, Radhakrishnan, Ohad Kadan, and Mikhail Pevzner, 2010, Asset Liquidity, and Stock Liquidity, *SSRN eLibrary*.
- Goyenko, Ruslan Y., Craig W. Holden, and Charles A. Trzcinka, 2009, Do Liquidity Measures Measure Liquidity?, *Journal of Financial Economics* 92, 153-181.
- Griffin, John M., Patrick J. Kelly, and Federico Nardari, 2009, Are Emerging Markets More Profitable? Implications for Comparing Weak and Semi-Strong Form Efficiency, *SSRN eLibrary*.
- Ho, Thomas, and Hans R. Stoll, 1981, Optimal Dealer Pricing under Transactions and Return Uncertainty, *Journal of Financial Economics* 9, 47-73.
- Huang, Roger D., and Hans R. Stoll, 1997, The Components of the Bid-Ask Spread: A General Approach, *Review Financial Studies* 10, 995-1034.
- Hung, Mingyi, 2000, Accounting Standards and Value Relevance of Financial Statements: An International Analysis, *Journal of Accounting and Economics* 30, 401-420.
- Ince, Ozgur S., and R. Burt Porter, 2006, Individual Equity Return Data from Thomson Datastream: Handle with Care!, *Journal of Financial Research* 29, 463-479.
- Kalcheva, Ivalina, and Karl V. Lins, 2007, International Evidence on Cash Holdings and Expected Managerial Agency Problems, *Review Financial Studies* 20, 1087-1112.
- Kothari, S. P., Ted Laguerre, and Andrew Leone, 2002, Capitalization versus Expensing: Evidence on the Uncertainty of Future Earnings from Capital Expenditures versus R&D Outlays, *Review of Accounting Studies* 7, 355-382.
- Kyle, Albert S., 1985, Continuous Auctions and Insider Trading, *Econometrica* 53, 1315-1335.
- La Porta, Rafael, Florencio Lopez-de-Silanes, Andrei Shleifer, and Robert W. Vishny, 1998, Law and Finance, *The Journal of Political Economy* 106, 1113-1155.

- Landsman, Wayne R., Edward L. Maydew, and Jake Thornock, 2009, The Information Content of Annual Earnings Announcements and Mandatory Adoption of IFRS, *SSRN eLibrary*.
- Lee, Kuan-Hui, 2010, The World Price of Liquidity Risk, *Journal of Financial Economics*, *Forthcoming*.
- Lesmond, David A., 2005, Liquidity of Emerging Markets, *Journal of Financial Economics* 77, 411-452.
- Lesmond, David A., Joseph P. Ogden, and Charles A. Trzcinka, 1999, A New Estimate of Transaction Costs, *Review of Financial Studies* 12, 1113-1141.
- Leuz, Christian, Dhananjay Nanda, and Peter D. Wysocki, 2003, Earnings Management and Investor Protection: An International Comparison, *Journal of Financial Economics* 69, 505-527.
- Leuz, Christian, and Peter D. Wysocki, 2008, Economic Consequences of Financial Reporting and Disclosure Regulation: A Review and Suggestions for Future Research, *SSRN eLibrary*.
- Matsumoto, Dawn A., 2002, Management's Incentives to Avoid Negative Earnings Surprises, *The Accounting Review* 77, 483.
- Myers, Stewart C., and Raghuram G. Rajan, 1998, The Paradox of Liquidity, *Quarterly Journal of Economics* 113, 733-771.
- Ohlson, James A., 1980, Financial Ratios and the Probabilistic Prediction of Bankruptcy, *Journal of Accounting Research* 18, 109-131.
- Pinkowitz, Lee, Rene Stulz, and Rohan Williamson, 2006, Does the Contribution of Corporate Cash Holdings and Dividends to Firm Value Depend on Governance? A Cross-country Analysis, *Journal of Finance* 61, 2725-2751.
- Preiato, John P., Philip R. Brown, and Ann Tarca, 2009, IFRS Adoption, Analysts and Institutional Setting, *SSRN eLibrary*.
- Sloan, Richard G., 1996, Do Stock Prices Fully Reflect Information in Accruals and Cash Flows about Future Earnings?, *The Accounting Review* 71, 289-315.
- Stoll, Hans R., 2000, Presidential Address: Friction, *Journal of Finance* 55, 1479-1514.

Table 3.1 Description of Variables

This table describes all variables used in the analysis and their data sources.

Variable	Description	Source
LIQ	Annual percentage of non-zero return days out of total trading days	Datastream/Worldscope
LOT	Trading cost estimated using Lesmond, Odgen, and Trzcinka (1999) model with maximum likelihood method, this is an annual measure	Datastream/Worldscope
AMI	Square root of median annual Amihud (2002) illiquidity measure. Amihud's measure is the yearly median of the daily absolute stock return divided by US\$ trading volume	Datastream/Worldscope
FERR	Absolute value of the difference between announced earning and mean of forecast earning scaled by mean of analyst forecasts	IBES
WAL1	Ratio of cash and cash equivalents to lagged value of assets	Datastream/Worldscope
WAL2	Ratio of sum of cash and one half times the value of non-cash current assets, to lagged value of assets	Datastream/Worldscope
WAL3	Ratio of sum of cash, 0.75 times the value of non-cash current assets and one half times the value of other tangible fixed assets, to lagged value of assets	Datastream/Worldscope
POSTIFRS	Indicator variable equal to 1 for IFRS adopting firm-years (firm-years in IFRS adopting countries and with fiscal year ended on or after 12/31/2005)	Datastream/Worldscope and Daske et al. (2008)
MV	Log of the market capitalization of firm in million US dollars	Datastream/Worldscope
BM	Book-to-market equity ratio	Datastream/Worldscope
PRICE	Log of stock price in US dollars	Datastream/Worldscope
LEVERAGE	Ratio of total debt over total asset	Datastream/Worldscope
ACCRUAL	Measure of a firm's accruals proposed in Sloan (1996)	Datastream/Worldscope
RETVOL	Log of standard deviation of monthly stock returns over preceding twelve months	Datastream/Worldscope
CAPEX	Ratio of firm's capital expenditures to lagged total assets	Datastream/Worldscope
ROA	Ratio of earnings before depreciation, interest, and taxes over lagged value of total assets	Datastream/Worldscope
BHAR	Buy-and-hold annual abnormal stock returns, it is the difference between the annual return of the firm's stock to the return on the country's stock market	Datastream/Worldscope
FOLLOWING	Number of analyst who announces annual earnings forecast within one year prior the financial year end	IBES
LAW	Indicator variable equal to 1 if the legal origin of a country is Common Law, zero otherwise	Djankov et al. (2008)
ANTI	Anti-self-dealing index compiled by Djankov et al. (2008)	Djankov et al. (2008)
ACCSTD	Accounting rating standards compiled by La Porta et al. (1998)	LLSV (1998)
RFREQ	Number of financial reporting required by regulatory or security exchange. The frequency includes both interm and annual financial reporting.	Manual Collection

Table 3.2 Summary Statistics of Asset and Stock Liquidity Measures

This table presents the time series means, median, and standard deviations of key variables of interest, together with the starting year of the sample period (Year), number of unique firms (NFirms), and number of firm-year observations (NObs) for every country. LIQ is annual percentage of non-zero return days out of total trading days. WAL1, WAL2, and WAL3 are measures of asset liquidity. WAL1 is the ratio of cash and cash equivalents to lagged value of assets; WAL2 is the ratio of sum of cash and one half times the value of non-cash current assets, to lagged value of assets; WAL3 is the ratio of sum of cash, 0.75 times the value of non-cash current assets and one half times the value of other tangible fixed assets, to lagged value of assets. LOT is alternate measure of annual stock liquidity, it is trading cost estimated using Lesmond, Odgen, and Trzcinka (1999) model with maximum likelihood method. FERR is analyst forecast error measured as absolute value of the difference between announced earning and mean of forecast earning scaled by mean of analyst forecasts. There are 47 countries in the sample. All continuous variables are winsorized at the 1st and 99th percentiles. Sample period is 1996-2007.

