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Accounting disclosure, stock price synchronicity and stock crash risk: An emerging-market perspective

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Abstract

Purpose – This study aims to examine the effects of firms' accounting disclosure policies on stock price synchronicity and stock crash risk, using a sample including 13 emerging markets. Furthermore, this research investigates how these relationships are affected by country-level investor protection and firm-level governance rankings.

Design/methodology/approach – This paper uses accounting disclosure measures constructed based on survey questions by Credit Lyonnais Securities Asia (2001, CLSA). The accounting disclosure measure is used to explain the two dependent variables, stock price synchronicity and stock crash risk. The stock price synchronicity measure is defined as the logistic transformation of R^2 following Hutton *et al.* (2009) and Jin and Myers (2006). R^2 is taken from the estimation of an extended market model. The stock crash risk variable is measured as the frequency difference between extremely negative and positive stock return residues following Jin and Myers (2006). These stock return residues are taken from the estimation of an extended market model. Because the CLSA firm-level disclosure data are from 2000, this paper matches other data taken from the same year, for consistency. The final sample includes 204 observations in 13 emerging countries.

Findings – This paper finds that firms' stocks are less synchronized with the entire market and have less crash risk if firms have superior accounting disclosure policies. These results suggest that the cost to collect firm-specific information may be decreased for investors if firms are more transparent. Thus, these firms' stocks have more firm-specific information content. These results also suggest that management is less likely to hide some negative information and release such negative information suddenly in the future if firms have higher levels of accounting disclosure. Thus, these firms' stocks are less likely to crash. In addition, the influences of firms' accounting disclosure policies on stock price synchronicity and crash risk are more significant for firms with superior country-level investor protection and firm-level governance rankings. These results imply that external investors place more value on accounting disclosure by well-governed firms because firms with superior governance standards are less likely to intentionally disclose misleading information. Thus, these firms' stocks can incorporate more firm-specific information and have less crash risk.

Originality/value – The current study is the first to show that the effects of accounting disclosure on stock price synchronicity and crash risk are more pronounced for firms with superior country-level investor protection and firm-level governance standards. Thus, this research extends the literature by providing a comprehensive picture of the influences of accounting disclosure on stock markets. In addition, the existing literature (Chen *et al.*, 2006; Durnev *et al.*, 2004) shows that firms with lower stock

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price synchronicity are associated with higher investment efficiency because managers invest based on the information in stock prices. Obviously, higher stock crash risk is highly related to higher bankruptcy risk for firms. Thus, examining the effects of accounting disclosure on stock price synchronicity and stock crash risk is of obvious importance to policy makers.

Keywords Emerging market, Accounting disclosure, Stock crash risk, Stock price synchronicity

Paper type Research paper

1. Introduction

The existing literature (Chen *et al.*, 2006; Durnev *et al.*, 2004) shows that firms with lower stock price synchronicity are associated with higher investment efficiency because lower stock price synchronicity indicates more firm-specific information in stock prices and managers invest based on that firm-specific information. Obviously, higher stock crash risk is highly related to higher bankruptcy risk for firms. Thus, examining the determinants of stock price synchronicity and stock crash risk is important to policy makers. First, this research investigates how firms' accounting disclosure policies affect their stock price synchronicity and stock crash risk in emerging economies.

The important effects of accounting disclosure on stock price synchronicity and stock crash risk have been established theoretically in the academic literature (Jin and Myers, 2006; Veldkamp, 2006). Specifically, if firms have creditable accounting disclosure policies, the cost for external investors to collect firm-specific information and incorporate it into stock prices by informed arbitrage is significantly reduced. Thus, firms' stocks have lower stock price synchronicity and more firm-specific information content. In addition, if firms' accounting disclosure standards are poor, a great deal of bad information may be kept inside the firms. When the firms cannot withhold such negative information, this bad information will be released suddenly and firms' stock will crash.

More importantly, this study investigates whether these relationships are influenced by country-level investor protection and firm-level governance rankings. Theoretically, firms with poor governance mechanisms may keep relevant information inside the company and disclose non-useful information (Armstrong *et al.*, 2010; Bushman and Smith, 2001; Francis *et al.*, 2005; Mazumdar and Sengupta, 2005). Thus, the effects of firms' accounting disclosure policies on stock price synchronicity and stock crash risk in emerging economies may be less pronounced for firms with poor governance standards.

