Asia Pacific Management Review xxx (xxxx) xxx

HOSTED BY

ELSEVIER

Contents lists available at ScienceDirect

Asia Pacific Management Review

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

Does institutional ownership affect the relationship between accounting quality and cost of capital? A panel smooth transition regression approach

Tsung-Yu Hsieh [a], Yung-Ming Shiu [b], Ariana Chang [c, *]

[a] Department of Finance, Ming Dao University, Taiwan, Chang Hua, 52345, Taiwan
[b] Department of Risk Management and Insurance, Research Fellow, Risk and Insurance Research Center, College of Commerce, National Chengchi University, Taiwan, Taipei, 11605, Taiwan
[c] Department of Business Administration, Fu Jen Catholic University, Taiwan

ARTICLE INFO

Article history:
Received 10 November 2016
Received in revised form
19 September 2018
Accepted 4 December 2018
Available online xxx

JEL classification:
G14
G15

Keywords:
Accounting quality
Cost of capital
Institutional ownership
Non-financial firms
Panel smooth transition regression analysis

ABSTRACT

We set out in this study to determine whether there are any discernible variations in the relationship between accounting quality and the cost of capital that may be attributable to the level of institutional ownership. Our analysis involves a flexible econometric approach, based upon a 'panel smooth transition regression' (PSTR) analysis, using data on 64 listed firms in Taiwan covering the period from 2000 to 2017. Our results provide clear evidence to suggest that the relationship between accounting quality and the cost of capital does indeed vary with changes in the level of institutional ownership, a finding which, having relaxed the assumption that the interpretations of accounting information amongst investors are homogeneous, goes beyond the general finding within the extant literature of a linear relationship between accounting quality and the cost of capital.

1. Introduction

Several prior studies have examined the relationship between accounting quality and the cost of capital,[1] with some of these studies indicating that high-quality accounting information provides investors with a clearer understanding of the related trading information. This can ultimately lead to a reduction in both information asymmetry[2] and trading costs,[3] whilst also facilitating enhanced capital allocation efficiency, reducing the information risk and the cost of capital.[4] However, Shaw (2003) and Daske (2006) argued that firms with better accounting quality were more likely to engage in income 'smoothing', thereby enhancing the degree of information asymmetry between investors, and consequently increasing the cost of capital.[5]

Sloan (1996) was one of the first to argue that the above conflicting results probably arise from the fact that different types of investors vary in the capability of comprehending the pricing implications of accruals. Some prior studies found that earnings manipulation is less common in firms with higher proportion of institutional investors because they tend to monitor firm

* Corresponding author.
E-mail addresses: tyhsieh@mail2000.com.tw (T.-Y. Hsieh), yungming@nccu.edu.tw (Y.-M. Shiu), 140517@mail.fju.edu.tw (A. Chang).

Peer review under responsibility of College of Management, National Cheng Kung University.

1 See, for example, Francis et al. (2005), Cohen (2008) and Ng (2011).

2 Examples include Diamond and Verrecchia (1991), Healy, Hutton, and Palepu (1999), Garcia–Teruel, Martinez–Solano, and Sanchez–Ballesta (2010) and Bhattacharya et al. (2013).

3 See Leuz and Verrecchia (2000), Botosan and Plumlee (2002), Francis et al. (2005) and Barth, Konchitchki, and Landsman (2013).

4 From an empirical examination of whether capital was allocated efficiently, Wurgler (2000) found that such efficiency was increased with improvements in the financial structure. Habib (2008) extended the work of Wurgler (2000) by considering the effects of financial reporting systems on capital allocation efficiency and found that such efficiency was higher for firms with higher financial transparency.

5 Extending the theoretical frameworks of Vuolteenaho (2002) and Callen and Segal (2004) – which examined the association between variability in accruals and firm-level stock return volatility – Shan, Taylor, and Walter (2015) decomposed the variability in accruals into two 'fundamental' and 'discretionary' components, and found that uncertainty in the available information on accruals was subsequently reflected in fluctuations in future stock returns, with only the fundamental uncertainty of the firms, as opposed to their managerial choices, potentially affecting the accounting process.

https://doi.org/10.1016/j.apmrv.2018.12.002
1029-3132/

performance more closely than individual investors (Chung, Firth, & Kim, 2002; Mitra & Cready, 2005; Rajgopal & Venkatachalam, 1998), have better access to expertise by employing professional analysts to monitor a firm's accounting quality, and have influence on replacing managers who are found to report low quality accounting numbers (Beneish & Vargus, 2002; Botosan, 1997; Francis, LaFond, Olsson, & Schipper, 2004; Francis, LaFond, Olsson, & Schipper, 2005; Grinblatt & Keloharju, 2000; Walther, 1997), thereby reducing informational asymmetry, processing cost and cost of capital (Bhattacharya, Desai, & Venkataraman, 2013). The above proposition only holds for whom care about long term returns have strong incentives to monitor managers to reduce their opportunistic manipulation of earnings (Chen, Harford, & Li, 2007), reducing the cost of capital. As for those focused on short-term profits have little incentives to engage in monitoring corporate financial reporting, leaving more room for managers to manipulate earnings towards market expectations (Chen et al., 2007; Gaspar, Massa, & Matos, 2005), increasing both information asymmetry and cost of capital.

Based on these inconsistent conclusions, an important moderator, institutional investors, seems to play an important role in the debate about shareholder value creation and the corporate governance of public companies (Hellman, 2005). Therefore, a combination of these effects leads to the prediction of a non-linear relation between ownership and firm value. Unlike prior studies (e.g., Cohen, 2008; Ng, 2011), we made these extensions to our framework relating the cost of capital and accounting quality by examining the moderating influence of the level of institutional ownership, a key motive of a firm's information asymmetry.

In the present study, we use balanced panel data listed on the Taiwan Stock Exchange (TSE) between January 2000 and December 2017 to examine whether, along with changes in the level of institutional ownership, corresponding variations will be discernible at which point the threshold effect and asymmetrical relationship between accounting quality and cost of capital may be determined. This empirical study contributes to the previous literature in a number of ways, as described below.

