

Contents lists available at [ScienceDirect](#)

Journal of Contemporary Accounting and Economics

journal homepage: www.elsevier.com/locate/jcae

Investor protection, cross-listing and accounting quality

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ARTICLE INFO

Article history:

Received 23 August 2019

Revised 7 November 2019

Accepted 26 November 2019

Available online 4 December 2019

JEL Classification:

G38

G18

M41

M43

M44

Keywords:

Cross-listing

Accounting quality

Earnings management

Value-relevance

Conservatism

ABSTRACT

Using 42,808 firm-year observations from 32 countries around the world, we investigate whether cross-listing in the US is associated with better accounting quality, and whether investor protection moderates the effect of cross-listing on accounting quality. Our main results show firms that are cross-listed in the US exhibit more timely reporting of losses, greater tendency to manage earnings downward, and more value relevance of accounting numbers as compared to their domestic counterparts. Cross-listed firms originating from high investor protection jurisdictions, particularly in high anti-director rights and common law countries, exhibit greater tendency to recognise a more timely reporting of losses and to manage earnings downward but exhibit lower value relevance of earnings as compared to cross-listed firms domiciled in low anti-director rights and non-common law countries. These results suggest that the strength of investor protection in home country plays an important role in determining the quality of accounting numbers of cross-listed firms.

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1. Introduction

The financial globalization literature highlights that cross-listed firms would benefit in terms of increasing visibility, broadening the shareholder base, gaining access to financial markets, improving relations with the foreign financial community, and increasing demand for the firm's stock (e.g., Siegel, 2005; He, 2008). Decision of foreign firms to list their shares particularly in the US securities markets (cross-listing hereafter) is driven by the quest for greater access to cheaper capital for funding growth opportunities (Hail and Leuz, 2009). This is due to the fact that cross-listed firms are subjected to the rigorous US Securities and Exchange Commission's (SEC) requirements including various aspects of corporate governance. However, cross-listing results in an implicit contract between corporate governance of the firm's home and host environments and raises questions on how much diffusion takes place between these two (Bauer et al., 2004). Evidence of accounting scandals (e.g., Tingting, 2014) brings into question the governance aspects of the cross-listed firms. In particular, despite having strong fundamental characteristics of being listed in the US stock exchanges, unethical issues of the cross-listed firms trigger concerns regarding their accounting quality. Hence, the aim of this paper is to examine whether cross-listing benefits

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in terms of enhancing accounting quality, and whether the strength of investor protection explains the variations in the accounting quality of firms cross-listed in the US stock market.

Thus far, the effect of cross-listing on accounting quality is still debatable as the proponent of the bonding hypothesis asserts that cross-listed firms rent the host market's superior corporate governance system (Licht, 2003) but critics argue that these firms actually face few regulatory and disclosure requirements due to weak enforcement (Frost and Pownall, 1994). Further, accounting quality is also influenced by a set of interrelated home country-level factors (Isidro et al., 2016). For example, the accounting quality varies for firms domiciled in different levels of investor protection (Houqe et al., 2012). Hence, when institutional factors are considered, the home-country governance could either complement or supplement the effect of cross-listing in the US on accounting quality. The question that arises is whether home-country governance continues to influence the accounting quality of firms that are cross-listed in the US, despite the firms having to meet stringent regulatory requirements of the US market.

In doing so, we conduct empirical analyses on 42,808 firm-year observations from 32 countries, covering data for a period from 2007 to 2016. Our main results show that firms cross-listed in the US demonstrate better accounting quality than their domestic counterparts, i.e., by exhibiting more timely reporting of losses, greater tendency to manage earnings downward, and higher value relevance of accounting numbers. Further analysis shows that cross-listed firms in the high investor protection jurisdictions exhibit more timely reporting of losses and manage earnings downward but lower value relevance of earnings as compared to cross-listed firms domiciled in the weak investor protection countries. This evidence suggests that the strength of investor protection of the home country plays important roles in influencing the accounting quality of cross-listed firms. Our results are robust even after considering (i) alternative measures of accounting quality and investor protection; (ii) the impact of the 2008–2011 global crisis and the passage of the Rule 12 h-6 that ease the requirements for deregistering from the US; (iii) firms audited by the Big 4; (iv) the exclusion of UK and Japanese firms in the analysis; and (v) selection bias issues.

This study makes three incremental contributions to the extant accounting literature: First, it sheds light on how the relationship between cross-listing and accounting quality depend not only on institutional factors of the host countries but also the home countries. In doing so, we incorporate the effect of home countries' in analysing the degree of accounting quality of cross-listed firms. Thus, we extend prior works by Lang et al. (2003) and Lang et al. (2006) by documenting that such association is also influenced by the strength of investor protection of home-country institutional factors. Further, we address the issue of sample selection bias highlighted by Leuz (2006) by comparing foreign firms that cross-list in the US to their domestic counterparts. Our study extends international accounting literature, (e.g., Cahan et al., 2009), by showing evidence on the moderating effect of investor protection on accounting quality. Second, unlike prior studies which mostly focus only on 'legal bonding', the evidence documented in this study use both bonding and signalling theories in explaining the motivations underlying cross listing. More to the point, we show that cross-listed firms benefited not only from renting the superior corporate governance system of the US, but also through the improvement in their information environment arising from cross-listing. Third, as compared to the cross-listing and accounting quality literature that often focus only on the host-country environment, our research contributes towards the understanding on the role of institutional factors in curbing the manipulation of accounting numbers. More specifically, we provide evidence related to the institutional theory by considering that cross-listed firms also face incentives from the various institutional factors of the home country.

This paper proceeds as follows: Section 2 reviews related literature review and develops testable hypotheses, section 3 discusses the research design and sample selection, section 4 presents empirical results, and finally, section 5 provides a summary and implications of the study.

2. Prior literature and hypotheses development

A proponent of the bonding hypothesis asserts that firms cross-list to rent the host market's superior corporate governance system (Licht, 2003) as they commit themselves to the stricter enforcement and litigation environment of the host market (Lang et al., 2006; Eng et al., 2008). Cross-listing makes it harder and more costly for controlling owners and managers to extract private control benefits and to expropriate outside investors (Stulz, 1999). Ghosh and He (2015) indicate that cross-listing improves investor protection, reduces agency problems, and induces better investment decisions by managers which collectively, result in higher value for firms. The bonding hypothesis is supported by studies that examine capital market benefits of cross-listing in the context of capital raising (Chinn and Ito, 2006), analyst following (Fernandes and Ferreira, 2008), corporate valuation (Ghosh and He, 2015) and cost of capital (Hail and Leuz, 2009). Nevertheless, that the actual 'legal bonding' benefits of cross-listing may be overstated (Siegel, 2005) as there are weak enforcement mechanisms in place when foreign firms are involved (Frost and Pownall, 1994).

Accordingly, there is anecdotal evidence that listing effects are exchange-specific (Eng et al., 2008) and that being cross-listed does not necessarily convey the impression of good news about a firm (Durand et al., 2006). In particular, the benefits of cross-listing are dedicated to the improvement in information environment of the cross-listed firms. For example, the information environment of firms cross-listed in the US is deemed to improve through the attention given by financial analysts and monitoring by sophisticated US capital market participants, all of which are facilitated by the regulatory requirement for a reconciliation of financial statements to US GAAP (Lang and Lundholm, 1996; Healy et al., 1999). As cross-listing creates better information environment surrounding the firms, it should convey useful information about their accounting

quality. In line with this argument, [Lang et al. \(2003\)](#) find that firms cross-listed in the US exhibit better accounting quality relative to foreign firms that are not. However, comparison between cross-listed firms in the US, and US firms themselves suggest that the cross-listed firms show more tendency to manage earnings, relative to the US firms ([Lang et al., 2006](#)). Findings of [Lang et al. \(2006\)](#) are consistent with the view that the underlying incentives and regulatory environments may differ between the cross-listed and US firms.¹ While the cross-listed firms are required to comply with similar requirements as the US firms, they are also influenced by different reporting incentives originating from the institutional arrangements and market forces in their home countries.

Against this backdrop, revisiting whether cross-listing in the US affects accounting quality is warranted for several reasons. First, this study attempts to resolve the dilemma on the extent to which the US environment influences the benefits of cross-listing, given the cross-listed firms are also subjected by the institutional environment of their home countries. [Bauer et al. \(2004\)](#) suggest that it is uncertain on how much diffusion takes place between corporate governance of the cross-listed firm's home and host environments. In doing so, we extend and follow the recommendation of [Leuz \(2006\)](#) by using both firms that cross-list in the US and firms that do not cross-list that are only subjected to their home countries' institutional environment. Second, this study examines whether cross-listing can truly signal to investors the quality of the firms' financial reporting. Despite various worldwide efforts to strengthen corporate ethical conducts, issues of accounting scandals are still escalating including those involving cross-listed firms in the US that are supposed to be subjected to the rigorous regulations of the US.² In incorporating various aspects of accounting quality of firms from various countries, we follow [Lang et al. \(2006\)](#) by employing a wide range of proxies for accounting quality.