This study focuses on emerging countries because, compared to developed countries, the information environment in emerging economies is less transparent because of the absence of enough analyst and media coverage (Chen *et al.*, 2011, 2014; Francis *et al.*, 2012, 2013; Li *et al.*, 2014). In addition, there is higher stock price synchronicity and stock crash risk in emerging economies (Morck *et al.*, 2000; Jin and Myers, 2006). Finally, emerging economies provide a better environment in which to test the effects of the interaction between accounting disclosure and governance standards because of the high variance of country-level and firm-level governance standards (Doidge *et al.*, 2007).

This paper uses accounting disclosure measures constructed based on survey questions by Credit Lyonnais Securities Asia (CLSA) (2001). These data are the only available and comprehensive disclosure index in emerging markets (Doidge *et al.*, 2007; Klapper and Love, 2004). The accounting disclosure measure is used to explain the two dependent variables, stock price synchronicity and stock crash risk. The stock price synchronicity measure is defined as the logistic transformation of R^2 following Hutton

et al. (2009) and Jin and Myers (2006). R^2 is taken from the estimation of an extended market model. Higher levels of the stock price synchronicity measure indicate lower firm-specific information content in stock prices. The stock crash risk variable is measured as the frequency difference between extremely negative and positive stock return residues following Jin and Myers (2006). These stock return residues are taken from the estimation of an extended market model. Higher values of this measure indicate more stock crash risk.

Using a sample including 13 emerging markets, this paper finds that firms' stocks are less synchronized with the entire market and have less crash risk if firms have superior accounting disclosure policies. These results suggest that the cost to collect firm-specific information may be decreased for investors if firms are more transparent. Thus, these firms' stocks have more firm-specific information content. These results also suggest that management is less likely to hide some negative information and release such negative information suddenly in the future if firms have higher levels of accounting disclosure. Thus, these firms' stocks are less likely to crash. In addition, the influences of firms' accounting disclosure policies on stock price synchronicity and crash risk are more significant for firms with superior country-level investor protection and firm-level governance rankings. These results imply that external investors place more value on accounting disclosure by well-governed firms because firms with superior governance standards are less likely to disclose misleading information intentionally. Thus, these firms' stocks can incorporate more firm-specific information and have less crash risk.

This research contributes to the extant literature from three perspectives. First, Haggard *et al.* (2008) demonstrate that higher levels of firm-level accounting disclosure are associated with lower stock price synchronicity and less crash risk in developed countries. Jin and Myers (2006) show that firms' stocks are more synchronized with the market and have more crash risk in a country with lower levels of accounting disclosure. This study advances the extant literature by demonstrating the effects of accounting disclosure on stock price synchronicity and stock crash risk in the setting of emerging markets.

Second, the current study is the first to show that the effects of accounting disclosure on stock price synchronicity and crash risk are more pronounced for firms with superior country-level investor protection and firm-level governance standards. This research extends the literature by providing a comprehensive picture of the influences of accounting disclosure on stock markets. The existing literature (Chen *et al.*, 2006; Durnev *et al.*, 2004) shows that firms with lower stock price synchronicity are associated with higher investment efficiency. Obviously, higher stock crash risk is highly related to higher bankruptcy risk for firms. Thus, investigating the determinants of stock price synchronicity and stock crash risk is important to regulators.

Finally, the existing literature (Chen *et al.*, 2011, 2014; Chen and Rezaee, 2012; Francis *et al.*, 2012, 2013; Hasan *et al.*, 2014c; Li *et al.*, 2014; Quttainah *et al.*, 2013; Samaha *et al.*, 2012; Song, 2014; Yu, 2011) demonstrates the effects of accounting disclosure, corporate governance and other information intermediaries on firms' investment behaviors and financing environments in emerging economies. This study advances this stream of literature by showing the effects of emerging market firms' accounting disclosure policies from the perspective of stock markets.

In Section 2, a number of related researches are described. Section 3 presents data. Section 4 describes and discusses empirical methodology and results. Section 5 concludes.

2. Research hypotheses

2.1 Accounting disclosure, stock price synchronicity and stock crash risk

The theoretical influences of firms' accounting disclosure policies on stock price synchronicity and stock crash risk have been established by Jin and Myers (2006) and Veldkamp (2006). Specifically, if firms have superior accounting disclosure standards, external investors have more incentive to collect firm-specific information and incorporate it into stock prices by informed arbitrage because of the reduced information collection cost. Thus, firms' stocks have more firm-specific information content and are less aligned with the market. They also provide the theoretical predictions about the relationship between accounting disclosure and stock crash risk. Specifically, if firms have poor accounting disclosure policies, it may indicate that management is hiding some negative information. When the cost to hide such negative information is too high, firms may release such negative information suddenly and firms' stocks are more likely to crash.