First, in line with improvements in the process of financial globalization, the quality of disclosure amongst Taiwanese firms has been continuously improving over the sample period examined in the present study; this continuing development is generally attributable to moves by the related authorities in Taiwan to improve the quality of disclosure in the financial reporting provided by firms, with the Information Transparency and Disclosure Rankings System having been specifically designed and implemented in 2003 to achieve this purpose. Significant variations have occurred in the level of institutional ownership in the Taiwanese stock market during the period under examination in our study. Based on the annual statistical data issued by the Taiwan Stock Exchange Corporation (TSEC), such mean ownership increased from 39.44 per cent in 2000 to 58.44 per cent in 2017 with the rise being particularly significant for individual firms.[6]

Secondly, in the majority of the prior related studies, the focus has tended to be placed on the US market, a market which is clearly dominated by institutional investors[7]; however, the focus in the present study is placed on an examination of the Taiwan market, a market in which the overwhelming majority of participants are individual investors and there have also been continuing significant increases in the level of foreign institutional investment in Taiwan over the study period. To our knowledge and surprise, there is no prior research concerning the moderating role played by institutional ownership in the relation between the accounting quality and cost of capital. Bhattacharya et al. (2013) has close connection to ours. However, they use institutional ownership as a control variable when examining the effect of earnings quality on information asymmetry, while we use institutional ownership as a moderator of the relation between accounting quality and cost of capital. Thus, our study may arguably provide a valuable contribution to the extant literature on the effects of accounting quality on the cost of capital. Finally, we apply a more flexible econometric methodology involving a 'panel smooth transition regression' (PSTR) analysis (Gonzalez, Teräsvirta, & van Dijk, 2005) to re-evaluate whether there is a "threshold" institutional ownership between accounting quality and the cost of capital. PSTR analysis allows a smooth change in the slope coefficient when moving from one regime to another and the relationship between accounting quality and the cost of capital can be time-varying.

Our results reveal a significant variations in the relationship between accounting quality and the cost of capital with changes in the level of institutional ownership. Thus, a non-linear relationship between accounting quality and the cost of capital seems more appropriate than the traditionally used linear relationship. The empirical results allows model parameters to change in a smooth, nonlinear manner as the transition variables change.

The remainder of this paper is organized as follows. A description of the data and data sources are provided in Section 2, along with an explanation of the variable measurement approach used in our study. Section 3 provides an explanation of our study methodology, followed in Section 4 by a discussion of the empirical findings. Finally, the conclusions drawn from this study are presented in Section 5.

2. Data and variable definitions

2.1. Data

Our data starts from 1 January 2000 to 31 December 2017, a total of 18 years, with the Taiwan Economic Journal (TEJ) 'equity database' providing us with annual data on the adjusted EP ratio (Adj-EP),[8] and the Fama-French three factors, including excess market risk premium (r_m), return to size factor mimicking portfolio (SMB) and return to book-to-market factor mimicking portfolio (HML). Accounting information and cost of debt capital on our sample of firms are obtained from the TEJ 'Finance database', whilst the level of institutional ownership (IO) is obtained from the TEJ 'corporate governance database'.[9]

Since we use a PSTR analysis in our study, balanced panel data is required. However, there are too many miss values for the variables used in our models before 2000. That is why our data starts from the year of 2000. Since there are significant differences between the capital structures of financial and non-financial firms, firms in the financial sector are excluded from our study, with the resultant sample comprising a balanced panel of 64 firms, providing a total of 1052 firm-year observations.

2.2. Variable definitions

2.2.1. Accounting quality (AQ)

Various proxies for the measurement of accounting quality have

[6] The smallest level of institutional ownership in 2000 is 0.40 per cent, while the largest level of institutional ownership is 85.14 per cent in 2017.

[7] See, for example, Francis et al. (2005), Cohen (2008) and Ng (2011).

[8] In order to obtain the accounting quality data, the data is from 1 January 1985 to 31 December 2017.

[9] The level of institutional ownership is measured by shares owned by institutional investors divided by shares outstanding.

Please cite this article as: Hsieh, T.-Y et al., Does institutional ownership affect the relationship between accounting quality and cost of capital? A panel smooth transition regression approach, Asia Pacific Management Review, https://doi.org/10.1016/j.apmrv.2018.12.002

been proposed in a substantial number of studies within the extant literature (Ball, Robin, & Sadka, 2008; Dechow & Dichev, 2002; Francis et al., 2005; Kothari, Leone, & Wasley, 2005; Lang, Raedy, & Wilson, 2006; Leuz, Nanda, & Wysocki, 2003), with these proxies including 'discretionary estimation errors'(Core, Guay, & Verdi, 2008; Francis et al., 2005), 'earnings response coefficients' (Ali & Hwang, 2000), 'smoothness' (Lang et al., 2006), 'accruals and discretionary accruals' (Hung, 2000; Pincus, Rajgopal, & Venkatachalam, 2007), 'timely loss recognition' (Ball et al., 2008), 'small positive profits' (Lang et al., 2006) and scores based upon a 'combination of quality measures' (Leuz et al., 2003).

After taking into consideration issues such as the availability of the data and the various estimation models, the change in sales revenue and PPE are important in forming expectations about current accruals, over and above the effects of operating cash flows (McNichols, 2000). The 'discretionary estimation errors' as the proxies for accounting quality (Core et al., 2008; Francis et al., 2005) are used. The total accruals is related to the extent to which accruals are well captured by fitted values obtained by regressing total accruals on cash flow from operations, changes in revenues and PPE (the gross property, plant and equipment) and all variables are scaled by average assets. The model equation is as follows:

$$\frac{TCA_{i,t}}{A_{i,t}} = \frac{CFO_{i,t-1}}{A_{i,t}} + \frac{CFO_{i,t}}{A_{i,t}} + \frac{CFO_{i,t+1}}{A_{i,t}} + \frac{DREV_{i,t}}{A_{i,t}} + \frac{PPE_{i,t}}{A_{i,t}} + \varepsilon_{i,t} \quad (1)$$

Where $TCA_{i,t}$ is total current accruals for firm i in year t, $CFO_{i,t}$ is the cash flow from operation for firm i at year t, $DREV_{i,t}$ is the change in revenues for firm i from year t to t-1; $PPE_{i,t}$ is the gross property, plant and equipment for firm i in year t, and $A_{i,t}$ is the firm i's assets in year t.