We posit that cross-listing in the US is associated with higher accounting quality. As rigorous regulations of the US strengthen their governance, cross-listed firms can be expected to have better accounting quality than the non-cross-listed. However, in the context where the enforcement aspects of the US regulation towards the cross-listed firms are weak, and the possibility that home-country institutional environment structures the governance of the cross-listed firms, their accounting quality may not be different than firms that are not cross-listed. Based on the above arguments, we formulate the following hypothesis:

3. H₁ Cross-listing in the US stock market is positively associated to accounting quality.

Drawing on the institutional theory, various aspects of the institutional environments including cultural norms, social knowledge, rules and regulations influence organizations and organizational behaviour. Institutional environments of each country create incentives that influence the behaviour of corporate executives, investors, regulators, and other market participants ([Bushman and Piotroski, 2006](#)). The variations related to institutional environment can be derived from two stream of extant studies: First, home countries' institutional factors influence cross-listing decisions and in particular, [Chen et al. \(2015\)](#) show that mandatory IFRS adoption in the home countries increases the propensity of firms' cross-listing activities especially in countries with larger and more liquid capital markets. [He \(2008\)](#) finds that the listings of Levels II and III American Depositary Receipts (ADRs) in US stock exchanges have dropped significantly in the post-Sarbanes-Oxley (SOX) period, with the drop being more evident for firms from countries with a lower level of shareholder protection. These results suggest that rigorous regulation of the host countries could have a different regulatory burden for firms in different institutional environments. Second, home countries' institutional factors determine the quality of financial reporting. Prior studies on investor protection rights show variations in earnings quality across countries (e.g., [DeFond et al., 2007](#); [Francis and Wang, 2008](#)) and suggest that managers' incentives for opportunistic behaviour decreases with the level of investor protection ([Leuz et al., 2003](#)). [Houqe et al. \(2012\)](#) find that the impact of mandatory IFRS adoption on earnings quality increases for firms in countries with strong investor protection. These findings highlight the importance of an individual country investors' protection on the quality of accounting information and the possibility that institutional environment of the countries influence the characteristics of reported accounting data. Thus, while renting the host countries' superior corporate governance system may benefit the cross-listed firms, the extent to which they would benefit is also determined by the institutional factors of their home countries.

In the context of firms that cross-list in the US, the determination of the prevailing institutional environment is an issue since cross-listing results in an implicit contract between corporate governance of the firm's home and host environments ([Bauer et al., 2004](#)). Prior empirical evidence involving the accounting quality of cross-listed firms are in support of the need to consider whether their managerial incentive is influenced by the institutional environments of the US or the home-country. [He et al. \(2008\)](#) compare conservative accounting behavior of ADRs in the pre- and post-Sarbanes Oxley periods. They find that only Levels II and III ADRs from code law countries become more conservative, whereas Levels II and III ADRs

¹ [Ball et al. \(2000a,b\)](#) provide example involving non-US firms that operate in environments where stakeholders such as labor and banks represent the composition of their corporate boards. On one hand, the stakeholders typically do not share as much in the upside, and face risk on the downside, and accordingly may provide incentives for management to report earnings with lower variance. On the other hand, reporting high profits is likely to attract political costs and greater demands from governments and labor, while large losses may increase the probability of intervention to ensure the viability of the firm. As a result, smoothing creates opacity to avoid firms from being scrutinized by outsiders and facilitate wealth expropriation by insiders ([Leuz et al., 2003](#)).

² Data from NYSE in the years 2011 and 2012 serves as evidence of the scenarios where unethical conducts, such as misrepresentations in financial reporting and falsification of the underlying documents on which audits relied, have caused more than 100 Chinese companies delisted or suspended from trading on the NYSE ([Cogman and Orr, 2013](#)).

from common law countries exhibit no significant change in accounting conservatism. Lang et al. (2006) argue that greater earnings management found in cross-listed firms could be due to the fact that the SEC regulation does not supplement the effect of weak local environment on foreign firms. Accordingly, the results indicate that there is a joint-effect of both cross-listing in the US and the strength of investor protection of the home country on accounting quality.

We posit that the strength of investor protection of the home country explains the variations in the accounting quality of firms cross-listed in the US. On the one hand, accounting quality of cross-listed firms in strong investor protection countries would be different than in weak investor protection countries as home-country environment jointly-affect accounting quality. In this complementary effect perspective, accounting quality for the cross-listed firms is better than the non-cross listed firms only in strong investor protection countries but not in weak investor protection countries. In the institutional setting of the home-country that increases incentives for firms to engage in manipulating behaviour, the benefit of strong enforcement and litigation environment of the US on accounting quality can be exacerbated. When home country's investor protection itself is weak, it would be difficult and costly for the US regulators to impose legal actions towards the cross-listed firms that do not abide to the SEC's regulation. By allowing controlling shareholders and managers to exert significant influence to opportunistic reporting, accounting quality for cross-listed firms in weak institutional environment would not be different than other firms that are not cross-listed. On the other hand, there would be no differences in the accounting quality of cross-listed firms in strong investor protection countries and in weak investor protection countries. In this substitutive effect perspective, the strength of investor protection is not expected to influence the effect of cross-listing on accounting quality. The pressure to meet stringent requirement of listing in the US market would already curb the managerial opportunistic behaviour among cross-listed firms in weak investor protection countries, thereby improving their accounting quality as well, similar to those from the strong investor protection countries. Hence, the hypothesis is set as follows:

H₂ The positive association between cross-listing in the US stock market and accounting quality is greater for firms from strong investor protection countries than weak investor protection countries.

4. data and research methodology

Our sample covers firms domiciled in 32 countries for the period 2007–2016. We collect the cross listing and the financial information from the *Osiris-Bureau van Dijk* database while data on investor protection and legal system are sourced from Djankov et al. (2008) and La Porta et al. (1998), respectively. The list of all variables, the definition and data sources are reported in Table 1.

We exclude (i) financial institutions (SIC code between 6000 and 6999), similar to the approach used by prior research (e.g. Francis and Wang, 2008; Houque et al., 2012); (ii) utility companies (SIC code between 4900 and 4999) because they are highly regulated; (iii) observations from countries with <100 observations i.e., Colombia, Czech Republic, and Ecuador; and (iv) observations from countries with no firms cross-list in the US market (e.g., Chile, Egypt, Jordan, Nigeria, Pakistan, Poland, Russia, Sri Lanka, Taiwan, Turkey).³ We also exclude observations with any missing or incomplete data, and winsorized observations that fell in the top and bottom 1% to mitigate the influence of outliers. Our final sample consists of 42,808 firm-year observations. The sample selection process is summarised in Table 2.

Following prior literature (e.g. Barth et al., 2008; Lang et al., 2003, 2006; Leuz et al., 2003), we use three dimensions of accounting quality: (i) timely loss recognition, (ii) earnings management; and (iii) value relevance.

4.1. Timely loss recognition

Timely loss recognition, or conservatism, is defined as the extent to which current period accounting earnings asymmetrically incorporate economic losses relative to economic gain (Basu, 1997). Prior studies (e.g., Ball et al., 2000a,b, 2003; Ball and Shivakumar, 2005; Bushman and Piotroski, 2006; Roychowdhury and Watts, 2007)) found a timelier reporting of bad news relative to that of good news. To test whether cross-listing in the US market leads to more timely loss recognition, and whether investor protections influence this relationship, we employed the Basu's (1997) asymmetric timeliness of earnings model.

In the Basu's (1997) model, stock return is used as a proxy for economic income as it is assumed that stock prices reflect all information from various sources other than the financial statements, consistent with evidence that stock prices lead earnings information (Ball and Brown, 1968; Kothari and Sloan, 1992). To examine whether cross-listing in the US market leads to more timely loss recognition, we modified the Basu's (1997) reverse regression model by incorporating a dummy variable for cross-listing (CROSS) and interacting this variable with the existing test variables in the Basu's model, as shown below:⁴

³ China and South Korea were excluded from our sample as we encountered problem matching the cross-list firms with disclosure made in NYSE.

⁴ In equation (1), timely loss recognition is measured by β_3 , the coefficient on RET*RD, where positive coefficient implies that earnings reflect bad news more quickly than good news. The modified Basu (1997) specification allows us to assess whether variations exist in the levels of accounting conservatism between firms that cross-list in the US market and their domestic counterparts. The coefficient of RET*RD*CROSS, β_7 , represents the change in the return response coefficient of the firms that cross-list in the US market. In relation to hypothesis 1, the coefficient of β_7 that is greater than zero indicates that firms that are cross-listed in the US market recognize losses more timely than other firms that are not cross-listed.

Table 1
Definitions of variables.