Empirically, Jin and Myers (2006) provide the evidence that superior country-level disclosure standards are associated with lower stock price synchronicity and stock crash risk. Hutton *et al.* (2009) and Haggard *et al.* (2008) show that firms with poor firm-level accounting disclosure standards and accounting quality have higher stock price synchronicity and more crash risk using samples including only firms in developed countries.

Compared to developed countries, the information environment in emerging economies is less transparent because there is not yet enough analyst and media coverage (Chen *et al.*, 2011, 2014; Francis *et al.*, 2012, 2013; Li *et al.*, 2014). In addition, there is higher stock price synchronicity and stock crash risk in emerging economies (Francis *et al.*, 2014; Hasan *et al.*, 2014b; Morck *et al.*, 2000; Jin and Myers, 2006). Thus, emerging economies provide a unique testing ground to investigate the effects of accounting disclosure on stock price synchronicity and stock crash risk.

The existing literature has examined the influences of accounting disclosure from several perspectives. For example, Hasan and Song (2014) show that banks provide more favorable bank loan contracting terms to firms with superior accounting disclosure standards. Hasan *et al.* (2014c) find that syndicated loan lenders create a less concentrated bank loan syndicate when borrowers have higher levels of accounting disclosure because such borrowers require less effort to monitor. This research focuses on the effects of accounting disclosure from the perspective of stock markets. The first formal hypothesis is below:

H1. Superior accounting disclosure policies are associated with lower stock price synchronicity and stock crash risk.

2.2 The interaction effects between disclosure and governance

Whether or not the effects of accounting disclosure on stock price synchronicity and stock crash risk are more or less pronounced for firms with superior governance is still an empirical question. When external investors trade a certain firm's stocks, firms may hide useful firm-specific information and intentionally disclose misleading information

(Mazumdar and Sengupta, 2005). The extant literature shows that firms with poor governance mechanisms are less transparent (Armstrong *et al.*, 2010; Bushman and Smith, 2001; Francis *et al.*, 2005). Thus, the effects of firms' accounting disclosure policies on stock price synchronicity and stock crash risk in emerging economies may be less pronounced for firms with poor governance standards.

Hasan and Song (2014) and Hasan *et al.*, (2014c) find that the influences of firms' accounting disclosure policies on syndicated loan markets are more pronounced for firms with superior country-level investor protection and firm-level governance rankings. This study examines this research question from the perspective of stock markets. The second formal hypothesis is below:

H2. The influences of firms' accounting disclosure policies on stock price synchronicity and crash risk are more pronounced for firms with superior country-level investor protection and firm-level governance rankings.

3. Empirical analysis

3.1 Variable definition

To investigate the effects of firm-level accounting disclosure policies on stock price synchronicity and stock crash risk, appropriate disclosure measures are required. This paper uses the accounting disclosure measure *FirmLevelDisclosure* based on survey questions by Credit Lyonnais Securities Asia (2001, CLSA). These data are the only available and comprehensive disclosure index in emerging markets (Doidge *et al.*, 2007; Klapper and Love, 2004). The variable *FirmLevelGovernance* is measured as the average value of six indices based on the survey questions from six categories in the CLSA survey. These six indices include social awareness, independence, responsibility, accountability, fairness and management discipline. These variables are further described in Appendix AI:

$$ret = \alpha_i + \beta_1 ret_{ind} + \beta_2 ret_m + \beta_3 [ret_{US} + rate] + \varepsilon \quad (1)$$

Following Hutton *et al.* (2009) and Jin and Myers (2006), the variable *Synchronicity* is defined as the logistic transformation of R^2. R square is taken from the estimation of equation (1). Higher levels of this stock price synchronicity measure indicate lower firm-specific information content in stock prices. In equation (1), the variable *ret* equals a firm's Wednesday-to-Wednesday weekly stock return, estimated based on the Datastream database. The variable ret_{ind} is the industry return and the variable ret_m is the market return. The variable ret_{USA} is the US market return, and the variable *rate* is equal to the return in the exchange rate between the US dollars and the local currency. To estimate equation (1), only firms with 30 weeks of trading data in a certain year are included. The variable *Crash* is measured as the frequency difference between extremely negative and positive stock return residues. These stock return residues are taken from the estimation of equation (1). Extremely negative stock return residues are measured as residues, lower than 1 per cent of the lognormal distribution. Extremely positive stock return residues are defined as residues, higher than 99 per cent of the lognormal distribution. This measure is presented in percentage. Higher values of this measure indicate more stock crash risk.

