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Differences in the reliability of fair value hierarchy measurements: A cross country study

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Abstract

Prior research suggests that there are significant differences in how investors perceive the reliability of fair values across the fair value hierarchy. An unaddressed question in this stream of research is whether cross-country differences in institutional factors are able to mediate differences in reliability for the fair value hierarchy measurements. Based on an international sample of banks across 20 different countries, we find that the probability of crash risk is lower among countries with better financial development infrastructure, greater level of trust, tighter security regulations and higher level of disclosure requirements. These results apply to Level 1 assets but not to Level 2 and Level 3 assets. We also document that these cross-country factors improve the trading volume of our sample banks. Our study suggests that while ongoing concerns toward the more opaque fair values are not fully eliminated by institutional differences, they matter in influencing investor willingness to trade in these stocks.

Keywords: Fair value accounting, institutional factors, reliability

JEL Classifications: D82, G34, M41

1. Introduction

This study examines whether institutional country differences are able to influence investors' perceptions towards the reliability of fair value hierarchy measurements. Prior research documents that investors perceive reliability concerns toward the more subjective fair value measurements (i.e., Level 2 and 3 fair value measurements) relative to fair value measurements that are derived directly from market prices (i.e., Level 1 fair value measurements).

An unaddressed question in this stream of research is whether cross-country institutional factors are able to mediate differences in reliability across the fair value hierarchy measurements. Prior research suggests that institutional factors are important toward the enforcement of financial reporting (e.g., Christensen et al. 2013). In our study, we examine whether differences across countries in terms of its sophistication of financial development, level of trust in a country, the extent of security regulations, and the amount of disclosure requirements will affect differences in the reliability of reported fair values.

This issue is important because much of the controversy with regard to fair value accounting stems from concerns regarding the reliability of inputs that are used in measuring fair values (Ryan 2008). While Level 1 fair value measurements are less controversial, the use of Level 2 and Level 3 fair value inputs (otherwise known as the mark-to-model approach) has generated tremendous concern and interest among standard setters, regulators and academics because the measurement of fair values based on these inputs are perceived to involve a certain degree of subjectivity and uncertainty (e.g., Song et al. 2010; Riedl and Serafeim 2011; Magnan et al. 2014; Chung et al. 2016).

Prior research on fair value hierarchy measurements tend to focus on US firms due to availability of data of reported fair values. We believe we are the first study to examine fair value hierarchy measurements in an international setting. We obtain our data from the SNL Global coverage database that provides international coverage of banks' fair value data both within and outside US. Based on this database, we are able to obtain cross-country data on fair value measurements across 20 different countries located in Americas, Europe, and the Asia-Pacific region.

We use four different country-level measures to test differences regarding the reliability of fair value measurements in an international context. Our country variables are based on various World Bank surveys that provide significant cross-sectional variations to our sample countries. Our first country level variable measures the extent of financial development in a country based on the level of sophistication of the country's stock market and the level of financial intermediaries in extending credit to the economy. This measure is also viewed as a country-level financial constraint measure. This is because richer countries which might have higher quality institutions and laws, in general, tend to be associated with better financial development regardless of the content of these laws and security enforcement (La Porta 1999).

Our second cross-country level variable measures the overall level of trust in the country. We believe trust is an important concept in accounting because the value of accounting lies in how much investors and other stakeholders trust the financial statements. This is especially so in situations where there appears to be significant concerns toward reported accounting information that involves professional estimates and subjective judgments, such as fair value measurements (e.g., Bell and Griffin 2012; Christensen et al. 2012). Fair value measurements, especially those measurements that involve Level 3 inputs, require considerable amount of subjectivity and

measurement uncertainty. Hence, cross-country differences in the overall level of trust might impact the extent to which market participants rely on fair value measurements in their investing decisions (e.g., Nanda and Wysocki 2013).

Our third country variable measures the extent of security regulations enforced within the country. This measure is a proxy for the degree of investor protection through security laws and other legislation. We use a composite measure of the mean of the disclosure index, the liability standard index, and the public enforcement index to capture this construct (La Porta et al. 2006). Finally, our fourth country variable measures the amount of disclosure requirements within a country. Following Hail and Leuz (2006), our disclosure requirements index variable is defined as the arithmetic mean of these various measures - *Prospectus, Compensation, Shareholders, Inside Ownership, Irregular Contracts and Transactions*.

We examine whether these four institutional factors will impact the probability of crash risk, return synchronicity and trading volume in relation to reported fair values in the banks' balance sheets. Crash risk relates to the probability of stock market crash in a firm's stock price as a result of a revelation of negative news that lead investors to significantly downgrade their assessments of a firm's prospects (e.g., Jin and Myers 2006). Prior studies on crash risk suggest that this phenomenon is exacerbated when a firm has a greater level of asset opacity in its financial reporting. To the extent that Level 2 and 3 fair value measurements are less transparent than Level 1 fair value measurements (market-based prices), information dissemination relating to changes in these reported amounts might exacerbate stock price crash risk.