Variable	Description	Data source
CROSS	A dummy variable that takes value one if the firm cross-list to US market, otherwise zero. The cross-list firms include Levels I, II and Level III American Depositary Receipts (ADRs).	Osiris BvD & the The Bank of New York Mellon Corporation
ANTIDIR	Anti-director rights index based on La Porta et al.'s (1998) anti-director rights index revised by Djankov et al.'s (2008)	Djankov et al. (2008)
HIADRI	A dummy variable that takes value one for the countries if the revised index (ANTIDIR) is four or higher, otherwise zero.	Djankov et al. (2008)
COMLAW	A dummy variable that takes value one for common law country, otherwise zero.	La Porta et al. (1998)
PRICE	The closing stock price at the fiscal year end	Osiris BvD
BV	The book value of common equity per share	Osiris BvD
E	Earnings per share	Osiris BvD
EY	The earnings per share deflated by the stock price at the beginning of the fiscal year	Osiris BvD
RET	The annual stock return	Osiris BvD
RD	A dummy variable equals to one if RET is negative, otherwise zero.	Osiris BvD
ABSDACC	The absolute value of residual generated from the modified Jones (1991)	Osiris BvD
SIZE	The natural logarithm of total assets	Osiris BvD
LEV	Total debts divided by total assets	Osiris BvD
AGE	The natural logarithm of number of years since the year of incorporation	Osiris BvD
BIG4	A dummy variable that equals one if the firm appoints a Big Four auditor, zero otherwise.	Osiris BvD
FMGROW	firm-specific growth, measured changes in sales compared to the previous year	Osiris BvD
INDGROW	The mean of FMGROW calculated based on the Fama and French's (1997) 48 industry groups	Osiris BvD
CAPINT	Capital intensity, equal to the ratio of net book value of property, plant and equipment to total assets	Osiris BvD
ININT	Intangible intensity, equal to ratio of research and development expenditure to total sales	Osiris BvD
GDP	The natural logarithm of gross domestic product per capita in US Dollar	World Bank
DISC	DISC is a disclosure index as reported in La Porta et al. (2006)	
IFRS	A dummy variable that takes value one if the financial statements are prepared using IFRS standards, otherwise zero.	Osiris BvD
OWN	Ownership concentration as reported in La Porta et al. (2006).	La Porta et al. (2006)

Table 2
Sample selection.

Total number of observations for 2007–2016	241,602
Less: financial institutions	(24,897)
Less: firms in regulated industry	(6,128)
Less: observations from the US	(29,612)
Less: observations in country < 100 observations	(1,15)
Less: observations in country with no data on cross-listing firms	(62,617)
Less: missing/incomplete data	(75,425)
Firms included in the sample	42,808

$$EY_{it} = \beta_0 + \beta_1 RET_{it} + \beta_2 RD_{it} + \beta_3 RET_{it} * RD_{it} + \beta_4 CROSS_{it} + \beta_5 RET * CROSS_{it} + \beta_6 RD * CROSS_{it} + \beta_7 RET * RD * CROSS_{it} + \psi_{1-n} Country_Effects_{it} + \theta_{1-n} Year_Effects + \varepsilon_{it} \quad (1)$$

where EY_{it} is the earnings yield, measured by earnings per share deflated by beginning of the fiscal year's price per share; RET_{it} is the annual return during the fiscal year; RD_{it} is a dummy variable equals to one if RET_{it} is negative, and zero otherwise; $CROSS$ is a dummy variable equals to one if a firm is cross-listed in the US stock market, and zero otherwise. Finally, we include country- and year-fixed effects to control for the potential effects of these variables.

4.2. Earnings management

Earnings management is proxied by absolute value of abnormal accruals in which a higher value indicates a greater likelihood that firms engage in earnings management and thus, lower earnings quality. In our study, abnormal accruals are the value of residuals generated by estimating Jones (1991)'s model by industry and year. The estimated sample includes companies in 48 industry groups based on Fama and French (1997) industry classification, with at least 20 observations in each group. We calculate the absolute value of discretionary accruals (ABSDACC) which captures the combined effects of income-increasing and income-decreasing earnings management decisions (Warfield, Wild and Wild, 1995; Myers, Myers and Omer, 2003). Following Hribar & Nichols (2007), we use the ABSDACC as the dependent variable in equation (2) below:

$$ABSDACC = \alpha_0 + \beta_1 CROSS_{it} + \beta_2 AGE_{it} + \beta_3 BIG4_{it} + \beta_4 SIZE_{it} + \beta_5 FMGROW_{it} + \beta_6 INDGROW_{it} + \beta_7 LEV_{it} + \beta_8 CFO_{it} + \beta_9 CAPINT_{it} + \beta_{10} ININT_{it} + \psi_{1-n} Country_Effects_t + \theta_{1-n} Year_Effects_t + \varepsilon_{it} \quad (2)$$

Equation (2) incorporates a set of firm-level controls: AGE is to control for the difference in discretionary accruals of firms with different life cycles (Anthony and Ramesh, 1992); BIG4 is to account for the effect of Big4 auditors on discretionary accruals; SIZE is to control for the differences in the accruals behaviour of managers of large and small firms (Van Tendeloo and Vanstrelen, 2005; Dechow and Dichev, 2002; Ashbaugh et al., 2003); FMGROW is firm-specific growth in sales, to capture the possible difference in the accruals behaviour between firms with high and low growth that is unrelated to earnings management (Gul et al., 2009); INDGROW is an industry growth, which is calculated based on Fama and French's (1997) industry groups, that may cause firms to report systematically different levels of accruals (Myers et al., 2003); LEV is to control for the impact of firm leverage (LEV) given that highly leveraged firms attempt to avoid debt covenant violations by managing earnings upwards (Van Tendeloo and Vanstrelen, 2005); CFO is to capture the negative association between accruals and cash flows (Dechow, 1994); CAPINT is to control the potential influence of capital intensity on firm's accruals (Dechow and Dichev, 2002; Francis et al., 2004); and ININT is to account for the intensity of intangible asset (Dechow and Dichev, 2002; Francis et al., 2004). Other variables are as previously defined.

4.3. Value relevance

Value relevance portrays how useful the accounting numbers are to equity investors. That is, accounting numbers are considered as value relevant if they have a predicted association with stock prices, in line with the argument that the accounting numbers are relevant and reliable to investors. In the main analysis, we estimate value relevance using the price model (Barth et al., 1998). We extend the value relevance analysis by assessing the relationship between cross-listing and value-relevant, and how investor protections moderate this relationship. The modified form of the regression model is as follows:⁵

$$\begin{aligned} \text{PRICE}_{it} = & \alpha_0 + \beta_1 \text{BV}_{it} + \beta_2 \text{E} + \beta_3 \text{CROSS}_{it} + \beta_4 \text{BV} * \text{CROSS}_{it} + \beta_5 \text{E} * \text{CROSS}_{it} + \psi_{1-n} \text{Country_Effects}_{it} \\ & + \theta_{1-n} \text{Year_effects} + \varepsilon_{it} \end{aligned} \quad (3)$$

where PRICE is the closing stock price of firm; BV is the book value of equity per share; E is earnings per share; and other variables are as previously defined.

4.4. Investor protection

We employ two measures of investor protection: The first measure is based on the countries' legal system and origin. Following La Porta et al. (1998) and He (2008), we classify common law countries as countries with strong investor protection and civil law countries as countries with weak investor protection. In the regression models, we incorporate a dummy variable that takes a value of one for common law countries, and zero for the civil law countries. The second measure is based on the anti-director rights index, which measures the strength of the legal system in protecting minority shareholders against managers or dominant shareholders in the corporate decision-making process (La Porta et al., 1998).⁶ In this study, we use the anti-directors index developed by La Porta et al. (1998) and modified by Djankov et al. (2008) where the total score of the revised index ranges from 0 to 5. We use a dummy variable HIADRI where value one is assigned for high investor protection countries if the index is four or higher, and value zero for weak investor protection if the anti-director rights index is below four.

5. Results

5.1. Descriptive statistics

Table 3, Panel A reports descriptive statistics for all the variables for the two group of samples, i.e., firms cross-listed in the US market and firms that do not cross-list. Sample of cross-listed firms shows higher stock prices (PRICE), stock returns (RET), book value of equity (BV), firm size (SIZE), earnings per share (E), earnings yield (EY), firm growth (FMGROW), average industry growth (INDGROW), and operating cash flow (CFO) than non-cross listed firms. However, compared to firms that do not cross-list, sample of firms that are cross-listed in the US market has higher debt to assets ratio (DA), lower natural logarithm of age (AGE), and mostly audited by BIG4 audit firms. We find no significant differences of capital intensity (CAPINT) and intangible intensity (ININT) between both samples. Further, sample of firms cross-listed to US market has higher absolute value for discretionary accruals (ABSDACC) but lower value of unadjusted discretionary accruals (DAC) compared to firms that do not cross-listed, exhibiting higher earnings management in particularly earnings downward in cross-listing sample. Panel B of Table 3 shows the descriptive statistics by countries for cross-listing firms (CROSS), anti-director rights'

⁵ In equation (2), we interpret positive coefficients for book value of equity and earnings (β_4 and β_5) as evidence of value relevance, and positive and significant coefficients on $\text{BV} * \text{CROSS}$ and $\text{E} * \text{CROSS}$ (β_4 and β_5) exhibit that cross-listed firms in the US market have greater value relevance of book value of equity and earnings as compared to non-cross-listed firms. In equation (3), a higher earnings-return relationship, signified by the coefficient of β_1 , as evidence of higher value relevance, while the coefficient of the interaction variable $\text{E} * \text{CROSS}$ tests whether cross-listed firms are linked to higher value relevance compared to non-cross-listed firms. If hypothesis H_1 is valid, the coefficient of $\text{E} * \text{CROSS}$, β_5 , is shown to be positive and significant.