The country-level governance measure *CountryLevelGovernance* is defined as the average value of six world governance indices from the World Bank. These indices

include control of corruption political stability, regulatory quality, government effectiveness, voice and accountability and rule of law. The variable *CountryGDPPerCapita* is equal to the logarithm of a country's GDP per capita, which is taken from the World Development Indicator database. The variable *CountryGDPGrowth* equals the logarithm of a country's GDP growth.

Several firm-level variables are constructed based on the Worldscope database. Specifically, the variable *FirmTotalAssets* is defined as the logarithm of a firm's assets. The variable *FirmTotalLiability* is measured as a firm's total liability divided by its assets. The variable *FirmEarnings* is equal to a firm's earnings scaled by its assets.

3.2 Sample construction and summary statistics

Because the CLSA firm-level disclosure data are from 2000, this paper matches other data taken from the same year, for consistency. The final sample includes 204 observations in 13 emerging countries. Summary statistics for firm-level disclosure measure, by country, are presented in Table I. Firm disclosure standards tend to be strongest in Singapore, Brazil and Chile and weakest in India. South Korea and the Philippines have the least standard deviation. Table II reports the descriptive statistics of other variables.

3.3 Empirical results of multivariate analysis

In Table III, this paper investigates two subsamples to examine the effects of firm-level disclosure standards on stock price synchronicity and stock crash risk. Specifically, this research partitions the entire sample into two subsamples, based on *FirmLevelDisclosure* being above or below the median value. This study then reports the mean for *Synchronicity* and *Crash*, for each subsample. Then, this research compares the difference between these two mean values. As reported in Table III, the differences in *Synchronicity* and *Crash* are statistically significant at the 1 per cent level. These results

Country	Mean	SD	Minimum	Maximum
Full sample	54.7059	19.9362	10.0000	100.0000
Brazil	76.2500	13.0247	50.0000	90.0000
Chile	71.6667	20.4124	50.0000	90.0000
Hong Kong	57.8571	14.2389	40.0000	80.0000
India	39.8039	16.5518	10.0000	90.0000
Indonesia	57.0000	13.3749	30.0000	80.0000
South Korea	49.0000	8.7560	40.0000	60.0000
Malaysia	63.5000	15.9852	30.0000	80.0000
Philippines	41.2500	12.4642	20.0000	60.0000
Singapore	71.3636	13.2001	30.0000	90.0000
South Africa	57.5000	14.3759	30.0000	80.0000
Taiwan	54.5833	26.0400	20.0000	100.0000
Thailand	58.7500	17.2689	30.0000	80.0000
Turkey	50.0000	16.3299	20.0000	70.0000

Table I. Summary statistics of *FirmLevelDisclosure*

Notes: Describes summary statistics of *FirmLevelDisclosure*. The variable definition is provided in the Appendix

Variable	Mean	SD	10th percentile	50th percentile	90th percentile
Synchronicity	−0.7009	1.6096	−2.8429	−0.4596	1.2380
Crash	−1.2070	1.0197	−2.6194	−1.1343	0.0993
FirmLevelGovernance	57.1416	13.5708	38.5167	58.4000	72.3500
CountryLevelGovernance	61.1960	17.5164	41.5575	62.2957	82.1358
FirmTotalAssets	14.1734	1.4512	12.4181	14.1604	16.0940
FirmTotalLiability	21.6633	19.1476	0.2900	18.9300	47.8700
FirmEarnings	14.9097	23.6923	2.2470	10.0277	29.2955
CountryGDPPerCapita	8.2526	1.2691	6.6490	8.2330	10.0516
CountryGDPGrowth	1.6262	0.3576	1.2238	1.6292	2.0412

Notes: Describes summary statistics of other variables. The variable definition is provided in the Appendix

Table II.
Summary statistics of other variables

Variables	*FirmLevelDisclosure* Low	High	High − Low
Synchronicity	0.2908	−1.4532	−1.7439***
Crash	−0.5472	−1.7076	−1.1604***

Notes: Describes univariate analysis. The variable definition is provided in the Appendix. This research uses *** significance 1% level, respectively

Table III.
Univariate analysis

indicate that firms with superior firm-level disclosure standards have lower stock price synchronicity and stock crash risk.