Return synchronicity relates to the extent a firm's stock return varies with market return. Extant research on stock market synchronicity suggests that the explanatory power of firm's stock return with the market return is lower when there is greater transparency and more

complete revelation of firm-specific information (e.g., Morck, Yeung and Yu 2000). With regard to fair value accounting, fair values are purported to be more transparent and relevant to decision makers. However, differences across the subjectivity of fair value inputs might impact the extent to which fair value reporting provides useful information to financial statement readers. To the extent that fair values are reliable and relevant, we expect return synchronicity to be lower. In contrast, opaque fair values might increase market return synchronicity in a firm's stock returns. Our third outcome variable is trading volume, which measures the extent to which investor is willing to trade in the shares of firms with reported fair values. If investors trust the reporting reliability of fair values, we expect trading volume to be high. Conversely, if reported fair values represent significant concerns to market participants, we expect trading volume in the shares of firms with high reported fair values in their balance sheets to be muted.

Our first set of tests examines whether institutional factors account for country variation in stock price crash risk and return synchronicity in reported fair values. We find consistent empirical evidence to suggest that institutional factors are able to mediate the relation between Level 1 fair value measurements and stock price crash risk. Specifically, the extent of a country's financial development, overall level of trust, the extent of security regulations, and the amount of disclosure requirements are negatively associated with stock price crash risk for reported Level 1 fair values. However, these institutional factors appear to have little effect in mediating the relation towards alleviating stock price crash risk for Level 2 and Level 3 fair value measurements. Likewise, we find corroborating evidence for Level 1 fair value measurements in our return synchronicity tests but these institutional factors do not affect how reported Level 2 and 3 fair value measurements affect crash risk and return synchronicity.

Our second set of tests examines the impact on institutional factors on trading volume. Specifically, we examine whether institutional factors are able to mediate the relation between reported fair values and trading volume. In these results, we find strong evidence that institutional factors have a positive effect on reported fair values across all three fair value designations. The incremental impact on trading volume is especially striking for the Level 2 and 3 fair value measurements. We interpret these results to suggest that institutional factors matter greatly to market participants in considering whether to trade the shares of banks that report significant amounts of Level 2 and 3 assets in their balance sheets. It appears that investors are relatively disinclined to invest in the companies of countries that have poor financial development and security regulation, low overall societal trust and lax disclosure requirements. We conjecture that the relative lack of investor interest in these firms is because there might be questionable doubts regarding the reliability of the fair value measurements on these firms' balance sheets.

We contribute to the research on fair value accounting by examining the impact of institutional factors toward the perceived reliability of fair value measurements in an international context. Prior studies have not examined fair value measurements in a cross-country study presumably because of unavailability of data for reported fair value hierarchy measurements. Our study provides early evidence suggesting that fair value measurements across the fair value hierarchy are impacted by a country's institutional background and financial development as well as the extent of its securities regulation and disclosure level.

The next section develops our hypotheses development and the institutional background surrounding fair value measurements and the regulatory environment. Section 3 describes the sample and empirical measures. Section 4 discusses the test results and Section 5 concludes.

2. Literature Review and Hypothesis Development

2.1 Fair value hierarchy

The issuance of FAS 157 (ASC 820) in September 2006 mandated a division of different classes of assets and liabilities into Level 1 observable inputs from quoted prices in active markets, Level 2 indirectly observable inputs from quoted prices of comparable items in active markets, identical items in inactive markets, or other market-related information and Level 3 unobservable, firm- generated inputs. Improved disclosure requirements of methods and inputs in determining fair value were also made in this accounting standard.

Since the advent of FAS 157, various studies have examined the market behavior towards the subjectivity of inputs used in each of these fair value levels. Song et al. (2010) and Riedl and Serafeim (2011) were the earlier studies that investigate the effect of different fair value levels on market pricing and information risk of assets respectively whereas Goh et al. (2015) and Chung et al. (2016) provide further cross sectional and longitudinal studies that build upon the earlier studies. There have also been studies that examine how the fair value hierarchy measurements affect analysts (e.g., Magnan et al. 2014; Barron et al. 2016).

The focus of this literature is primarily confined to firms in the financial sector (e.g., banks, mortgage companies, insurance companies with a large concentration of financial instruments reported of fair value that were affected by the implementation of FAS 157). Notably, all these studies use firms within the US. Our study differs from this stream of research by being the first paper to examine firms outside the US. In particular, we focus on the impact of countries' institutional factors in influencing investors' perceptions regarding the reliability of these fair value measurements.

2.2 Institutional factors

Extant research examines the impact of securities laws and stock market development on financial markets (e.g., Barth et al. 2003; La Porta et al. 2006). These studies generally find that securities laws and regulatory enforcement are important factors in influencing the development of financial markets. In addition, the availability of laws to mandate disclosure requirements and facilitate private enforcement through liability rules has also been shown to benefit stock markets. On the other hand, in the context of fair value measurements, the link between institutional environmental factors and the reliability of fair values have not been fully examined.

Over the decades, there is also an emerging literature on trust. Trust plays an important role in the social and economic world. It is broadly defined as the subjective probability that an individual assigns to the events of a potential counterparty performing an action that is beneficial or at least not harmful to that individual (Gambetta, 1988). A group of researchers investigates the role of trust in economic development and economic efficiency (La Porta et al., 1997; Zak and Knack, 2001; Guiso, Sapienza and Zinagles, 2004). In the context of our study, trust has been alluded to but has not been examined in a fair value accounting setting.

