

Transparency, Liquidity, and Valuation: International Evidence

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Abstract

We examine the relation between transparency, stock market liquidity, and valuation for a global sample of firms. Following the prior literature, we argue that transaction costs will be higher and investors will be less willing to transact if they perceive significant issues with respect to transparency, particularly in international settings where potential information effects are more pronounced. Consistent with expectations, we document lower transaction costs and greater liquidity (as measured by lower bid-ask spreads and fewer zero return days) when transparency is likely to be higher (as measured by less evidence of earnings management, better accounting standards, higher quality auditors, more analyst following and more accurate analyst forecasts). We also find evidence that the relation between transparency and liquidity is more pronounced in periods of high volatility, when investor protection and disclosure requirements are poor, and when ownership is more concentrated, suggesting that firm-level transparency matters more when overall uncertainty is greater. Finally, we provide evidence that increased liquidity is associated with lower implied cost of capital from an analyst-forecast-based valuation model, and with higher valuation as measured by Tobin's Q.

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Transparency, Liquidity, and Valuation: International Evidence

1. Introduction

A significant body of literature beginning with Glosten and Milgrom (1985) and Kyle (1985) suggests that transaction costs will be higher and, therefore, liquidity will be lower in the face of decreased transparency. Amihud and Mendelson (1986) show theoretically and, for U.S. firms, empirically that illiquidity can drive up expected returns and, thus, a firm's cost of capital.¹ In an international setting, transparency and liquidity issues are likely to be more pronounced because of greater diversity in firms' information environments as reflected by financial reporting and disclosure standards, regulatory oversight, attestation, investor protection, internal firm governance and private information acquisition. Further, Amihud and Mendleson (2008) argue that, while most valuation analysis focuses on cash flows and the effects of risk through models such as the Capital Asset Pricing Model, the potential importance of liquidity to valuation (particularly in environments with limited transparency and, consequently, high transaction costs and low liquidity) has received less attention than it should. As they note, recent upheaval in global capital markets highlights the potential importance of transparency and its effect on liquidity and valuation.

We investigate, internationally, the extent to which a firm's information environment appears to be associated with liquidity and the links between any such liquidity effect and a firm's cost of capital and valuation. Prior international research has primarily focused on transparency and liquidity at the country level. However, we view a firm's information

¹ Several papers have reconfirmed and extended this finding for the securities of U.S. firms [e.g., Brennan and Subramanyan (1996), Chordia, Subrahmanyam, and Anshuman (2001), Pastor and Stambaugh (2003), and Fang, Noe, and Tice (2008)].

environment as being a function of a combination of factors, at both the firm and country level, including financial reporting quality, oversight by regulators and auditors, investor protection, analyst following, and managerial incentives. The extent to which information factors are important determinants of liquidity in an international setting and their effect on cost of capital and valuation remain open questions. Issues of transparency and liquidity have taken on particular relevance in light of recent disruptions in securities markets.

We consider an international setting for several reasons. First, information and transparency effects are likely to be particularly pronounced in international settings. As discussed in Nikolaev and van Lent (2005) and Roulstone (2003), there is mixed evidence on the relation between components of transparency, such as voluntary disclosure and analyst following, and liquidity in US settings, perhaps reflecting the fact that the US tends to be a relatively transparent and homogeneous market. Second, we observe significant variation in economic environments and institutions internationally (e.g., investor protection and disclosure regimes, ownership structures and country-wide economic shocks) which allows us to investigate whether the role that transparency plays depends crucially on the context facing the firm. Third, the international setting is inherently interesting and timely because transparency and liquidity outcomes do not, in fact, appear to be homogenous as illustrated by the substantial cross-country variation in the impact of the recent financial crisis. Fourth, even factors such as auditor choice, accounting standards, earnings smoothing and analyst following may have different implications internationally than they do in the US context. For example, big-5 auditor involvement in recent non-US frauds such as Parmalat and Satyam raise questions about the level of oversight for non-U.S. affiliates of major U.S. accounting firms.

We study a broad sample of firms from 43 countries over the period 1994–2007. We consider several measures of transparency beginning with earnings management. Cross-country research by Fan and Wong (2002) and Leuz, Nanda, and Wysocki (2003) suggests that managers smooth earnings to create opacity to permit, for example, expropriation of assets. To the extent that the accounting system creates opacity and information asymmetry, it likely reduces investors' willingness to trade. We measure earnings management after controlling out the effects of cash flow volatility, industry factors, and other potential intrinsic determinants of earnings smoothing. Because earnings management is inherently difficult to measure, we confirm that our measure is positively correlated with incentives to manage earnings (concentrated ownership and high book-tax accounting conformity) and negatively correlated with impediments to earnings management (high quality auditor, strong investor protection, global accounting standards, and analyst following).

In addition to earnings management, we also consider auditor quality and use of global accounting standards as likely determinants of the transparency of financial reporting.² Prior cross-country research suggests that larger, top-tier audit firms may be more likely to provide robust oversight [Fan and Wong (2005)]. Similarly, research such as Barth et al. (2007) suggests that global accounting standards may facilitate more transparent reporting.

Beyond firm-generated disclosure and auditor choices, information gathering by intermediaries is likely to affect transparency. In particular, analysts gather and aggregate information from public and private sources to assess firm value, improving overall transparency [Brennan and Subrahmanyam (1995), Lang and Lundholm (1996), and Lang, Lins, and Miller (2004)]. In addition, research from U.S. settings, such as Yu (2008), suggests that analysts

² While auditor and accounting standard choice likely affect transparency through their effect on earnings management, they are also likely to affect transparency more generally through their effect on overall accounting quality and the supporting disclosure provided with the financial statements.

discipline firm reporting choices. As a result, we expect greater analyst following to be associated with greater transparency.

Finally, we include analyst forecast accuracy, after controlling for earnings surprise and forecast bias, as a measure of the availability of information about the underlying economics of the firm. If there is more information available to market participants, either through public disclosure or private information acquisition, analyst forecasts should be more accurate.

We relate our measures of transparency to two measures of transaction costs and liquidity that are readily available for large samples of firms across many countries and that have been shown to correlate well with actual transaction costs for trading a firm's shares: (1) the proportion of zero-return trading days over the fiscal year relative to the total trading days of a firm's fiscal year, and (2) the average bid-ask spread measured over the fiscal year. Bid-ask spreads speak more directly to transaction costs and have a long history in the finance literature, while zero return days measure liquidity more directly and are available for a wider sample of firms.³ As Amihud and Mendelson (2008) note, transaction costs and liquidity are related but separate concepts. From an investor's perspective, both the direct transaction costs of trading in shares as well as the ability to form and liquidate a substantial portfolio in a timely manner are important determinants of the price they are willing to pay for a stock. We control for variables generally found in prior research to be significant determinants of a firm's transaction costs and liquidity and we also include country, year, and firm fixed effects.

Our results show that transparency is indeed associated with transaction costs and liquidity in our global sample of firms. In particular, firms with more evidence of earnings management have a greater incidence of zero returns and higher bid-ask spreads, consistent with

³ Research such as Lesmond, Ogden, and Trzcinka (1999), Lesmond (2005), and Bekaert et al. (2007) suggests that a zero return day variable better captures priced liquidity than a variety of other measures.

earnings management reducing transparency, thereby reducing liquidity and increasing transaction costs. Similarly, liquidity is higher and transaction costs are lower for firms that are audited by top-tier audit firms and firms that follow international accounting standards, suggesting that better accounting oversight and higher quality accounting standards are associated with greater transparency. Liquidity is higher and transaction costs are lower when analyst following is high, consistent with additional oversight and information acquisition increasing liquidity. Further, liquidity is higher and transaction costs are lower when analysts' forecasts are more accurate. Finally, the economic magnitudes are substantial. Results are consistent for firm fixed effects models suggesting that our transparency variables explain within-firm variation in liquidity.

Next, we examine the effect of other factors on the relation between transparency and liquidity. In particular, firm-level transparency is likely to be especially important in situations in which there is more opacity generally. We consider three levels of opacity: country-level, time period specific and firm-level. Our primary analysis focuses on firm-level, within country, comparisons because there is relatively little existing evidence on the economic effects of firm-level transparency and, while country-level transparency may also affect liquidity, market microstructure differences make cross-country comparisons difficult. However, country-level institutions are likely to affect the importance of firm-level factors. For example, earnings smoothing, permissive auditors, weak local accounting standards, and a lack of analyst following are all likely to be more of an issue when country-wide shareholder protection is poor and regulatory oversight and disclosure requirements are relatively weak. We split our sample based on the Anti-Self-Dealing Index (ASDI) of Djankov et al. (2008) and the Disclosure Scores from La Porta et al. (2006). Consistent with expectations, our results suggest that firm-level oversight

and transparency effects are particularly important in countries where there is likely to be significant self-dealing and where disclosure requirements are relatively weak.

In terms of time periods, we argue that transparency is likely to be particularly important during periods of greater turmoil and uncertainty. We consider two related measures, country-level volatility and liquidity shocks. We focus on periods in which recent country-level share price volatility has been unusually high and periods in which country-level liquidity has been unusually low, and examine the relation between transparency and liquidity. Not surprisingly, liquidity tends to dry up during periods of volatility. More interestingly, the effect of volatility on liquidity is substantially mitigated for firms with high levels of transparency, suggesting that transparency is particularly important in periods of greater uncertainty, consistent with a flight to quality. Similarly, when liquidity is unusually low in a country, opaque firms appear to suffer more relative to transparent firms.

In terms of firm-level uncertainty, transparency is likely to be particularly important for firms expected to have internal governance issues. Prior research such as McConnell and Servaes (1990) suggests that, while firm value is enhanced by concentrated ownership to a point, high ownership concentration increases agency costs and reduces firm value. As a result, we expect transparency to be particularly important to liquidity for firms with high levels of ownership concentration. To assess this, we split our sample based on ownership concentration and find that the association between transparency and liquidity is substantially stronger for firms with likely greater governance issues, as reflected in more concentrated ownership. Further, there is evidence of an interaction between firm-level governance and country-level institutions; firm-level transparency is particularly important for firms with concentrated ownership in countries with relatively weak country-level institutions.

While drawing a strong inference on causality is difficult, overall results are robust to estimation using firm fixed effects, as well as to estimation using lagged transparency measures and lagged transparency with firm fixed effects. Further results are robust to simultaneous estimation of transparency and liquidity. Finally, similar results hold for short estimation windows around liquidity shocks, suggesting that reverse causality from liquidity to transparency is unlikely to be driving the empirical results. Finally, we consider the link between liquidity, cost of capital, and valuation to assess the extent to which transparency is associated with firm valuation through liquidity. There is relatively little evidence on the relation between transaction costs, cost of capital, and valuation in international settings. Bekaert et al. (2007) suggests that liquidity behaves like a priced risk factor for a sample of firms from emerging markets, but does not quantify the potential effect of liquidity on cost of capital. Our results indicate that liquidity is negatively correlated with ex-ante cost of capital (as measured using an analyst-forecast-based valuation model) and positively correlated with firm valuation (as measured by Tobin's Q) for our global sample of firms. Overall, we document a strong positive relation between transparency, cost of capital and valuation which is driven in large part by the association between transparency and liquidity. A path analysis suggests that liquidity fully mediates the association between transparency and cost of capital, suggesting that the primary effect of transparency on cost of capital for our sample of firms is through liquidity. Transparency is associated with Tobin's Q both through liquidity and directly, likely reflecting the fact that firm valuation is affected by cash flow effects (e.g., expropriation of assets) as well as cost of capital. Further, the magnitude of the liquidity effects we document have the potential to materially affect cost of capital and liquidity.