Country	Year	NFirms	NObs	LIQ			WAL1			WAL2			WAL3			LOT	FERR
				Mean	Median	Std	Mean	Median	Std	Mean	Median	Std	Mean	Median	Std	Mean	Mean
Argentina	1996	63	451	54.492	61.408	32.364	0.081	0.051	0.106	0.234	0.198	0.165	0.673	0.613	0.225	0.088	1.100
Australia	1996	633	2,874	81.921	88.506	22.756	0.178	0.073	0.276	0.345	0.283	0.287	0.682	0.621	0.346	0.039	0.343
Austria	1996	66	542	66.107	77.171	31.470	0.122	0.073	0.169	0.323	0.299	0.216	0.675	0.650	0.222	0.065	0.567
Belgium	1996	112	933	74.583	83.267	24.542	0.141	0.075	0.176	0.358	0.332	0.201	0.664	0.645	0.233	0.045	0.623
Brazil	1996	72	394	45.701	27.993	40.902	0.167	0.116	0.175	0.352	0.316	0.229	0.734	0.695	0.239	0.126	0.957
Canada	1996	806	4,631	81.603	86.454	17.560	0.250	0.102	0.359	0.395	0.282	0.378	0.766	0.653	0.426	0.057	0.465
Chile	1996	113	769	38.506	26.908	33.912	0.093	0.038	0.169	0.212	0.174	0.159	0.645	0.619	0.184	0.079	0.551
China	1996	1,311	7,260	93.873	95.816	7.511	0.198	0.158	0.164	0.376	0.348	0.201	0.746	0.714	0.225	0.024	0.326
Czech Republic	1996	15	136	47.627	36.454	40.222	0.075	0.042	0.092	0.200	0.164	0.144	0.593	0.577	0.144	0.100	0.319
Denmark	1996	104	1,026	56.334	63.473	30.230	0.165	0.080	0.244	0.378	0.342	0.239	0.705	0.677	0.258	0.077	0.559
Finland	1996	116	1,021	73.765	81.028	22.677	0.157	0.086	0.202	0.374	0.333	0.216	0.677	0.645	0.224	0.056	0.445
France	1996	682	5,347	73.745	84.556	26.474	0.177	0.109	0.213	0.431	0.396	0.229	0.693	0.662	0.261	0.066	0.705
Germany	1996	773	5,483	75.298	84.980	24.833	0.179	0.091	0.237	0.398	0.354	0.242	0.674	0.642	0.272	0.060	1.008
Greece	1996	242	2,050	87.433	89.069	11.130	0.114	0.055	0.174	0.385	0.350	0.224	0.761	0.712	0.268	0.035	0.727
Hong Kong	1996	189	848	81.871	87.149	16.749	0.231	0.184	0.225	0.358	0.323	0.280	0.745	0.691	0.274	0.037	0.302
Hungary	1996	22	185	77.190	88.400	24.981	0.106	0.079	0.102	0.313	0.297	0.208	0.685	0.661	0.234	0.060	0.464
India	1996	767	3,756	94.097	98.785	12.011	0.108	0.044	0.170	0.372	0.323	0.221	0.788	0.733	0.262	0.028	0.323
Indonesia	1996	111	374	45.975	45.325	31.741	0.179	0.130	0.170	0.412	0.384	0.203	0.832	0.777	0.240	0.128	0.860
Ireland	1996	37	277	87.973	100.000	22.618	0.230	0.143	0.218	0.434	0.410	0.219	0.728	0.714	0.286	0.040	0.242
Israel	1996	72	521	89.334	96.735	17.202	0.182	0.121	0.206	0.345	0.306	0.227	0.692	0.645	0.250	0.031	0.792
Italy	1996	212	1,527	90.126	94.444	13.146	0.142	0.091	0.170	0.362	0.336	0.198	0.660	0.640	0.243	0.024	0.793

Country	Year	NFirms	NObs	LIQ			WAL1			WAL2			WAL3			LOT	FERR
				Mean	Median	Std	Mean	Median	Std	Mean	Median	Std	Mean	Median	Std	Mean	Mean
Japan	1996	2,189	21,426	84.256	90.204	16.369	0.168	0.128	0.147	0.364	0.351	0.159	0.691	0.675	0.136	0.040	0.698
Luxembourg	1996	21	186	48.279	51.533	33.939	0.185	0.108	0.247	0.270	0.211	0.264	0.615	0.585	0.285	0.081	0.791
Malaysia	1996	398	1,884	72.540	74.597	15.816	0.180	0.122	0.181	0.350	0.330	0.199	0.728	0.704	0.220	0.043	0.440
Mexico	1996	93	644	78.055	95.785	33.331	0.109	0.081	0.101	0.274	0.235	0.162	0.674	0.658	0.202	0.044	0.508
Netherlands	1996	114	1,154	81.477	88.583	20.290	0.127	0.055	0.179	0.389	0.338	0.228	0.699	0.675	0.267	0.040	0.480
New Zealand	1996	85	495	64.246	69.323	21.094	0.074	0.023	0.147	0.252	0.235	0.207	0.647	0.615	0.233	0.047	0.290
Norway	1996	144	908	66.180	78.400	29.025	0.250	0.147	0.284	0.416	0.342	0.321	0.757	0.671	0.341	0.083	0.827
Pakistan	1996	84	451	60.925	73.092	34.520	0.196	0.118	0.232	0.419	0.388	0.206	0.796	0.751	0.194	0.090	0.430
Peru	1996	50	244	68.784	90.805	38.894	0.131	0.046	0.210	0.294	0.236	0.236	0.697	0.636	0.282	0.067	0.561
Philippines	1996	34	152	42.744	45.432	32.593	0.169	0.116	0.169	0.307	0.282	0.174	0.712	0.686	0.174	0.114	0.268
Poland	1996	186	780	84.888	87.649	11.379	0.137	0.077	0.208	0.400	0.350	0.257	0.786	0.713	0.329	0.041	0.541
Portugal	1996	49	428	66.275	77.778	30.328	0.068	0.035	0.099	0.253	0.223	0.147	0.601	0.584	0.192	0.054	0.769
Russian	1996	60	235	72.222	95.769	35.357	0.106	0.072	0.118	0.257	0.220	0.155	0.744	0.701	0.199	0.071	0.876
Singapore	1996	201	889	76.764	80.695	20.543	0.202	0.145	0.191	0.372	0.330	0.245	0.738	0.687	0.265	0.038	0.448
South Africa	1996	160	1,045	72.468	80.242	23.696	0.175	0.130	0.180	0.399	0.381	0.214	0.773	0.740	0.251	0.051	0.307
South Korea	1996	639	5,475	91.339	92.713	6.298	0.149	0.090	0.183	0.320	0.294	0.173	0.696	0.666	0.209	0.040	1.296
Spain	1996	92	875	84.934	92.339	19.075	0.103	0.061	0.130	0.323	0.302	0.179	0.692	0.657	0.213	0.028	0.476
Sri Lanka	1996	16	87	55.417	55.462	23.777	0.134	0.099	0.157	0.307	0.295	0.172	0.748	0.716	0.186	0.076	0.604
Sweden	1996	262	1,923	79.281	84.190	16.171	0.204	0.112	0.263	0.434	0.376	0.280	0.698	0.652	0.304	0.053	0.790
Switzerland	1996	176	1,615	72.773	82.000	24.890	0.193	0.129	0.222	0.371	0.345	0.207	0.674	0.652	0.219	0.052	0.511
Taiwan	1996	553	2,769	89.484	90.688	6.174	0.222	0.172	0.190	0.428	0.398	0.229	0.811	0.767	0.223	0.027	0.523
Thailand	1996	268	1,270	63.761	69.423	29.342	0.129	0.081	0.141	0.297	0.282	0.155	0.693	0.676	0.175	0.082	0.685
Turkey	1996	202	1,544	82.763	83.504	6.020	0.170	0.084	0.227	0.470	0.424	0.267	0.919	0.852	0.325	0.044	0.851
UK	1996	1,307	7,665	57.839	55.512	29.496	0.193	0.100	0.262	0.397	0.343	0.287	0.686	0.643	0.318	0.071	0.419
US	1996	3,666	31,768	91.048	95.635	11.637	0.235	0.104	0.316	0.421	0.348	0.330	0.686	0.625	0.333	0.040	0.267
Venezuela	1996	7	23	74.194	86.250	29.040	0.080	0.065	0.050	0.189	0.178	0.077	0.638	0.632	0.095	0.059	0.406
All Countries		17,574	126,340	82.302	90.726	21.664	0.188	0.108	0.242	0.385	0.340	0.259	0.708	0.669	0.272	0.046	0.506

Table 3.3 Summary Statistics for Firm-Level Characteristics and Country-Level Institutional Factors

This table presents the time series means of country-level institutional infrastructure variables and firm-level characteristics for a sample of 47 countries. NFirms is number of unique firms. NObs is number of firm-year observations. The legal origin (LAW), Anti-self-dealing index (ANTI), and accounting rating standards (ACCSTD) for sample countries are listed. MV is log of the market capitalization of firm in million US dollars. BM is book-to-market equity ratio. PRICE is log of stock price in US dollars. LEVERAGE is the ratio of total debt over total asset. ACCRUAL is measure of a firm's accruals proposed in Sloan (1996). RETVOL is log of standard deviation of monthly stock returns over preceding twelve months. FOLLOWING is number of analyst who announces annual earnings forecast within one year prior the financial year end. All firm-level continuous firm-level characteristics are winsorized at the 1st and 99th percentiles. Sample period is 1996-2007.