We estimate the regression to obtain the residuals for each firm in each year. The standard deviation in the residuals (t-15 through t) is then used as the proxy for accounting quality (AQ), with a higher standard deviation indicating poorer accounting quality (i.e., the standard deviation during the sixteen-year period from 1985 to 2000 is used as the proxy for accounting quality in the year of 2000).[10]

2.2.2. Cost of capital

The cost of capital generally include the cost of equity capital and the cost of debt capital. In this work, following Francis et al. (2005) proposition and the industry effect (Alford, 1992), the investors' ex-ante assessment of the cost of equity capital, the industry-adjusted EP ratios, is used. The industry-adjusted EP ratio (Adj-EP), as the difference between its EP ratio and the median industry EP ratio in year t.[11] The investors apply higher multiples to lower accounting quality, the earnings associated with such accounting quality are expected to have larger Adj-EP. Similarly, the realized cost of debt capital (Debt), the investors' ex-post assessment of the cost of debt capital, is defined as the ratio of firm's i interest expense in year t to interest-bearing debt outstanding in year t.

[10] This selection criteria may lead to bias our sample to the existing firms being lager and being more successful than the population. This restriction may reduce the variation in AQ and make it more difficult to detect the effect between the accounting quality and cost of capital moderated by the level of institutional ownership (Francis et al., 2005).

[11] The median EP ratios for all firms in year t in each of the TEJ industry groups are calculated.

3. Methodology

3.1. PSTR analysis

Our examination in the present study of the influence of accounting quality on the cost of capital is undertaken using PSTR analysis, with heterogeneity both across the panel members and over time, and the level of institutional ownership being used as the threshold variable while a simple panel threshold regression analysis, in which the beta coefficient on accounting quality is held constant and the slope coefficients change significantly using dummary variable. PSTR analysis can effectively describe the trade-off between the benefits of a reduction in the level of information asymmetry and the disadvantage of income smoothing, in which, PSTR analysis allows a smooth change in the slope coefficient when moving from one regime to another and the relationship between accounting quality and the cost of capital can be time-varying. Furthermore, by using a PSTR analysis, we can identify the influence of both unobserved and time-invariant firm effects, with the threshold values being determined by the model.

We use the industry-adjusted EP ratios as the dependent variable, and the level of institutional ownership ($IO_{i,t}$) as the transition variable (which is regarded as an exogenous variable). Following Fama and French (1993), we use excess market risk premium ($r_{m,t}$), SMB_t and HML_t as the control variables, since these are presumed to influence the cost of capital, whilst accounting quality ($AQ_{i,t-1}$) is used as the explanatory variable and are lagged by one year to ensure that the information is available for investors to assess the risk (Ng, 2011).[12] The dummy variable (D) is used to control the influence of financial crisis on the relationship between the accounting quality and cost of capital. The PSTR model used in the present study is expressed as follows:

$$Y_{i,t} = \mu_i + \beta_0(r_{m,t} + SMB_t + HML_t + AQ_{i,t-1} + D_{i,t}) + \sum_{j=1}^{r} \beta_j g(IO_{i,t}; \gamma_j, c_k)((r_{m,t} + SMB_t + HML_t + AQ_{i,t-1} + D_{i,t}) + \varepsilon_{i,t} \quad (2)$$

$$g(IO_{i,t}; \gamma_j, c_k) = (1 + \exp(-\gamma_j \prod_{k=1}^{m} (IO_{i,t} - c_k))^{-1} \quad (3)$$

Where Y represents the $Adj - EP_{i,t}$ or $Debt_{i,t}$, respectively. $Adj - EP_{i,t}$ refers to the adjusted-EP ratio for firm i in year t; the realized cost of debt capital (Debt) is defined as the ratio of firm's i interest expense in year t to interest-bearing debt outstanding in year t. c_k is the location parameter ($c_1 \leq c_2 \leq \ldots \leq c_m$), representing the level of institutional ownership (the threshold value); and the slope parameter, γ_j, is the transition variable, ($\gamma_j > 0$), which indicates the smoothness of the transition functions. $D_{i,t} = 1$ for the years 2007, 2008 and 2009; $D_{i,t} = 0$, otherwise.

Generally, $m = 1$ or $m = 2$ is sufficient to evaluate the types of variation in these parameters (Gonzalez et al., 2005). When $m = 1$ (the logistic model) there are two regimes and one single monotonic transition function, and when $m = 2$ (the exponential model) there are three regimes and two monotonic transition functions.

3.2. PSTR estimation procedure

Three procedures, described in the following paragraphs, are

[12] In order to eliminate the influence of outliers on our data, the variables, including Adj−EP ratio, Debt, AQ, and IO, are winsorized at 1%.

Please cite this article as: Hsieh, T.-Y et al., Does institutional ownership affect the relationship between accounting quality and cost of capital? A panel smooth transition regression approach, Asia Pacific Management Review, https://doi.org/10.1016/j.apmrv.2018.12.002

used to construct our PSTR analysis. Firstly, we examine whether the linear model presented in our study holds, where the null hypothesis (H_0) is that the linear model can best explain the data, whilst the alternative hypothesis (H_1) is that the PSTR model with at least one threshold variable ($r = 1$) is the better model.

Secondly, if H_1 does hold, then we examine whether there is any remaining heterogeneity between the coefficients in the PSTR model with one threshold variable, with the results being reported in Section 4.3; if there is no homogeneity in the model, we estimate the number of transition functions, which requires the number of regimes in the panel regression analysis to be specified; these results are reported in Section 4.4. Thirdly, the non-linear estimation method is used to estimate the parameters, with the results being reported in Section 4.5. Finally, the sensitivity analysis based on the median market value (NT$ 14,754.5 million dollars) is used to examine whether our results are robust, with the results being reported in Section 4.6.