Taken together, our results suggest that, around the world, there is a strong association between transparency, liquidity and transaction costs and, ultimately, cost of capital and firm valuation as well. We provide evidence that firms with lower firm-level transparency, as reflected in greater evidence of earnings management, lower-quality auditors, use of local GAAP, lower analyst following, and less accurate analyst forecasts have lower liquidity. These results are most pronounced in environments in which inherent uncertainty is likely to be higher (weak country institutions, firm-level governance issues and high volatility). Further, higher liquidity is associated with lower cost of capital and higher valuation. Subject to the caveat that establishing causality is notoriously difficult in these environments and that we document only associations, our results suggest specific channels – reduced transparency and its resulting illiquidity – through which poor firm-level and country-level corporate governance may be associated with lower firm values.⁴

The remainder of the paper is organized as follows. In the next section we review the related international literature on transparency and liquidity. In Section 3 we discuss the data and our transparency proxies. In Section 4 we discuss our methodology and present the results of tests on the relation between transparency, liquidity, and valuation. We conclude in Section 5.

2. Discussion of Related Literature

While theoretical bases exist for expecting transparency to affect liquidity and cost of capital, there is limited firm-level evidence on its importance and the channels through which it functions, especially from an international perspective. Transparency is a potential issue in any

⁴ A reasonable question is why, if increased transparency reduces cost of capital and increases firm value, not all firms would seek to be as transparent as possible. However, the value being considered here is to the firm's shareholders. To the extent that management or other stakeholders such as labor can benefit from opacity through expropriation or excess perquisite consumption, shareholder value may be sacrificed [Fan and Wong (2002)].

market, but it is likely to be particularly pronounced in an international context where there is more diversity in managerial incentives, regulatory structure, mandated disclosure and outside shareholder protection from managerial expropriation. Transparency, liquidity and cost of capital likely differ across firms within a particular setting based on factors such as earnings management, accounting standards and disclosure, auditing quality and private information acquisition by analysts. Further, the strength of the relation between transparency and liquidity is likely to differ across countries and time periods depending on economic circumstances.

There is relatively little extant international research that links measures of transparency to liquidity or cost of capital at the firm level. Several studies consider the effects of specific changes in accounting standards on measures of liquidity, with mixed results. Leuz (2003) finds no evidence that the choice of U.S. GAAP versus International Accounting Standards (IAS) matters to the liquidity of firms trading on the German Neuer Market and Daske (2006) finds no evidence that adoption of International Financial Reporting Standards (IFRS) matters to cost of capital for European firms. On the other hand, Daske, Hail, Leuz, and Verdi (2008) provide evidence of an increase in liquidity and reduction in cost of capital for firms converting to IFRS, and Leuz and Verrecchia (2000) document that German firms listing on U.S. exchanges experience an increase in liquidity. However, Daske, Hail, Leuz, and Verdi (2007) find that the benefits of IFRS adoption accrue only to “serious” adopters of IFRS. Because the preceding firm-level studies examine fairly specific contexts, the results from them are mixed, and the analyses are limited to accounting standards, it is difficult to discern a more general relation between transparency and liquidity.

Two studies examine transparency and liquidity at the country level. Eleswarapu and Venkataraman (2006) use exchange-listed ADRs to study the impact of macro-level institutions

on liquidity across a range of countries and find that trading costs are lower for firms from countries with better accounting standards and legal systems. However, their analysis is limited to firms that fall under the U.S. regulatory and disclosure system and they examine only country-wide institutions. Bhattacharya et al. (2003) investigate, at the country level, the association between country-wide aggressive loss recognition, loss avoidance and smoothing, cost of equity capital and turnover. They provide mixed evidence on the relation between earnings attributes, turnover and cost of capital depending on the measure of cost of capital and the earnings attribute employed.

Several studies assess the impact of liquidity on expected returns or valuation for non-U.S. securities, but these studies are limited in scope. The most comprehensive is Bekaert et al. (2007) who document that liquidity behaves like a priced risk factor for a sample of firms from 19 emerging market countries. Amihud, Mendelson, and Uno (1999) show that when 66 Japanese firms reduced the lot size required for trading, the price of their shares increased, while Amihud, Lauterbach, and Mendelson (2003) show a similar outcome for a small set of Israeli stocks that moved to a more liquid trading regime. In a study of non-U.S. debt issues, Chaplinsky and Ramchand (2004) find that yields were incrementally higher for issues traded on the less liquid Rule 144A U.S. market compared to similar bonds traded in the U.S. public bond market.

Finally, several studies examine determinants of cost of capital in specific settings. Hail and Leuz (2006) provide evidence that countries with better legal institutions and investor protection enjoy a lower cost of capital and Hail and Leuz (2008) suggest that firms that cross list experience a reduction in cost of capital. However, these studies do not directly examine the effect of liquidity on cost of capital nor do they focus directly on the link to transparency.

Our results make several contributions to the literature. First, our findings highlight the potential importance of transparency for liquidity, cost of capital, and valuation in international markets. Transparency is potentially costly for managers, both in terms of direct costs (e.g., hiring higher quality auditors and adopting international accounting standards) and indirect costs (e.g., limiting their ability to expropriate assets and disclosing potentially sensitive information to competitors). While assessing causality is difficult, our results suggest that a significant potential benefit from greater transparency may accrue to a firm's outside shareholders through increased liquidity and lower cost of capital.

Second, our analysis highlights a variety of firm-specific channels through which transparency may be associated with liquidity and valuation. Our results suggest that oversight by reputable auditors, use of international GAAP, reductions in earnings management, and increases in analyst following and forecast accuracy are all associated with greater liquidity.

Third, our international sample provides an opportunity to examine the importance of transparency in a variety of settings. We find that firm-level transparency is particularly important in contexts in which other aspects of the firm's environment increase uncertainty. Our results suggest that firm level transparency is especially important when country-level investor protection and disclosure is weak, firm-level governance is weak, and the country is suffering from volatility and liquidity shocks.

Fourth, we explore the link between earnings management, liquidity and valuation. Prior research such as Francis, LaFond, Olsson and Schipper (2004) suggests that, for US firms, accruals which smooth earnings are associated with a lower cost of capital, while research in an international context, such as Leuz et al (2003) suggests that greater earnings smoothing is associated with greater opacity. Our results potentially help bridge the gap in suggesting that

firms with innately smooth earnings enjoy greater liquidity, consistent with Francis et al. (2004), but that firms with greater discretionary smoothing experience lower liquidity, consistent with Leuz et al. (2003). In other words, it may be that the “normal” smoothing properties of accruals are associated with greater transparency as intended by the accounting system, but “excess smoothing” is associated with greater opacity. Consistent with this notion, our measure of discretionary smoothing is highest when incentives to create opacity are high (greater block ownership and greater book-tax conformity) and oversight is relatively weak (lower-quality auditor, lower analyst following, local GAAP, no U.S. listing, and weak country-wide institutions).

Finally, our results underscore and quantify the link between liquidity, cost of capital, and valuation in international settings. While theory suggests liquidity should affect cost of capital and valuation, there is relatively little evidence on that link outside of the U.S. Our results indicate that greater transparency is associated with higher firm valuation and lower cost of capital. More importantly, a path analysis suggests that a substantial portion of that relation appears to be driven through the effect of transparency on liquidity, and the magnitude of these effects is economically substantial.

3. Data

Our sample includes 43 countries: Argentina, Australia, Austria, Belgium, Brazil, Canada, Chile, China, Colombia, Denmark, Finland, France, Germany, Greece, Hong Kong, Hungary, India, Indonesia, Ireland, Israel, Italy, Japan, Luxembourg, Malaysia, Mexico, the Netherlands, New Zealand, Norway, Pakistan, Peru, Philippines, Poland, Portugal, Singapore, South Africa, Spain, Sri Lanka, Sweden, Switzerland, Taiwan, Thailand, the U.K., and

Venezuela. The countries represented likely reflect a wide range of transparency, liquidity, investor protection, and general economic circumstances. Accounting and market data are collected from *Datastream Advanced* (a collaboration of market statistics from *Datastream* and accounting data from *WorldScope*) over the 1994-2007 time period. We require firm-year observations to have the necessary income statement and balance sheet data to calculate cash flows, accruals, and operating characteristic variables and to have sufficient market data to calculate the annual percentage of zero return days. In total, our sample contains 95,106 firm-year observations. Table 1 reports the frequency of observations by country.

Table 2 provides descriptive statistics on our sample firms. Our typical sample firm is medium in size as measured by market value of equity and by total assets (median *MVE* of \$132 million and median *ASSETS* of \$252 million over the sample period), does not have a particularly high level of debt to assets (median *LEV* = 0.54) and is not likely to have large growth prospects as captured by a median *BM* value of 0.75. The median sample firm reports losses infrequently and has experienced 7.1% sales growth over recent years. Table 2 also reports descriptive statistics on the firm- and country-level governance and transparency measures we use. The average country-level disclosure score for our sample of firms is 0.75 and the average Anti-Self Dealing Index score for a firm in our sample is 0.50 (each measure has a range of possible scores from 0 to 1), where higher values represent stronger investor protection against managerial self-dealing. The table also shows that 1.3% of the sample firms have a U.S. exchange-listed ADR while 3.7% have an ADR that is not exchange traded.

The mean and median analyst following levels indicate that our sample firms are, on average, followed by relatively few analysts, with a mean analyst following of 3.2 and median

following of one. Of our sample firms, 56.1% are audited by Big-5 affiliates and 9.9% prepare their financial statements under non-local GAAP.

Table 2 also displays the descriptive statistics for our liquidity variables. The median sample firm has a zero return on 22.6% of the trading days in the year and has a bid-ask spread of 1.4%. Data requirements to calculate *BIDASK* reduce the sample size relative to the *ZERORET* metric, with this measure available for 61,641, rather than 95,106, firm-years. We defer a discussion of average cost of capital and Tobin's Q statistics until later in the paper when we present valuation tests.

Overall, an advantage of this sample is that it includes a wide range of firms and is not dominated by only the largest, most heavily followed multinational firms. As a consequence, these are firms for which transparency issues are potentially more pronounced and the relatively wide variability within the sample should increase the power of our tests.

4. Methodology and Results – Transparency, Liquidity, and Valuation

4.1. Transparency and Liquidity

Our primary hypothesis is that increased transparency is expected to have positive capital market consequences in terms of reduced transaction costs and increased liquidity. Because transparency is inherently difficult to measure and has many potential facets, we consider several measures.

Our first transparency variable is based on a measure of the extent of discretionary earnings management by the firm. As discussed in more detail in the Appendix, we combine two measures of earnings management common in the literature, variability of net income relative to cash flow and correlation between accruals and cash flows (e.g., Leuz et al (2003) and Barth et al

(2007)). The underlying argument is that earnings management is manifested in use of accruals to smooth out fluctuations in underlying cash flows.

There are clearly nondiscretionary components to earnings smoothness. Therefore, following the discretionary accruals literature (e.g., Jones, 1991), we first regress out a set of fundamental determinants of earnings smoothness, and use the resulting residuals to form our measure of discretionary earnings smoothness. Our analyses include both the portion of smoothing explained by the intrinsic fundamental factors (*FUND_SMTHC*) as well as the excess portion (*DIS_SMTHC*) and we present the details on their composition in the Appendix. Our primary interest is in *DIS_SMTHC* as a measure of transparency, and we predict that greater discretionary smoothing will be indicative of greater earnings management and associated with greater opacity. However, we expect *FUND_SMTHC* to be positively correlated with liquidity to the extent that there is less potential for asymmetric information for firms whose profits are naturally smooth.⁵ To provide further assurance that our measure captures elements of managerial discretion, we demonstrate that *DIS_SMTHC* is predictably correlated with variables that capture incentives and impediments to earnings management, as detailed in the Appendix.⁶

Additional transparency variables, other than a proxy for earnings management, are likely to be important determinants of liquidity as well. The informativeness of accounting data may be higher if accounting data are audited by an affiliate of a global accounting firm so we include an indicator variable, *BIG5*, if a firm's auditor is affiliated with a Big-5 audit firm [Francis (2004) and Fan and Wong (2005)]. However, recent scandals such as Parmalat and Satyam have raised questions about the level of oversight provided by Big-5 firms over local affiliates.