A recent trend in the literature is to use broad measures of trust from existing surveys to conduct studies related to trust. For example, Nanda and Wysocki (2013) investigate the relation between financial reporting transparency and societal trust. Trust is an important concept in accounting because the value of accounting lies in how much investors and other stakeholders trust the financial statements. Fair value measurements, especially those measurements that involve Level 3 inputs, require considerable amount of subjectivity and measurement uncertainty (Bell and Griffin 2012; Christensen et al. 2012). Recent developments in accounting standards have also provided firms with more discretion to decide what measurement basis to adopt. With

a move toward more fair value accounting in financial reporting, investors may become more skeptical about reported fair value information in the financial statements.

2.3 Crash risk

The theoretical crash risk model in Jin and Myers (2006) postulates that increased opacity in financial reporting lead to managers being able to withhold bad news from public disclosure. However, managers are only able to withhold bad news up to certain threshold. Once the threshold is met, the accumulated bad news are disclosed all at once, and market participants surprised by these news, will start to exit the market together, resulting in a stock price crash.

A necessary condition for this phenomenon is the ability of managers to control public access to negative information about firm value, either through financial reporting or other mechanisms. Prior research has examined the impact of financial reporting transparency and accounting standards on crash risk (e.g., Hutton et al. 2009; DeFond et al. 2015). Hutton et al. (2009) use a firm-specific measure of opacity and find that more opaque firms are more prone to stock price crashes although the effect weakens in the post-Sarbanes-Oxley period. DeFond et al. (2015) test whether mandatory IFRS adoption affects firm-level crash risk. Their results indicate that increased transparency from IFRS adoption has the effect of reducing crash risk among nonfinancial firms, but more selectively among financial firms, presumably because of the countervailing effects of fair value accounting to crash risk.

On the one hand, fair value accounting might better reflect firms' true underlying performance, thereby reducing crash risk (Bleck and Liu 2007). On the other hand, it might also introduce greater measurement errors in financial reporting, which reduce investors' ability to observe firms' true underlying performance (European Central Bank 2004). In the context of fair value hierarchy measurements, the fair value estimates of more opaque assets (i.e., Level 2 and 3

assets) may contain relatively more measurement errors, thus increasing financial reporting opacity.

2.4 Return synchronicity

Extant research on return synchronicity suggests that stock returns are less synchronous in more developed markets. For example, Morck et al. (2000) find that in emerging markets like China, Malaysia, and Poland, over 80% of stocks often move in the same direction in a given week. In contrast, Denmark, Ireland, and the United States lack any instances of more than 57% of the stocks moving in the same direction during any week. The authors suggest that this is because stock markets in poor economies are generally less developed. Thus there is poorer information transfer, which impede the capitalization of firm-specific information into stock prices. This effect would reduce firm-specific stock price variation, and increase stock return synchronicity with the market return.

The notion that greater transparency and more complete revelation of firm-specific information will reduce return synchronicity has been extensively examined (e.g., Durnev et al. 2003; Ashbaugh et al. 2005). In the context of fair value measurements, it remains to be seen whether fair values facilitate or worsen information sharing. This is especially so in relation to institutional factors in an international setting. For example, it is possible that country specific factors such as the extent of financial development or the effectiveness of security regulations can have a mediating effect on stock prices through reported fair values.

2.5 Hypotheses development

In this study, we use an international setting to study whether cross-country variation in institutional factors account for differences in the transparency of Level 2 and Level 3 fair value measurements. We use four empirical measures, the extent of a country's financial development,

security regulations, disclosure requirements and the overall level of trust in a country, to proxy for cross-country differences in a firm's business environment.

We conjecture that the usefulness of fair value accounting depends on individual countries' implementation of accounting rules and the proper enforcement of these rules. It also depends on how much and how willing market participants trust the reliability of fair values. To the extent that there are cultural and institutional factors determining the level of trust in a society, our study enables us to examine whether trust plays a mediating role toward the usefulness of fair values.

As previously stated, studies that have examined crash risk and return synchronicity suggest that opacity in financial reporting will increase the occurrence of crash risk. In the fair value accounting research stream, reliability concerns toward reported fair values remain an ongoing concern. If fair value measurements are able to increase transparency in financial statements, we will expect the market participants to be informative about firm's fundamentals when there is greater use of fair values in the financial statements. In our setting, we are interested to examine whether there are cross-country differences in the perceived reliability of reported fair values, and whether these differences will impact market outcomes.

We state our first set of hypotheses, in alternative form, as follows:

H1a: Fair value accounting reduces the probability of crash risk and return synchronicity when the sophistication of a country's financial development is higher.

H1b: Fair value accounting reduces the probability of crash risk and return synchronicity when the overall level of trust in a country is higher.

H1c: Fair value accounting reduces the probability of crash risk and return synchronicity when the extent of security regulations is greater.

H1d: Fair value accounting reduces the probability of crash risk and return synchronicity when there are more disclosure requirements.

A second research question that we examine in this paper is whether market participants are more willing to trade in the shares of companies with high reported fair values in their balance sheets among countries with stronger institutional background (i.e., more well-regulated, better disclosure regimes) than in countries that have relatively weaker institutions and regulations. This question is particularly salient with regard to reported Level 2 and 3 fair values given the relatively lack of transparency in determining these reported amounts.