Country	NFirms	NObs	LAW	ANTI	ACCSTD	MV	BM	PRICE	LEVERAGE	ACCRUAL	RETVOL	CAPEX	ROA	BHAR	FOLLOWING
Argentina	63	451	Civil	0.342	45	4.819	1.407	0.516	0.260	-0.044	-2.203	0.053	5.804	0.100	10.758
Australia	633	2,874	Common	0.757	75	5.322	0.599	0.644	0.203	-0.037	-2.467	0.070	6.057	0.237	11.177
Austria	66	542	Civil	0.213	54	4.758	1.222	3.445	0.242	-0.055	-2.585	0.061	3.250	-0.005	9.307
Belgium	112	933	Civil	0.544	61	5.342	0.827	3.914	0.233	-0.051	-2.662	0.066	5.507	0.018	10.541
Brazil	72	394	Civil	0.274	54	4.961	1.777	2.123	0.271	-0.022	-2.133	0.053	8.367	0.156	14.301
Canada	806	4,631	Common	0.642	74	5.005	0.689	1.564	0.181	-0.044	-2.120	0.091	-1.939	0.255	15.889
Chile	113	769	Civil	0.625	52	5.277	0.943	1.433	0.199	-0.034	-2.781	0.057	8.645	0.087	6.716
China	1,311	7,260	Civil	0.763		5.570	0.474	0.077	0.259	-0.017	-2.319	0.069	4.385	-0.014	3.442
Czech Republic	15	136	Civil	0.333		4.905	2.053	3.125	0.144	-0.059	-2.339	0.077	5.836	-0.089	13.406
Denmark	104	1,026	Civil	0.463	62	4.432	0.915	3.473	0.262	-0.038	-2.479	0.064	4.099	0.044	10.272
Finland	116	1,021	Civil	0.457	77	4.938	0.825	2.189	0.231	-0.048	-2.384	0.069	6.115	-0.021	14.211
France	682	5,347	Civil	0.379	69	4.714	0.744	3.343	0.213	-0.046	-2.273	0.055	3.294	0.046	16.498
Germany	773	5,483	Civil	0.282	62	4.507	0.856	2.792	0.194	-0.052	-2.194	0.056	0.476	0.028	13.342
Greece	242	2,050	Civil	0.217	55	4.269	0.798	1.522	0.245	-0.006	-1.974	0.056	4.964	0.244	6.938
Hong Kong	189	848	Common	0.963	69	7.003	0.848	0.303	0.174	-0.023	-2.335	0.056	10.372	0.323	27.755
Hungary	22	185	Civil	0.181		4.630	1.226	2.344	0.151	-0.052	-2.173	0.099	6.455	-0.060	14.246
India	767	3,756	Common	0.579	57	4.875	0.824	1.373	0.274	-0.014	-1.965	0.085	11.086	0.296	9.879
Indonesia	111	374	Civil	0.653		4.926	0.953	0.204	0.267	-0.018	-2.213	0.085	11.528	0.261	17.453
Ireland	37	277	Common	0.789		5.988	0.492	1.471	0.246	-0.019	-2.409	0.055	6.853	0.144	8.919
Israel	72	521	Common	0.725	64	5.622	0.718	2.108	0.312	-0.039	-2.303	0.048	3.408	0.056	4.392
Italy	212	1,527	Civil	0.421	62	5.679	0.747	1.510	0.241	-0.044	-2.474	0.047	2.390	0.003	13.365

Country	NFirms	NObs	LAW	ANTI	ACCSTD	MV	BM	PRICE	LEVERAGE	ACCRUAL	RETVOL	CAPEX	ROA	BHAR	FOLLOWING
Japan	2,189	21,426	Civil	0.499	65	5.638	1.067	1.971	0.247	-0.027	-2.359	0.040	2.259	0.056	5.697
Luxembourg	21	186	Civil	0.283		4.706	1.509	3.454	0.130	-0.065	-2.625	0.041	4.506	-0.003	7.778
Malaysia	398	1,884	Common	0.950	76	5.087	0.725	0.187	0.189	-0.012	-2.355	0.062	7.968	0.108	15.292
Mexico	93	644	Civil	0.172	60	6.322	1.144	0.662	0.216	-0.023	-2.386	0.060	8.976	0.065	17.459
Netherlands	114	1,154	Civil	0.203	64	5.711	0.611	2.933	0.226	-0.046	-2.472	0.061	5.712	0.042	21.200
New Zealand	85	495	Common	0.950	70	4.870	0.640	0.494	0.267	-0.032	-2.711	0.070	8.798	0.082	9.739
Norway	144	908	Civil	0.421	74	5.042	0.683	1.955	0.272	-0.042	-2.224	0.086	4.140	0.167	10.998
Pakistan	84	451	Common	0.408		4.170	0.797	0.537	0.224	-0.021	-2.201	0.076	13.661	0.174	4.034
Peru	50	244	Civil	0.450	38	4.283	1.903	0.851	0.201	-0.042	-2.286	0.061	12.252	0.378	7.842
Philippines	34	152	Civil	0.215	65	5.377	0.803	0.855	0.237	-0.035	-2.363	0.077	8.552	0.143	22.693
Poland	186	780	Civil	0.288		4.019	0.894	1.818	0.156	-0.015	-2.109	0.073	6.952	0.359	7.835
Portugal	49	428	Civil	0.444	36	4.651	1.183	1.690	0.333	-0.053	-2.548	0.052	3.197	-0.026	11.361
Russian Federation	60	235	Civil	0.440		7.086	5.054	2.039	0.175	-0.036	-1.941	0.094	11.868	0.190	9.006
Singapore	201	889	Common	1.000	78	5.905	0.959	0.341	0.202	-0.020	-2.411	0.065	6.975	0.131	18.774
South Africa	160	1,045	Common	0.813	70	5.759	0.735	1.089	0.139	-0.026	-2.317	0.070	11.695	0.143	8.999
South Korea	639	5,475	Civil	0.469	62	4.124	2.146	2.028	0.301	-0.032	-1.912	0.050	4.228	0.039	9.662
Spain	92	875	Civil	0.374	64	6.218	0.666	2.587	0.255	-0.034	-2.559	0.056	6.377	0.079	20.451
Sri Lanka	16	87	Common	0.392		3.577	1.263	0.554	0.246	-0.005	-2.260	0.076	9.104	0.153	5.417
Sweden	262	1,923	Civil	0.333	83	4.830	0.654	1.937	0.180	-0.038	-2.242	0.047	1.814	0.093	10.378
Switzerland	176	1,615	Civil	0.267	68	5.438	0.985	5.043	0.225	-0.043	-2.551	0.044	3.901	0.058	12.985
Taiwan	553	2,769	Civil	0.565	65	5.752	0.533	0.134	0.199	-0.009	-2.175	0.066	9.631	0.159	9.233
Thailand	268	1,270	Common	0.813	64	4.237	0.989	0.344	0.259	-0.035	-2.280	0.072	9.200	0.253	12.553
Turkey	202	1,544	Civil	0.429	51	4.381	0.816	1.969	0.219	0.000	-1.771	0.072	11.950	0.001	10.298
UK	1,307	7,665	Common	0.950	78	5.185	0.644	1.108	0.171	-0.039	-2.361	0.057	3.064	0.144	11.218
US	3,666	31,768	Common	0.654	71	5.821	0.618	2.575	0.220	-0.040	-2.102	0.058	0.629	0.148	10.188
Venezuela	7	23	Civil	0.092	40	6.113	2.530	0.593	0.118	-0.096	-1.951	0.073	7.005	0.176	9.316
All Countries	17,574	126,340		0.499	63.081	5.333	0.840	1.921	0.226	-0.033	-2.233	0.058	3.317	0.111	10.269

Table 3.4 Correlation Matrix

This table presents the Pearson correlation matrices for firm-level (Panel A) and country-level (Panel B) variables. LIQ is annual percentage of non-zero return days out of total trading days. LOT is alternate measure of annual stock liquidity, it is trading cost estimated using Lesmond, Odgen, and Trzcinka (1999) model with maximum likelihood method. AMI is square root of median annual Amihud (2002) illiquidity measure. Amihud's measure is the yearly median of the daily absolute stock return divided by US\$ trading volume. FERR is analyst forecast error measured as absolute value of the difference between announced earning and mean of forecast earning scaled by mean of analyst forecasts. WAL1, WAL2, and WAL3 are measures of asset liquidity. WAL1 is the ratio of cash and cash equivalents to lagged value of assets; WAL2 is the ratio of sum of cash and one half times the value of non-cash current assets, to lagged value of assets; WAL3 is the ratio of sum of cash, 0.75 times the value of non-cash current assets and one half times the value of other tangible fixed assets, to lagged value of assets. MV is log of the market capitalization of firm in million US dollars. BM is book-to-market equity ratio. PRICE is log of stock price in US dollars. LEVERAGE is the ratio of total debt over total asset. ACCRUAL is measure of a firm's accruals proposed in Sloan (1996). RETVOL is log of standard deviation of monthly stock returns over preceding twelve months. CAPEX is ratio of firm's capital expenditures to lagged total assets. ROA is ratio of earnings before depreciation, interest, and taxes over lagged value of total assets. BHAR is buy-and-hold annual abnormal stock returns, it is the difference between the annual return of the firm's stock to the return on the country's stock market. FOLLOWING is number of analyst who announces annual earnings forecast within one year prior the financial year end. LAW is an indicator variable equal to 1 if the legal origin of a country is Common Law, and zero otherwise. ANTI is Anti-self-dealing index compiled by Djankov et al. (2008). ACCSTD is accounting rating standards compiled by La Porta et al. (1998). The frequency includes both interm and annual financial reporting. All continuous firm-level characteristics in are winsorized at the 1st and 99th percentiles. Sample period is 1996-2007.