⁵ Inclusion of both *DIS_SMTHC* and *FUND_SMTHC* also provides evidence on the extent to which the smoothing we identify as "discretionary" behaves differently than the intrinsic smoothness of a firm's operations.

⁶ As discussed in more detail in the robustness section, results are consistent if we instead use the fitted value from the regression of *DIS_SMTHC* on variables that capture incentives and impediments to earnings management as our measure of discretionary smoothing.

Also, accounting data may be more informative if a firm follows international accounting standards, particularly if the firm is from a country with relatively poor local accounting standards so we include an indicator, *INTGAAP*, for firms that have adopted either IAS or U.S. GAAP [Barth et al. (2007) and Bradshaw and Miller (2008)]. As demonstrated in the appendix, the degree of discretionary smoothing is likely to be affected by choice of auditor and accounting standards, but firms' auditor and accounting standards also affect decisions around footnote and other disclosures. As discussed earlier, existing research is mixed on the effect of accounting standard choice on liquidity.

To the extent that analysts serve as information intermediaries, their presence should tend to increase transparency. Research in the U.S. provides mixed evidence on the effect of analysts on transparency. Chung et al. (1995) argue that increased analyst following is associated with increased information asymmetry and, hence, reduced liquidity, while Roulstone (2003) suggests that analyst following increases publicly available information and increases liquidity. Lang et al. (2004) argue that, in an international setting, analysts are likely to play a particularly important oversight and information processing role. We therefore include *ANALYST*, the number of analysts forecasting current-year earnings, in our liquidity models.

In addition to the number of analysts following a firm, the accuracy of their forecasts likely reflects the transparency of the firm's information environment. The accuracy of analyst forecasts reflects both the information acquisition activities of analysts as well as the disclosure policies of firms [Lang and Lundholm, 1996]. To the extent that there is more transparency in a firm's information environment, analyst forecasts should be more accurate. Following Lang and Lundholm (1996), we measure forecast accuracy (*ACCURACY*) after controlling for the size of the earnings surprise and bias during the period. As a result, our measure captures, for a given

magnitude of earnings surprise and bias, the extent to which analysts were able to forecast earnings.⁷

Also, we include a variety of controls from the prior literature. First, we include the percentage of closely held shares (*%CLHLD*). The existence of large blocks of shares can affect transparency through its effect on incentives to create opacity. However, its interpretation here is more nuanced because this variable will directly affect the supply of shares available to outside investors because it lessens free float (Dahlquist, Pinkowitz, Stulz, and Williamson (2003), Brockman, Chung, and Yan (2008), and Leuz, Lins and Warnock (2008)), which could result in lower liquidity.⁸

In addition, we include indicator variables for whether the stock trades in the U.S., either on an exchange (*ADR_EX*) or on the OTC or PORTAL markets (*ADR_NEX*). While U.S. trading likely affects transparency (Lang et al. (2003)), it also affects our measures of liquidity because U.S. trading draws liquidity from local markets and our tests are based on liquidity in the local market [Baruch, Karolyi, and Lemmon (2007)].

We also include controls for firm size as measured by the log of a firm's market value of equity (*LN MVE*), book to market (*BM*), whether the firm had a loss during the period (*LOSS*), and return variability (*STDRET*), as is typical in empirical tests of liquidity [Stoll (2000)]. Finally, for our main specifications, we include country, year, and industry fixed effects. While transparency likely differs across countries, market microstructure does as well, so it is difficult to attribute differences in transparency to country-level factors. Given potential concerns about omitted variables and endogeneity, we also report results using firm and year fixed effects.

⁷ Results are not sensitive to the inclusion of controls for earnings surprise and bias. We present summary statistics for these measures (*SUE* and *BIAS*) in Table 2.

⁸ As discussed later, research such as McConnell and Servaes (1990) suggests that concentrated ownership may improve governance up to a certain level, but that high levels of ownership concentration create agency problems. Our results are robust to splitting between low and high levels of ownership concentration.

While within-firm comparisons have the disadvantage of ignoring potentially interesting cross-firm variation and thus weakening the power of the tests, they have the advantage of fewer potential econometric issues.

We use two measures of liquidity and transaction costs: zero return days and bid-ask spreads. As noted earlier, while liquidity and transaction costs are related concepts, transaction costs measure a direct cost of transacting in a firm's shares, while liquidity also reflects the frequency of trade and, therefore, the difficulty of taking and disposing of a position in a firm's shares. For our measure of liquidity, we follow Bekaert, Harvey and Lundblad (2007) and define the zero-return metric (*ZERORET*) as the number of zero-return trading days over the fiscal year divided by the total trading days of the firm's fiscal year. An advantage of using the zero return measure in an international setting is that stock prices are widely available and measured consistently across markets relative to other measures such as volume or bid-ask spreads.⁹ Lesmond, Ogden, and Trzcinka (1999) argue that a manifestation of illiquidity will be infrequent trading reflected in days without price movements. As such, higher values correspond to greater illiquidity.

Bekaert, Harvey and Lundblad (2007) apply the zero return measure in an international context and find that the measure predicts future returns and behaves like a priced returns factor. Lesmond (2005) provides evidence that zero returns are a better proxy for liquidity than is volume or several other proxies in international settings. He also demonstrates that more traditional measures of transaction costs such as effective bid-ask spreads computed with detailed transaction data, where available, tend to be correlated with zero return days. Ashbaugh-

⁹ Country fixed effects are used in the model to control for potential cross country differences in the measurement of the liquidity variables.

Skaife, Gassen and LaFond (2006) provide evidence that a zero return metric is a summary measure of the extent to which firm-specific information is impounded in share price.

We also estimate our models using the bid-ask spread (*BIDASK*) as a proxy for transaction costs, measured as the average bid-ask spread over the fiscal year, where the bid-ask spread is calculated as $(ASK-BID)/((ASK+BID)/2)$, and the value is included in log format in the models following prior literature [see, e.g., Daske et al. (2008)]. Given that higher values of the *ZERORET* and *BIDASK* measures correspond to greater illiquidity, we predict a negative relation between these measures and our previously described transparency measures.

4.2. Liquidity Results

Tables 3 and 4 display the results using our two different measures of liquidity as dependent variables. In addition, in subsequent tables we report results using a combined liquidity measure (*ILLIQ*), which for each firm takes the average percentile rank across the two liquidity measures, *ZERORET* and *BIDASK*. Since the two liquidity measures provide consistent results, for parsimony we use the combined measure in our later empirical tests and in discussing the results. We report results separately with and without the analyst forecast accuracy variable because inclusion of forecast accuracy substantially reduces the sample size and limits the sample to the largest firms.

Recall that larger values of our liquidity measures represent higher illiquidity. In terms of our control variables, the results suggest that larger firms (*LNMVE*) with higher book-to-market ratios (*BM*) tend to be more liquid, although the relations are not always statistically significant in every specification. The coefficients on the two ADR variables are mixed and depend on the specification. The predicted direction of the effect here is ambiguous because, on

the one hand, US listing requirements likely increase transparency but, on the other hand, research such as Baruch, Karolyi, and Lemmon (2007) argues that local market trading often migrates to the U.S. market. The coefficients on the non-exchange-traded ADR variable are generally positive, suggesting that the effect of cross listing on local liquidity may be negative in cases in which it is not accompanied by an increase in mandated disclosure, but the coefficients on the exchangetraded ADR variable are mixed suggesting that the liquidity migration and disclosure effects may be offsetting.

In addition, the *%CLHLD* variable is significantly positive, suggesting that higher levels of insider ownership are associated with lower liquidity. While this could reflect a lower level of transparency for firms with relatively concentrated ownership, it may also capture differences in free float.¹⁰ Finally, the coefficient on *FUND_SMT* is consistently negative. This result is interesting because it suggests that firms for which accruals naturally smooth earnings relative to cash flows are characterized by lower levels of information asymmetry and higher liquidity, consistent with research such as Francis, LaFond, Olsson and Schipper (2004), suggesting that transparency may be greater for firms for which accruals smooth earnings.

In terms of our primary variables of interest, we find consistent results across most liquidity measures that indicate increased transparency is associated with increased liquidity. For both zero return days and bid-ask spread, we find a significantly positive coefficient on earnings smoothing, suggesting that transaction costs are higher and investors are less willing to trade in firms' shares when managers report earnings that are excessively smoothed relative to underlying cash flows. Recall from the results in the Appendix that managers tend to smooth earnings more when incentives to create opacity are strongest and oversight is weakest. The

¹⁰ Consistent with a transparency explanation, *%CLHLD* is a significant determinant of earnings smoothing, and the relation between *%CLHLD* and liquidity is larger for firms with poor country-level governance (low *ASDI* and *DISCLOSURE*) than for firms with strong country-level governance.

results here complement those results by suggesting that earnings smoothing is indeed associated with greater opacity and is reflected in investors' willingness to transact in the firm's shares. Further, the fact that the coefficient on DIS_SMTH is the opposite sign from the coefficient on FUND_SMTH suggests that the split between discretionary and fundamental smoothing is not arbitrary in the sense that the two measures appear to capture different aspects of smoothing.

In addition, we find a consistent and significant negative coefficient on the indicator variable for Big-5 auditor in most specifications, suggesting that, even controlling for evidence of earnings smoothing, the presence of a large, high quality, auditor, is associated with greater transparency and an increased willingness by investors to transact in a firm's shares. The coefficient on the variable for international GAAP is significantly negative in all specifications for using the zero returns dependent variable, but mixed for the bid-ask spread regressions, perhaps reflecting the smaller sample sizes.¹¹ The coefficient estimate is negative in the firm fixed effects analysis for both measures of liquidity, suggesting that changes to non-local accounting standards are associated with greater liquidity.

In terms of the analyst variables, both are consistent with expectations. Across all specifications, the number of analysts following the firm is significantly correlated with liquidity. In terms of transparency, the results suggest that the oversight and information acquisition roles of analysts increase investors' willingness to transact in the firm's shares. Similarly, analyst forecast accuracy is consistently significant across specifications, suggesting that smaller analyst forecast errors are associated with greater transparency and greater liquidity in a firm's stock.

Overall, the liquidity analysis is consistent with our predictions. It suggests that, controlling for country, industry, year, and many other factors, transaction costs are lower and

¹¹ Mixed results for accounting standards is also consistent with the prior literature discussed earlier and perhaps reflects the greater importance of incentives and enforcement relative to accounting standards in determining transparency (Daske, Hail, Leuz, and Verdi, 2007).

liquidity is higher for firms with less evidence of earnings management, a higher quality auditor, international GAAP, greater analyst following, and more accurate analyst earnings forecasts. It is particularly reassuring to see that the results are most consistent with firm fixed effects, suggesting that the findings do not simply reflect fundamental firm-level differences across the sample.

In terms of economic significance, the effects are substantial as well. For parsimony in our later analyses, we combine the transparency variables to create an aggregate measure, *TRANS*, by ranking each variable, summing the percentile ranks and taking the average. As reported in the final two columns (columns V and VI) of Tables 3 and 4, when we replace the individual transparency components with *TRANS*, the coefficient on *TRANS* is highly significant in both the *ZERORET* and *LN(BIDASK)* specifications with coefficients of -0.187 and -0.433, respectively. Coupled with the interquartile range of *TRANS*, the Table 4 coefficients imply that an interquartile reduction in transparency is associated with about a 30% reduction in bid-ask spread.