We postulate that there is a cross-sectional difference in the willingness of investors to trade in the shares of banks with high reported fair values between countries with rich institutional background versus countries with relatively poor institutional background. As with our first set of hypotheses, we examine countries' institutional factors relating to its financial development, overall trust level, sophistication of security regulations and level of disclosure requirements.

We state our second set of hypotheses, in alternative form, as follows:

H2a: Fair value accounting is positively associated with trading volume when the sophistication of a country's financial development is higher.

H2b: Fair value accounting is positively associated with trading volume when the overall level of trust in a country is higher.

H2c: Fair value accounting is positively associated with trading volume when the extent of security regulations is greater.

H2d: Fair value accounting is positively associated with trading volume when there are more disclosure requirements.

3. Research Design

We obtain our fair value data from the SNL Global coverage database. This database provides international coverage of banks' fair value data that is based on the fair value hierarchy classification, including countries in Americas, Europe, and Asia-Pacific region. We obtain our capital market data from Datastream to compute price and other market variables. We exclude sample firms that do not have a matching ISIN number with the SNL Global coverage database. Our sample period is from 2007 – 2015. We obtain an initial sample of 6,485 bank-year observations across 20 different countries with reported Level 1, 2 and 3 assets from this dataset.

We use four different country-level measures in our regression analyses. We develop our composite-level variables from various World Bank surveys. Our first country level measure is *Financial Development (FD)*. This variable measures the extent of financial development in a country along two dimensions. Specifically, it is measured as the sum of stock market development index and financial intermediary development index. The stock market development index is the sum of market capitalization over GDP, total value traded over GDP, and total value traded over market capitalization. The financial intermediary development index is the sum of liquid liabilities over GDP and the credit going to the private sector over GDP and is typically regarded as a country-level financial constraint measure.

Our second cross-country level variable is *Trust.* Our measure of trust is based on the World Value Survey, defined by asking respondents the following question: "Generally speaking, would you say that most people can be trusted or that you need have to be very careful in dealing with people?" The level of trust in each country is based on the percentage of respondents replying the following response "most people can be trusted". This measures ranges from 0% (absolute distrust) to 100% (absolute trust).

Our third measure is *Security Regulation (SR)*. This is a country-level measure to proxy for the level of security laws and investor protection. Following Hail and Leuz (2006), this variable is defined as the mean of the disclosure index, the liability standard index, and the public enforcement index (La Porta et al. 2006). Our fourth country level measure is *Disclosure*. Following Hail and Leuz (2006), this variable is defined as the arithmetic mean of *Prospect*, *Compensation*, *Shareholders*, *Inside Ownership*, *Irregular Contracts* and *Transactions*.

We estimate the following regressions to test our hypotheses:

$$CRASH_{it} = \beta_0 + \beta_1 FVA1_{it} + \beta_2 FVA23_{it} + \beta_3 CROSS\text{-}COUNTRY_{it} + \\ + \beta_4 FVA1*CROSS\text{-}COUNTRY_{it} + \beta_5 FVA23*CROSS\text{-}COUNTRY_{it} \\ + \beta_6 ROA_{it} + \beta_7 LEVERAGE_{it} + \beta_8 M2B_{it} + \beta_9 SIZE_{it} + \varepsilon_{it} \quad (1)$$

$$SYN_{it} = \beta_0 + \beta_1 FVA1_{it} + \beta_2 FVA23_{it} + \beta_3 CROSS\text{-}COUNTRY_{it} + \\ + \beta_4 FVA1*CROSS\text{-}COUNTRY_{it} + \beta_5 FVA23*CROSS\text{-}COUNTRY_{it} \\ + \beta_6 ROA_{it} + \beta_7 LEVERAGE_{it} + \beta_8 M2B_{it} + \beta_9 SIZE_{it} + \varepsilon_{it} \quad (2)$$

$$VOLUME_{it} = \beta_0 + \beta_1 FVA1_{it} + \beta_2 FVA23_{it} + \beta_3 CROSS\text{-}COUNTRY_{it} + \\ + \beta_4 FVA1*CROSS\text{-}COUNTRY_{it} + \beta_5 FVA23*CROSS\text{-}COUNTRY_{it} \\ + \beta_6 ROA_{it} + \beta_7 LEVERAGE_{it} + \beta_8 M2B_{it} + \beta_9 SIZE_{it} + \varepsilon_{it} \quad (3)$$

where *CRASH* is defined as the negative skewness of firm-specific weekly returns over the fiscal year period based on Jin and Myers (2006). *SYN* is the return synchronicity of a firm's stock returns with market returns. It is calculated as the log (R^2 / 1 - R^2) estimated from regressing weekly market return during the fiscal year on the firm's stock return. *VOLUME* is the mean of weekly trading volume during the fiscal year. *FVA1* is Level 1 fair value assets scaled by total outstanding shares during the fiscal year. *FVA23* is the sum of Level 2 and Level 3 fair

value assets scaled by total outstanding shares during the fiscal year. The cross-country variables are *Financial Development (FD), Trust*, *Security Regulation (SR),* and *Disclosure,* as previously defined. In our regression analyses, our cross-country variables are indicator variables that equal one if their scores are above the median value, and zero otherwise.