This study next conducts a multivariate analysis of the effects of firm-level disclosure standards on stock price synchronicity and stock crash risk. In Table IV, this research estimates equation (2). In Table V, this research estimates equation (3):

$$\begin{aligned} Synchronicity = {} & \alpha + \beta_1\, FirmLevelDisclosure + \beta_2\, FirmLevelGovernance \\ & + \beta_3\, CountryLevelGovernance + \beta_4\, FirmTotalAssets \\ & + \beta_5\, FirmTotalLiability + \beta_6 FirmEarnings \\ & + \beta_7\, CountryGDPPerCapita + \beta_8\, CountryGDPGrowth + \varepsilon \end{aligned} \tag{2}$$

$$\begin{aligned} Crash = {} & \alpha + \beta_1\, FirmLevelDisclosure + \beta_2\, FirmLevelGovernance \\ & + \beta_3\, CountryLevelGovernance + \beta_4\, FirmTotalAssets \\ & + \beta_5\, FirmTotalLiability + \beta_6\, FirmEarnings + \beta_7\, CountryGDPPerCapita \\ & + \beta_8\, CountryGDPGrowth + \varepsilon \end{aligned} \tag{3}$$

The key independent variable is *FirmLevelDisclosure*, and $\beta_1 < 0$ is expected according to the hypotheses. $\beta_2 < 0$ and $\beta_3 < 0$ are expected because superior governance is associated with lower stock price synchronicity and stock crash risk (Francis *et al.*, 2011; Morck *et al.*, 2000; Jin and Myers, 2006). It is expected that *FirmTotalAssets* is positively associated with *Synchronicity*, as shown by Roll (1988). Business models of large firms

Table IV.
The effects of accounting disclosure on stock price synchronicity

	Synchronicity			
Dependent variable	(1)	(2)	(3)	(4)
FirmLevelDisclosure	−0.0510*** (0.0000)	−0.0440*** (0.0000)	−0.0450*** (0.0000)	−0.0467*** (0.0000)
FirmLevelGovernance		−0.0415*** (0.0000)	−0.0298*** (0.0000)	−0.0257*** (0.0000)
CountryLevelGovernance			−0.0447*** (0.0000)	−0.0429*** (0.0000)
FirmTotalAssets				−0.0667 (0.1445)
FirmTotalLiability				0.0078*** (0.0058)
FirmEarnings				−0.0006 (0.5530)
CountryGDPPerCapita	−0.3162*** (0.0000)	−0.3376*** (0.0000)	0.0653 (0.2830)	0.0818 (0.2127)
CountryGDPGrowth	−0.8390*** (0.0000)	−0.6117*** (0.0000)	−0.2204** (0.0174)	−0.2673*** (0.0104)
Industry effects	Yes	Yes	Yes	Yes
Obs	204	204	204	203
R^2	0.675	0.789	0.816	0.819

Notes: Describes the effects of accounting disclosure on stock price synchronicity. The variable definition is provided in the Appendix. This research uses ** and ***significance 5 and 1% levels, respectively

Table V.
The effects of accounting disclosure on stock crash risk

	Crash			
Dependent variable	(1)	(2)	(3)	(4)
FirmLevelDisclosure	−0.0292*** (0.0000)	−0.0242*** (0.0000)	−0.0250*** (0.0000)	−0.0260*** (0.0000)
FirmLevelGovernance		−0.0294*** (0.0000)	−0.0207*** (0.0000)	−0.0179*** (0.0000)
CountryLevelGovernance			−0.0335*** (0.0000)	−0.0330*** (0.0000)
FirmTotalAssets				−0.0019 (0.9225)
FirmTotalLiability				0.0044*** (0.0016)
FirmEarnings				−0.0005 (0.4261)
CountryGDPPerCapita	−0.2489*** (0.0000)	−0.2641*** (0.0000)	0.0376 (0.3384)	0.0380 (0.3475)
CountryGDPGrowth	−0.5824*** (0.0000)	−0.4211*** (0.0000)	−0.1280** (0.0145)	−0.1277** (0.0203)
Industry effects	Yes	Yes	Yes	Yes
Obs	204	204	204	203
R^2	0.686	0.830	0.868	0.871