4.3 When Does Firm-Level Transparency Matter Most?

A second question that we examine with respect to liquidity and transparency is whether the relation differs across countries, firms, and time periods. In particular, it seems likely that the importance of firm-level transparency varies depending on other aspects of the firm's environment. We consider three aspects of the firm's environment that are likely to increase investor demand for information: country-level institutions, firm-level governance issues and time period uncertainty.

First, in terms of country-level institutions, because we estimate models with country fixed effects, we cannot test for country effects using country-level variables across our full sample. However, country-level institutions are likely to have significant implications for the importance of firm-level transparency in determining liquidity. In particular, firm-level transparency likely matters more when general oversight and disclosure are weak. For example, in countries with relatively weak accounting standards, regulatory oversight and overall disclosure levels, the role of high quality auditors, international accounting standards, reduced levels of earnings management and high levels of analyst activity is likely to be especially important.

To examine the effect of country-level institutions, we use the two country-level characteristics that speak to governance and transparency, *ASDI* and *DISCLOSE*. To execute our tests while still controlling for country fixed effects, we split our sample based on countries that score below and above the median score for these two measures, respectively.¹²

Table 5 reports the results of this analysis. For parsimony, we use our combined liquidity measure, *ILLIQ*, along with our combined transparency measure, *TRANS*. Our primary interest is in comparing the strength of the relation between *TRANS* and *ILLIQ* between the high and low *ASDI* and *DISCLOSE* subsamples. The results are consistent with expectations. First, in terms of controls, most relations are similar across the two subsamples. Where the coefficients differ, they are consistent with expectation. For example, cross listing has a greater positive effect on liquidity for firms from countries with weak investor protection, consistent with bonding being more important in those environments. Similarly, concentrated ownership is more of an issue for liquidity in environments with weaker investor protection.

¹² Results are very similar if we estimate a single regression with an interactive term for country level institutions and transparency.

In terms of our primary relation of interest, the association between transparency and illiquidity is significantly negative for countries with both weak and strong country-wide institutions. However, consistent with expectations, the relation is substantially stronger for countries with low *ASDI* and *DISCLOSURE* scores, indicating that the effect of transparency on liquidity is more pronounced in countries with worse investor protection and overall disclosure. Further, the results are similar regardless of whether our measure captures a country's governance (*ASDI*) or its opacity (*DISCLOSURE*). Overall, the results suggest that, consistent with expectations, firm-level transparency factors are more important in environments in which country-level institutions tend to be weaker. The effects are also economically significant. Coefficient estimates relating transparency to liquidity are two to three times as large for firms in countries with weak investor protection and disclosure, consistent with the notion that, in environments in which country-wide institutions are weak, firm level factors such as choice of auditor, accounting standards, extent of earnings smoothing, oversight by analysts and the general information environment become more important.

Second, it seems likely that differences in time periods can matter to transparency. For example, when there are exogenous shocks which increase uncertainty, effects are likely to be mitigated for more transparent firms. One common measure for operationalizing market uncertainty in the U.S. is to use a measure such as the Chicago Board Options Exchange Volatility Index (VIX), which captures expected volatility of the S&P Index over the next 30 days. Unfortunately, similar measures are not available for all markets we study here. However, volatility of the previous 30 days is highly correlated with subsequent volatility, so we base our first measure of expected volatility going forward on the last 30 days of country-level returns

volatility.¹³ The basic notion of interest is whether, when a country is hit by increased uncertainty as reflected in a volatility shock, investors become especially hesitant to trade in firms with greater opacity.

Our second measure is based on country-wide liquidity. Our goal here is to assess which firms are affected most when there are liquidity shocks and, in particular, whether liquidity dries up the most for more opaque firms. We measure country-wide liquidity shocks by aggregating our liquidity measures at the country level and comparing periods in which liquidity is relatively high to those in which it is relatively low.

While our preceding analyses are based on annual observations because of our measures of transparency, we can measure volatility and liquidity over much shorter windows. We conduct our analysis over a monthly window. As a result, the question is whether, following a month of high country-level uncertainty or a month of low country-level liquidity, firm-level illiquidity is more sensitive to transparency.¹⁴

Table 6 reports the empirical results, splitting the sample based on lagged country-wide volatility and liquidity. Results are consistent with expectations. For months in which prior country-level volatility is high or liquidity is low, transparency is more strongly associated with firm-level liquidity. Results for firm fixed effects are similar, suggesting that it is not simply cross-company differences in uncertainty that drive the empirical results. These results are particularly interesting in light of the recent economic crisis because they suggest that

¹³ Results are similar if we forecast volatility based on past volatility and use that as our measure.

¹⁴ Because our transparency measures are at an annual level, the assumption is that transparency measured in the preceding year is approximately representative for subsequent months. Results are very consistent if contemporaneous transparency and liquidity or alternate-length windows are used.

transparent firms are less likely to be affected by increases in volatility and reductions in overall liquidity than are opaque firms.¹⁵

Finally, transparency is likely to be particularly important when firm-level governance is weak. While it is difficult to measure firm-level governance precisely, one approach is to base it on concentrated ownership. Research such as McConnell and Servaes (1990) suggests that, while some block ownership can be beneficial because it aligns incentives, high levels are detrimental because they create sufficient control to permit, for example, expropriation of assets. In situations in which ownership is particularly concentrated, firm-level transparency is likely to be particularly important in alleviating investor concern.

To examine the effect of firm-level governance, we split the sample between firms that have above- and below-median levels of concentrated ownership. Because the McConnell and Servaes (1990) results suggest that the effect of ownership concentration may be nonmonotonic, we include separate coefficients for low and high ownership concentration, as well as interactions with transparency.

Results are reported in Table 7. Two points are worth noting. First, consistent with McConnell and Servaes (1990), at lower levels, more concentrated ownership appears to be associated with better incentive alignment and greater liquidity, but, at higher levels, increased ownership concentration appears to exacerbate agency problems and increase investor uncertainty. However, the interactions between ownership concentration and transparency remain significantly positive for both low and high ownership concentration firms, suggesting that transparency is associated with less uncertainty irrespective of the ownership level. More important for our purposes, the effect of transparency is particularly strong among firms with the

¹⁵ Not surprisingly, results are very similar if we limit attention to the current economic crisis; liquidity decreased substantially for firms as a whole, but especially those with relatively low levels of transparency.

highest levels of ownership concentration, suggesting that, while transparency is associated with greater liquidity at all levels of ownership, the effects are particularly pronounced when ownership concentration (and, hence, agency issues) is likely to be high.

One final issue is whether ownership concentration interacts with the institutions that shape a firm's behavior. In particular, the effect of firm-level governance likely varies based on country-level institutions. For example, in environments with weak protection of minority investors, greater ownership concentration is likely to be more problematic. As a result, we repeat the analysis, splitting between high- and low-ASDI firms, including the ownership concentration interaction. The last two columns of Table 7 report the results of the analysis. Irrespective of country-level investor protection, transparency is more important for firms with more concentrated ownership. More importantly, transparency is most important when concentrated ownership is combined with weak investor protection. We also repeat the analysis splitting based on country-level opacity using our DISCLOSE variable and find similar results (not tabulated for the sake of brevity).

Overall, results from this section suggest important interactions between transparency and other aspects of the firm's environment. In particular, if overall uncertainty is likely to be high, either because of weak country-level institutions, economic volatility, weak firm-level governance, or a combination of these factors, the association between transparency and liquidity is particularly strong.

4.4 Endogeneity

As noted earlier, a challenge for research on transparency, particularly in international contexts, is assessing causality. For example, the firm's choice of transparency may be a

function of the underlying liquidity in a firm's shares. Our results are based on associations and, while we view them as descriptively interesting, it is inappropriate to draw strong conclusions about the direction of causality. That being said, we use several approaches to attempt to provide further assurance about the likely direction of causality.

First, the preceding analysis includes a wide range of control variables which should capture many of the reasons that transparency might be endogenous. For example, suppose that transparency and liquidity are both high because a firm trades on a U.S. exchange or because it attracts greater investor interest. Inclusion of variables such as cross listing, market-to-book ratios and past growth should mitigate those types of effects. Similarly, our primary analyses use country, industry and year fixed effects, which should control for country, industry and time period factors.

Second, the robustness to inclusion of firm fixed effects makes it clear that our results do not simply reflect cross-firm differences in transparency and liquidity. For example, if it was simply the case that some firms are of inherently higher liquidity and higher transparency, the relation between liquidity and transparency should disappear in a within-firm comparison. If anything, our results are more consistent after controlling for cross-firm differences, suggesting that within-firm variation drives the results.

Third, results are robust to inclusion of lagged transparency. Results (not tabulated) indicate similar conclusions when the transparency values are replaced by a lagged value of transparency, suggesting that the results do not simply reflect the notion that firms become more transparent when liquidity is higher. Further, fixed effects results are robust to inclusion of lagged transparency, suggesting that innovations in transparency tend to be associated with higher subsequent liquidity.

Fourth, the analysis in the preceding section suggests that the effects are strongest following exogenous shocks to uncertainty. Ideally, we would be able to observe exogenous shocks to transparency to help to identify the system. While it is difficult to identify exogenous transparency shocks, we can examine exogenous shocks to country-level uncertainty and liquidity, over periods during which transparency is unlikely to change appreciably (e.g., one month windows). Given that transparency is being held approximately constant during those periods, but that changes in liquidity remain a function of transparency, it is unlikely to be the case that the observed association between transparency and liquidity is simply the result of transparency changing in response to changes in liquidity.

Fifth, given that the association between liquidity and transparency varies predictably across subsamples, it is more difficult to envision a consistent theory in which causality is reversed yet the subsample results hold. For example, the theory would need to explain why, in low investor protection environments, in firms with higher ownership concentration, and in periods of high uncertainty, relatively lower levels of liquidity result in relatively higher levels of transparency.

Finally, we attempt to explicitly model transparency and liquidity simultaneously. Statistical approaches for dealing with simultaneity are notoriously difficult to implement because of the difficulty in obtaining variables that are entirely exogenous to identify the system. Of our transparency variables, concerns about reverse causality seem less pronounced for variable such as auditor choice, accounting standard choice and earnings management because it is more difficult to see why greater liquidity would motivate those types of choices (if anything, it seems likely that lower liquidity would provide incentives for firms to improve reporting quality). However, it is possible that analyst following is affected by liquidity. To the extent

that investors are attracted to firms with greater liquidity, it could be that the direction of causality is reversed.

Roulstone (2003) provides some comfort on this point. He jointly estimates analyst following and liquidity for a sample of U.S. firms and concludes that analysts provide information to capital markets rather than simply chasing liquidity. Similarly, Yu (2008) provides evidence that analysts discipline accounting choices around earnings management. Following those studies, we conduct a two-stage least squares estimation in which the first stage features transparency as a function of variables suggested by research such as Lang and Lundholm (1996), Roulstone (2003) and Yu (2008): standard deviation of return on equity, return-earnings correlation, and asset growth, all computed over the prior three to five year window, and one-year lagged return on assets. The liquidity equation from Table 3 is our structural model. Analysis of the first stage suggests that our determinants are significantly related to transparency and the Cragg-Donald Wald Fstatistic indicates that we do not suffer from weak instruments. Results from the second stage are consistent with those reported earlier in that transparency remains significantly positively correlated with liquidity.

Combined with the preceding evidence, and subject to the caveat that assessing liquidity is notoriously difficult in these types of environments, the overall evidence provides some confidence that the observed relation is not simply a result of liquidity causing transparency.

4.5. Other Analyses

In this section we discuss the results of several untabulated robustness tests designed to bolster confidence in the interpretation of our results.

First, because they represent such a significant portion of our sample, and thus threaten the generalizability of our results, we repeat our analyses eliminating Japanese and U.K. firms. We find that our inferences are robust to the exclusion of both of these countries. In fact, we document a negative relation between transparency and liquidity for 41 out of 43 sample countries, suggesting that the results are not driven by a small subset of countries. Similarly, to examine whether the results are sensitive to time period, we rerun the analysis by year. Results are consistent for each of the years in the sample suggesting that the conclusions are not sensitive to time periods.