⁶ The La Porta et al. (1998)'s anti-director rights index comprises six components namely voting by mail, voting without blocking of shares, calling an extraordinary general meeting, proportional board representation, pre-emptive rights, and judicial remedies.

Table 3
Descriptive statistics.

Panel A Cross-list vs non-cross list samples											
Variable	Cross-List (N = 5,608)		Non-Cross-List (N = 37,200)		Mean Diff						
	Mean	SD	Mean	SD							
PRICE	20.60	38.93	8.045	21.10	-12.552***						
BV	9.568	16.17	6.509	15.01	-3.059***						
E	0.770	2.246	0.417	1.615	-0.353***						
EY	0.009	0.225	0.030	0.260	0.021***						
RET	0.112	0.605	0.090	0.556	-0.023***						
ABSDACC	0.028	0.032	0.026	0.024	-0.002***						
SIZE	14.11	2.090	11.98	1.854	-2.130***						
LEV	0.897	1.087	0.864	1.120	-0.033**						
MTB	2.805	5.031	1.696	3.403	-1.109***						
BIG4	0.837	0.369	0.504	0.500	-0.333***						
AGE	3.310	0.965	3.397	0.817	0.087***						
FMGROW	0.342	9.436	0.208	12.45	-0.134						
INDGROW	2.183	1.923	1.854	2.075	-0.329***						
CFO	0.083	0.144	0.059	0.244	-0.023***						
CAPINT	0.292	0.236	0.285	0.211	-0.006**						
ININT	0.663	27.86	0.066	5.373	-0.597***						

Panel B: Summary of country-level variables											
Country	Obs	Pct	Cross	Pct	INVDUM	ANTIDIR	Legal System	GDP	DISC	IFRS (%)	OWN
Argentina	109	0.25	19	0.34	Low	2.0	Civil Law	9.22	0.50	73.39	0.55
Australia	1,907	4.45	589	10.5	High	4.0	Common Law	10.96	0.75	99.69	0.28
Austria	167	0.39	20	0.36	Low	2.5	Civil Law	10.76	0.25	94.61	0.51
Belgium	281	0.66	52	0.93	Low	3.0	Civil Law	10.69	0.42	93.59	0.62
Brazil	269	0.63	4	0.07	High	5.0	Civil Law	9.39	0.25	99.63	0.63
Canada	1,747	4.08	1,394	24.85	High	4.0	Common Law	10.8	0.92	80.94	0.24
Denmark	364	0.85	86	1.53	High	4.0	Civil Law	10.95	0.58	95.33	0.40
Finland	544	1.27	42	0.75	Low	3.5	Civil Law	10.75	0.50	98.90	0.34
France	1,034	2.42	159	2.83	Low	3.5	Civil Law	10.64	0.75	84.91	0.24
Germany	1,764	4.12	310	5.53	Low	3.5	Civil Law	10.64	0.42	88.61	0.50
Greece	612	1.43	12	0.21	Low	2.0	Civil Law	10.15	0.33	93.79	0.68
Hong Kong	595	1.39	128	2.28	High	5.0	Mixed System	10.41	0.92	99.83	0.54
India	7,216	16.86	2	0.04	High	5.0	Common Law	7.18	0.92	0.60	0.43
Indonesia	683	1.60	25	0.45	High	4.0	Civil Law	8.16	0.50	0.00	0.62
Ireland	205	0.48	138	2.46	High	5.0	Common Law	10.82	0.67	64.88	0.36
Israel	1,249	2.92	268	4.78	High	4.0	Mixed System	10.25	0.67	85.59	0.55
Italy	360	0.84	55	0.98	Low	2.0	Civil Law	10.41	0.67	98.61	0.60
Japan	10,439	24.39	531	9.47	High	4.5	Civil Law	10.71	0.75	1.18	0.13
Malaysia	2,895	6.76	25	0.45	High	5.0	Mixed System	9.11	0.92	99.21	0.52
Mexico	109	0.25	48	0.87	Low	3.0	Civil Law	9.21	0.58	96.33	0.67
Netherlands	221	0.52	89	1.59	Low	2.5	Civil Law	10.76	0.50	87.78	0.31
New Zealand	347	0.81	94	1.68	High	4.0	Common Law	10.42	0.67	99.42	0.51
Norway	337	0.79	117	2.09	Low	3.5	Mixed System	11.45	0.58	100	0.31
Philippines	467	1.09	68	1.21	High	4.0	Mixed System	7.68	0.83	100	0.51
Portugal	193	0.45	14	0.25	Low	2.5	Civil Law	9.96	0.42	98.96	0.59
Singapore	1,993	4.66	153	2.73	High	5.0	Common Law	10.72	1.00	99.3	0.53
South Africa	613	1.43	68	1.21	High	5.0	Mixed System	8.89	0.83	0.00	0.52
Spain	182	0.43	46	0.82	High	5.0	Civil Law	10.29	0.50	98.90	0.50
Sweden	1,009	2.36	143	2.55	Low	3.5	Civil Law	10.87	0.58	91.58	0.28
Switzerland	538	1.26	112	2	Low	3.0	Civil Law	11.19	0.67	72.68	0.48
Thailand	1,570	3.67	13	0.23	High	4.0	Civil Law	8.56	0.92	64.52	0.48
United Kingdom	2,789	6.52	784	13.98	High	5.0	Common Law	10.58	0.83	97.99	0.15
Total	42,808	100	5,608	100							

*, ** and *** represent significance at $p < 0.10$, < 0.05 and < 0.01 , respectively. See Table 1 for the variable definitions.

index (ANTIDIR), dummy variable for high investor protection countries (HIADRI) and types of legal system. We also present the statistics for other country level variables namely the natural logarithm of gross domestic product per capita (GDP), disclosure index (DISC), accounting standards (IFRS), and ownership concentration (OWN).

We perform pair-wise correlation analysis among the dependent and independent variables. The untabulated results, for brevity purpose, reveal that CROSS is positively correlated with book value of equity, earnings per share, stock returns, SIZE, LEV, GROWTH, BIG4, CFO, and ININT. We find CROSS is negatively associated with AGE. Although the results show several significant correlations between independent variables, none represent any concern for multicollinearity.⁷

⁷ Multicollinearity is likely to be a concern when pair-wise correlation between the two variables exceeds 0.80 (Gujarati, 1995).

5.2. Main empirical results

Table 4 presents the results for timely loss recognition, regressed separately for different subsamples. Models (1), (4) and (5) show that the coefficients for RET*RD*CROSS are positively significant indicating evidence of incremental timely loss recognition in cross-listed firms compared to non-cross-listed firms in high investor protection environment, particularly with high anti-director rights and common law legal system, and the full sample. For low investor protection samples, as reported in Models (2) and (3), there is no evidence that cross-listing leads to more timely reporting of losses in low anti-director rights and civil law legal system. These results suggest that the impact of cross-listing on earnings conservatism is influenced by the level of anti-director rights and the type of legal systems. For additional tests, we limit our analyses to cross-listed firms and incorporate dummy variables HIADRI and COMLAW and the interaction variables in Models (6) and (7). The results show that the coefficients for RET*RD*HIADRI and RET*RD*COMLAW are positively significant, indicating evidence of incremental timely loss recognition for cross-listed firms in high investor protection countries than in low investor protection countries. In sum, strong investor protection in home country and exposure to a more stringent regulation in the US markets provide greater incentives for managers to report more conservative earnings, i.e. timelier loss recognition, consistent with prior evidence that managers' incentives for opportunistic behaviour decrease with the level of investor protection (Leuz et al., 2003).

Table 5 presents the regression results in relation to the effect of cross-listing on absolute value of discretionary accruals for various subsamples. The coefficients for CROSS in Models (1) to (5) are positive and statistically significant indicating that cross-listed firms exhibit greater tendency to manage earnings as compared to their domestic counterparts in both low and high investors protection countries. The results in Models (6) and (7), where the sample is restricted to cross-listed firms, show that the coefficients for HIADRI and COMLAW are statistically significant suggesting that cross-listed firms in high investor protection countries show lower tendency to manage earnings compared to cross-listed firms in low investor protection countries.