Notes: Describes the effects of accounting disclosure on stock crash risk. The variable definition is provided in the Appendix. This research uses ** and ***significance 5 and 1% levels, respectively

are more complicated than small firms. Thus, it is expected that *FirmTotalAssets* is positively associated with the variable *Crash*. Firms with higher levels of liability and lower levels of earnings are more risky. Thus, it is expected that *FirmTotalLiability* has a positive influence on *Synchronicity* and *Crash*. The variable *FirmEarnings* has a negative impact on *Synchronicity* and *Crash*. Firms in a more developed country are less synchronized and are less risky (Morck *et al.*, 2000). Thus, it is expected that *CountryGDPPerCapita* and *CountryGDPGrowth* have a negative effect on the two dependent variables. Because there is only one-year firm-level disclosure data and a cross-section regression is estimated, only industry effect is included. Firm-level clustering is included when calculating standard errors.

As reported in Table IV, the coefficient of *FirmLevelDisclosure* is always negative and is statistically significant at a 1 per cent level. Thus, firms with superior accounting disclosure standards have lower stock price synchronicity. These results suggest that the cost to collect firm-specific information may be decreased for investors if firms are more transparent. Thus, these firms' stocks have more firm-specific information content. These results support *H1*. These results are also consistent with the findings in developed countries (Haggard *et al.*, 2008; Hutton *et al.*, 2009; Jin and Myers, 2006). In the second column, the variable *FirmLevelGovernance* is introduced into the analysis and the coefficient also is significant at the 1 per cent level. In the third column, the variable *CountryLevelGovernance* is included into the analysis and the coefficient also is significant at the 1 per cent level. After controlling for *FirmTotalAssets, FirmTotalLiability* and *FirmEarnings*, only *FirmTotalLiability* has a significant and positive impact on *Synchronicity*. At the country level, *CountryGDPGrowth* has a significant negative relation to *Synchronicity*, as one might expect. Importantly, the variable *FirmLevelDisclosure* is always statistically and economically related to the dependent variable *Synchronicity*. Based on the results reported in the last column, an increase from the 10th to the 90th percentile in the key variable *FirmLevelDisclosure* reduces the dependent variable *Synchronicity* by 7.78 per cent [(80-30)/30 $\times$ 0.0467], on average.

As shown in Table V, the coefficient of *FirmLevelDisclosure* is always negative and is statistically significant at a 1 per cent level. Thus, firms with superior accounting disclosure standards have lower stock crash risk. These results suggest that management is less likely to hide some negative information and release such negative information suddenly in the future if firms have higher levels of accounting disclosure. Thus, these firms' stocks are less likely to crash. These results support *H1*. These results are also consistent with the findings in developed countries (Haggard *et al.*, 2008; Hutton *et al.*, 2009; Jin and Myers, 2006). The coefficients of *FirmLevelGovernance* and *CountryLevelGovernance* are also significant and negative at the 1 per cent level. Among firm characteristics, only *FirmTotalLiability* has a significant and positive impact on *Crash*. At the country level, only *CountryGDPGrowth* has a significant negative relation to *Crash*, as one might expect. The variable *FirmLevelDisclosure* is statistically and economically related to the dependent variable *Crash*. Based on the results reported in the last column, an increase from the 10th to the 90th percentile in the key variable *FirmLevelDisclosure* reduces the dependent variable *Crash* by 4.33 per cent [(80-30)/30 $\times$ 0.0260], on average.

To investigate *H2*, whether the influences of firms' accounting disclosure policies on stock price synchronicity and crash risk are more pronounced for firms with superior country-level investor protection and firm-level governance rankings, this research estimates equation (4) in Table VI and equation (5) In Table VII:

$$\begin{aligned} Synchronicity\ or\ Crash = {} & \alpha + \beta_1\, FirmLevelDisclosure * CountryLevelGovernance \\ & + \beta_2 FirmLevelDisclosure + \beta_3\, FirmLevelGovernance \\ & + \beta_4\, CountryLevelGovernance + \beta_5 FirmTotalAssets \\ & + \beta_6\, FirmTotalLiability + \beta_7\, FirmEarnings \\ & + \beta_8\, CountryGDPPerCapita + \beta_9 CountryGDPGrowth + \varepsilon \end{aligned} \quad (4)$$