Second, we test for liquidity effects by estimating the *DIS_SMTHC* variable within country, rather than pooling firm-year observations from all countries. Specifically, we use the residuals from within-country regressions in calculating the discretionary smoothness measures used in our liquidity analysis. We continue to find that discretionary smoothness is significantly related to a reduction in liquidity in all model specifications.

Third, we include controls for the overall level and absolute value of accruals in our tests of liquidity effects. Jayaraman (2007) and Bhattacharya et al. (2008) suggest that, in a U.S. setting, a higher level of accruals may be suggestive of greater informed trading and higher transaction costs. The idea here is that large accruals may be indicative of unusual circumstances faced by the firm and correspondingly greater uncertainty and information asymmetry. To ensure that our analysis is not affected by such circumstances, we replicate our analysis including the level and absolute value of accruals. We find that including either (or both) accruals measures has no effect on the inferences drawn in our liquidity analysis.

4.6. Liquidity and Valuation

In our final analysis, we examine the relation between liquidity and ex-ante cost of capital and firm valuation. While it is true in theory that liquidity should affect cost of capital and valuation, there is little empirical evidence for an international set of firms on the importance of this relation. The closest research is Bekaert et al. (2007), which finds that, for a sample of emerging market firms, unexpected liquidity shocks are positively correlated with contemporaneous return shocks and negatively correlated with shocks to dividend yield, consistent with liquidity being a priced risk factor. However, as they note, emerging markets are likely to be extreme in terms of liquidity effects and it is unclear to what extent liquidity affects pricing in more developed markets. Further, their analysis does not quantify the economic magnitudes of the potential effects. As a result, it is possible that, while transparency is associated with significant liquidity effects, the relation to cost of capital and firm value is minor.

We assess the effects of liquidity using two modeling approaches: implied cost of capital and Tobin's Q. There is debate in the empirical literature as to the optimal approach to estimating an implied cost of capital [see, for example, Botosan and Plumlee (2005) and Hail and Leuz (2006)]. For this reason, we estimate four separate models frequently cited in the empirical literature: 1) the modified PEG ratio model by Easton (2004); 2) the Ohlson and Juettner-Nauroth (2005) model; 3) the Gebhardt, Lee, and Swaminathan (2001) model; and 4) the Claus and Thomas (2001) model. Following Hail and Leuz (2006), we take the average of these four models as our firm-specific measure of cost of capital.

The cost of capital model we employ includes the following control variables: *LNASSETS*; *LEV*; *STDRET*; *ADR*, an indicator variable equal to one if the firm had a U.S. depository receipt during the year; and *RF_RATE*, the country-specific yearly risk-free interest rate. These control variables are typical for the literature [see, e.g., Easton (2004), Botosan and

Plumlee (2005), and Daske et al. (2008)]. In addition, we include country, industry, and year fixed effects.

Descriptive statistics for our cost of capital measure are reported in Table 2. For our sample, the mean cost of capital is 11.4%, the median is 10.4% and the interquartile range is from 8.3% to 13.2%. Overall, the relative order of magnitude seems reasonable based on prior studies and there is substantial variation among sample firms.

Our valuation regression estimates are reported in Tables 8 and 9. For the Table 8 models, which feature implied cost of capital as the dependent variable, it is important to note that the number of observations here has dropped from 95,106 in the preceding analysis to 9,855, reflecting the limited availability of analyst forecast data for our sample of firms. This is likely to bias against our finding strong results because the sample here is limited to the largest, most heavily followed firms, which are likely to have fewer transparency issues and therefore a weaker relation between transparency and cost of capital. The table shows that cost of capital behaves as one would expect with respect to the control variables; cost of capital is higher the greater is the risk free rate, and it is higher for smaller firms, more highly leveraged firms, and more volatile firms. The *ADR* cross listing variable is generally insignificant.

More importantly for our purposes, our variable of interest, *ILLIQ*, is positively and significantly associated with average cost of capital, which indicates that, as predicted, firms with higher levels of illiquidity, as captured by the number of zero return days and the bid-ask spread, tend to face a higher cost of equity capital. Moving from the 25th to 75th liquidity percentile is associated with a decrease in cost of capital of about half a percentage point, suggesting that liquidity effects are economically important as well as statistically significant.

Results are very consistent in the firm fixed effects estimations, suggesting that the analysis does not simply capture differences in underlying characteristics across firms.

Given that the liquidity variable is correlated with our transparency variables, it is possible that liquidity is capturing omitted correlated variables related to our transparency measures that affect cost of capital, but not through liquidity. For example, Lambert, Leuz and Verrecchia (2007) develop a theoretical model in which transparency can affect cost of capital, but not through liquidity. Table 8 also reports results including *TRANS* along with *ILLIQ*. Controlling for *ILLIQ*, the *TRANS* coefficient is negative, suggesting that higher transparency reduces cost of capital, but is only significant with country fixed effects. More importantly, its inclusion does not affect the coefficient on *ILLIQ*. As a result, it appears that the liquidity effect is an incremental one beyond any more direct link between transparency and cost of capital.¹⁶

An alternate approach is to conduct a path analysis. The path analysis uses the covariance matrix to assess the path through which transparency is reflected in cost of capital. The path analysis suggests that there is a significant negative relation between transparency and cost of capital overall. However, the effect of liquidity fully mediates the direct relation between transparency and cost of capital. In other words, based on the path analysis, it appears that the relation between transparency and cost of capital occurs entirely through the effect of transparency on liquidity coupled with the effect of liquidity on cost of capital.

We also estimate the relation between liquidity and valuation as measured with Tobin's Q. While a cost of capital approach is more direct, it limits our analysis to a small subsample of the largest firms and relies crucially on the assumptions around analyst forecasts. This is

¹⁶ We also estimate the relation between liquidity and cost of capital including both the intrinsic portion of liquidity explained by the control variables and the proportion explained by the transparency variables. Both are consistently positive, suggesting that cost of capital responds to both intrinsic liquidity effects as well as those related to transparency.

particularly an issue in international settings where analyst following, when it exists, tends to be limited. For our Tobin's Q analysis, the sample size increases substantially to 82,165 and therefore includes a much wider range of firms.

Tobin's Q is defined as: $(\text{book value of assets} + (\text{market value of equity} - \text{book value of equity}))/\text{book value of assets}$. It is designed to reflect the valuation placed on the assets by the market relative to their book value and inherently incorporates the cost of capital used by the market in discounting future cash flows. Table 2 provides statistics for Tobin's Q (Q). The median Q for the sample is about 1.11, indicating that investors value assets a little above their book value.

Table 9 reports results for Tobin's Q. Again we include controls from the prior literature, along with country, industry, and year fixed effects.¹⁷ Results for the control variables are again consistent with prior literature. In particular, Tobin's Q tends to be higher for firms that are smaller, more profitable, more highly levered, have higher growth, are cross listed on U.S. exchanges, and pay dividends. In terms of our variables of interest, the coefficient on *ILLIQ* is strongly negative, suggesting that investors place lower valuations on less liquid firms.

In this case, it is particularly important to control for *TRANS* directly because transparency can affect valuation through its effect on cash flows. That is, by construction Q captures variables that affect both the cash flows to the assets as well as the cost of capital. If transparency affects, for example, managers' ability to expropriate assets, it will affect valuations through expected future cash flows. When we include *TRANS* directly in the regression, it is strongly positive, consistent with transparency affecting valuation over and above its effect

¹⁷ See, for example, Claessens et al. (2003), Lins (2003), and Kalcheva and Lins (2007).

through liquidity. More importantly, however, *ILLIQ* remains strongly negative, suggesting that liquidity remains important, even once the direct effects of transparency are included.¹⁸

Again, we estimate a path analysis to disentangle the effect of transparency through liquidity to valuation from the direct effect of transparency on valuation. The path analysis suggests that transparency is important to valuation, both through the liquidity path as well as directly. The strength of the two effects of transparency on valuation is similar, although somewhat stronger for the liquidity effect, suggesting that liquidity is an important path from transparency to valuation.

5. Conclusion

Recent reductions in the liquidity and valuation of securities traded in global capital markets have demonstrated the importance of understanding more fully the drivers of a firm's stock market liquidity and any associated linkages to valuation. In this paper, we examine whether reduced transparency is an important factor that raises transaction costs and lowers liquidity in a firm's shares, thereby increasing cost of capital and reducing valuation.

For a global sample of firms, our evidence suggests that increased transparency, as reflected in reduced earnings management, higher quality auditing, use of international accounting standards, increased analyst following and smaller analyst forecast errors is associated with lower bid-ask spreads and greater liquidity. The effect of firm-specific transparency on transaction costs and liquidity is particularly pronounced in environments in which there is likely to be more inherent uncertainty (weak country-level institutions,

¹⁸ As with cost of capital, we also estimate the relation between liquidity and Q including both the intrinsic portion of liquidity explained by the control variables and the proportion explained by the transparency variables. Both are consistently positive, suggesting that Q responds to both intrinsic liquidity effects as well as those related to transparency.

concentrated firm-level ownership and time periods of increased country-level volatility and lower liquidity), suggesting that firm-level transparency is particularly important in the presence of other informational issues. Finally, our results suggest that increased liquidity and lower transaction costs are associated with a lower cost of capital and higher valuation. Our results are both statistically significant as well as economically meaningful. Taken together, our results suggest that a focus on the transparency provided to those who invest in a firm's securities could be a fruitful component of an effort to more fully understand the recent increases in illiquidity and decreases in valuation for many assets worldwide.

Our results are also subject to several caveats. First, we focus only on one potential consequence of increased transparency, improved liquidity. Of course, increased transparency also entails other types of costs and benefits. As a consequence, our results do not imply that managers would necessarily be better off by increasing transparency, only that benefits may accrue through reduced transaction costs and increased liquidity. It is possible that other costs associated with increased transparency would more than offset the benefits in terms of liquidity. There is room for future research examining more specifically the tradeoffs in establishing an optimal level of transparency.

Second, as discussed earlier, it is difficult to ascertain causality. By their very nature our analyses are based on associations, and we cannot be certain to what extent the relations are causal. While we attempt to control for a wide range of potentially-important factors as well as incorporating endogeneity of analyst following and firm fixed effects, conclusions should be drawn with caution. There is substantial scope for additional research identifying more specifically the channels through which transparency affects liquidity. Overall, however, we

view our paper as providing interesting initial evidence on the important effects of transparency on liquidity and valuation in an international setting.