Panel A: Correlation between Stock Liquidity, Asset Liquidity, and Firm-level Characteristics

Variable	LIQ	LOT	AMI	FERR	WAL1	WAL2	WAL3	MV	BM	PRICE	LEVERAGE	ACCRUAL	RETVOL	CAPEX	ROA	BHAR	FOLLOWING
LIQ	1																
LOT	-0.746	1															
AMI	-0.593	1	1														
FERR	-0.105	0.213	0.199	1													
WAL1	0.049	0.034	-0.046	-0.031	1												
WAL2	0.035	0.040	-0.025	-0.036	0.866	1											
WAL3	0.021	0.002	-0.031	-0.047	0.672	0.841	1										
MV	0.482	-0.515	-0.529	-0.216	-0.043	-0.119	-0.084	1									
BM	-0.171	0.159	0.214	0.165	-0.154	-0.166	-0.119	-0.350	1								
PRICE	0.143	-0.199	-0.252	-0.165	0.006	0.020	-0.008	0.406	-0.179	1							
LEVERAGE	0.045	-0.010	0.002	0.099	-0.326	-0.338	-0.206	0.043	0.063	-0.063	1						
ACCRUAL	0.027	-0.054	-0.049	-0.041	-0.003	0.119	0.122	-0.004	-0.018	0.000	-0.005	1					
RETVOL	0.115	0.185	0.110	0.152	0.214	0.218	0.131	-0.246	0.006	-0.176	-0.030	0	1				
CAPEX	0.021	-0.020	-0.024	-0.033	-0.094	-0.150	0.076	0.063	-0.093	0.025	0.089	-0.118	-0.006	1.000			
ROA	0.033	-0.207	-0.113	-0.161	-0.214	-0.134	0.016	0.201	-0.026	0.176	-0.029	0.197	-0.252	0.081	1.000		
BHAR	0.079	-0.059	-0.065	-0.069	0.136	0.154	0.171	0.075	-0.148	0.089	-0.059	0.048	0.265	0.017	0.096	1	
FOLLOWING	0.267	-0.281	-0.256	-0.118	-0.059	-0.115	-0.081	0.652	-0.184	0.250	0.027	-0.071	-0.124	0.088	0.132	-0.031	1

Panel B: Correlation between Stock Liquidity, Asset Liquidity, and Country-level Characteristics

Variable	LIQ	LOT	AMI	FERR	WAL1	WAL2	WAL3	LAW	ANTI	ACCSTD
LAW	0.106	-0.091	-0.093	0.042	0.082	0.138	0.120	1		
ANTI	0.089	-0.062	0.042	-0.006	-0.013	0.039	0.095	0.735	1	
ACCSTD	-0.090	0.119	0.040	0.125	0.090	0.164	0.105	0.475	0.460	1

Table 3.5 Multivariate Analysis of Asset Liquidity on Stock Liquidity

This table reports results from cross-country firm-level OLS regressions of stock liquidity on asset liquidity and firm-level characteristics. The dependent variable is LIQ (stock liquidity) measured as annual percentage of non-zero return days out of total trading days. WAL1, WAL2, and WAL3 are measures of asset liquidity. WAL1 is the ratio of cash and cash equivalents to lagged value of assets; WAL2 is the ratio of sum of cash and one half times the value of non-cash current assets, to lagged value of assets; WAL3 is the ratio of sum of cash, 0.75 times the value of non-cash current assets and one half times the value of other tangible fixed assets, to lagged value of assets. MV is log of the market capitalization of firm in million US dollars. BM is book-to-market equity ratio. PRICE is log of stock price in US dollars. LEVERAGE is the ratio of total debt over total asset. ACCRUAL is measure of a firm's accruals proposed in Sloan (1996). RETVOL is log of standard deviation of monthly stock returns over preceding twelve months. CAPEX is ratio of firm's capital expenditures to lagged total assets. ROA is ratio of earnings before depreciation, interest, and taxes over lagged value of total assets. BHAR is buy-and-hold annual abnormal stock returns, it is the difference between the annual return of the firm's stock to the return on the country's stock market. NObs is the number of observations. Intercept, country, year, and industry effects are not tabulated. Robust t-statistics are in parentheses. Sample period is 1996-2007.

Variables	LIQ			LIQ			LIQ		
	M1	M2	M3	M4	M5	M6	M7	M8	M9
WAL1	1.948 (6.35)	2.124 (7.03)	1.992 (5.34)						
WAL2				1.897 (7.55)	2.297 (9.03)	3.264 (9.49)			
WAL3							0.834 (4.36)	1.590 (7.63)	2.365 (9.33)
MV		6.338 (41.06)	6.015 (61.69)		6.415 (40.96)	6.064 (61.81)		6.452 (37.07)	6.138 (60.64)
BM		1.132 (8.49)	0.254 (1.53)		1.193 (8.87)	0.332 (1.99)		1.216 (8.63)	0.282 (1.67)
PRICE		-1.112 (-6.96)	-1.431 (-10.25)		-1.152 (-7.18)	-1.438 (-10.31)		-1.195 (-7.00)	-1.499 (-10.48)
LEVERAGE		-1.000 (-1.67)	1.001 (1.64)		-0.714 (-1.19)	1.521 (2.49)		-0.638 (-0.99)	1.271 (2.05)
ACCRUAL		0.122 (0.26)	5.381 (8.48)		-0.042 (-0.09)	4.577 (7.27)		-0.302 (-0.61)	4.833 (7.34)
RETVOL		1.418 (13.14)	5.876 (30.79)		1.434 (13.26)	5.834 (30.72)		1.394 (12.29)	5.933 (30.13)
CAPEX		-5.865 (-5.55)	3.287 (2.49)		-5.948 (-5.63)	4.027 (3.06)		-6.894 (-6.02)	1.557 (1.10)
ROA		0.022 (4.26)	0.018 (3.02)		0.021 (4.03)	0.017 (2.89)		0.024 (4.15)	0.013 (2.01)
BHAR		0.443 (7.56)	-0.194 (-2.72)		0.427 (7.31)	-0.257 (-3.59)		0.393 (6.41)	-0.270 (-3.61)
Fixed Effects	Firm	Firm	Country, Year, and Industry	Firm	Firm	Country, Year, and Industry	Firm	Firm	Country, Year, and Industry
NObs	126,337	99,573	99,531	118,552	99,542	99,500	110,609	92,704	92,674
Adj R-Sq	0.77	0.82	0.53	0.77	0.82	0.53	0.78	0.82	0.53

Table 3.6 Multivariate Analysis of Asset Liquidity on Analysts' Information

This table reports results from cross-country firm-level OLS regressions of analysts' information on asset liquidity and firm-level characteristics. The analysts' information is proxied by analyst forecast error (FERR), measured as absolute value of the difference between announced earning and mean of forecast earning scaled by mean of analyst forecasts. Pane A reports results from regressions of analysts forecast errors on asset liquidity. Panel B reports results from regression of stock liquidity on asset liquidity with analyst forecast errors. WAL1, WAL2, and WAL3 are measures of asset liquidity. WAL1 is the ratio of cash and cash equivalents to lagged value of assets; WAL2 is the ratio of sum of cash and one half times the value of non-cash current assets, to lagged value of assets; WAL3 is the ratio of sum of cash, 0.75 times the value of non-cash current assets and one half times the value of other tangible fixed assets, to lagged value of assets. MV is log of the market capitalization of firm in million US dollars. BM is book-to-market equity ratio. LEVERAGE is the ratio of total debt over total asset. ACCRUAL is measure of a firm's accruals proposed in Sloan (1996). RETVOL is log of standard deviation of monthly stock returns over preceding twelve months. CAPEX is ratio of firm's capital expenditures to lagged total assets. ROA is ratio of earnings before depreciation, interest, and taxes over lagged value of total assets. BHAR is buy-and-hold annual abnormal stock returns, it is the difference between the annual return of the firm's stock to the return on the country's stock market. FOLLOWING is number of analyst who announces annual earnings forecast within one year prior the financial year end. NObs is the number of observations. Intercept, country, year, and industry effects are not tabulated. Robust t-statistics are in parentheses. Sample period is 1996-2007.