Table 6 reports the regression results for the effect of cross-listing on the value relevance of accounting numbers, under different subsamples of investor protection. The results in all models are consistent with results of prior studies, where we find strong evidence of value relevance of book value of equity and earnings across firms in different subsamples.⁸ The results in Models (1) to (5) show significantly positive coefficients for BV*CROSS and E*CROSS implying that higher value relevance of accounting numbers, for both book value of equity and earnings, in cross-listed firms compared to non-cross-listed firms, regardless of the level of anti-directors rights and types of legal system.⁹ The results, however, show that the coefficients for E*CROSS is higher in low anti-directors rights and weak legal system environment compared to high anti-directors rights and strong legal system. In Models (6) and (7), where the sample is limited to cross-listed firms, the coefficients for BV*HIADRI and BV*COMLAW are insignificant, indicating that no differences in the value relevance of book value of equity among cross-listed firm in high or low investor protection countries. In contrast, the coefficients for E*HIADRI and E*COMLAW are significantly negative, suggesting that the value relevance of earnings in cross-listed firm is higher in low investor protection countries than in high investor protection countries.

The results implies that in low investor protection environments, cross-listing has greater positive impact on the value relevance of earnings, compared to high investor protection environments. The plausible explanation is a high investor protection environment is associated with higher earnings quality (Francis and Wang, 2008; DeFond et al., 2007; Cahan et al., 2009), and the decision to cross-list would marginally enhance the quality of accounting information since the difference in security laws and investor protections between the US and high investor protection countries are minimal, compared to low investor protection environments where the gap is greater.

In summary, the results in Tables 4–6 suggest that investor protection plays an important role in determining the quality of accounting numbers. However, such effects vary across different proxies of accounting quality. Strong investor protection in home country and exposure to a more stringent regulation in the US markets contributes to a more conservative reported earnings, showed by timelier loss recognition and tendency to manage earnings downward. In the value relevance context, stock prices and stock return exhibit stronger link with earnings in low investor protection countries compared to high investor protection countries. Consistent with prior studies that argued that a high investor protection environment is associated with higher earnings quality (Francis and Wang, 2008; DeFond et al., 2007; Cahan et al., 2009), our study implies that the decision to cross-list would marginally enhance the quality of accounting information since the difference in security laws and investor protections between the US and high investor protection countries are minimal, compared to low investor protection environment where the gap is much greater.

5.3. Endogeneity issue

In our main analysis, we assume that the investor protection variable is an exogenous variable. If, on the other hand, investor protection and accounting quality are simultaneously determined, our results suffer from an endogeneity bias.

⁸ The coefficients on book value of equity (β_1) and earnings (β_2) are positive and significant in all samples, implying that accounting numbers are important for investors. The results indicate that the coefficients of CROSS (β_3), which capture the effect of cross-listing on stock prices, are positive and significant in Models (1) to (5) showing that firms cross-listed in US market exhibit higher stock prices than their domestic counterparts, consistent with the findings of Sami and Zhou (2008).

⁹ It is important to note that the firms in high investor protections samples have higher coefficient of BV*CROSS than the firms in low investor protections samples, for both measures of investor protections i.e. anti-directors rights and legal system.

Table 4
Regression results on timely loss recognition and cross-listing.

Variable/Sample	Full Sample	Low Investor Protection		High Investor Protection		Reduced Sample	
		HIADRI = 0	COMLAW = 0	HIADRI = 1	COMLAW = 1	Anti-Director Rights	Legal System
Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Intercept	0.177*** (6.952)	0.219*** (6.955)	0.182*** (8.560)	0.038*** (3.054)	0.037* (1.894)	0.203*** (3.908)	0.212*** (4.117)
RET	0.054*** (17.018)	0.040*** (3.996)	0.053*** (14.996)	0.056*** (16.788)	0.059*** (10.264)	0.051*** (3.253)	0.028*** (2.587)
RD	0.006 (1.561)	-0.008 (-0.835)	-0.004 (-1.062)	0.007 (1.602)	0.015* (1.746)	0.027 (1.490)	0.017 (1.324)
RET*RD	0.219*** (21.144)	0.222*** (8.557)	0.171*** (15.006)	0.221*** (19.514)	0.266*** (13.793)	0.183*** (3.642)	0.209*** (5.701)
CROSS	0.003 (0.476)	-0.006 (-0.418)	-0.007 (-1.046)	0.003 (0.411)	0.015 (1.218)		
RET*CROSS	-0.028*** (-3.560)	0.021 (1.025)	-0.028*** (-2.750)	-0.037*** (-4.292)	-0.038*** (-2.864)		
RD*CROSS	0.022** (2.149)	0.019 (0.810)	0.016 (1.362)	0.023* (1.934)	0.021 (1.127)		
RET*RD*CROSS	0.091*** (3.628)	-0.038 (-0.604)	0.054 (1.609)	0.110*** (4.049)	0.086** (2.101)		
HIADRI						-0.109* (-1.957)	
RET*HIADRI						-0.030* (-1.731)	
RD*HIADRI						0.002 (0.092)	
RET*RD*HIADRI						0.141*** (2.591)	
COMLAW							-0.091* (-1.753)
RET*COMLAW							-0.002 (-0.164)
RD*COMLAW							0.018 (1.034)
RET*RD*COMLAW							0.131*** (3.001)
Country Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj.R ²	0.08	0.12	0.10	0.08	0.07	0.12	0.12
Obs	42,808	7278	26,604	35,530	16,204	5608	5608
F-stat	84.771	35.861	76.844	90.401	60.353	16.903	16.977

*, ** and *** represent significance at $p < 0.10$, < 0.05 and < 0.01 , respectively. t-values are reported in the parentheses. See Table 1 for the variable definitions.

To mitigate for endogeneity, we employ a two-stage estimation procedure proposed by Heckman (1979) to correct for the selection bias. In the first stage, we employed a Probit regression on a dummy variable for investor protection. Specifically, we estimate the following model in the first stage equation:

$$HIADRI = \alpha_0 + \beta_1 GDP + \beta_2 DISC + \beta_3 IFRS + \beta_4 OWN + \varepsilon_{it} \quad (4)$$

where HIADRI is a dummy variable that takes value one for the countries if the revised index (ANTIDIR) is four or higher, otherwise zero; GDP is the natural logarithm of gross domestic product per capita in US Dollar; DISC is a disclosure index as reported in La Porta et al. (2006); IFRS is a dummy variable that takes value one if the financial statements are prepared using IFRS standards, otherwise zero; and OWN is an ownership concentration as reported in La Porta et al. (2006).

The model includes countries' GDP per capita since an effective legal infrastructure is costly to create and maintain, and hence a country's wealth potentially influences the level of legal enforcement and investor protection. We also include disclosure index (DISC) and ownership concentration (OWN) because these variables exert significant influence on investor protection (La Porta et al., 2006). The accounting standards are also argued to be related to investor protection (Houque et al., 2012). The results for the first stage estimations are presented in model (1) Table 7.¹⁰

¹⁰ In the initial model, we include countries' legal system which is considered as predetermined and exogenous because the origins of most legal systems are several centuries old and many countries inherited their legal system through occupation and colonization (La Porta et al., 1998; Leuz et al., 2003). However, the legal system is later dropped by the PROBIT model due to collinearity issue.

Table 5
Regression results on earnings management and cross-listing.

Variable/Sample	Full Sample	Low Investor Protection		High Investor Protection		Reduced Sample	
		HIADRI = 0	COMLAW = 0	HIADRI = 1	COMLAW = 1	Anti-Director Rights	Legal System
Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Intercept	0.053*** (19.637)	0.066*** (15.790)	0.051*** (19.017)	0.057*** (38.122)	0.061*** (27.278)	0.111*** (8.986)	0.098*** (12.267)
CROSS	0.003*** (5.866)	0.002** (2.021)	0.002*** (3.518)	0.003*** (6.278)	0.004*** (4.996)		
HIADRI						-0.007** (-2.537)	
COMLAW							-0.022*** (-2.994)
AGE	-0.001*** (-8.142)	-0.003*** (-7.045)	-0.000*** (-2.630)	-0.001*** (-4.824)	-0.002*** (-8.674)	-0.002*** (-4.720)	-0.002*** (-4.720)
BIG4	-0.001*** (-4.698)	0.001 (0.862)	-0.001*** (-3.443)	-0.002*** (-5.588)	-0.002*** (-3.205)	-0.002 (-1.470)	-0.002 (-1.470)
SIZE	-0.002*** (-30.378)	-0.003*** (-15.187)	-0.002*** (-24.898)	-0.002*** (-25.255)	-0.002*** (-16.898)	-0.004*** (-14.595)	-0.004*** (-14.595)
FMGROW	0.000*** (2.663)	0.000 (0.884)	0.000*** (3.888)	0.000** (2.523)	0.000 (1.469)	0.000 (0.124)	0.000 (0.124)
INDGROW	0.000*** (5.791)	0.001*** (3.630)	0.000*** (4.299)	0.000*** (4.753)	0.000*** (4.109)	0.001*** (2.827)	0.001*** (2.827)
LEV	0.003*** (22.800)	0.003*** (9.179)	0.003*** (19.005)	0.002*** (19.866)	0.002*** (12.563)	0.002*** (5.188)	0.002*** (5.188)
CFO	-0.002*** (-3.019)	0.002** (2.461)	0.000 (0.547)	-0.010*** (-10.569)	-0.008*** (-6.468)	-0.001 (-0.238)	-0.001 (-0.238)
CAPINT	0.013*** (22.518)	0.011*** (6.625)	0.012*** (17.057)	0.014*** (23.039)	0.014*** (14.221)	0.016*** (8.309)	0.016*** (8.309)
ININT	0.000 (1.485)	0.000 (1.525)	0.000** (2.331)	0.000 (0.581)	0.000 (0.304)	0.000 (0.649)	0.000 (0.649)
Country Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj.R ²	0.08	0.08	0.06	0.08	0.08	0.13	0.13
Obs	42,808	7278	26,604	35,530	16,204	5608	5608
F-stat	70.934	21.771	42.537	84.544	60.653	17.468	17.468

*, ** and *** represent significance at $p < 0.10$, < 0.05 and < 0.01 , respectively. t-values are reported in the parentheses. See Table 1 for the variable definitions.