4. Empirical results

4.1. Univariate results

The descriptive statistics of all the variables adopted for our study are reported in Table 1, from which we can see that the annual EP ratio adjusted for industry has a mean of −2.35 per cent and a standard deviation of 5.70 per cent, whereas the annual excess market risk premium has a mean of 0.04 per cent and a standard deviation of 28.33 per cent. The mean value for accounting quality in our sample is found to be 18.47 per cent, which is higher than the reported mean of 4.42 per cent for the stocks listed on the NYSE, AMEX, or NASDAQ (Francis et al., 2005). The negative correlation between AQ and IO indicates that the institutional investors usually invest the firms with better accounting quality. Similarly, firms with poorer accounting quality usually have less risk premium than those with better accounting quality. The firms with higher level of institutional ownership usually tends to hold stocks with better AQ and therefore, tends to have higher risk premium.

4.2. Panel unit root tests

As noted in Hansen (1999), in order to avoid any potential spurious regressions, prior to carrying out the PSTR analysis we first of all need to determine whether the variables in the model are stationary; this is achieved by applying three test statistics: (i) the PP-Fisher Chi-square test (Phillips & Perron, 1988); (ii) the LLC test (Levin, Lin, & Chu, 2002); and (iii) the IPS test (Im, Pesaranand & Shin, 2003). Table 2 clearly reveals that nearly all of the variables are stationary, since each of the null hypotheses of the unit root tests are rejected at the 1 per cent significance level.

4.3. Homogeneity test

Prior to applying the PSTR model, we need to determine whether any threshold effect exists. The null hypothesis is the linear model, whilst the alternative hypothesis is the PSTR model with at least one threshold variable. The 'likelihood ratio test' (LRT) is used to examine whether the coefficients of accounting quality are homogeneous; that is, whether there are variations in the relationship between accounting quality and cost of capital with changes in the level of institutional ownership. The existence of threshold effects will not be rejected if the null hypothesis fails to hold.

The empirical results, which are shown in Table 3, indicate that homogeneity is rejected at the 1 per cent significance level; thus, variations are discernible in the relationship between accounting

Table 2
Panel unit root tests.

Variables	PP		LLC		IPS	
Adj-$EP_{i,t}$	−6.344	***	−7.0714	***	−6.1738	***
$Debt_{i,t}$	349.874	***	−22.2046	***	−14.1219	***
$IO_{i,t}$	169.843	**	−1.4372		2.0017	
$r_{m,t}$	2230.58	***	−22.0634	***	−21.6336	**
SMB_t	664.308	***	−20.3150	***	−16.2600	**
HML_t	2307.04	***	9.7175		−27.4445	**
$AQ_{i,t-1}$	124.71		−5.1450	**	0.1928	

Note. *, **, and *** indicate significance at the 0.1, 0.05, and 0.01 levels, respectively. This table examines whether a unit root exists for each variable. In order to avoid any potential spurious regressions, three test statistics are applied to determine whether the variables in the model are stationary; these are: (i) the PP-Fisher Chi-square test (Phillips & Perron, 1988); (ii) the LLC test (Levin et al., 2002); and (iii) the IPS test (Im et al., 2003). The industry-adjusted EP ratio (Adj-EP) is defined as the difference between its EP ratio and the median industry EP ratio in year t. The interest rate of debt (*Debt*) is defined as the ration of firm's interest expense in year t to interest-bearing debt outstanding during year t. The institutional ownership (IO) is measured by shares owned by institutional investors divided by shares outstanding. r_m, SMB, and HML are the Fama-French 3 factor. The accounting quality (AQ) is calculated as follows. First, the total accruals is related to the extent to which accruals are well captured by fitted values obtained by regressing total accruals on changes in revenues and PPE and all variables are scaled by average assets and then the standard deviation in the residuals (t-15 through t) is then used as the proxy for accounting quality. 64firms are included in this work.

Table 1
Univariate analysis and Correlations.

Variables	Mean	Median	Std. ev.	Adj-$EP_{i,t}$	$Debt_{i,t}$		$IO_{i,t}$		$r_{m,t}$		SMB_t	HML_t		$AQ_{i,t-1}$	
Adj-$EP_{i,t}$	−0.0235	−0.0116	0.0570	1	−0.2698	***	0.2313	***	0.0812	***	−0.0095	0.0465	*	−0.2635	**
$Debt_{i,t}$	0.0165	0.0135	0.0133		1		−0.2478	***	−0.2490	***	−0.0341	−0.0656	**	0.2196	***
$IO_{i,t}$	0.4710	0.4899	0.1989				1		0.0650	**	0.0318	0.0058		−0.1577	***
$r_{m,t}$	0.0004	0.0692	0.2833						1		0.4033	0.0965	***	−0.0933	***
SMB_t	0.0015	−0.0153	0.1141								1	0.2116	***	−0.0530	**
HML_t	0.0099	0.0066	0.1595									1		−0.0206	
$AQ_{i,t-1}$	0.1847	0.1640	0.0947											1	

Note. *, **, and *** indicate significance at the 0.1, 0.05, and 0.01 levels, respectively.
This table shows the descriptive statistics, including mean, median, standard deviation and the correlation coefficient between the variables The variable includes the cost of capital (Adj-EP), the cost of debt (DebtRatio), the institutional ownership (IO), the excess market return (r_m), return to size factor mimicking portfolio (SMB) and return to book-to-market factor mimicking portfolio (HML) and the accounting quality (AQ). The industry-adjusted EP ratio (Adj-EP) is defined as the difference between its EP ratio and the median industry EP ratio in year t. The interest rate of debt ($DebtRatio_{i,t}$) is defined as the ration of firm's interest expense in year t to interest-bearing debt outstanding during year t. The institutional ownership (IO) is measured by shares owned by institutional investors divided by shares outstanding. r_m, SMB, and HML are the Fama-French 3 factor. The accounting quality (AQ) is calculated as follows. First, the total accruals is related to the extent to which accruals are well captured by fitted values obtained by regressing total accruals on changes in revenues and PPE and all variables are scaled by average assets and then the standard deviation in the residuals (t-15 through t) is then used as the proxy for accounting quality. 64 firms are included in this work.