Panel A: Asset Liquidity and Analyst Forecast Errors									
Variables	FERR			FERR			FERR		
	M1	M2	M3	M4	M5	M6	M7	M8	M9
WAL1	-0.255 (-6.65)	-0.102 (-2.37)	-0.155 (-5.54)						
WAL2				-0.341 (-9.69)	-0.153 (-3.89)	-0.185 (-6.71)			
WAL3							-0.290 (-9.50)	-0.134 (-3.77)	-0.189 (-7.19)
MV		-0.062 (-5.36)	-0.076 (-13.12)		-0.067 (-5.68)	-0.079 (-13.52)		-0.067 (-5.15)	-0.076 (-12.57)
BM		0.206 (8.06)	0.106 (7.07)		0.200 (7.77)	0.102 (6.76)		0.199 (7.33)	0.102 (6.65)
LEVERAGE		0.729 (10.62)	0.775 (17.41)		0.699 (10.10)	0.757 (16.99)		0.731 (9.70)	0.807 (17.65)
ACCRUAL		-0.293 (-3.10)	-0.487 (-6.29)		-0.277 (-2.93)	-0.438 (-5.60)		-0.259 (-2.61)	-0.418 (-5.11)
RETVOL		0.101 (6.75)	0.190 (13.46)		0.100 (6.67)	0.190 (13.55)		0.099 (6.20)	0.183 (12.39)
CAPEX		0.027 (0.18)	-0.599 (-6.12)		0.032 (0.22)	-0.636 (-6.48)		0.082 (0.50)	-0.537 (-5.15)
ROA		-0.011 (-9.42)	-0.010 (-15.71)		-0.011 (-9.32)	-0.010 (-15.67)		-0.011 (-8.87)	-0.011 (-16.05)
BHAR		-0.027 (-2.59)	-0.072 (-7.55)		-0.025 (-2.33)	-0.070 (-7.22)		-0.020 (-1.69)	-0.063 (-6.02)
FOLLOWING		-0.002 (-2.04)	-0.003 (-4.22)		-0.002 (-2.13)	-0.003 (-4.20)		-0.002 (-1.91)	-0.003 (-4.33)
Fixed Effects	Firm	Firm	Country, Year, and Industry	Firm	Firm	Country, Year, and Industry	Firm	Firm	Country, Year, and Industry
NObs	76,528	61,451	61,427	72,827	61,441	61,417	67,442	56,852	56,828
Adj R-Sq	0.23	0.27	0.13	0.23	0.27	0.13	0.23	0.27	0.13

Panel B: Asset Liquidity and Stock Liquidity with Analyst Forecast Errors									
Variables	LIQ			LIQ			LIQ		
	M1	M2	M3	M4	M5	M6	M7	M8	M9
WAL1	1.128 (3.82)	1.707 (5.69)	1.244 (4.03)						
WAL2				0.443 (1.77)	1.741 (6.87)	2.096 (7.11)			
WAL3							-0.584 (-2.78)	1.003 (4.68)	1.850 (7.44)
FERR	-0.383 (-10.13)	-0.141 (-3.81)	-0.179 (-3.38)	-0.388 (-10.11)	-0.138 (-3.73)	-0.172 (-3.25)	-0.377 (-9.52)	-0.125 (-3.26)	-0.157 (-2.87)
MV		5.925 (36.98)	4.417 (50.14)		5.993 (36.96)	4.454 (50.20)		6.010 (32.91)	4.563 (49.59)
BM		1.539 (8.36)	0.010 (0.05)		1.596 (8.61)	0.076 (0.38)		1.625 (8.24)	0.087 (0.43)
PRICE		-0.948 (-5.45)	-0.289 (-2.62)		-0.982 (-5.62)	-0.296 (-2.68)		-0.981 (-5.23)	-0.346 (-3.08)
LEVERAGE		-0.186 (-0.28)	1.209 (2.27)		0.038 (0.06)	1.582 (2.96)		-0.213 (-0.29)	1.564 (2.87)
ACCRUAL		-0.743 (-1.35)	3.287 (4.92)		-0.904 (-1.65)	2.712 (4.09)		-1.133 (-1.94)	2.826 (4.01)
RETVOL		1.511 (12.59)	5.310 (28.52)		1.523 (12.68)	5.274 (28.45)		1.416 (11.03)	5.469 (28.06)
CAPEX		-9.113 (-7.10)	1.151 (0.92)		-9.175 (-7.14)	1.704 (1.36)		-9.669 (-6.73)	-0.361 (-0.26)
ROA		-0.013 (-2.39)	0.006 (1.01)		-0.014 (-2.54)	0.005 (0.96)		-0.011 (-1.80)	0.004 (0.72)
BHAR		0.542 (8.17)	0.071 (1.03)		0.530 (8.02)	0.021 (0.31)		0.512 (7.28)	-0.026 (-0.35)
Fixed Effects	Firm	Firm	Country, Year, and Industry	Firm	Firm	Country, Year, and Industry	Firm	Firm	Country, Year, and Industry
NObs	76,525	63,890	63,865	72,824	63,880	63,855	67,439	59,100	59,075
Adj R-Sq	0.74	0.8	0.52	0.75	0.8	0.52	0.75	0.8	0.52

Table 3.7 Asset Liquidity on Stock Liquidity -- Subsamples Analysis

This table reports results from subsample OLS regressions of stock liquidity on asset liquidity and control variables based on country's institutional factors. In Panel A, the samples are split into firms in common and civil law countries. In Panel B, samples are split into firms in above and below median levels of country's anti-self-dealing index. In Panel C, samples are split into firms in above and below median levels of country's accounting rating standards. In Panel D, samples are split into firms with high and low financial reporting frequency. Financial reporting frequency is considered high if the regulatory or security exchange require firms to report three or four times in a year, and low if the requirement is less than three times. The dependent variable is LIQ (stock liquidity) measured as annual percentage of non-zero return days out of total trading days. There are three measures of asset liquidity: WAL1 is the ratio of cash and cash equivalents to lagged value of assets; WAL2 is the ratio of sum of cash and one half times the value of non-cash current assets, to lagged value of assets; WAL3 is the ratio of sum of cash, 0.75 times the value of non-cash current assets and one half times the value of other tangible fixed assets, to lagged value of assets. MV is log of the market capitalization of firm in million US dollars. BM is book-to-market equity ratio. PRICE is log of stock price in US dollars. LEVERAGE is the ratio of total debt over total asset. ACCRUAL is measure of a firm's accruals proposed in Sloan (1996). RETVOL is log of standard deviation of monthly stock returns over preceding twelve months. CAPEX is ratio of firm's capital expenditures to lagged total assets. ROA is ratio of earnings before depreciation, interest, and taxes over lagged value of total assets. BHAR is buy-and-hold annual abnormal stock returns, it is the difference between the annual return of the firm's stock to the return on the country's stock market. Δ Coef represents the difference between the coefficients on WAL across the two subsamples. All continuous variables are winsorized at the 1st and 99th percentiles. NObs is the number of observations. Intercept, country, year, and industry effects are not tabulated. Robust t-statistics are in parentheses. Sample period is 1996-2007.