The results show that HIADRI is positively associated with DISC suggesting that countries with a high level of investor protection exhibit a high degree of disclosure. We also found that GDP, IFRS and OWN have significant negative association suggesting that countries with high GDP per capita, IFRS accounting standards and high ownership concentration have poor investor protection. We then calculate the Inverse Mills (IMR) ratio by dividing the ratio of the probability density function with the cumulative distribution function. In the second stage, we incorporate IMR as an additional explanatory variable in Models (2) to (4) to examine whether there is difference on the association between investor protection and accounting quality proxies on sample restricted to cross-listed firms.

In Model (2), the coefficient for $RET*RD*HIADRI$ is positive and significant, indicating evidence of incremental timely loss recognition for cross-listed firms in high investor protection countries than in low investor protection countries. We also find the coefficient for HIADRI in Model (3) is negative and significant suggesting than cross-listed firms in high investor protection countries have lower tendency to manage earnings compared to cross-listed firms in low investor protection countries. Finally, the results in Model (4) show that the coefficients for $BV*HIADRI$ is positive and significant while the coefficient for $E*HIADRI$ is negative and significant, suggesting higher value relevance of book value of equity and lower value relevance of earnings in high investor protection countries compared to low investor protection countries. In addition, we find the coefficients for IMR are insignificant in Models (2)-(4), hence eliminating concern on self-selection issues. Overall, the regression results are qualitatively similar to those in the main analysis.

5.4. Robustness tests

We perform a battery of tests to ensure our findings are robust to various specifications. First, we employ alternative measurements for accounting quality where we use the Ball and Shivakumar's (2005) accruals-based test of loss recognition for timely loss recognition, while for value relevance we use the return-earnings model by Easton and Harris (1991). The untabulated results show significant increase in the timely reporting of losses in cross-listed firms compared to non-cross-listed firms in high investor protection environment, consistent with the main results. We also find qualitatively similar findings where cross-listing only enhances the value relevance of earnings in low investor protection sample. For earnings management, we use the unadjusted value of discretionary accruals which identifies direction of either downward or

Table 6
Regression results on value relevance and cross-listing.

Variable/Sample	Full Sample	Low Investor Protection		High Investor Protection		Reduced Sample	
		HIADRI = 0	COMLAW = 0	HIADRI = 1	COMLAW = 1	Anti-Director Rights	Legal System
Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Intercept	0.736 (0.531)	0.941 (0.299)	1.168 (0.691)	1.787*** (3.972)	1.750*** (3.205)	-1.674 (-0.307)	-1.179 (-0.217)
BV	0.743*** (118.562)	0.841*** (52.233)	0.763*** (100.801)	0.626*** (99.906)	0.550*** (37.434)	1.118*** (33.670)	1.090*** (38.769)
E	3.597*** (66.069)	3.747*** (28.383)	3.567*** (54.626)	3.009*** (50.618)	4.139*** (30.885)	7.032*** (32.074)	7.444*** (37.836)
CROSS	2.231*** (8.707)	3.478*** (3.391)	2.037*** (4.902)	1.655*** (8.392)	2.325*** (9.646)		
BV*CROSS	0.385*** (27.271)	0.293*** (7.673)	0.336*** (17.194)	0.493*** (35.462)	0.535*** (24.207)		
E*CROSS	2.964*** (27.738)	3.285*** (12.067)	3.834*** (26.008)	3.057*** (28.086)	0.674*** (3.977)		
HIADRI						11.216* (1.916)	
BV* HIADRI						-0.023 (-0.489)	
E* HIADRI						-0.947*** (-2.992)	
COMLAW							2.638 (0.484)
BV*COMLAW							-0.039 (-0.757)
E*COMLAW							-2.580*** (-7.820)
Country Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj.R ²	0.70	0.71	0.71	0.63	0.55	0.66	0.67
Obs	42,808	7278	26,604	35,530	16,204	5608	5608
F-stat	2248.607	650.349	1756.980	1945.019	971.749	253.760	257.903

*, ** and *** represent significance at $p < 0.10$, < 0.05 and < 0.01 , respectively. t-values are reported in the parentheses. See Table 1 for the variable definitions.

upward adjustment of reported earnings occurred.¹¹ Compared to non-cross-listed firms, we find cross-listed firms in full sample, high anti-director rights sample and both types of legal system pursue earnings decreasing strategy, suggesting that strong investor protection leads to managing earnings downward.

Second, our study control for the impact of the 2008–2011 global financial crisis which is also the period associated with the passage of Rule 12 h-6 that significantly ease the requirements for deregistering from US exchanges (Ghosh and He, 2015). The Rule 12 h-6, which enables firms to escape the US market's stringent regulatory and legal environment, weakened the bonding benefits of cross-listing (Fernandes et al., 2010; Doidge et al., 2010). Ghosh and He (2015) assert that the financial crisis and the passage of Rule 12 h-6 had a material impact on both cross-listed firms' investment behavior and the consequent changes in firm value. In assessing whether our results hold to these possibilities, we repeated the regression analyses by excluding data during the global financial crisis period. The untabulated results show that the findings associated with all the three accounting quality proxies remain qualitatively similar.

Third, we examine whether our results were driven by auditor quality. Our concern was whether higher accounting quality in cross-listed firms were driven by their high tendency of selecting Big 4 auditors compared to the non-cross-listed. Wang and Xin (2011) find that cross-listed firms with non-Big 4 auditors are more likely to understate their earnings and experience larger reversals of accruals in the future than cross-listed firms with Big 4 auditors, suggesting that Big 4 auditors play a meaningful role in improving earnings quality for cross-listed firms. We regress the equation by limiting our sample to firms audited by Big 4 auditors. The untabulated regression estimates on the reduced sample (32,218 firm-year observations) produced qualitatively similar results to those reported earlier, except for the second measure of conservatism that is based on Ball and Shivakumar (2005), where we find no evidence of differences in the extent of conservatism between cross-listed and non-cross-listed firms in high investor protection sample. In sum, the results show evidence that support our earlier findings.

Fourth, the UK was argued as one of the stronger shareholder protection systems in the world. Following Ghosh and He (2015) and Goto, Watanabe, and Xu (2009), we exclude UK firms from our analysis to estimate whether our result in the strong investor protection sample was heavily influenced by the UK. We also tested whether our results were sensitive to the inclusion of Japan with an extremely large number of observations (N = 10,439) which constitutes almost 25 percent

¹¹ The upward adjustment, or earnings overstatement, is more frequent and of greater concern to auditors, as it is likely to be associated with opportunistic earnings management (e.g. Ashbaugh et al., 2003). The downward adjustment, reflected through the use of negative discretionary accruals, is considered as a form of conservative accounting (Ashbaugh et al., 2003).

Table 7
Regression results using Heckman (1979) two-stage estimation procedure.

First Stage		Second Stage					
Probit Model (1)		Timely Loss Recognition Model (2)		Earnings Management Model (3)		Value Relevance Model (4)	
Intercept	11.440*** (31.601)	Intercept	0.241*** (3.608)	Intercept	0.100*** (10.088)	Intercept	-2.846 (-0.403)
GDP	-1.399*** (-42.243)	RET	0.051*** (3.255)	HIADRI	-0.022** (-2.322)	BV	1.118*** (33.662)
DISC	7.477*** (72.182)	RD	0.027 (1.471)	AGE	-0.002*** (-4.709)	E	12.351* (1.693)
IFRS	-0.807*** (-26.419)	RET*RD	0.181*** (3.597)	BIG4	-0.002 (-1.458)	HIADRI	-0.023 (-0.497)
OWN	-1.158*** (-11.072)	HIADRI	-0.145** (-2.111)	SIZE	-0.004*** (-14.600)	BV* HIADRI	7.035*** (32.030)
		RET*HIADRI	-0.030* (-1.738)	FMGROW	0.000 (0.124)	E* HIADRI	-0.949*** (-2.998)
		RD*HIADRI	0.002 (0.100)	INDGROW	0.001*** (2.839)	IMR	-0.641 (-0.261)
		RET*RD*HIADRI	0.143*** (2.628)	LEV	0.002*** (5.196)		
		IMR	0.021 (0.896)	CFO	-0.001 (-0.238)		
				CAPINT	0.016*** (8.316)		
		Country Effects	Yes	Country Effects	Yes	Country Effects	Yes
		Year Effects	Yes	Year Effects	Yes	Year Effects	Yes
Pseudo R2	0.6269	Adj.R ²	0.12	Adj.R ²	0.13	Adj.R ²	0.66
Obs	42,808	Obs	5608	Obs	5608	Obs	5608
LR chi2	24469.27	F-stat	16.560	F-stat	17.120	F-stat	248.081

*, ** and *** represent significance at $p < 0.10$, < 0.05 and < 0.01 , respectively. t-values are reported in the parentheses. IMR is the ratio of the probability density function to the cumulative distribution function. See Table 1 for the variable definitions.

of the total sample. In our untabulated results, both analyses yield similar findings, showing robust evidence on the positive impact of cross-listing on timely loss recognition, earnings downward attributes and value relevance, compared to non-cross-listed firms. These results are also influenced by the extent of investor protection as cross-listed firms in high investor protection sample report more timely loss recognition, higher tendency for earnings downward, and lower value relevance compared to non-cross-listed firms.