$$\begin{aligned} Synchronicity\ or\ Crash = {} & \alpha + \beta_1\, FirmLevelDisclosure * FirmLevelGovernance \\ & + \beta_2 FirmLevelDisclosure + \beta_3\, FirmLevelGovernance \\ & + \beta_4\, CountryLevelGovernance + \beta_5 FirmTotalAssets \\ & + \beta_6\, FirmTotalLiability + \beta_7\, FirmEarnings \\ & + \beta_8\, CountryGDPPerCapita + \beta_9 CountryGDPGrowth + \varepsilon \end{aligned} \quad (5)$$

As shown in Table VI, the coefficient of the interaction between *FirmLevelDisclosure* and *CountryLevelGovernance* is always negative and is statistically significant at a 1 per cent level. The effects of *FirmLevelDisclosure* on *Synchronicity* are equal to ($-0.0005 \times$ *CountryLevelGovernance*). The effects of *FirmLevelDisclosure* on *Crash* are equal to ($-0.0002 \times$ *CountryLevelGovernance* -0.0143). The results suggest that the influences of firms' accounting disclosure policies on stock price synchronicity and crash risk are more pronounced for firms with superior country-level investor protection.

As shown in Table VII, the coefficient of the interaction between *FirmLevelDisclosure* and *FirmLevelGovernance* is always negative and is statistically significant at a 1 per cent level. The effects of *FirmLevelDisclosure* on *Synchronicity* are equal to ($-0.0003 \times$ *FirmLevelGovernance* -0.0299). The effects of *FirmLevelDisclosure* on *Crash* are equal to ($-0.0002 \times$ *FirmLevelGovernance* -0.0130). The results suggest that the influences of firms' accounting disclosure policies on stock price synchronicity and crash risk are more pronounced for firms with superior firm-level governance rankings.

Dependent variable	*Synchronicity* (1)	*Crash* (2)
FirmLevelDisclosure × *CountryLevelGovernance*	−0.0005** (0.0135)	−0.0002** (0.0435)
FirmLevelDisclosure	−0.0168 (0.1064)	−0.0143*** (0.0078)
FirmLevelGovernance	−0.0269*** (0.0000)	−0.0183*** (0.0000)
CountryLevelGovernance	−0.0113 (0.3775)	−0.0206*** (0.0006)
FirmTotalAssets	−0.0585 (0.1830)	0.0013 (0.9454)
FirmTotalLiability	0.0073*** (0.0093)	0.0042*** (0.0025)
FirmEarnings	−0.0009 (0.4387)	−0.0007 (0.3844)
CountryGDPPerCapita	0.0025 (0.9696)	0.0069 (0.8483)
CountryGDPGrowth	−0.1967** (0.0453)	−0.1000* (0.0592)
Industry effects	Yes	Yes
Obs	203	203
R^2	0.824	0.873

Table VI. The effects of country-level investor protection

Notes: Describes the effects of the interaction between accounting disclosure and country-level investor protection. The variable definition is provided in the Appendix. This research uses *, ** and *** to indicate 10, 5 and 1% significance levels, respectively

Dependent variable	*Synchronicity* (1)	*Crash* (2)
FirmLevelDisclosure × *FirmLevelGovernance*	−0.0003* (0.0549)	−0.0002** (0.0179)
FirmLevelDisclosure	−0.0299*** (0.0025)	−0.0130** (0.0236)
FirmLevelGovernance	−0.0100 (0.2339)	−0.0057 (0.3742)
CountryLevelGovernance	−0.0436*** (0.0000)	−0.0336*** (0.0000)
FirmTotalAssets	−0.0621 (0.1844)	0.0017 (0.9321)
FirmTotalLiability	0.0076*** (0.0077)	0.0042*** (0.0017)
FirmEarnings	−0.0006 (0.5535)	−0.0005 (0.4007)
CountryGDPPerCapita	0.0884 (0.1777)	0.0431 (0.2938)
CountryGDPGrowth	−0.2641** (0.0105)	−0.1252** (0.0228)
Industry effects	Yes	Yes
Obs	203	203
R^2	0.819	0.873

Table VII.
The effects of firm-level governance rankings

Notes: Describes the effects of the interaction between accounting disclosure and firm-level governance rankings. The variable definition is provided in the Appendix. This research uses *, ** and *** to indicate 10, 5 and 1% significance levels, respectively

These results imply that external investors place more value on accounting disclosure by well-governed firms because firms with superior governance standards are less likely to intentionally disclose misleading information. Thus, these firms' stocks can incorporate more firm-specific information and have less crash risk. These results support *H2*. These results are also consistent with the findings in the existing literature (Hasan and Song, 2014; Hasan *et al.*, 2014c).