REFERENCES

- Amihud, Y., Lauterbach, B., Mendelson, H., 2003. The Value of Trading Consolidation: Evidence from the Exercise of Warrants. *Journal of Financial and Quantitative Analysis* 38, 829-846.
- Amihud, Y., Lauterbach, B., Mendelson, H., 1997. Market Microstructure and Securities Values: Evidence from the Tel Aviv Exchange. *Journal of Financial Economics* 25, 365-390.
- Amihud, Y., Mendelson, H., 1986. Asset Pricing and the Bid-Ask Spread. *Journal of Financial Economics* 17, 223-249.
- Amihud, Y., Mendelson, H., 2008. Liquidity, the Value of the Firm, and Corporate Finance. *Journal of Applied Corporate Finance* 2008, 32-45.
- Amihud, Y., Mendelson, H., Uno, J., 1999. Number of Shareholders and Stock Prices: Evidence from Japan. *Journal of Finance* 54, 1169-1184.
- Alford, A., Jones, J., Leftwich, R., Zmijewski, M., 1993. The Relative Informativeness of Accounting Disclosures in Different Countries. *Journal of Accounting Research*, 31, 183-223.
- Ali, A., Hwang, L., 2000. Country-Specific Factors Related to Financial Reporting and the Value Relevance of Accounting Data. *Journal of Accounting Research*, 38, 1-21.
- Ashbaugh, H., Olsson P. 2002. An Exploratory Study of the Valuation Properties of Cross-Listed Firms' IAS and US-GAAP Earnings and Book Values. *The Accounting Review* 77, 107-126.
- Ashbaugh, H. Gassen, J., LaFond, R., 2006. Does Stock Price Synchronicity Reflect Firm Specific Information? The International Evidence. Working Paper.
- Ashbaugh, H., LaFond, R. 2004. Reporting Incentives and the Quality of Non-U.S. Firms' Working Capital Accruals. Working paper, University of Wisconsin.
- Barth, M., Landsman, W., Lang, M. 2007. International Accounting Standards and Accounting Quality. *Journal of Accounting Research* 46, 467-498.
- Baruch, S., Karolyi, G., Lemmon, M. 2007. Multi-Market Trading and Liquidity: Theory and Evidence. *Journal of Finance* 62, 2169-2200.
- Bekaert, G., Harvey C., Lundblad C. 2007. Liquidity and Expected Returns: Lessons from Emerging Markets. *Review of Financial Studies* 20, 1783-1831.
- Bhattacharya, N., Desai, H., Venkataraman, K. 2008. Earnings Quality and Information Asymmetry: Evidence from Trading Costs. Working paper, Southern Methodist University.

Bhattacharya, U., Daouk, H., Welker, M. 2003. The World Price of Earnings Opacity. *The Accounting Review* 78, 641-678.

Botosan, C., and Plumlee, M., 2005. Assessing Alternative Proxies for the Expected Risk Premium. *The Accounting Review* 80, 21–53.

Bradshaw, M., and G. Miller, 2008. Will Harmonizing Accounting Standards Really Harmonize Accounting? Evidence from Non-U.S. Firms Adopting U.S. GAAP. *Journal of Accounting, Auditing and Finance* 23, 233-263.

Brennan, M., Subrahmanyam, A., 1995, Investment Analysis and Price Formation in Securities Markets. *Journal of Financial Economics* 38, 361-381.

Brennan, M., Subrahmanyam, A. 1996, Market Microstructure and Asset Pricing: On the Compensation for Illiquidity in Stock Returns. *Journal of Financial Economics* 41, 441-446.

Brockman, P., D. Chung, and X. Yan, 2008, Block Ownership, Trading Activity, and Market Liquidity, forthcoming, *Journal of Financial and Quantitative Analysis*.

Chaplinsky, S., Ramchand, L., 2004. The Borrowing Costs of International Issuers: SEC Rule 144A. *The Journal of Business* 77, 1073-1079.

Chordia, T. Subrahmanyam, A., Anshuman V. 2001. Trading Activity and Expected Stock Returns. *Journal of Financial Economics* 59, 3-32.

Claessens, S., Djankov, S., Fan, J., Lang, L. 2002. Disentangling the incentive and entrenchment effects of large shareholders. *The Journal of Finance* 57, 2741-2771.

Claus, J., and Thomas, J., 2001. Equity Premia as Low as Three Percent? Evidence from Analysts' Earnings Forecasts for Domestic and International Stock Markets. *Journal of Finance* 56, 1629–1666.

Dahlquist, M., Pinkowitz, L., Stulz, R., Williamson, R. 2003. Corporate Governance and the Home Bias. *Journal of Financial and Quantitative Analysis* 38, 87-110.

Daske, H., 2006. Economic Benefits of Adopting IFRS or US-GAAP – Have the Expected Cost of Equity Capital Really Decreased? *Journal of Business Finance and Accounting* 33, 329-373.

Daske, H., Hail, L., Leuz, C., Verdi, R., 2008. Mandatory IFRS Reporting Around the World: Early Evidence on the Economic Consequences, forthcoming, *Journal of Accounting Research*, December Issue.

Djankov, S., La Porta, R. Lopez-de-Silanes, F., Shleifer, A. 2008. The Law and Economics of Self-Dealing. *Journal of Financial Economics* 88, 430-465.

- Easton, P., 2004. PE Ratios, PEG Ratios, and Estimating the Implied Expected Rate of Return on Equity Capital. *The Accounting Review* 79, 79–95.
- Eleswarapu V., Venkataraman, K. 2006. The Impact of Legal and Political Institutions on Equity Trading Costs: A Cross-Country Analysis. *Review of Financial Studies* 19, 1081-1111.
- Fan, J., Wong, T., 2002. Corporate Ownership Structure and the Informativeness of Accounting Earnings in East Asia. *Journal of Accounting and Economics* 33, 401-425.
- Fan, J., Wong, T., 2005. Do External Auditors Perform a Corporate Governance Role in Emerging Markets? *Journal of Accounting Research* 43, 35-72.
- Fang, V., Noe, T., and Tice, S., 2008, Stock Market Liquidity and Firm Value, forthcoming, *Journal of Financial Economics*.
- Francis, J., 2004. What Do We Know About Audit Quality? *British Accounting Review* 36, 345-368.
- Francis, J., LaFond, R., Olsson, P., Schipper, K., 2004. Costs of Equity and Earnings Attributes. *The Accounting Review* 79, 967-1010.
- Gebhardt, W., Lee C., and Swaminathan, B., 2001. Toward an Implied Cost of Capital, *Journal of Accounting Research* 39, 135–176.
- Glosten, L., Milgrom, P., 1985. Bid, Ask, and Transaction Prices in a Specialist Market with Heterogenously Informed Traders. *Journal of Financial Economics* 14, 71-100.
- Hail, L., Leuz C., 2006. International Differences in the Cost of Equity Capital: Do Legal Institutions and Securities Regulation Matter? *Journal of Accounting Research* 44, 485–531.
- Hail, L., Leuz C., 2008. Cost of Capital Effects and Changes in Growth Expectations around U.S. Cross-Listings. Working Paper, University of Chicago.
- Jayaraman, S. 2007. Earnings Volatility, Cash Flow Volatility and Informed Trading, forthcoming, *Journal of Accounting Research*.
- Juettner-Nauroth B., and Ohlson, J., 2005. Expected EPS and EPS Growth as Determinants of Value. *Review of Accounting Studies* 10, 349–365.
- Kalcheva, I., Lins, K., 2007. International Evidence on Cash Holdings and Expected Managerial Agency Problems. *Review of Financial Studies* 20, 1087-1112.
- Kasanen, E., Kinnunen, J., Kiskanen, J., 1996, “Dividends-Based Earnings Management: Evidence from Finland,” *Journal of Accounting and Economics*, 22, 283-312.
- Kyle, A. S. 1985. Continuous Auction and Insider Trading. *Econometrica*, 1315-1335.

- La Porta, R., Lopez-de-Silanes, F., Shleifer, A., 2006. What Works in Securities Laws? *Journal of Finance* 61, 1-32.
- Lambert, R., Leuz, C., Verrecchia, R. 2007. Accounting Information, Disclosure and the Cost of Capital. *Journal of Accounting Research* 45, 385-420.
- Lang, M., Lundholm, R., 1996. Corporate Disclosure Policy and Analyst Behavior. *The Accounting Review* 71, 467-493.
- Lang, M., Lins, K., Miller, D. 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, M., Lins, K., Miller, D. 2004. Concentrated Control, Analyst Following, and Valuation: Do Analysts Matter Most When Investors are Protected Least? *Journal of Accounting Research* 42, 581-623.
- Lang, M., Smith Raedy, J., Wilson, W., 2006. Earnings Management and Cross Listing: Are Reconciled Earnings Comparable to U.S. Earnings? *Journal of Accounting and Economics* 42, 255-283.
- Lesmond, D., Ogden, J., Trzcinka, J. 1999. A New Estimate of Transaction Costs. *The Review of Financial Studies*. 12, 1113-1141.
- Lesmond, D. 2005. Liquidity of Emerging Markets. *Journal of Financial Economics*. 77, 411-452.
- Leuz, C., Verrecchia, R. 2000. The Economic Consequences of Increased Disclosure, *Journal of Accounting Research* 38, 353-386.
- Leuz, C. 2003. AS Versus U.S. GAAP: Information Asymmetry-Based Evidence from Germany's New Market. *Journal of Accounting Research*, 41, 445-472.
- Leuz, C., Nanda, D., Wysocki, P., 2003. Earnings Management and Investor Protection: An International Comparison. *Journal of Financial Economics* 69: 505-527.
- Leuz, C., 2006. Cross Listing, Bonding and Firms' Reporting Incentives: A Discussion of Lang, Raedy and Wilson. *Journal of Accounting and Economics* 42: 284-296.
- Leuz, C., Lins, K , Warnock, F. 2008. Do Foreigners Invest Less in Poorly Governed Firms?, *Review of Financial Studies*, forthcoming.
- Lins, K., 2003. Equity Ownership and Firm Value in Emerging Markets. *Journal of Financial and Quantitative Analysis* 38, 159-184.

McConnell, J. and Servaes, H., 1990. Additional Evidence on Equity Ownership and Corporate Value. *Journal of Financial Economics* 27, 595-612.

Nikolaev, V. and L. van Lent, 2005, The Endogeneity Bias in the Relation between Cost-of-Debt Capital and Corporate Disclosure Policy. *European Accounting Review* 14(4), pp. 677-724.

Pastor, L., Stambaugh, R., 2003. Liquidity Risk and Expected Stock Returns. *Journal of Political Economy* 111, 642-685.

Pownall, G., Schipper, K. 1999. Implications for Accounting Research for the SEC's Consideration of International Accounting Standards for U.S. Securities Offerings. *Accounting Horizons* 13, 259-280.

Roulstone, D., 2003. Analyst Following and Market Liquidity. *Contemporary Accounting Research* 20, 552-578.

Stoll, H. 2000. Friction, *Journal of Finance* 55, 1479-1514.

Yu, F., 2008. Analyst Coverage and Earnings Management. *Journal of Financial Economics* 88, 245-271.

APPENDIX

Computation and tests of the discretionary earnings management proxy: DIS_SMTHC ¹⁹

We compute DIS_SMTHC based on two earnings smoothness measures commonly used in the literature. The first earnings smoothness measure ($SMTH1$) captures the volatility of earnings relative to the volatility of cash flows with the idea being that the more firms use accruals to manage earnings the smoother net income will be relative to cash flows [Leuz et al. (2003) and Francis, LaFond, Olsson and Schipper (2004)]. $SMTH1$ is measured as the standard deviation of net income before extraordinary items divided by the standard deviation of cash flow from operations, where net income before extraordinary items and cash flow from operations are scaled by average total assets and the standard deviations are calculated using rolling time intervals requiring a minimum of three and a maximum of five years of data. Cash flow from operations is equal to net income before extraordinary items minus accruals, where accruals are defined as the change in current assets minus the change in current liabilities minus the change in cash plus the change in current debt in current liabilities minus depreciation and amortization expense.

The second earnings smoothness measure ($SMTH2$) is the correlation between the cash flow from operations scaled by total assets and total accruals scaled by total assets. The idea behind this measure is that, to the extent managers create accrual reserves in good times and use them to compensate for poor cash flows in bad times, accruals and cash flows will be more negatively correlated [Lang et al., 2006, Barth et al., 2007]. We note that Leuz et al. (2003) and Bhattacharya et al. (2003) calculate their correlation-based measure using the change in cash

¹⁹ A portion of the analysis in this appendix is based on the analysis conducted in a discontinued paper: “Earnings Smoothing, Governance, and Liquidity: International Evidence.”

flows from operations and the change in total accruals, whereas our correlation measure is based on the level. We draw identical inferences when defining *SMTH2* based on changes; however, the sample sizes are smaller due to the additional data requirements of the change measures. Both smoothing measures (*SMTH1*, *SMTH2*) are multiplied by negative one so that larger values represent firms with smoother earnings.