Fifth, although legal system and anti-directors right index are mostly used in prior studies, they are subjected to the assumption that the classifications have not changed over time. To overcome this issue, we employ two alternative measures for investor protection, i.e., (i) the anti-self-dealing index by Djankov et al. (2008) and (ii) the WEF's index for investor protection. The former measures the strength of minority shareholder protection against self-dealing by the controlling shareholder (ASDI), while the latter combines the extent of disclosure index, the extent of director liability index, and the ease of shareholder suit index (IPWEF).¹² The findings for ASDI for all models hold, showing robust evidence that cross-listed firms in high investor protection sample report more timely loss recognition, have higher tendency for managing earnings downward, and lower value relevance compared to cross-listed firms in low investor protection countries. The results for IPWEF show similar findings for timely loss recognition and value relevance, but no significant evidence documented for earnings management model. Overall, the results generally support our findings.

Finally, in our main analysis, a total of 42,808 firm-year observations was analysed, in which 5,608 are from cross-listed sample. To address the selection bias that potentially confounds the effect of cross-listing on accounting quality as the treatment and control groups become dissimilar, we perform the propensity score matching.¹³ This procedure matches observations from cross-listed sample (treatment group) with the control group on several dimensions using the estimated likelihood of receiving treatment.¹⁴ The untabulated regression estimates on the reduced sample (11,216 firm-year observations), which

¹² ASDI focuses on private enforcement mechanisms, such as disclosure, approval, and litigation that govern a specific self-dealing transaction, developed with the help from Lex Mundi law firms and calculated based on the average of ex ante and ex post private control of self-dealing. We established dummy variables for DUMASDI and DUMIPWEF, where we assign value one if the value higher than median, otherwise zero. We then re-estimate model (6) and (7) for Table 5 to (7) using the dummy variables as alternative measures for investor protection.

¹³ Shipman et al. (2017) argued that propensity score matching does not address most concerns relating to self-selection or endogeneity, hence it is inaccurate to suggest that the procedure is an alternative to Heckman (1979) type selection models.

¹⁴ When examining the treatment effect (the effect of cross-listing on accounting quality), the treatment sample (cross-listing firms) should have similar characteristics to those of the controlled sample (non-cross listing firms)

consists of 5,608 firm-year observations of cross-listed firms and 5,608 firm-year observation from the control group, show qualitatively similar results to those reported earlier. We find evidence of differences in the timely loss recognition, earnings management and value relevance of book value of equity and earnings between cross-listed and non-cross-listed firms, hence showing that the resulting differences between the groups is theoretically the treatment effects - the effect of cross-listing on accounting quality.

6. Conclusions

Consistent with the importance of regulatory and legal environments in determining the quality of accounting data (Leuz et al., 2003; Ball et al., 2003), we posit that the accounting quality of firms that are cross-listed in the US is not only influenced by the stringent security laws, investor protection, litigation risk and disclosure requirement in the US but also influenced by the home country investor protection. In this study, we extend Lang et al. (2003) and Lang et al. (2006) by incorporating the role of investor protection in explaining the link between cross-listing and accounting quality. We also add to the findings and suggestion of Lang et al. (2006) by comparing the accounting quality between firms cross-listed in the US and other domestic counterparts to provide a more relevant approach and give an accurate picture of the effects of cross-listing.

Our study finds that cross-listed firms, as compared with non-cross-listed firms, show more timely recognition of losses particularly those domiciled in high investor protection countries, high anti-director rights index and common law legal system. In contrast, we find no evidence to link cross-listing with more timely reporting of losses in low investor protection countries, hence suggesting that the level of investor protection has influenced the cross-listing effects on earnings conservatism. Furthermore, we find similar result for earnings management measures, where cross-listed firms are associated with high earnings management practices, specifically earnings decreasing strategy. The results are robust in the full samples and subsamples analyses, except for the low anti-directors rights sample where we find evidence of earnings management but no evidence specifying the direction of earnings management. Finally, our analyses show that cross-listing has positive impact on the value relevance of book value of equity and earnings, and that the impact is more pronounced in low investor protection countries, compared to high investor protection countries. The results imply that the decision to cross-list would substantially enhance the quality of accounting information in a low investor protection environment since the gap in security laws and investor protections between the US and high investor protection countries is minimal, compared to a low investor protection environment where the gap is greater. In summary, our results show cross-listing is associated with enhanced accounting quality but the association is influenced by the extent of home country institutional factors.

A public policy implication of our study is that listing in the US should be viewed as a new mobile governance by creating incentives for better disclosures and law enforcement in the home market through the renting of the superior corporate governance of the US. More transparent accounting and enhanced corporate governance mechanisms as well as stricter law in the home market serve as a partial substitute for the benefit of the US listing. Future research, however, could provide further evidence on the net benefits of cross-listings by evaluating whether the costs of cross-listing to US market significantly exceed its benefits, hence offering more salient inferences to the current debate through cross-country evidence. In addition, future studies could compare the accounting quality before and after cross-listing, and examine how investor protection and cross listing interaction affects accounting quality. A richer understanding on the variations in the effect of cross-listing can also be derived from comparing sub-samples with different governance and financial characteristics. Another potentially fruitful area for future research is to examine the impact of Rule 12 h-6's passage on accounting quality since it was argued to have weakened the bonding benefits of the US market (Doidge et al., 2010). Further, refinement in terms of research methodology and analysis, especially relating to the variables, can be made by future researchers. Examples include adopting the incidence of qualified audit opinion to proxy for accounting quality. It would also be interesting to incorporate Gray's (1998) Index of Conservatism, which is based on Hofstede's dimensions of national culture, to proxy for country-level institutional environment. Finally, variables related to the quality of home country auditors may also be included for richer understanding on the variations in the effect of cross-listing.

Acknowledgement

We thank Ferdinand Gul (editor), two anonymous referees, Zoltan Matolcsy, Wan Nordin Wan Hussin, Prem Lal Joshi, and participants at the JCAE Annual Symposium 2019 and workshop participants at Universiti Teknologi Mara, Universiti Malaysia Terengganu and Bangor University for insightful and constructive comments.

References

- Anthony, J.H., Ramesh, K., 1992. Association between accounting performance measures and stock prices: a test of the life cycle hypothesis. *J. Account. Econ.* 15 (2–3), 203–227.
- Ashbaugh, H., LaFond, R., Mayhew, B.W., 2003. Do non-audit services compromise auditor independence? Further evidence. *Account. Rev.* 78 (3), 611–639.
- Ball, R., Brown, P., 1968. An empirical evaluation of accounting income numbers. *J. Account. Res.* 6 (2), 159–178.
- Ball, R., Kothari, S.P., Robin, A., 2000a. The effect of international institutional factors on properties of accounting earnings. *J. Account. Econ.* 29 (1), 1–51.
- Ball, R., Robin, A., Wu, J.S., 2000b. Accounting standards, the institutional environment and issuer incentives: effect on timely loss recognition in China. *Asia-Pacific J. Account. Econ.* 7 (2), 71–96.