Please cite this article as: Hsieh, T.-Y et al., Does institutional ownership affect the relationship between accounting quality and cost of capital? A panel smooth transition regression approach, Asia Pacific Management Review, https://doi.org/10.1016/j.apmrv.2018.12.002

Table 3
Likelihood ratio tests for homogeneity.

Variables	Test for Homogeneity	Test for No Remaining Homogeneity
Panel A: Full sample (n=64)		
Likelihood ratio test	42.774(147.822)	3.034(5.103)
P-value	0.000(0.000)	0.695(0.403)
Wald test	2.758(1.530)	0.567(0.995)
P-value	0.000(0.000)	0.726(0.445)
Fisher test	43.589(158.204)	3.038(5.114)
P-value	0.000(0.000)	0.694(0.402)
Panel B: Small firm (n=32)		
Likelihood ratio test	27.1150(64.044)	0.654(1.020)
P-value	0.028(0.000)	0.985(0.075)
Wald test	1.7420(4.4120)	0.120(1.873)
P-value	0.0400(0.000)	0.998(0.097)
Fisher test	27.774(67.892)	0.655(1.109)
P-value	0.000(0.000)	0.985(0.072)
Panel C: Large firm (n=32)		
Likelihood ratio test	37.1050 (157.877)	6.056 (−1.814)
P-value	0.0010 (0.0000)	0.301 (1.000)
Wald test	2.4280 (13.316)	1.124 (−0.332)
P-value	0.002 (0.0000)	0.346 (1.000)
Fisher test	38.354 (184.512)	6.088 (−1.8110)
P-value	0.000(0.000)	0.2980 (1.000)

This table examines the number of threshold values. The Likelihood ratio test, Wald test and Fisher test are used. In the test for homogeneity, H_0 is the linear model, whilst H_1 is the PSTR model with at least one threshold variable r = 1. In the test for no remaining homogeneity, H_0 is the PSTR model with r = 1, whilst H_1 is the PSTR model with at least one threshold variable (r ≧ 2).

quality and the cost of capital with changes in the level of institutional ownership. In the test for no remaining homogeneity, where the null hypothesis is that the number of threshold variables will be 1, whilst the alternative hypothesis is that the number of threshold variables will be 2 or more. If the null hypothesis is rejected, then this means that there are at least two threshold variables. The empirical result shows, the null hypothesis, r = 1, is not rejected, thereby indicating that one transition function can sufficiently evaluate the parameters in our study.

4.4. Determination of the number of regimes

The optimal setting of the threshold variables is determined in this study using F-test. If the strongest rejection of H_{02} occurs, the exponential function is more appropriate; otherwise, the logistics function is used (Gonzalez et al., 2005). Table 4 reveals that the optimal setting for the threshold transition functions is (r,m)=(1,1), with both the transition function (r = 1) and the logistic model (m = 1) being sufficient to explain the empirical results in our study.[13]

4.5. Parameter estimates

The parameter estimates are reported in Table 5, along with both the conventional and heteroskedasticity-consistent standard errors. The empirical results of cost of equity capital (cost of debt capital) reveal that there is one threshold value, 35.09 (46.35) per cent. The slope parameter is 13.7484 (6.0713), thereby indicating that the function changes abruptly from one regime to another. The accounting information amongst investors are not homogeneous, going beyond the general finding within the extant literature of a linear relationship between accounting quality and the cost of capital (Cohen, 2008; Francis et al., 2005; Ng, 2011). The level of institutional ownership serves as a moderator in the relationship between the cost of capital and accounting quality and the beta coefficient on accounting quality is time-varying. In order to take into account the effects of the financial crisis, we use a dummy variable, D = 1, for the years of 2007, 2008 and 2009; otherwise, D = 0. We find that the coefficient of D is not significantly different from zero at the 5% significance level.

Table 4
Determination of model selection.

Null Hypothesis	F-value	P-value
Panel A: Full Sample (n=64)_		
H_{03}:$\beta_2 = 0$	0.223(0.409)	0.999(0.977)
$^{Ho2:}\beta_1 \mid \beta_2 = 0$	0.327(0.275)	0.993(0.997)
H_{01}:$\beta_0 \mid \beta_1 = \beta_2 = 0$	2.212(9.844)	0.005(0.000)
Panel B: Small firm (n=32)		
H_{03}:$\beta_2 = 0$	0.500 (0.895)	0.941 (0.570)
$^{Ho2:}\beta_1 \mid \beta_2 = 0$	0.154 (0.181)	1.000(1.000)
H_{01}:$\beta_0 \mid \beta_1 = \beta_2 = 0$	1.088 (3.295)	0.364 (0.000)
Panel C: Large firm (n=32)		
H_{03}:$\beta_2 = 0$	0.327 (0.744)	0.993 (0.740)
$^{Ho2:}\beta_1 \mid \beta_2 = 0$	0.573 (0.276)	0.896 (0.997)
H_{01}:$\beta_0 \mid \beta_1 = \beta_2 = 0$	1.518 (12.172)	0.094 (0.000)

This table examines whether the logistic function or exponential function is more appropriate in this work. The model is constructed as follows: $Y_{i,t} = \mu_i + \beta_0(r_{m,t} + SMB_t + HML_t + AQ_{i,t-1} + D_{i,t}) + \sum_{j=1}^{2}\beta_j g(IO_{i,t};\gamma_j,c_k)((r_{m,t} + SMB_t + HML_t + AQ_{i,t-1} + D_{i,t}) + \varepsilon_{i,t}$; where $g(IO_{i,t};\gamma_j,c_k) = (1 + \exp(-\gamma_j\prod_{k=1}^{m}(IO_{i,t} - c_k))^{-1}$; $Y_{i,t}$ includes the Adj-EP or Debt. The industry-adjusted EP ratio (Adj-EP) is defined as the difference between its EP ratio and the median industry EP ratio in year t. The interest rate of debt ($DebtRatio_{i,t}$) is defined as the ration of firm's interest expense in year t to interest-bearing debt outstanding during year t. The institutional ownership (IO) is measured by shares owned by institutional investors divided by shares outstanding. r_m, SMB, and HML are the Fama-French 3 factor. The accounting quality (AQ) is calculated as follows. First, the total accruals is related to the extent to which accruals are well captured by fitted values obtained by regressing total accruals on changes in revenues and PPE and all variables are scaled by average assets and then the standard deviation in the residuals (t-15 through t) is then used as the proxy for accounting quality. $D_{i,t} = 1$ for the years 2007, 2008 and 2009; $D_{i,t} = 0$, otherwise. c_k is the location parameter, representing the level of institutional ownership (the threshold value); and the slope parameter, γ_j, is the transition variable, ($\gamma_j > 0$), which indicates the smoothness of the transition functions. If the strongest rejection of H_{02} occurs, the exponential function is more appropriate; otherwise, the logistics function is used. The number in the parenthesis is the results of cost of debt capital.