Panel A: Subsample by Legal Origin (Civil Law vs Common Law)						
Variables	(Civil)	(Common)	(Civil)	(Common)	(Civil)	(Common)
	M1	M2	M3	M4	M5	M6
WAL1	3.751 (4.22)	1.834 (4.81)				
WAL2			5.546 (7.49)	2.570 (7.15)		
WAL3					3.282 (7.03)	1.793 (6.16)
MV	6.222 (46.55)	5.543 (36.89)	6.295 (46.66)	5.590 (37.04)	6.294 (46.46)	5.721 (35.94)
BM	0.564 (2.71)	-0.331 (-1.21)	0.655 (3.10)	-0.244 (-0.89)	0.578 (2.75)	-0.404 (-1.43)
PRICE	-1.921 (-10.98)	-0.403 (-1.73)	-1.936 (-11.10)	-0.414 (-1.77)	-1.920 (-10.92)	-0.595 (-2.40)
LEVERAGE	-0.538 (-0.57)	2.327 (3.06)	0.032 (0.03)	2.681 (3.50)	-0.689 (-0.75)	2.778 (3.50)
ACCRUAL	8.845 (9.69)	2.028 (2.34)	7.559 (8.42)	1.431 (1.66)	8.085 (8.92)	1.046 (1.12)
RETVOL	6.444 (22.55)	5.649 (22.94)	6.399 (22.51)	5.625 (22.95)	6.447 (22.39)	5.720 (22.12)
CAPEX	1.266 (0.58)	5.170 (3.20)	2.690 (1.25)	5.694 (3.53)	-0.269 (-0.12)	3.584 (2.03)
ROA	0.000 (0.01)	0.008 (1.24)	-0.007 (-0.50)	0.007 (1.07)	-0.008 (-0.60)	0.006 (0.86)
BHAR	-0.754 (-5.98)	0.080 (0.91)	-0.815 (-6.47)	0.030 (0.34)	-0.813 (-6.44)	0.082 (0.86)
Fixed Effects	Country, Year, and Industry		Country, Year, and Industry		Country, Year, and Industry	
NObs	52,150	47,381	52,140	47,360	51,120	41,554
Adj R-Sq	0.48	0.59	0.48	0.59	0.48	0.60
Δ Coef (WAL)		-1.917 (-1.98)		-2.976 (-3.62)		-1.489 (-2.71)

Panel B: Subsample by Anti-self-dealing Index (Low vs High ANTI)						
Variables	(Low ANTI)	(High ANTI)	(Low ANTI)	(High ANTI)	(Low ANTI)	(High ANTI)
	M1	M2	M3	M4	M5	M6
WAL1	4.867 (3.34)	1.757 (5.11)				
WAL2			7.479 (6.25)	2.716 (8.29)		
WAL3					4.407 (6.32)	2.061 (7.90)
MV	7.562 (35.83)	5.382 (50.42)	7.689 (35.94)	5.422 (50.56)	7.614 (35.66)	5.496 (49.08)
BM	-0.004 (-0.01)	0.360 (2.19)	0.189 (0.40)	0.425 (2.58)	0.042 (0.09)	0.386 (2.32)
PRICE	-3.528 (-10.79)	-0.521 (-3.70)	-3.555 (-10.86)	-0.525 (-3.74)	-3.575 (-10.86)	-0.584 (-4.02)
LEVERAGE	-1.059 (-0.53)	2.375 (4.00)	0.018 (0.01)	2.774 (4.66)	-1.321 (-0.69)	2.797 (4.61)
ACCRUAL	7.980 (5.30)	3.873 (5.75)	6.453 (4.36)	3.197 (4.76)	6.983 (4.68)	3.217 (4.55)
RETVOL	7.362 (14.45)	5.303 (27.38)	7.309 (14.40)	5.269 (27.34)	7.401 (14.49)	5.327 (26.58)
CAPEX	1.754 (0.43)	4.314 (3.34)	3.784 (0.93)	4.891 (3.79)	-0.492 (-0.12)	2.907 (2.11)
ROA	0.022 (1.24)	0.009 (1.53)	0.014 (0.76)	0.008 (1.39)	0.012 (0.67)	0.005 (0.81)
BHAR	-0.308 (-1.20)	-0.165 (-2.41)	-0.427 (-1.67)	-0.216 (-3.12)	-0.402 (-1.59)	-0.230 (-3.13)
Fixed Effects	Country, Year, and Industry		Country, Year, and Industry		Country, Year, and Industry	
NObs	19,394	80,137	19,386	80,114	19,162	73,512
Adj R-Sq	0.47	0.56	0.47	0.56	0.47	0.56
Δ Coef	-3.109		-4.763		-2.346	
(WAL)	(-2.08)		(-3.85)		(-3.15)	

Panel C: Subsample by Accounting Rating Standards (Low vs High ACCSTD)						
Variables	(Low ACCSTD)	(High ACCSTD)	(Low ACCSTD)	(High ACCSTD)	(Low ACCSTD)	(High ACCSTD)
	M1	M2	M3	M4	M5	M6
WAL1	5.125 (4.55)	0.955 (2.42)				
WAL2			5.479 (5.94)	2.438 (6.77)		
WAL3					2.939 (5.24)	1.887 (6.77)
MV	6.468 (30.66)	5.757 (54.45)	6.555 (30.89)	5.797 (54.44)	6.423 (30.23)	5.943 (53.43)
BM	1.087 (4.41)	-0.703 (-3.21)	1.161 (4.65)	-0.614 (-2.80)	1.034 (4.22)	-0.682 (-3.01)
PRICE	-2.701 (-9.04)	-0.924 (-6.38)	-2.735 (-9.16)	-0.926 (-6.39)	-2.703 (-8.93)	-1.040 (-6.94)
LEVERAGE	1.720 (1.35)	0.164 (0.25)	1.864 (1.47)	0.793 (1.19)	1.211 (0.99)	0.733 (1.05)
ACCRUAL	5.976 (5.54)	4.351 (5.72)	4.759 (4.44)	3.716 (4.92)	5.202 (4.90)	3.941 (4.82)
RETVOL	6.268 (16.43)	5.621 (26.56)	6.281 (16.47)	5.559 (26.48)	6.195 (16.24)	5.706 (25.63)
CAPEX	0.179 (0.08)	3.458 (2.24)	1.091 (0.47)	4.144 (2.69)	-1.961 (-0.83)	2.310 (1.35)
ROA	0.057 (3.33)	0.001 (0.23)	0.052 (2.99)	0.003 (0.42)	0.045 (2.58)	0.000 (0.01)
BHAR	-0.646 (-3.83)	-0.016 (-0.22)	-0.699 (-4.16)	-0.086 (-1.12)	-0.703 (-4.21)	-0.067 (-0.83)
Fixed Effects	Country, Year, and Industry		Country, Year, and Industry		Country, Year, and Industry	
NObs	29,436	70,095	29,432	70,068	28,693	63,981
Adj R-Sq	0.52	0.55	0.52	0.55	0.52	0.55
Δ Coef (WAL)	-4.171 (-3.50)		-3.041 (-3.07)		-1.052 (-1.68)	

Table 3.8 Impact of IFRS Adoption on Asset - Stock Liquidity Relationship

This table reports results from cross-country firm-level OLS regressions of asset liquidity on stock liquidity, IFRS adoption indicator, and firm-level characteristics. The dependent variable is LIQ (stock liquidity) measured as annual percentage of non-zero return days out of total trading days. Panel A reports results for full sample analysis, and panel B reports for subsample analysis. WAL1, WAL2, and WAL3 are measures of asset liquidity. WAL1 is the ratio of cash and cash equivalents to lagged value of assets; WAL2 is the ratio of sum of cash and one half times the value of non-cash current assets, to lagged value of assets; WAL3 is the ratio of sum of cash, 0.75 times the value of non-cash current assets and one half times the value of other tangible fixed assets, to lagged value of assets. POSTIFRS is an indicator variable equal to 1 for IFRS adopting firm-years (firm-years in IFRS adopting countries and with fiscal year ended on or after 12/31/2005). MV is log of the market capitalization of firm in million US dollars. BM is book-to-market equity ratio. PRICE is log of stock price in US dollars. LEVERAGE is the ratio of total debt over total asset. ACCRUAL is measure of a firm's accruals proposed in Sloan (1996). RETVOL is log of standard deviation of monthly stock returns over preceding twelve months. ΔCoef represents the difference between the coefficients on WAL and POSTIFRS*WAL across the two subsamples. All continuous variables are winsorized at the 1st and 99th percentiles. NObs is the number of observations. Intercept, country, year, and industry effects are not tabulated. Robust t-statistics are in parentheses. Sample period is 1996-2007.