Following Hutton et al. (2009), we use the following firm-specific variables as control variables. *SIZE* is calculated as the log of total assets, *ROA* is earnings before extraordinary items divided by total assets. *LEVERAGE* is the book value of total liabilities scaled by total assets, and *M2B* is the ratio of the market value of equity to the book value of equity. We also incorporate year and country fixed effects in our regression specifications.

4. Empirical results

4.1 Descriptive statistics and univariate results

Table 1 reports our descriptive statistics for our sample. We report our fair value measures scaled by the total assets of the bank. The mean (median) value of *FVA1* is 0.021 (0.000), whereas the mean (median) value of *FVA2* is 0.164 (0.145), and the mean (median) value of *FVA3* is 0.018 (0.007). The descriptive statistics are generally consistent with the results reported in prior studies that indicate Level 2 assets represent the largest proportion of fair value assets on the bank's balance sheet.

For our dependent variables, the mean (median) value of our crash risk measure is -0.051 (-0.055). The mean (median) value of our return synchronicity measure is -2.622 (-2.091). Finally, the mean (median) value of our trading volume measure is 2.373 (0.020). For our country level variables, the mean (median) value of *Financial Development (FD)* is 800.39 (759.39) There is substantial variation in the level of financial development across our sample

countries. Panel B of Table 1 reports the sample distribution of these country variables. Across our sample countries, countries with well-developed financial services sectors such as Hong Kong (1711.42), USA (838.74), Switzerland (799.64), and UK (759.23) scored high on this measure, whereas countries such as Pakistan (105.12), and Philippines (188.12) have relatively lower scores.

The mean (median) value of *TRUST* is 0.371 (0.382) indicating that about 37-38% of the population in our sample expressed trust towards others in business dealings. Among the countries that have higher level of trust are Australia (0.533), Finland (0.588), Netherlands (0.602) and Sweden (0.680). In contrast, Philippines (0.028) and Malaysia (0.085) are countries that indicate the lowest level of trust towards others in our sample countries. Our third cross-country variable is *Security Regulation (SR)*. Across our sample countries, high *SR* scores are found in countries such as USA (2.900), Canada (2.717), and Singapore (2.527) whereas countries that report low level of security regulation are Germany (0.633), Sweden (1.358) and Italy (1.370). Our fourth cross-country variable is *Disclosure*. Similar to our *Security Regulation* variable, we find that countries that have relatively high level of disclosure requirements are USA (1.000), Singapore (1.000) and Canada (0.917). In contrast, countries with low disclosure scores include Germany (0.417), Finland (0.500) and Netherlands (0.500).

Table 2 reports the Pearson correlations among our variables used in our analyses. Among the fair value variables, we find that *FVA1* and *FVA2* are negatively correlated with each other whereas *FVA2* is negatively correlated with *FVA3.* With regard to the outcome variables, crash risk is positively correlated with *Financial Development* (0.057) and *Trust* (0.044) but negatively correlated with *Security Regulation* (-0.039) and *Disclosure* (0.039). We also find that return synchronicity is negatively correlated with all the four institutional factors. Interestingly,

we find that *FVA1* tend to be negatively correlated with the institutional factors while *FVA2* tend to be positively correlated with them. *FVA3* is negatively correlated with *Financial Development* (-0.036) and *Trust* (-0.062).

Among the cross-country variables, *Financial Development* is positively correlated with *Trust* (0.537), *Security Regulation* (0.394), and *Disclosure* (0.435). These correlations are statistically significant at the 0.01 level. Likewise, *Trust* is positively correlated with *Security Regulation* (0.246) and *Disclosure* (0.268), These correlations are also statistically significant at the 0.01 level. Not surprisingly, we find *Security Regulation* is strongly correlated with *Disclosure* (0.953).

4.2 Crash risk and return synchronicity analyses

Table 3 reports the results of our regression analyses from regressing crash risk on our various cross-country variables. We combine Level 2 and Level 3 assets (*FVA23)* to differentiate this variable from *FVA1* which uses solely market-based prices when estimating fair values. Prior literature asserts that Level 1 assets are more reliable because they rely directly on market prices in determining fair values. In contrast, *FVA23* represent fair values of financial assets that are subject to some form of managerial discretion during the fair value estimation process.

Prior studies on crash risk suggest that greater transparency will reduce the probability of crash risk but do not examine the interaction effect of cross-country effects on fair value measurements. In our tests, we document significant cross-country effects across our interaction variables of interest for Level 1 assets. In particular, we find a negative association between Level 1 fair value assets and crash risk among countries with a higher level of *Financial Development*, *Trust*, *Security Regulation* and *Disclosure*. The coefficients on our interaction variables on Level 1 assets are negative and statistically significant for *FVA1 x FD* (-1.639, *t*-

stat=-2.420), *FVA1 x Trust* (-1.208, *t-stat*=-1.672), *FVA1 x SR* (-1.782, *t-stat*=-2.571), and *FVA1 x Disclosure* (-1.712, *t-stat*=-2.654). *FVA1 x Disclosure* is statistically significant at the 0.01 level and *FVA1 x FD* and *FVA1 x SR* are significant at the 0.05 level whereas *FVA1 x Trust* is significant at the 0.10 level.