13 In order to obtain the sensitivity tests, the samples are further clasiffed into small and large firm based on the median market value (NT$ 14754.5 million dollars). The optimal setting for the threshold transition functions is (r,m)=(1,1).

Please cite this article as: Hsieh, T.-Y et al., Does institutional ownership affect the relationship between accounting quality and cost of capital? A panel smooth transition regression approach, Asia Pacific Management Review, https://doi.org/10.1016/j.apmrv.2018.12.002

Table 5
Parameter estimates of the PSTR model.

Variables	Coeff.	S.E.	t-value	C_1	γ_1	MSE
Panel A:β_0						
$AQ_{i,t-1}$	−0.3642(0.1183)	0.0370 (0.0073)	−9.8400(16.1081)	35.09%(46.35%)	13.3784(6.0713)	2.422(0.085)
$r_{m,t}$	0.0219(-0.0177)	0.0127(0.0026)	1.7263(-6.8989)			
SMB_t	−0.0492(0.0232)	0.0298(0.0062)	−1.6507(3.7445)			
HML_t	−0.0332(-0.0177)	0.0162(0.0050)	2.0512(-2.3433)			
D_t	0.0142(-0.0025)	0.0103(0.0019)	1.3846(-1.3286)			
Panel B:β_1						
$AQ_{i,t-1}$	0.2212(-0.1187)	0.0369(0.0120)	5.9938(-9.9246)	35.09%(46.35%)	13.3784(6.0713)	2.422(0.085)
$r_{m,t}$	−0.0109(0.0152)	0.0164(0.0043)	−0.6654(3.5055)			
SMB_t	0.0290(-0.0278)	0.0374(0.0103)	0.7744(-2.7022)			
HML_t	−0.0244(0.0130)	0.0235(0.0085)	−1.0381(1.5301)			
D_t	−0.0200(0.0076)	0.0122(0.0030)	−1.6407(2.5323)			

Note. *, **, and *** indicate significance at the 0.1, 0.05, and 0.01 levels, respectively.

$Y_{i,t} = \mu_i + \beta_0(r_{m,t} + SMB_t + HML_t + AQ_{i,t-1} + D_{i,t}) + \sum_{j=1}^{2}\beta_j g(IO_{i,t};\gamma_j,c_k)((r_{m,t} + SMB_t + HML_t + AQ_{i,t-1} + D_{i,t}) + \varepsilon_{i,t}$; where $g(IO_{i,t};\gamma_j,c_k) = (1+\exp(-\gamma_j\prod_{k=1}^{m}(IO_{i,t}-c_k))^{-1}$; $Y_{i,t}$ includes the Adj-EP or Debt. The industry-adjusted EP ratio (Adj-EP) is defined as the difference between its EP ratio and the median industry EP ratio in year t. The interest rate of debt ($Debt_{i,t}$) is defined as the ration of firm's interest expense in year t to interest-bearing debt outstanding during year t. The institutional ownership (IO) is measured by shares owned by institutional investors divided by shares outstanding. r_m, SMB, and HML are the Fama-French 3 factor. The accounting quality (AQ) is calculated as follows. First, the total accruals is related to the extent to which accruals are well captured by fitted values obtained by regressing total accruals on changes in revenues and PPE and all variables are scaled by average assets and then the standard deviation in the residuals (t-15 through t) is then used as the proxy for accounting quality. $D_{i,t} = 1$ for the years 2007, 2008 and 2009; $D_{i,t} = 0$, otherwise. c_k is the location parameter, representing the level of institutional ownership (the threshold value); and the slope parameter, γ_j, is the transition variable, ($\gamma_j > 0$), which indicates the smoothness of the transition functions. If the strongest rejection of H_{02} occurs, the exponential function is more appropriate; otherwise, the logistics function is used. The number in parenthesis is the results of cost cost of debt capital.

Table 6
Marginal effects of the cost of capital regression.

Variables	Regimes	
	1	2
Panel A: Full Sample (n=64, threshold value=35.09% (46.35%))		
$AQ_{i,t-1}$	−0.3642(0.1183)	−0.1402(-0.0004)
$r_{m,t}$	0.0219(-0.0177)	0.0110(-0.0025)
SMB_t	−0.0492(0.0232)	−0.0202(-0.0046)
HML_t	0.0332(-0.117)	0.0088(0.0013)
D_t	0.0142(-0.0025)	−0.0058(0.0051)
Panel B: Small firm (n=32, threshold value= 28.01%(25.77%))		
$AQ_{i,t-1}$	−0.3224(0.0893)	−0.1590(0.0401)
$r_{m,t}$	0.0190(-0.0132)	−0.0066(-0.0066)
SMB_t	−0.0302(0.0135)	−0.0107(0.0046)
HML_t	0.0129(-0.0091)	0.0192(-0.0030)
D_t	0.0150(-0.0020)	0.0090(0.0027)
Panel C: Large firm (n=32, threshold value= 44.67% (68.32%))		
$AQ_{i,t-1}$	−0.3069(0.0000)	−0.1136(-4.2875)
$r_{m,t}$	0.0288(-0.0000)	0.0249(0.3905)
SMB_t	−0.0575(0.000)	−0.0056(-0.7681)
HML_t	0.0508(-0.0000)	−0.0041(0.3525)
D_t	−0.0002(-0.0000)	−0.0138(0.1643)

The table evaluates the marginal effect of the cost of capital in each regime. The accounting quality (AQ) is calculated as follows. First, the total accruals is related to the extent to which accruals are well captured by fitted values obtained by regressing total accruals on changes in revenues and PPE and all variables are scaled by average assets and then the standard deviation in the residuals (t-15 through t) is then used as the proxy for accounting quality. r_m, SMB, and HML are the Fama-French 3 factor. The institutional ownership (IO) is measured by shares owned by institutional investors divided by shares outstanding. Panel A is the marginal effect of the cost of capital regression in full sample. Panel B is the marginal effect of the cost of capital regression in small firm. Finally, Panel C is the maginal effect of the cost of capital regression in large firm.