The smoothness of earnings relative to cash flows is clearly a natural function of the firms operating environment, but we are interested in the portion in excess of naturally-occurring earnings smoothness. As a consequence, we draw from prior research on the determinants of earnings smoothness and specify an equation designed to capture, to the extent possible, the expected level of earnings smoothness for a firm. We then measure discretionary (excess) smoothing using the residual from this regression, as specified below:

$$\begin{array}{ccccccc}
 = & & + & + & + & - & + \quad \% \\
 & + & & + & + & + & + \quad \Sigma \\
 & + \Sigma & & + & & &
 \end{array}$$

The right hand side variables are: *LNASSETS*, the log of total assets measured in millions of U.S. dollars, as a measure of firm size; *LEV*, total debt divided by total assets, to capture differences in financing choices; *BM*, the ratio of book value to market value of equity, to reflect the extent of the firm’s intangible assets and expected earnings growth; *STD_SALES*, the standard deviation of sales to capture the volatility of a firm’s underlying operating environment; *%LOSS*, the proportion of years that a firm experiences losses over the last three to five years, to capture differences in the accruals properties of loss observations; *OPCYCLE*, the log of days of accounts receivable plus inventories, to capture the length of the firm’s operating cycle; *SG*, the average sales growth over the past three to five years, to capture growth opportunities; *OPLEV*,

net property, plant and equipment divided by total assets, to capture capital intensity; *AVECFO*, average cash flow from operations divided by total assets over the last five years, to capture a firm's general level of profitability; and indicator variables for a firm's industry because the properties of accruals are likely to depend on industry, as well as year indicator variables to control for macro-economic cycles that could affect earnings cycles.

After we obtain each of the two discretionary smoothness regression residual measures for *SMTH1* and *SMTH2*, they are then scaled into percentile ranks, and combined by taking the average. This variable is referred to as *DIS_SMTHC* and is used to proxy for earnings management in our liquidity regressions.

Because earnings management is inherently difficult to measure, we next conduct a set of tests designed to build confidence in the selection of our residuals-based measure of earnings management. For these tests, we benchmark our *SMTH1* and *SMTH2* measures against likely determinants of discretionary earnings management. If our measures reflect managerial discretion, there should be predictable correlations with managerial incentives to smooth earnings and with institutional constraints on those incentives that go beyond the correlations with fundamentals-based variables that we have specified in our model above.

Therefore, we conduct an additional analysis that assesses the association between our smoothing measure and a set of incentive and oversight proxies. As country-level measures of governance, we include either the recently developed Anti-Self-Dealing Index (*ASDI*) of Djankov et al. (2008), which has been shown to be particularly useful in determining the extent to which managerial self-dealing is likely to be controlled by a country's institutional factors as or *DISCLOSE* from La Porta, Lopez-de-Silanes, and Shleifer (2006), which summarizes the disclosure requirements faced by firms in a given country. In addition, we include an indicator

variable for the degree of alignment between tax and financial reporting (*TXBKCONFORM* from Ashbaugh and LaFond (2004)) since, in countries with a high degree of alignment, the incentives managers face to smooth earnings for taxes will carry over to smoother accounting earnings [Alford et al. (1993), Ali and Hwang (2000), and Kasanen et al. (1996)],

In terms of firm-level determinants, we include an indicator variable for whether the firm is listed on a U.S. exchange, *ADR_EX*, since the U.S. regulatory environment is considered one of the most demanding in the world. We note that while firms trading in U.S. markets are not required to report local accounts that comply with U.S. GAAP, Pownall and Schipper (1999), Ashbaugh and Olsson (2002) and Lang, Ready and Wilson (2006) suggest that non-U.S. firms required to prepare U.S. GAAP financial information choose alternatives under IFRS or their domestic standards that are closer U.S. GAAP. We also include an indicator, *ADR_NEX*, for other types of U.S. cross listings (Level 1 and Rule 144A listings) that allow access to U.S. investors, but do not commit the firm to SEC registration requirements since firms may choose to curtail discretionary smoothing to enhance the informativeness of their accounting earnings by U.S. investors, even if they are not subject to additional regulatory oversight. Oversight by informational intermediaries likely affects firms' incentives and ability to smooth earnings as well. We use analyst following (*ANALYST*) as a proxy for the demand for transparent financial information by capital market participants.²⁰ Further, because larger auditing firms are likely to have greater resources and greater legal and reputational exposure, we expect attestation by a Big-5 auditing firm (*BIG5*) to be associated with less discretionary smoothing [Fan and Wong (2005)]. Finally, following Bradshaw and Miller (2008) and Barth et al. (2007), we expect better

²⁰ All of our results are consistent if we remove analyst following from the model, given the potential simultaneity discussed in the body of the paper.

accounting standards to reduce the ability to manage earnings and include an indicator, *INTGAAP*, for firms that have adopted either IAS or U.S. GAAP.

Results for our earnings smoothing measures (not tabulated) are all consistent with predictions. In particular, our measures of earnings management are lower for firms in countries with better investor protection and a weaker link between tax and financial reporting, and in firms with higher analyst following and a Big-5 auditor that report under IFRS or U.S. GAAP in their local accounts and trade in the U.S., particularly if they trade on a U.S. exchange. Taken together, these results provide some comfort that our smoothing measures behave as though they reflect managerial discretion in the sense that they are positively correlated with incentives to manage earnings and negatively correlated with impediments to earnings management.

TABLE 1
Sample by Country

C o u n t r y	N	P e r c e n t
ARGENTINA	292	0.31
AUSTRALIA	2,986	3.14
AUSTRIA	521	0.55
BELGIUM	731	0.77
BRAZIL	1,063	1.12
CANADA	4,179	4.39
CHILE	872	0.92
CHINA	4,775	5.02
COLOMBIA	156	0.16
DENMARK	1,137	1.2
FINLAND	833	0.88
FRANCE	4,473	4.7
GERMANY	4,373	4.6
GREECE	1,055	1.11
HONG KONG	3,298	3.47
HUNGARY	189	0.2
INDIA	1,840	1.93
INDONESIA	1,328	1.4
IRELAND	436	0.46
ISRAEL	406	0.43
ITALY	1,494	1.57
JAPAN	26,244	27.59
LUXEMBOURG	87	0.09
MALAYSIA	4,058	4.27
MEXICO	645	0.68
NETHERLANDS	1,472	1.55
NEW ZEALAND	366	0.38
NORWAY	769	0.81
PAKISTAN	291	0.31
PERU	167	0.18
PHILIPPINES	690	0.73
POLAND	185	0.19
PORTUGAL	476	0.5
SINGAPORE	2,367	2.49
SOUTH AFRICA	1,207	1.27
SPAIN	1,024	1.08
SRI LANKA	98	0.1
SWEDEN	1,347	1.42
SWITZERLAND	1,515	1.59
TAIWAN	3,449	3.63
THAILAND	2,397	2.52
UNITED KINGDOM	9,739	10.24
VENEZUELA	76	0.08
	95,106	100

The sample is based on all firms having sufficient data over the 1994 – 2007 period.

TABLE 2
Descriptive Statistics

<u>Variable</u>	<u>N</u>	<u>Mean</u>	<u>P25</u>	<u>Median</u>	<u>P75</u>	<u>Std</u>
MVE	95,106	732.107	38.853	132.063	466.520	1,924.732
BM	95,106	1.100	0.418	0.746	1.316	1.389
PRICE	95,106	67.269	0.803	4.013	16.702	491.931
STDRET	95,106	0.114	0.067	0.096	0.140	0.069
LOSS	95,106	0.218	0.000	0.000	0.000	0.413
ADR_EX	95,106	0.013	0.000	0.000	0.000	0.112
ADR_NEX	95,106	0.037	0.000	0.000	0.000	0.188
%CLHLD	95,106	0.410	0.025	0.389	0.663	0.340
SMTH1	95,106	-0.661	-0.877	-0.518	-0.269	0.567
SMTH2	95,106	0.735	0.687	0.919	0.983	0.410
BIG5	95,106	0.561	0.000	1.000	1.000	0.496
ANALYST	95,106	3.244	0.000	1.000	4.000	5.548
INTGAAP	95,106	0.099	0.000	0.000	0.000	0.299
TRANS	95,106	0.491	0.393	0.483	0.581	0.127
ZERORET	95,106	0.318	0.123	0.226	0.475	0.250
ASDI	95,106	0.599	0.460	0.500	0.790	0.234
DISCLOSE	95,106	0.734	0.667	0.750	0.833	0.162
ASSETS	95,106	1,208.054	88.861	251.789	798.900	3,265.170
LEV	95,106	0.538	0.383	0.538	0.681	0.229
SG	95,106	0.160	0.000	0.071	0.175	0.442
NIEX_TA	95,106	0.007	0.003	0.027	0.060	0.823
ACCURACY	41,789	-0.033	-0.023	-0.007	-0.002	0.087
BIAS	41,789	0.019	-0.005	0.000	0.011	0.091
SUE	41,789	0.062	0.009	0.023	0.059	0.118
BIDASK	61,641	0.028	0.006	0.014	0.033	0.037
AVG_COC	10,180	0.114	0.083	0.104	0.132	0.048
RF_RATE	10,180	0.031	0.014	0.031	0.046	0.021
Q	82,165	1.323	0.904	1.109	1.481	0.729
CASH_TA	82,165	0.124	0.038	0.091	0.173	0.114
DIV_DUM	82,165	0.737	0.000	1.000	1.000	0.440
CAPEX_TA	82,165	0.050	0.017	0.037	0.068	0.047

Descriptive statistics are based on all firms having sufficient data over the 1994 – 2007 period.

The definitions of the control variables are as follows:

MVE is equal to the market value of equity at yearend, measured in U.S. dollars (millions); *PRICE* is the firm's share price as of yearend, measured in U.S. dollars; *BM* is equal to the book value of common equity divided by market value of equity; *LOSS* is equal to one if net income before extraordinary items is negative, and zero otherwise; *STDRET* is the standard deviation of monthly returns measured over the past three to five years; *ADR_EX* is equal to one if the firm trades on a U.S. exchange during the year, and zero otherwise; *ADR_NEX* is equal to one if the firm has an ADR but is not traded on a U.S. exchange during the year, and zero otherwise; *%CLHLD* is the average proportion of shares that are closely held as of the end of year *t*; *SMTH1* is defined as the standard deviation of net income before extraordinary items scaled by average total assets divided by the standard deviation of cash flow from operations scaled by average total assets, where standard deviations are calculated using a minimum of three and maximum of five years of data. *SMTH1* is multiplied by negative one so that larger values, i.e. values

closer to zero, represent more smooth earnings; *SMTH2* is defined as the correlation between the cash flow from operations and total accruals where both measures are scaled by average total assets - correlations are calculated using a minimum of three and maximum of five years of data. *SMTH2* is multiplied by negative one so that larger values, i.e. values closer to one, represent more smooth earnings. *BIAS* is the signed value of the forecast error, scaled by stock price at the end of the prior fiscal year, where the forecast error is the I/B/E/S analysts' mean annual earnings forecast less the actual earnings as reported by I/B/E/S; *SUE* is the absolute value of unexpected earnings, scaled by the stock price at the end of the prior year, where unexpected earnings is actual earnings less the mean analyst forecast; *ASDI* is the Anti-Self-Dealing Index developed by Djankov et al. (2008) for the country; *DISCLOSE* is the disclosure index as reported in La Porta et al. (2006); *ASSETS* is equal to total assets measured in U.S. dollars (millions) at the end of the fiscal year; *LEV* is equal to total debt divided by total assets measured at the end of the fiscal year; *RF_RATE* is the country-specific yearly risk-free interest rate collected from Global Insight's *World Overview* database; *CASH_TA* is equal to cash and cash equivalents as of the end of the fiscal year scaled by average total assets; *CAPEX_TA* is equal total capital expenditures for the fiscal year scaled by average total assets; *SG* is the average sales growth over the past three to five years; *NIEX_TA* is equal to net income before extraordinary items scaled by total assets measured at the end of the fiscal year; *DIV_DUM* is an indicator variable equal to one if the firm paid a cash dividend during the fiscal year, and zero otherwise.