4. Conclusion

Compared to developed countries, the information environment in emerging economies is less transparent because of the absence of enough analyst and media coverage (Chen *et al.*, 2011, 2014; Francis *et al.*, 2012, 2013; Li *et al.*, 2014). In addition, there is higher stock price synchronicity and stock crash risk in emerging economies (Morck *et al.*, 2000; Jin and Myers, 2006). This research, first, investigates how firms' accounting disclosure policies affect their stock price synchronicity and stock crash risk in emerging economies. More importantly, this study examines whether these relationships are influenced by country-level investor protection and firm-level governance rankings.

Using a sample including 13 emerging markets, this paper finds that firms' stocks are less synchronized with the entire market and have less crash risk if firms have superior accounting disclosure policies. These results suggest that the cost to collect firm-specific information may be decreased for investors if firms are more transparent. Thus, firms' stocks have more firm-specific information content. These results also suggest that management is less likely to hide some negative information and release such negative information suddenly in the future if firms have higher levels of accounting disclosure. Thus, these firms' stocks are less likely to crash. In addition, the influences of firms' accounting disclosure policies on stock price synchronicity and crash risk are more significant for firms with superior country-level investor protection and firm-level governance rankings. These results imply that external investors place more value on accounting disclosure by well-governed firms because firms with superior governance

standards are less likely to intentionally disclose misleading information. Thus, these firms' stocks can incorporate more firm-specific information and have less crash risk.

This research extends the literature by providing a comprehensive picture of the influences of accounting disclosure on stock markets. The existing literature (Chen *et al.*, 2006; Durnev *et al.*, 2004) shows that firms with lower stock price synchronicity are associated with higher investment efficiency because managers invest based on the information in stock prices. Obviously, higher stock crash risk is highly related to higher bankruptcy risk for firms. Thus, examining the effects of accounting disclosure on stock price synchronicity and stock crash risk is of obvious importance to policy makers.

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Further reading

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Appendix I

Variable name	Description of the variable definition
Synchronicity	The logistic transformation of R^2. R^2 is taken from the estimation of equation (1)
Crash	The frequency difference between extremely negative and positive stock return residues. These stock return residues are taken from the estimation of equation (1). Extremely negative stock return residues are measured as residues, lower than 1% of the lognormal distribution. Extremely positive stock return residues are defined as residues, higher than 99% of the lognormal distribution. This measure is presented in percentage. Higher values of this measure indicate more stock crash risk
FirmLevelDisclosure	The index constructed based on the survey questions from the transparency category in the CLSA survey. Klapper and Love (2004) describe the sample survey questions: "Has management disclosed 3- or 5-year ROA or ROE targets? Does the company publish its Annual Report within four months of the end of the financial year? Does the company publish/announce semiannual reports within two months of the end of the half year? Does the company publish/announce quarterly reports within 2 months of the end of the quarter? " "Has the public announcement of results been no longer than two working days after the Board meeting? Are the reports clear and informative? Are accounts presented according to IGAAP? Does the company consistently disclose major and market sensitive information punctually? Do analysts have good access to senior management? Good access implies accessibility soon after results are announced and timely meetings where analysts are given all relevant information and are not misled. Does the Company have an English language website where results and other announcements are updated promptly (no later than one business day)?"
FirmLevelGovernance	The average value of six indices constructed based on the survey questions from six categories in the CLSA survey. These six indices include social awareness, independence, responsibility, accountability, fairness and management discipline
CountryLevelGovernance	The average value of six world governance indices from the World Bank. These indices include control of corruption political stability, regulatory quality, government effectiveness, voice and accountability and rule of law
FirmTotalAssets	The logarithm of a firm's assets
FirmTotalLiability	A firm's total liability divided by its assets
FirmEarnings	A firm's earnings divided by its assets
CountryGDPPerCapita	The logarithm of a country's GDP per capita
CountryGDPGrowth	The logarithm of a country's GDP growth

Table AI.
Descriptions of the variable definition

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