Panel A: Multivariate Analysis									
Variables	WAL1			WAL2			WAL3		
	M1	M2	M3	M4	M5	M6	M7	M8	M9
WAL	2.080 (6.23)	1.928 (5.86)	1.649 (4.11)	2.002 (7.39)	1.852 (6.72)	2.960 (7.94)	0.817 (4.02)	1.021 (4.48)	2.255 (8.03)
POSTIFRS*WAL	-0.099 (-0.10)	-1.774 (-1.71)	-0.190 (-0.20)	1.779 (1.98)	1.089 (1.18)	0.892 (1.05)	2.773 (3.99)	1.978 (2.69)	-0.790 (-1.15)
POSTIFRS	7.607 (23.14)	5.757 (16.87)	4.444 (12.76)	6.610 (14.97)	5.051 (11.21)	4.033 (8.90)	5.439 (10.31)	4.197 (7.57)	5.003 (8.88)
MV		5.551 (36.13)	5.864 (60.13)		5.617 (35.97)	5.911 (60.25)		5.513 (31.62)	5.983 (59.14)
BM		1.028 (7.59)	0.266 (1.65)		1.081 (7.92)	0.344 (2.12)		1.052 (7.37)	0.304 (1.86)
PRICE		-0.803 (-4.99)	-1.341 (-9.52)		-0.830 (-5.14)	-1.348 (-9.59)		-0.832 (-4.84)	-1.408 (-9.76)
LEVERAGE		-2.008 (-3.31)	0.831 (1.33)		-1.742 (-2.86)	1.397 (2.24)		-1.876 (-2.87)	1.226 (1.94)
ACCRUAL		0.506 (1.06)	5.464 (8.42)		0.338 (0.71)	4.712 (7.30)		0.170 (0.34)	4.905 (7.26)
RETVOL		1.740 (15.44)	5.939 (30.41)		1.752 (15.53)	5.890 (30.30)		1.730 (14.63)	5.988 (29.72)
CAPEX		-4.133 (-3.81)	2.788 (1.98)		-4.247 (-3.92)	3.508 (2.50)		-4.933 (-4.21)	1.085 (0.72)
ROA		0.016 (2.83)	0.018 (2.95)		0.014 (2.55)	0.017 (2.88)		0.016 (2.60)	0.016 (2.38)
BHAR		0.528 (8.64)	-0.238 (-3.24)		0.518 (8.51)	-0.300 (-4.06)		0.495 (7.71)	-0.320 (-4.15)
Fixed Effects	Firm	Firm	Country, Year, and Industry	Firm	Firm	Country, Year, and Industry	Firm	Firm	Country, Year, and Industry
NObs	118,612	93,786	93,745	111,561	93,765	93,724	104,091	87,306	87,277
Adj R-Sq	0.78	0.82	0.53	0.78	0.82	0.53	0.78	0.82	0.53

Panel B: Subsample Analysis by Legal Origin						
Variables	WAL1		WAL2		WAL3	
	(Civil)	(Common)	(Civil)	(Common)	(Civil)	(Common)
	M1	M2	M3	M4	M5	M6
WAL	3.034 (3.07)	1.929 (4.66)	4.645 (5.74)	2.778 (7.07)	2.679 (5.03)	2.100 (6.55)
POSTIFRS*WAL	1.393 (1.11)	-8.772 (-5.00)	2.665 (2.55)	-7.751 (-4.80)	1.615 (2.03)	-6.626 (-5.08)
POSTIFRS	3.226 (7.78)	7.586 (10.80)	2.371 (4.38)	8.826 (10.14)	2.454 (3.82)	10.488 (9.69)
MV	6.104 (46.04)	5.304 (35.18)	6.174 (46.13)	5.346 (35.32)	6.173 (45.97)	5.480 (34.37)
BM	0.525 (2.57)	-0.253 (-1.00)	0.614 (2.98)	-0.169 (-0.66)	0.537 (2.62)	-0.303 (-1.17)
PRICE	-1.830 (-10.40)	-0.239 (-1.00)	-1.842 (-10.54)	-0.241 (-1.01)	-1.833 (-10.44)	-0.434 (-1.72)
LEVERAGE	-0.836 (-0.89)	2.299 (2.90)	-0.265 (-0.28)	2.733 (3.42)	-0.952 (-1.04)	3.008 (3.65)
ACCRUAL	8.742 (9.66)	1.668 (1.82)	7.585 (8.54)	1.099 (1.20)	8.067 (8.99)	0.527 (0.53)
RETVOL	6.590 (23.21)	5.525 (21.34)	6.542 (23.16)	5.488 (21.29)	6.585 (23.01)	5.561 (20.50)
CAPEX	2.102 (0.98)	3.771 (2.05)	3.390 (1.59)	4.243 (2.31)	0.759 (0.35)	1.996 (0.97)
ROA	0.001 (0.10)	0.009 (1.25)	-0.004 (-0.35)	0.008 (1.13)	-0.006 (-0.47)	0.010 (1.34)
BHAR	-0.818 (-6.46)	0.131 (1.44)	-0.878 (-6.93)	0.074 (0.81)	-0.872 (-6.88)	0.136 (1.36)
Fixed Effects	Country, Year, and Industry		Country, Year, and Industry		Country, Year, and Industry	
NObs	51,680	42,065	51,673	42,051	50,656	36,621
Adj R-Sq	0.48	0.60	0.49	0.60	0.48	0.61
Δ Coef (WAL)	-1.106 (-1.03)		-1.867 (-2.08)		-0.579 (-0.93)	
Δ Coef (POSTIFRS*WAL)	-10.165 (-4.72)		-10.416 (-5.42)		-8.241 (-5.40)	

Panel C: Subsample Analysis by Anti-self-dealing Index						
Variables	WAL1		WAL2		WAL3	
	(Low ANTI)	(High ANTI)	(Low ANTI)	(High ANTI)	(Low ANTI)	(High ANTI)
	M1	M2	M3	M4	M5	M6
WAL	5.101 (2.66)	1.701 (4.67)	6.894 (4.58)	2.807 (7.96)	3.987 (4.38)	2.213 (7.90)
POSTIFRS*WAL	-1.110 (-0.60)	-6.951 (-4.32)	1.007 (0.68)	-6.372 (-4.42)	0.627 (0.59)	-4.950 (-4.18)
POSTIFRS	1.228 (1.41)	8.371 (13.76)	0.423 (0.43)	9.480 (12.41)	0.613 (0.59)	10.444 (10.73)
MV	7.472 (35.47)	5.209 (48.73)	7.598 (35.60)	5.246 (48.88)	7.520 (35.34)	5.318 (47.45)
BM	-0.051 (-0.11)	0.388 (2.48)	0.144 (0.31)	0.449 (2.86)	-0.006 (-0.01)	0.429 (2.71)
PRICE	-3.506 (-10.58)	-0.453 (-3.20)	-3.529 (-10.63)	-0.455 (-3.22)	-3.550 (-10.67)	-0.502 (-3.44)
LEVERAGE	-1.134 (-0.57)	2.296 (3.77)	-0.113 (-0.06)	2.763 (4.52)	-1.409 (-0.74)	2.900 (4.67)
ACCRUAL	8.075 (5.39)	3.766 (5.44)	6.572 (4.47)	3.110 (4.50)	7.124 (4.80)	3.033 (4.16)
RETVOL	7.571 (14.92)	5.222 (26.24)	7.521 (14.89)	5.173 (26.13)	7.604 (14.95)	5.226 (25.41)
CAPEX	2.933 (0.71)	3.224 (2.32)	4.759 (1.17)	3.765 (2.71)	0.707 (0.17)	1.729 (1.16)
ROA	0.029 (1.60)	0.010 (1.66)	0.021 (1.17)	0.010 (1.61)	0.020 (1.07)	0.010 (1.44)
BHAR	-0.399 (-1.53)	-0.160 (-2.27)	-0.513 (-1.98)	-0.213 (-3.00)	-0.486 (-1.89)	-0.233 (-3.10)
Fixed Effects	Country, Year, and Industry		Country, Year, and Industry		Country, Year, and Industry	
NObs	18,961	74,784	18,956	74,768	18,735	68,542
Adj R-Sq	0.47	0.56	0.47	0.56	0.47	0.57
Δ Coef (WAL)	-3.400 (-1.74)		-4.087 (-2.65)		-1.773 (-1.86)	
Δ Coef (POSTIFRS*WAL)	-5.842 (-2.39)		-7.379 (-3.58)		-5.577 (-3.50)	

Panel D: Subsample Analysis by Accounting Rating Standards						
Variables	WAL1		WAL2		WAL3	
	(Low ACCSTD)	(High ACCSTD)	(Low ACCSTD)	(High ACCSTD)	(Low ACCSTD)	(High ACCSTD)
	M1	M2	M3	M4	M5	M6
WAL	4.179 (3.30)	0.760 (1.82)	4.349 (4.28)	2.401 (6.23)	2.391 (3.81)	2.022 (6.65)
POSTIFRS*WAL	2.500 (1.50)	-3.219 (-2.57)	5.382 (3.88)	-2.859 (-2.54)	2.281 (2.28)	-2.982 (-3.21)
POSTIFRS	7.076 (12.69)	3.973 (8.45)	5.464 (7.52)	4.470 (7.35)	6.101 (7.22)	5.312 (6.99)
MV	6.423 (30.68)	5.570 (52.81)	6.508 (30.90)	5.606 (52.79)	6.372 (30.22)	5.757 (51.81)
BM	1.031 (4.30)	-0.716 (-3.38)	1.105 (4.56)	-0.629 (-2.96)	0.978 (4.12)	-0.671 (-3.05)
PRICE	-2.584 (-8.72)	-0.867 (-5.96)	-2.609 (-8.82)	-0.873 (-6.00)	-2.586 (-8.64)	-0.986 (-6.55)
LEVERAGE	1.066 (0.84)	0.014 (0.02)	1.293 (1.02)	0.708 (1.03)	0.628 (0.52)	0.787 (1.09)
ACCRUAL	6.251 (5.78)	4.190 (5.33)	5.161 (4.80)	3.619 (4.61)	5.557 (5.22)	3.758 (4.41)
RETVOL	6.572 (17.29)	5.612 (25.69)	6.562 (17.28)	5.536 (25.54)	6.506 (17.14)	5.689 (24.72)
CAPEX	2.271 (0.97)	2.238 (1.30)	3.115 (1.34)	2.919 (1.71)	0.428 (0.18)	1.073 (0.55)
ROA	0.051 (2.96)	0.001 (0.23)	0.046 (2.65)	0.003 (0.49)	0.038 (2.20)	0.003 (0.47)
BHAR	-0.761 (-4.53)	-0.006 (-0.07)	-0.819 (-4.89)	-0.074 (-0.94)	-0.822 (-4.93)	-0.061 (-0.73)
Fixed Effects	Country, Year, and Industry		Country, Year, and Industry		Country, Year, and Industry	
NObs	29,188	64,557	29,184	64,540	28,446	58,831
Adj R-Sq	0.52	0.55	0.52	0.55	0.52	0.55
Δ Coef (WAL)	-3.419 (-2.56)		-1.949 (-1.80)		-0.369 (-0.53)	
Δ Coef (POSTIFRS*WAL)	-5.719 (-2.74)		-8.241 (-4.62)		-5.264 (-3.85)	