The definitions of the transparency variables are as follows:

BIG5 is equal to one if the firm is audited by a "BIG5" auditing firm, and zero otherwise; *ANALYST* is equal to the average number of analysts making a forecast for year *t*'s earnings over the *SMTH* estimation period; *ACCURACY* is the absolute value of the forecast error multiplied by -1, scaled by the stock price at the end of the prior fiscal year, where the forecast error is the I/B/E/S analysts' mean annual earnings forecast less the actual earnings as reported by I/B/E/S; *INTGAAP* is equal to one if the firm reports under IFRS or U.S. GAAP during the year, and zero otherwise; *TRANS* is as defined in Table 2.

The definitions of the liquidity variables are as follows:

ZERORET is equal to the percent of days in year *t* for which the stock price does not change; *BIDASK* is equal to the average bid ask spread over the year, where the bid ask spread is equal to $(ASK-BID)/((ASK+BID)/2)$.

The definitions of the valuation variables are as follows:

AVG_COC is the average implied cost of capital calculated as the yearly average of four commonly used empirical estimation techniques: 1) is the modified PEG ratio model by Easton (2004), 2) is the Ohlson and Juettner-Nauroth (2005) model; 3) is the Gebhardt, Lee, and Swaminathan (2001) model; 4) is the Claus and Thomas (2001) model. Following Daske et al. (2008) we use the yearly average from these four estimation techniques as our measure of implied cost of capital; *Q* is defined as total assets less book value plus market value scaled by total assets.

All continuous non-logarithmic variables are truncated at the 1% level.

The dependent variable is defined as follows:

ZERORET is the zero returns metric following Bekaert, Harvey and Lundblad (2007).

The transparency variables are defined as follows:

DIS_SMTHC is the average of the scaled percentile rank of *DIS_SMTH1* and *DIS_SMTH2*, where *DIS_SMTH1,2* are the residual values from the fundamental earnings smoothness model described in the Appendix. *R_ACCURACY* is equal to the residual value from a regression of *ACCURACY* on *SUE* and *BIAS*.

TRANS is defined as the average scaled percentile rank of the variables: *ANALYST*, *R_ACCURACY*, *INTGAAP*, *BIG5*, and $(1-*DIS_SMTHC*)$. All other variables are defined in Table 2. P-values (two-sided) are based on White adjusted standard errors clustered at the firm-level. All continuous non-logarithmic variables are truncated at the 1% level.

TABLE 5
Country-level Governance and Liquidity
Regressions of Aggregate Illiquidity on Transparency and Country-level Governance

Variable	ASDI				DISCLOSE			
	LOW		HIGH		LOW		HIGH	
	Estimate	p-value	Estimate	p-value	Estimate	p-value	Estimate	p-value
Intercept	0.228	0.00	1.136	0.00	0.160	0.00	1.165	0.00
LN MVE	-0.089	0.00	-0.096	0.00	-0.086	0.00	-0.098	0.00
BM	-0.005	0.01	0.000	0.91	0.004	0.00	-0.007	0.00
LOSS	-0.016	0.00	-0.016	0.00	-0.011	0.00	-0.017	0.00
STDRET	-0.350	0.00	-0.287	0.00	-0.225	0.00	-0.344	0.00
ADR_EX	-0.027	0.09	0.016	0.38	-0.028	0.12	0.024	0.11
ADR_NEX	-0.027	0.03	0.028	0.00	-0.006	0.67	0.020	0.01
%CLHLD	0.061	0.00	0.042	0.00	0.081	0.00	0.028	0.00
FUND_SMTHC	-0.017	0.12	-0.010	0.09	-0.018	0.08	-0.006	0.34
TRANS	-0.340***	0.00	-0.091	0.00	-0.243***	0.00	-0.138	0.00
Industry FE	YES		YES		YES		YES	
Country FE	YES		YES		YES		YES	
Year FE	YES		YES		YES		YES	
Firm FE	NO		NO		NO		NO	
Adj R2	0.62		0.64		0.65		0.62	
# of Obs.	24,272		70,834		28,081		67,025	

The dependent variable in all models is *ILLIQ* which is a combined measure of illiquidity equal to the average scaled percentile rank of the available measures, *ZERORET* and *LN(BIDASK)*. The above regressions are run separately for high and low ASDI (DISCLOSE) subgroups. HIGH (LOW) ASDI firms are those firms from countries with an ASDI score above (below) the sample median. HIGH (LOW) DISCLOSE firms are those firms from countries with a DISCLOSE score above (below) the sample median.

All other variables are as defined in Tables 2 and 3. P-values (two-sided) are based on White adjusted standard errors clustered at the firm level. All continuous non-logarithmic variables are truncated at the 1% level. *** denotes that the difference is significant at the 1% level.

TABLE 6
Country-level Volatility and Illiquidity
Regressions of Aggregate Illiquidity on Transparency and Country-level Volatility and Illiquidity

Variable	VOLATILITY				ILLIQUIDITY			
	LOW		HIGH		LOW		HIGH	
	Estimate	p-value	Estimate	p-value	Estimate	p-value	Estimate	p-value
Intercept	1.474	0.00	1.551	0.00	1.444	0.00	1.517	0.00
LN MVE	-0.080	0.00	-0.084	0.00	-0.076	0.00	-0.083	0.00
BM	-0.005	0.00	-0.008	0.00	-0.005	0.00	-0.006	0.00
LOSS	0.014	0.00	-0.002	0.24	0.014	0.00	0.005	0.00
STDRET	-0.386	0.00	-0.996	0.00	-0.420	0.00	-0.509	0.00
ADR_EX	0.032	0.00	0.049	0.00	0.029	0.00	0.038	0.00
ADR_NEX	0.008	0.00	0.008	0.05	0.015	0.00	-0.002	0.36
%CLHLD	-0.014	0.00	-0.067	0.00	-0.001	0.59	-0.037	0.00
FUND_SMTHC	-0.006	0.00	0.005	0.18	-0.007	0.00	-0.015	0.00
TRANS	-0.190***	0.00	-0.231	0.00	-0.198***	0.00	-0.221	0.00
Industry FE	YES		YES		YES		YES	
Country FE	YES		YES		YES		YES	
Year FE	YES		YES		YES		YES	
Firm FE	NO		NO		NO		NO	
Adj R2	0.61		0.62		0.58		0.63	
# of Obs.	329,890		201,999		282,267		249,662	

The dependent variable in all models is *ILLIQ* which is a combined measure of illiquidity equal to the average scaled percentile rank of the available measures, *ZERORET* and *LN(BIDASK)*. The above regressions are run separately for high and low *VOLATILITY* (*ILLIQUIDITY*) subgroups. *HIGH* (*LOW*) *VOLATILITY* firms are firms from countries where the country-level *VOLATILITY* in month t-1 exceeded the country-level median. *VOLATILITY* is defined as the monthly standard deviation of returns. *HIGH* (*LOW*) *ILLIQUIDITY* firms are firms from countries where the country-level *ILLIQUIDITY* in month t-1 exceeded the country-level median. *ILLIQUIDITY* is defined as the monthly average percentile rank of *BIDASK* and *ZERORET*.

All other variables are as defined in Tables 2 and 3. P-values (two-sided) are based on White adjusted standard errors clustered at the firm level. All continuous non-logarithmic variables are truncated at the 1% level. *** denotes that the difference is significant at the 1% level.

TABLE 7
Country-level Governance and Liquidity
Regressions of Aggregate Illiquidity on Transparency and Country-level Governance

Variable	Estimate	p-value	Estimate	p-value	Estimate	p-value
Intercept	0.145	0.00	0.240	0.00	1.131	0.00
LNMVE	-0.093	0.00	-0.088	0.00	-0.095	0.00
BM	-0.002	0.05	-0.006	0.00	0.000	0.74
LOSS	-0.013	0.00	-0.015	0.00	-0.015	0.00
STDRET	-0.304	0.00	-0.351	0.00	-0.289	0.00
ADR_EX	-0.004	0.72	-0.028	0.08	0.014	0.43
ADR_NEX	0.016	0.02	-0.026	0.03	0.029	0.00
FUND_SMTHC	-0.011	0.04	-0.018	0.08	-0.013	0.03
CLHLD*CLHLDH	0.105	0.00	0.117	0.00	0.085	0.00
CLHLD*CLHLDL	-0.128	0.00	-0.178	0.00	-0.128	0.00
CLHLDH*TRANS	-0.210	0.00	-0.380	0.00	-0.131	0.00
CLHLDL*TRANS	-0.102	0.00	-0.251***	0.00	-0.041	0.00
Industry FE	YES		YES		YES	
Country FE	YES		YES		YES	
Year FE	YES		YES		YES	
Firm FE	NO		NO		NO	
Adj R2	0.63		0.63		0.64	
# of Obs.	95,106		24,272		70,834	

The dependent variable in all models is *ILLIQ* which is a combined measure of illiquidity equal to the average scaled percentile rank of the available measures, *ZERORET* and *LN(BIDASK)*. The sample is split between low ASDI and high ASDI depending on whether a firm's ASDI is below the sample median ASDI. All other variables are as defined in Table 2. P-values (two-sided) are based on White adjusted standard errors clustered at the firm level. All continuous non-logarithmic variables are truncated at the 1% level. *** denotes that the difference between subsamples is significant at the 1% level.

TABLE 9
Firm Value, Illiquidity and Transparency
Tobin's Q Regressed on Illiquidity and Transparency

	=	+	+	+	-	+	+	+	%	-	+	-	+	
	-	+	-	+	-	+	+	+	+	+	+	+	+	
	I		II		III		IV							
Variable	Estimate	p-value	Estimate	p-value	Estimate	p-value	Estimate	p-value	Estimate	p-value	Estimate	p-value	Estimate	p-value
Intercept	4.254	0.00			3.662	0.00								
LNTOTASS	-0.125	0.00	-0.285	0.00	-0.141	0.00	-0.290	0.00						
LEV	0.529	0.00	0.599	0.00	0.551	0.00	0.602	0.00						
CASH_TA	1.202	0.00	0.687	0.00	1.152	0.00	0.682	0.00						
SG	0.124	0.00	0.093	0.00	0.128	0.00	0.094	0.00						
NIEX_TA	0.209	0.00	0.216	0.00	0.208	0.00	0.217	0.00						
DIV_DUM	0.023	0.01	0.058	0.00	0.024	0.01	0.057	0.00						
CAPEX_TA	1.596	0.00	1.123	0.00	1.511	0.00	1.112	0.00						
ADR_EX	0.066	0.10	-0.032	0.36	0.038	0.34	-0.034	0.33						
ADR_NEX	0.127	0.00	0.004	0.86	0.106	0.00	-0.003	0.90						
ILLIQ	-0.987	0.00	-0.690	0.00	-0.914	0.00	-0.671	0.00						
TRANS					0.780	0.00	0.282	0.00						
Industry FE	YES		NO		YES		NO							
Country FE	YES		NO		YES		NO							
Year FE	YES		YES		YES		YES							
Firm FE	NO		YES		NO		YES							
Adj R2	0.25		0.73		0.26		0.73							
# of Obs.	82,165		82,165		82,165		82,165							

The dependent variable is Tobin's Q. The dependent variable and all other variables are as described in Tables 2, 3 and 4. P-values (two-sided) are based on White adjusted standard errors clustered at the firm level. All continuous non-logarithmic variables are truncated at the 1% level.