Table 7
Number of firms across different regimes, 2000−2017.

Years	Regimes	
	IO<35.09%(46.35%)	IO>35.09%(46.35%)
2000	25(37)	39(27)
2001	24(36)	40(28)
2002	24(35)	40(29)
2003	23(35)	41(29)
2004	25(34)	39(30)
2005	23(32)	41(32)
2006	21(30)	43(34)
2007	16(27)	48(37)
2008	16(22)	48(42)
2009	15(25)	49(39)
2010	16(26)	48(38)
2011	17(25)	47(39)
2012	14(23)	50(41)
2013	14(21)	50(43)
2014	13(18)	51(46)
2015	8(19)	56(45)
2016	7(17)	57(47)
2017	8(16)	56(48)

The table shows the number of firms which belong to different levels of institutional ownership (IO). Based on the empirical findings, the threshold value is 58.69%. The total number of firms is 64. The number in parenthesis are the number of firms using the proxy of cost of debt (Debt).

The results reported in Table 6 indicate a negative marginal effect between accounting quality and the cost of equity capital. A 1 per cent improvement in accounting quality would give a 36.42% per cent increase in the cost of equity capital in regime 1 (IO< 35.09%) while a 1 per cent improvement in accounting quality would give a 14.02% per cent increase in the cost of equity capital (IO> 35.09%). Such result indicates that the benefit of income 'smoothing' dominates the benefits of reduced information asymmetry. The effect of accounting quality on the cost of capital gradually decreases as the level of institutional ownership increase, indicating that the institutional investors plays an monitor in the accounting quality. Similar 1 per cent increases in excess market risk premium, SMB and HML would lead to respective changes of 0.0219 (1.10) per cent, −4.92 (−2.02) per cent and 3.32 (0.08) per cent in the cost of equity (debt) capital.

On the other hand, the relationship between the cost of debt capital is positively related to the accounting quality in regime 1 (IO<46.53%), indicating that a 1 per cent increase in accounting quality would give rise to an 11.83 per cent increase in the cost of debt capital. However, up to a certain level of institutional ownership (IO>46.53%), the cost of debt capital will decrease even facing the poor accounting quality. This may be due to the fact that firms with poor accounting quality are monitored by the institutional investors when the institutional ownership is up to a certain level.

Please cite this article as: Hsieh, T.-Y et al., Does institutional ownership affect the relationship between accounting quality and cost of capital? A panel smooth transition regression approach, Asia Pacific Management Review, https://doi.org/10.1016/j.apmrv.2018.12.002

Therefore, the cost of debt capital issuing by such firms decreases. Finally, the total numbers of firms across different regimes, during the period from 2000 to 2017, are shown in Table 7. We find that the level of institutional ownership is more than 35.07% (46.35%) for most firms.

4.6. Sensitivity analysis

The investment strategies adopted by foreign institutional investors may differ significantly from those adopted by individual investors. Kang and Stulz (1997) indicates that the institutional investors tend to hold stocks in relatively large and more transparent local firms (Covrig, Lau, & Ng, 2006; Ferreira & Matos, 2008) than the foreign institutional investors, as opposed to those with more opaque accounting practices (Leuz, Lins, & Warnock, 2008). Hence, we divide the sample firms into two sub-samples (large and small firms) based on the median market value (14,754.5 million dollars) in the year of 2017. The optimal setting for the threshold transition functions is (r,m)= (1,1). The threshold value for small firm is 28.01% (25.77%) and the threshold value for large firm is 44.67% (68.32%) while the cost of equity (debt) capital is used in this work. The results are reported in Table 8.

First of all, for both the large and small firms, the relationship between the EP ratio and the accounting quality is still negative but the magnitude between the accounting quality and EP raito decreases with the increase in the level of institutional ownership. Further, the positive relationship between the cost of debt equity and the accounting quality is the same as the previous discussion. It is worthwhile to note that the level of institutional ownership exceeds 68.32%, the accounting quality is negatively related to the cost of debt, indicating that the cost of debt increases with the improvement of accounting quality for the large firms. Such result is consistent with the findings of Table 4, supporting the view that the income smoothing effect dominates the effect of reduced information asymmetry.

5. Conclusions

We contribute to the ongoing debate on the relationship between accounting quality and the cost of capital based upon a PSTR model which incorporates heterogeneity by allowing the regression coefficients to vary as a function of 'institutional ownership', the exogenous variable. Our PSTR model reveals variations in the relationship between accounting quality and the cost of equity

Table 8
Sensitivity Analysis:Parameter estimates of the PSTR model classified by market value.