We interpret these results suggest that there is a cross-country effect for crash risk among countries with better developed financial development infrastructure, greater security regulations, and higher level of trust and disclosure requirements. However, it appears that these cross-country improvements impact differences in crash risk for Level 1 assets but not in Level 2 and Level 3 assets. That is, we do not find any cross-country variables that reduce the probability of crash risk inherent in non-market based fair values (i.e., Level 2 and 3 assets) in these tests.

Table 4 reports the results of regressing return synchronicity on our cross-country variables. These test results corroborate our earlier tests using crash risk as the dependent variable. We find statistically significant cross-country effects in countries with greater *Security regulation* and *Disclosure* requirements. However, we do not find statistically results for *Financial Development* and *Trust.* Consistent with the results in our crash risk tests, the impact from cross-country effects on return synchronicity as a result of better security regulations and disclosure requirements apply only to Level 1 fair value assets. Specifically, the coefficients on our interaction variables on Level 1 assets are negative and statistically significant for *FVA1 x SR* (-6.232, *t-stat*=-4.122), and *FVA1 x Disclosure* (-2.650, *t-stat*=-1.880).

On the other hand, we do not find any statistical difference with regard to the incremental impact to return synchronicity for Level 2 and 3 assets across any of these four cross-country variables. One interpretation of both sets of results is that cross-country differences in financial infrastructure, security regulations, and levels of trust and disclosure requirements do not seem to

alleviate reliability concerns toward Level 2 and 3 assets. Hence, asset opacity in Level 2 and 3 assets remain high even in well-developed financial markets.

4.3 Trading volume analyses

Table 5 reports the results of regressing trading volume on our cross-country variables. In countries with better quality financial infrastructure, greater security regulation, and higher level of trust and disclosure, there appears to be greater confidence towards reported fair values, which translates to higher trading volume among the shares of these banks. The strongest country effects reside in differences in security regulations and disclosure requirements. Specifically, we find positive associations for our *FVA1* and *FVA2* interaction cross-country variables among countries with high level of security regulation and disclosure compared with countries with lax security regulation and poor disclosure requirements. The coefficients for *FVA1 x SR* and *FVA2 x SR* are 24.81 and 18.57 respectively, both statistically significant at the 0.01 level. Likewise, the coefficients for *FVA1 x Disclosure* and *FVA2 x Disclosure* are 16.33 and 19.59 respectively, also statistically significant at the 0.01 level. These results suggest that tighter security regulations and greater disclosure requirements inspire investor confidence to trade in the shares of banks with a large proportion of fair value assets.

Apart from the above results, we also find that investors are more willing to trade in the shares of banks with Level 2 and 3 assets in countries with more well-developed financial development infrastructure (*FD),* and in countries where there is a greater level of trust. Overall, the results suggest that there is a significant cross-country effect to differences in trading volume. It appears that investors are less reserved toward banks with greater reported Level 2 and Level 3 fair values if these banks are located in countries with better security regulations and disclosure requirements. We also find similar results for Level 1 assets in the predicted direction although

the results are not statistically significant. These results suggest that a country's level of financial development and the cross-country differences in a country's level of trust plays a less important role in influencing trading volume for banks with different amounts of Level 1 assets, presumably because there is less concern toward Level 1 assets in the first place.

Overall, we document that there are significant cross-country differences in the level of trading volume among banks with different amounts of reported Level 2 and Level 3 assets. It appears that cross-country effects have a mediating effect on trading volume with regard to differences in reported fair values in banks' balance sheets.

5. Conclusion

In this study, we examine how country's institutional factors are able to play a mediating role in affecting reliability concerns towards fair value measurements. Using various empirical measures to proxy for a country's level of financial development, extent of security regulations and disclosure requirements, as well as its overall level of trust, we find that these institutional factors matter to investors when trading the shares of banks with high reported fair value figures in their balance sheets. Specifically, our tests reveal that investors are relatively disinclined to invest in the companies of countries that have poor financial development and security regulation, low overall societal trust and lax disclosure requirements, where there might be questionable doubts regarding the reliability of the fair value measurements on the firms' balance sheets.

We also show whether these institutional factors mediate the relation between the probability of crash risk and return synchronicity. The study of tail events such as crash risk is particularly relevant to debates regarding fair value accounting as it is a policy issue whether

firms that have more assets that are fair valued in their balance sheets are more likely to suffer from higher crash risk owing to concerns regarding the transparency of these assets and the subjectivity of the fair value estimation processes. We find empirical evidence suggesting that country's institutional factors are able to mediate the Level 1 fair values, but not Level 2 and 3 fair values.

Our study extends prior research on the fair value hierarchy measurements. We provide empirical evidence that assess how various countries' institutional differences might alleviate significant reliability concerns toward fair value measurements. In doing so, we shed further light toward a better understanding of the usefulness of fair value accounting in relation to various market outcome factors in an international setting. Our study also contributes to the ongoing debate regarding the role of fair value measurements on financial markets.