Table 3.9 Robustness Tests

This table presents the results of robustness tests stock liquidity on asset liquidity and control variables. Panel A reports robustness check for main analysis and panel B reports robustness check for impact of IFRS adoption. In panel A, four robustness checks are reported. (i) LOT is used as alternate measure of stock liquidity. (ii) Amihud (2002) illiquidity measure is used as alternate measure of stock liquidity. (iii) All US firm-years are excluded. (iv) Samples from each and every country for every year are randomly selected to minimize the overweight of some countries. If the sample has less than 100 firms for a given country-year, all observations from that country-year are retained. (v) Newly listed firms during the sample period are removed. LOT is trading cost estimated using Lesmond, Odgen, and Trzcinka (1999) model with maximum likelihood method. In panel B, all newly listed firms are removed. Subsample analysis by LAW, ANTI, and ACCSTD are presented. Δ Coef represents the difference between the coefficients on WAL and POSTIFRS*WAL across the two subsamples. The definition of all variables is contained in Table 3.1. All continuous variables are winsorized at the 1st and 99th percentiles. NObs is the number of observations. Intercept, country, year, industry, and firm effects are not tabulated. Robust t-statistics are in parentheses. Sample period is 1996-2007.

Panel A: Robustness Checks on Main Analysis										
	LOT		AMI		Without US Sample		Random Sample		Without New Firms	
	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10
WAL3	-0.004	-0.005	-0.174	-0.166	1.411	2.835	3.179	3.820	1.437	2.594
	(-6.38)	(-7.21)	(-12.92)	(-12.98)	(4.95)	(8.17)	(6.36)	(7.39)	(5.28)	(7.00)
MV	-0.015	-0.012	-0.267	-0.265	6.806	7.088	7.049	7.870	6.670	6.481
	(-32.16)	(-56.27)	(-25.42)	(-57.10)	(31.25)	(58.61)	(18.47)	(42.85)	(33.41)	(49.57)
BM	-0.000	-0.001	0.055	0.036	1.362	0.617	0.985	0.634	1.441	0.531
	(-0.32)	(-2.15)	(4.98)	(3.40)	(8.40)	(3.24)	(2.68)	(1.83)	(8.89)	(2.62)
PRICE	0.003	0.001	0.002	-0.018	-1.358	-1.781	-1.707	-2.613	-1.334	-2.089
	(6.47)	(1.91)	(0.19)	(-3.41)	(-6.97)	(-11.27)	(-5.11)	(-8.97)	(-6.82)	(-9.99)
LEVERAGE	0.016	0.002	0.173	0.033	-0.036	2.226	0.703	1.497	-1.004	1.189
	(8.05)	(1.82)	(3.85)	(1.06)	(-0.04)	(2.84)	(0.45)	(1.15)	(-1.26)	(1.42)
ACCRUAL	-0.003	-0.009	-0.066	-0.281	-0.201	5.009	-1.897	3.144	-1.183	4.515
	(-1.37)	(-4.70)	(-1.73)	(-7.16)	(-0.34)	(6.27)	(-1.53)	(2.43)	(-1.81)	(5.09)
RETVOL	0.006	0.004	0.006	-0.101	1.493	6.567	2.584	6.857	1.848	5.840
	(16.57)	(8.61)	(0.81)	(-9.77)	(10.84)	(27.34)	(9.75)	(18.40)	(13.45)	(23.60)
CAPEX	0.025	0.001	0.107	-0.196	-5.442	-0.253	-3.408	-0.236	-7.560	3.337
	(6.98)	(0.23)	(1.28)	(-2.59)	(-4.07)	(-0.15)	(-1.35)	(-0.09)	(-4.89)	(1.64)
ROA	-0.000	-0.000	-0.004	-0.001	0.050	0.019	0.070	0.032	0.019	0.034
	(-11.16)	(-17.02)	(-8.39)	(-2.82)	(5.74)	(1.96)	(3.98)	(2.21)	(2.44)	(3.45)
BHAR	-0.002	-0.001	-0.023	-0.022	0.321	-0.483	0.259	-0.236	0.693	0.049
	(-10.42)	(-3.80)	(-5.98)	(-5.42)	(4.02)	(-4.88)	(1.52)	(-1.34)	(8.83)	(0.50)
Fixed Effects	Firm	Country, Year, and Industry	Firm	Country, Year, and Industry	Firm	Country, Year, and Industry	Firm	Country, Year, and Industry	Firm	Country, Year, and Industry
NObs	88,518	88,493	91,197	91,170	71,479	71,451	28,436	28,415	63,884	63,871
Adj R-Sq	0.66	0.39	0.70	0.41	0.82	0.52	0.83	0.52	0.82	0.55

Panel B: Robustness Checks on Impact of IFRS adoption and Asset - Stock Liquidity Relationship						
Variables	Subsample Analysis Without New Firms					
	(Civil Law)	(Common Law)	(Low ANTI)	(High ANTI)	(Low ACCSTD)	(High ACCSTD)
	M1	M2	M3	M4	M5	M6
WAL3	3.264 (4.27)	2.087 (4.78)	4.239 (3.23)	2.574 (6.56)	3.665 (4.32)	2.141 (4.91)
POSTIFRS*WAL3	1.447 (0.94)	-10.342 (-5.48)	1.285 (0.70)	-8.635 (-4.86)	3.571 (1.78)	-7.486 (-4.73)
POSTIFRS	0.094 (0.08)	14.561 (10.10)	-1.301 (-0.84)	14.093 (10.59)	2.448 (1.61)	8.616 (7.39)
MV	6.980 (38.94)	5.289 (28.80)	8.286 (30.60)	5.610 (37.23)	7.177 (26.87)	5.981 (39.68)
BM	1.271 (5.29)	-1.012 (-2.97)	0.901 (1.51)	0.553 (2.87)	1.637 (5.71)	-0.719 (-2.73)
PRICE	-2.932 (-10.18)	-0.483 (-1.61)	-3.772 (-9.01)	-1.188 (-4.84)	-2.578 (-6.65)	-1.817 (-7.38)
LEVERAGE	-0.848 (-0.65)	3.553 (3.33)	-0.478 (-0.17)	2.742 (3.21)	3.485 (1.94)	-0.308 (-0.33)
ACCRUAL	6.123 (4.57)	1.582 (1.32)	4.354 (1.84)	3.029 (3.21)	0.946 (0.62)	5.453 (4.92)
RETVOL	5.976 (16.12)	5.858 (17.66)	6.582 (9.26)	5.525 (22.06)	6.340 (12.18)	5.454 (19.57)
CAPEX	0.620 (0.18)	2.231 (0.86)	2.754 (0.46)	3.266 (1.53)	-2.318 (-0.65)	3.945 (1.48)
ROA	0.096 (4.06)	0.014 (1.25)	0.177 (4.07)	0.018 (1.80)	0.164 (5.56)	0.006 (0.54)
BHAR	-0.284 (-1.66)	0.141 (1.13)	-0.022 (-0.05)	0.010 (0.11)	-0.618 (-2.91)	0.347 (3.09)
Fixed Effects	Country, Year, and Industry		Country, Year, and Industry		Country, Year, and Industry	
NObs	33,538	26,978	11,406	49,110	17,480	43,036
Adj R-Sq	0.52	0.62	0.51	0.58	0.55	0.56
Δ Coef (WAL)	-1.176 (-1.34)		-1.665 (-1.22)		-1.524 (-1.60)	
Δ Coef (POSTIFRS*WAL)	-11.789 (-4.85)		-9.920 (-3.88)		-11.057 (-4.33)	