- Ball, R., Robin, A., Wu, J.S., 2003. Incentives versus standards: properties of accounting income in four East Asian countries. *J. Account. Econ.* 36 (1–3), 235–270.
- Ball, R., Shivakumar, L., 2005. Earnings quality in UK private firms: comparative loss recognition timeliness. *J. Account. Econ.* 39 (1), 83–128.
- Barth, M.E., Beaver, W.H., Landsman, W.R., 1998. Relative valuation roles of equity book value and net income as a function of financial health. *J. Account. Econ.* 25 (1), 1–34.
- Barth, M.E., Landsman, W.R., Lang, M., 2008. International accounting standards and accounting quality. *J. Account. Res.* 46 (3), 467–498.
- Basu, S., 1997. The conservatism principle and the asymmetric timeliness of earnings. *J. Account. Econ.* 24 (1), 3–37.
- Bauer, R., Wojcik, D., Clark, G.L., 2004. Corporate Governance and Cross-Listing: evidence from European Companies. <https://ssrn.com/abstract=593364> (accessed 20 September 2018).
- Bushman, R.M., Piotroski, J.D., 2006. Financial reporting incentives for conservative accounting: the influence of legal and political institutions. *J. Account. Econ.* 42 (1–2), 107–148.
- Cahan, S., Emanuel, D., Sun, J., 2009. The effect of earnings quality and country-level institutions on the value relevance of earnings. *Rev. Quant. Finance Account.* 33 (4), 371–391.
- Chen, L., Ng, J., Tsang, A., 2015. The effect of mandatory IFRS adoption on international cross-listings. *Account. Rev.* 90 (4), 1395–1435.
- Chinn, M.D., Ito, H., 2006. What matters for financial development? Capital controls, institutions, and interactions. *J. Dev. Econ.* 81 (1), 163–192.
- Cogman, D., Orr, G., 2013. How they fell: the collapse of Chinese cross-border listings. <https://www.mckinsey.com/business-functions/strategy-and-corporate-finance/our-insights/how-they-fell-the-collapse-of-chinese-cross-border-listings> (accessed 15 August 2018).
- Dechow, P.M., 1994. Accounting earnings and cash flows as measures of firm performance: the role of accounting accruals. *J. Account. Econ.* 18 (1), 3–42.
- Dechow, P.M., Dichev, I.D., 2002. The quality of accruals and earnings: the role of accrual estimation errors. *Account. Rev.* 77 suppl, 35–59.
- DeFond, M., Hung, M., Trezevant, R., 2007. Investor protection and the information content of annual earnings announcements: international evidence. *J. Account. Econ.* 43 (1), 37–67.
- Djankov, S., La Porta, R., Lopez-de-Silanes, F., Shleifer, A., 2008. The law and economics of self-dealing. *J. Financ. Econ.* 88 (3), 430–465.
- Dojode, C., Karolyi, G.A., Stulz, R.M., 2010. Why Do Foreign Firms Leave US Equity Markets?. *J. Finance* 65 (4), 1507–1553.
- Durand, R.B., Gunawan, F., Tarca, A., 2006. Does cross-listing signal quality?. *J. Contemp. Account. Econ.* 2 (2), 170–189.
- Easton, P.D., Harris, T.S., 1991. Earnings as an explanatory variable for returns. *J. Account. Res.* 29 (1), 19–36.
- Eng, L.L., Nabar, S., Mian, G.M., 2008. Cross-listing, information environment, and market value: evidence from US firms that list on foreign stock exchanges. *J. Int. Account. Res.* 7 (2), 25–41.
- Fama, E.F., French, K.R., 1997. Industry costs of equity. *J. Financ. Econ.* 43 (2), 153–193.
- Fernandes, N., Ferreira, M.A., 2008. Does international cross-listing improve the information environment. *J. Financ. Econ.* 88 (2), 216–244.
- Fernandes, N., Lei, U., Miller, D.P., 2010. Escape from New York: the market impact of loosening disclosure requirements. *J. Financ. Econ.* 95 (2), 129–147.
- Francis, J.R., LaFond, R., Olsson, P.M., Schipper, K., 2004. Costs of equity and earnings attributes. *Account. Rev.* 79 (4), 967–1010.
- Francis, J.R., Wang, D., 2008. The joint effect of investor protection and Big 4 audits on earnings quality around the world. *Contemp. Account. Res.* 25 (1), 157–191.
- Frost, C.A., Pownall, G., 1994. Accounting disclosure practices in the United States and the United Kingdom. *J. Account. Res.* 32 (1), 75–102.
- Ghosh, C., He, F., 2015. Investor protection, investment efficiency and value: the case of cross-listed firms. *Financ. Manage.* 44 (3), 499–546.
- Goto, S., Watanabe, M., Xu, Y., 2009. Strategic disclosure and stock returns: theory and evidence from US cross-listing. *Rev. Financ. Stud.* 22 (4), 1585–1620.
- Gujarati, D.N., 1995. *Basic Econometric*. McGraw-Hill, New York.
- Gul, F.A., Fung, S.Y.K., Jaggi, B., 2009. Earnings quality: some evidence on the role of auditor tenure and auditors' industry expertise. *J. Account. Econ.* 47 (3), 265–287.
- Hail, L., Leuz, C., 2009. Cost of capital effects and changes in growth expectations around US cross-listings. *J. Financ. Econ.* 93 (3), 428–454.
- He, H., 2008. Are changes in cross-listing in the US from the pre- to post-Sarbanes-Oxley period associated with shareholder protection in foreign firms' home countries? *J. Int. Account. Res.* 7 (2), 65–84.
- He, H., El-Masry, E.H., Wu, Y., 2008. Accounting conservatism of cross-listing firms in the pre- and post-Sarbanes Oxley periods. *Adv. Account.* 24 (2), 237–242.
- Healy, P., Hutton, A., Palepu, K., 1999. Stock performance and intermediation changes surrounding increases in disclosure. *Contemp. Account. Res.* 16 (3), 485–520.
- Heckman, J.J., 1979. Sample Selection as a Specification Error. *Econometrica* 47 (1), 153–161.
- Houque, M.N., van Zijl, T., Dunstan, K., Karim, A.K.M.W., 2012. The effect of IFRS adoption and investor protection on earnings quality around the world. *Int. J. Account.* 47 (3), 333–355.
- Hribar, P., Nichols, D.C., 2007. The use of unsigned earnings quality measures in tests of earnings management. *J. Account. Res.* 45 (5), 1017–1053.
- Isidro, H., Nanda, D., Wysocki, P.D., 2016. Financial reporting differences around the world: what matters? https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2788741 (accessed 15 September 2018).
- Jones, J.J., 1991. Earnings management during import relief investigations. *J. Account. Res.* 29 (2), 193–228.
- S.P. Kothari R.G. Sloan Information in prices about future earnings. Implications for earnings response coefficients *J. Account. Econ.* 15 1992 (2–3), 143–171.
- La Porta, R., Lopez-de-Silanes, F., Shleifer, A., 2006. What Works in Securities Laws?. *J. Finance* 61 (1), 1–32.
- La Porta, R., Lopez-de-Silanes, F., Shleifer, A., Vishny, R.W., 1998. Law and Finance. *J. Polit. Econ.* 106 (6), 1113–1155.
- Lang, M., Lundholm, R.J., 1996. Corporate disclosure policy and analyst behavior. *Account. Rev.* 71 (4), 467–492.
- Lang, M., Raedy, J.S., Wilson, W., 2006. Earnings management and cross listing: are reconciled earnings comparable to US earnings?. *J. Account. Econ.* 42 (1–2), 255–283.
- Lang, M., Raedy, J.S., Yetman, M., 2003. How representative are firms that are cross-listed in the United States? An analysis of accounting quality. *J. Account. Res.* 41 (2), 363–386.
- Leuz, C., 2006. Cross listing, bonding and firms' reporting incentives: a discussion of Lang, Raedy and Wilson. *J. Account. Econ.* 42 (1–2), 285–299.
- Leuz, C., Nanda, D., Wysocki, P.D., 2003. Earnings management and investor protection: an international comparison. *J. Financ. Econ.* 69 (3), 505–527.
- Licht, A., 2003. Cross-listing and corporate governance: bonding or avoiding?. *Chicago J. Int. Law* 4 (1), 141–163.
- Myers, J., Myers, L., Omer, T., 2003. Exploring the term of the auditor–client relationship and the quality of earnings: a case for mandatory auditor rotation?. *Account. Rev.* 78 (3), 779–799.
- Roychowdhury, S., Watts, R.L., 2007. Asymmetric timeliness of earnings, market-to-book and conservatism in financial reporting. *J. Account. Econ.* 44 (1–2), 2–31.
- Sami, H., Zhou, H., 2008. The economic consequences of increased disclosure: evidence from cross-listings of Chinese firms. *J. Int. Financ. Manage. Account.* 19 (1), 1–27.
- Shipman, J.E., Swanquist, Q.T., Whited, R.L., 2017. Propensity score matching in accounting research. *Account. Rev.* 92 (1), 213–244.
- Siegel, J., 2005. Can foreign firms bond themselves effectively by renting US securities laws?. *J. Financ. Econ.* 75 (2), 319–359.
- Stulz, R.M., 1999. Globalization, corporate finance and the cost of capital. *J. Appl. Corp. Finance* 12 (3), 8–25.
- Tingting, A., 2014. Case study on accounting fraud of U.S.-listed Chinese companies. Masters Thesis. Institute of Technology, Massachusetts.
- Van Tendeloo, B., Vanstraelen, A., 2005. Earnings management under German GAAP versus IFRS. *European Account. Rev.* 14 (1), 155–180.
- Wang, B., Xin, Q., 2011. Auditor choice and accruals patterns of cross-listed firms. *China J. Account. Res.* 4 (4), 233–251.
- Warfield, T.D., Wild, J.J., Wild, K.L., 1995. Managerial ownership, accounting choices, and informativeness of earnings. *J. Account. Econ.* 20 (1), 61–91.