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TABLE 1: Sample Composition

This table reports the descriptive statistics for our sample banks. Panel A reports the descriptive statistics of the variables used in our regression analyses and Panel B provides our sample distribution and the values of our country variables. *FVA1* is Level 1 fair value assets scaled by total assets during the year. *FVA2* is Level 2 fair value assets scaled by total assets during the year. *FVA3 is* Level 3 fair value assets scaled by total assets during the year. *CRASH* is defined as the negative skewness of firm-specific weekly returns calculated over the fiscal year. *SYN* is defined as the return synchronicity of a firm's stock returns with market returns. It is calculated as the log (R^2 / 1-R^2) estimated from regressing weekly market return during the fiscal year on the firm's stock return. *VOLUME* is the mean of weekly trading volume during the fiscal year. *FD* is the measure for the extent of financial development in a country, *TRUST* is the measure for the extent of trust in a country, *DISCLOSURE* is the measure of the extent of disclosure in a country, *SIZE* is calculated as the log of total assets, *ROA* is earnings before extraordinary items divided by total assets, *LEVERAGE* is the book value of total liabilities scaled by total assets, and *M2B* is the ratio of the market value of equity to the book value of equity.

Panel A: Descriptive statistics

	Obs	*Mean*	*Std Dev*	*5th Pctl*	*Median*	*95th Pctl*
FVA1	6485	0.021	0.059	0.000	0.000	0.136
FVA2	6485	0.164	0.130	0.004	0.145	0.388
FVA3	6485	0.018	0.049	0.000	0.007	0.062
CRASH	4531	-0.051	0.862	-1.276	-0.055	1.092
SYN	3908	-2.622	2.522	-7.182	-2.091	0.287
VOLUME	4910	2.373	13.04	0.001	0.020	9.067
FD	6485	800.39	209.24	450.69	759.39	1171.38
TRUST	6485	0.371	0.072	0.195	0.382	0.396
DISCLOSURE	6485	0.963	0.104	0.667	1.000	1.000
SIZE	6485	14.505	2.243	11.823	13.889	19.306
ROA	6485	0.004	0.015	-0.015	0.006	0.014
LEVERAGE	6475	0.099	0.086	0.000	0.079	0.260
M2B	4415	1.041	0.969	0.181	0.922	2.139

TABLE 1 (Cont'd)

Panel B: Sample distribution

Country	*Obs*	*FD*	*Trust*	*SR*	*Disclose*
Australia	76	522.19	0.533	2.310	0.750
Canada	3	579.03	0.421	2.717	0.917
Finland	7	389.43	0.588	1.477	0.500
France	106	419.67	0.187	1.737	0.750
Germany	43	451.69	0.403	0.633	0.417
Hong Kong	53	1711.42	0.470	2.443	0.917
Italy	133	460.65	0.292	1.370	0.667
Malaysia	48	449.98	0.085	2.343	0.917
Netherlands	16	627.51	0.602	1.855	0.500
Pakistan	2	105.12	0.239	1.552	0.583
Philippines	131	188.12	0.028	2.667	0.833
Singapore	22	579.12	0.385	2.527	1.000
South Africa	23	489.75	0.236	1.743	0.833
South Korea	49	624.63	0.297	1.660	0.750
Spain	53	688.02	0.196	1.493	0.500
Sweden	9	609.74	0.680	1.358	0.583
Switzerland	62	799.64	0.511	1.440	0.667
Thailand	13	457.64	0.326	1.855	0.917
UK	66	759.23	0.304	2.177	0.833
USA	5,570	838.74	0.384	2.900	1.000

TABLE 2 Correlations among key variables

This table presents the Pearson correlations among the variables used in the empirical analyses. The variables are defined in Table 1. *, **, and *** indicate significance at the 10, 5, and 1 percent levels respectively.

	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*	*(10)*
FVA1 (1)	1.000	-0.032***	0.014	0.015	0.202***	0.226***	-0.287***	-0.278***	-0.501***	-0.520***
FVA2(2)		1.000	-0.022*	-0.023	0.034	0.152***	0.053***	0.055***	0.089***	0.089***
FVA3 (3)			1.000	0.013	-0.072***	-0.001	-0.036***	-0.062***	-0.003	-0.001
CRASH (4)				1.000	0.067***	0.013	0.057***	0.044***	-0.039***	-0.039***
SYN (5)					1.000	0.150***	-0.017	-0.045***	-0.228***	-0.242***
VOLUME (6)						1.000	-0.055***	-0.088***	-0.229***	-0.229***
FD (7)							1.000	0.537***	0.394***	0.435***
TRUST (8)								1.000	0.246***	0.268***
SR (9)									1.000	0.953***
DISCLOSURE (10)										1.000

TABLE 3: Crash risk analyses

This table presents the results of the regressions from regressing crash risk on various cross-country indicator variables. The cross-country variables are *FD, Trust, SR,* and *Disclosure.* Our cross-country variables are indicator variables that equal one if their scores are above the median value, and zero otherwise. All the variables are defined in Table 1. t-statistics, in parentheses, are indicated below the coefficients. *, **, and *** indicate significance at the 10, 5, and 1 percent levels (two-tailed), respectively.

Crash risk	*FD*	*Trust*	*SR*	*Disclosure*
	(1)	*(2)*	*(3)*	*(4)*
FVA1	1.232**	0.872	1.103**	1.310**
	(2.007)	(1.434)	(1.972)	(2.172)
FVA23	-0.174	-0.190	-0.202	-0.172
	(-1.167)	(-1.281)	(-1.423)	(-1.155)
Cross-country	0.110	0.287*	0.112	0.179
	(0.589)	(1.837)	(0.450)	(0.561)
FVA1 × Cross-country	-1.639**	-1.208*	-1.782**	-1.712***
	(-2.420)	(-1.672)	(-2.571)	(-2.654)
FVA23 × Cross-country	0.0330	0.0321	0.0718	0.0118
	(0.159)	(0.155)	(0.346)	(0.0567)
ROA	0.122	-0.003	-0.112	0.025
	(1.08)	(-0.02)	(-0.55)	(0.14)
LEVERAGE	-6.815***	-6.850***	-6.907***	-6.885***
	(-5.478)	(-5.506)	(-5.558)	(-5.541)
M2B	-0.335*	-0.338*	-0.373*	-0.331*
	(-1.743)	(-1.758)	(-1.944)	(-1.721)
SIZE	-0.0115	-0.00893	-0.00633	-0.00685
	(-0.757)	(-0.587)	(-0.418)	(-0.453)
Constant	-0.432	-0.634**	-0.461	-0.505
	(-1.414)	(-2.269)	(-1.383)	(-1.453)
Year fixed effects	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes
Observations	4,022	4,022	4,022	4,022
Adjusted R-squared	0.0284	0.0284	0.0286	0.0289

TABLE 4: Return synchronicity analyses

This table presents the results of the regressions from regressing return synchronicity on various cross-country variables. The cross-country variables are *FD, Trust, SR,* and *Disclosure.* Our cross-country variables are indicator variables that equal one if their scores are above the median value, and zero otherwise. All the variables are defined in Table 1. t-statistics, in parentheses, are indicated below the coefficients. *, **, and *** indicate significance at the 10, 5, and 1 percent levels (two-tailed), respectively.

Synchronicity	*FD*	*Trust*	*SR*	*Disclosure*
	(1)	*(2)*	*(3)*	*(4)*
FVA1	-2.926**	-3.422**	0.0137	-1.259
	(-2.155)	(-2.539)	(0.0112)	(-0.949)
FVA23	-1.531***	-1.456***	-1.673***	-1.499***
	(-4.645)	(-4.455)	(-5.348)	(-4.567)
Cross-country	1.086***	0.831**	-0.346	0.880
	(2.662)	(2.422)	(-0.642)	(1.263)
FVA1 × Cross-country	-0.363	0.669	-6.232***	-2.650*
	(-0.245)	(0.422)	(-4.122)	(-1.880)
FVA23 × Cross-country	-0.0816	-0.246	0.150	-0.0412
	(-0.178)	(-0.539)	(0.329)	(-0.0899)
ROA	2.164	2.134	2.264	2.273
	(0.790)	(0.779)	(0.829)	(0.830)
LEVERAGE	0.383	0.384	0.265	0.394
	(0.905)	(0.906)	(0.627)	(0.930)
M2B	0.210***	0.211***	0.217***	0.207***
	(5.923)	(5.956)	(6.154)	(5.866)
SIZE	0.923***	0.922***	0.923***	0.919***
	(45.80)	(45.81)	(45.93)	(45.63)
Constant	-18.45***	-18.14***	-16.87***	-18.11***
	(-27.37)	(-29.42)	(-23.10)	(-23.88)
Year fixed effects	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes
Observations	3,886	3,886	3,886	3,886
Adjusted R-squared	0.447	0.447	0.449	0.447

TABLE 5: Trading volume analyses

This table presents the results of the regressions from regressing trading volume on various cross-country variables. The cross-country variables are *FD, Trust, SR,* and *Disclosure.* Our cross-country variables are indicator variables that equal one if their scores are above the median value, and zero otherwise. All the variables are defined in Table 1. t-statistics, in parentheses, are indicated below the coefficients. *, **, and *** indicate significance at the 10, 5, and 1 percent levels (two-tailed), respectively.

Trading volume	*FD*	*Trust*	*SR*	*Disclosure*
	(1)	*(2)*	*(3)*	*(4)*
FVA1	11.65**	14.10***	9.783**	10.48**
	(2.084)	(2.619)	(2.211)	(2.354)
FVA23	3.575*	3.425**	4.536***	3.087*
	(1.944)	(1.962)	(2.615)	(1.726)
Cross-country	-5.173**	-6.127***	-1.516	-6.899***
	(-2.128)	(-4.110)	(-0.943)	(-2.803)
FVA1 × Cross-country	9.272	8.837	24.81***	16.33***
	(1.500)	(1.385)	(3.431)	(2.607)
FVA23 × Cross-country	18.59***	20.47***	18.57***	19.59***
	(7.388)	(8.251)	(7.259)	(7.771)
ROA	-26.99*	-29.69*	-26.43*	-28.09*
	(-1.695)	(-1.867)	(-1.662)	(-1.767)
LEVERAGE	-0.384	-0.595	0.298	-0.506
	(-0.162)	(-0.252)	(0.126)	(-0.214)
M2B	-0.707***	-0.732***	-0.765***	-0.749***
	(-3.480)	(-3.607)	(-3.754)	(-3.682)
SIZE	2.206***	2.218***	2.196***	2.215***
	(19.10)	(19.23)	(19.01)	(19.21)
Constant	-33.51***	-33.01***	-37.75***	-32.50***
	(-8.708)	(-10.30)	(-11.75)	(-8.820)
Year fixed effects	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes
Observations	4,346	4,346	4,346	4,346
Adjusted R-squared	0.290	0.293	0.292	0.292