Variables	Coeff.	S.E.	t-value	C_1	γ_1	MSE
Panel A: Small Firm (n=32)						
β_0						
$AQ_{i,t-1}$	−0.3224 (0.0893)	0.037 (0.0078)	−8.7142 (11.4334)	28.01% (25.77%)	33.2259 (183.2472)	1.284 (0.051)
$r_{m,t}$	0.0190 (0.0132)	0.0151 (0.0029)	1.2584 (−4.6136)			
SMB_t	−0.0302 (0.0135)	0.0384 (0.0075)	−0.8666 (1.8058)			
HML_t	0.0129 (−0.0091)	0.0169 (0.0060)	0.7592 (−1.5336)			
D_t	0.0150 (−0.0020)	0.0120 (0.0023)	1.2462 (−0.8786)			
β_1						
$AQ_{i,t-1}$	−0.0492(0.1634)	0.0059(0.0321)	−7.1584(5.0943)	28.01% (25.77%)	33.2259 (183.2472)	1.284 (0.051)
$r_{m,t}$	0.0066(-0.0256)	0.0036(0.0192)	1.8362(-1.3296)			
SMB_t	−0.0089(0.0195)	0.0088(0.0430)	−1.0108(0.4533)			
HML_t	0.0061(0.0063)	0.0074(0.0278)	0.8303(0.2255)			
D_t	0.0047(-0.0060)	0.0026(0.0143)	1.8158(-.4203)			
Panel B: Large Firm (n=32)						
β_0						
$AQ_{i,t-1}$	−0.3069 (0)	0.0505 (0)	−6.0727 (16.0476)	44.67% (68.32%)	$2.2122*10^4$ (37.8117)	1.072 (0.028)
$r_{m,t}$	0.0288 (−0)	0.0131 (0)	2.1940 (−4.2304)			
SMB_t	−0.0575 (0)	0.0430 (0)	−1.9109 (3.1964)			
HML_t	0.0508 (−0)	0.0278 (0)	2.9446 (−2.0709)			
D_t	−0.0002 (0)	0.0143 (0)	−00.4203 (−1.7194)			
β_1						
$AQ_{i,t-1}$	0.1709 (−4.2875)	0.0340 (3.0962)	−5.0203 (13.8478)	44.67% (68.32%)	$2.2122*10^4$ (37.8117)	1.072 (0.028)
$r_{m,t}$	−0.0039 (0.3905)	0.0161 (1.1878)	−0.2436 (3.2880)			
SMB_t	0.0270 (−0.7681)	0.0376 (2.7194)	0.7301 (−2.8243)			
HML_t	−0.0549 (0.3525)	0.0232 (2.0960)	−2.3694 (1.6816)			
D_t	−0.0136 (0.1643)	0.0127 (0.8460)	−1.770 (1.9423)			

Note. *, **, and *** indicate significance at the 0.1, 0.05, and 0.01 levels, respectively.
The firms are classified by the median market value in 2017, which are classified into the large and small firms. The model is as follows: $Y_{i,t} = \mu_i + \beta_0(r_{m,t} + SMB_t + HML_t + AQ_{i,t-1} + D_{i,t}) + \sum_{j=1}^{2}\beta_j g(IO_{i,t};\gamma_j,c_k)((r_{m,t} + SMB_t + HML_t + AQ_{i,t-1} + D_{i,t}) + \epsilon_{i,t}$; where $g(IO_{i,t};\gamma_j,c_k) = (1+\exp(-\gamma_j\prod_{k=1}^{m}(IO_{i,t}-c_k))^{-1}$; $Y_{i,t}$ includes the Adj-EP or Debt. The industry-adjusted EP ratio (Adj-EP) is defined as the difference between its EP ratio and the median industry EP ratio in year t. The interest rate of debt ($DebtRatio_{i,t}$) is defined as the ration of firm's interest expense in year t to interest-bearing debt outstanding during year t. The institutional ownership (IO) is measured by shares owned by institutional investors divided by shares outstanding. r_m, SMB, and HML are the Fama-French 3 factor. The accounting quality (AQ) is calculated as follows. First, the total accruals is related to the extent to which accruals are well captured by fitted values obtained by regressing total accruals on changes in revenues and PPE and all variables are scaled by average assets and then the standard deviation in the residuals (t-9 through t) is then used as the proxy for accounting quality. $D_{i,t} = 1$ for the years 2007, 2008 and 2009; $D_{i,t} = 0$, otherwise. c_k is the location parameter, representing the level of institutional ownership (the threshold value); and the slope parameter, γ_j, is the transition variable, ($\gamma_j > 0$), which indicates the smoothness of the transition functions. If the strongest rejection of H_{02} occurs, the exponential function is more appropriate; otherwise, the logistics function is used. The parenthesis is the results of the cost cost of debt capital (Debt). Panel A is the parameter estimates of the PSTR model in small firm while Panel B is the parameter estimates of the PSTR model in large firm.

Please cite this article as: Hsieh, T.-Y et al., Does institutional ownership affect the relationship between accounting quality and cost of capital? A panel smooth transition regression approach, Asia Pacific Management Review, https://doi.org/10.1016/j.apmrv.2018.12.002

capital with changes in the level of institutional ownership. This indicates that investors will demand a greater risk premium when faced with better financial reporting quality, and the magnitudes between accounting quality and cost of equity capital decreases with the increase in the level of institutional ownership. The cost of equity capital will decrease with the improvement of accounting quality when the level of institutional ownership is smaller than 46.35% but the relationship between the cost of debt capital and the accounting quality is negative when the level of institutional ownership is above 46.35%, supporting the view that the disadvantage of income smoothing effect is larger than the benefits of reduced information asymmetry.

Our study has several implications for both investors and academic researchers. For instance, the results show that the impact of accounting quality on the cost of capital varies with the level of institutional ownership, which may be attributable to the important role played by institutional ownership in shaping managerial behavior, in terms of financial reporting. Moreover, the conditional distribution between the cost of capital and accounting quality is allowed to vary across the institutional ownership. It seems that the institutional ownership is a moderator between the accounting quality and cost of capital. The appropriate ratio of institutional ownership is encouraged to be considered endogenously into the future research between accounting quality and cost of capital. Furthermore, investors need to pay close attention to the level of institutional ownership when evaluating stock prices, in addition to looking at financial statements. For government authorities, the Information Transparency and Disclosure Rankings System in Taiwan implemented in 2003 may include a quantitative score which reflects financial reporting quality.

One limitation of our study is that the level of institutional ownership is only one of the threshold variables between accounting quality and the cost of capital; thus, the results should not be generalized to the relationship between accounting quality and the overall cost of capital, since other threshold variables may have some influence on such costs. We also recommend the use of other proxies for accounting quality in any future work to strengthen the empirical results of our study.

References

Alford, A. (1992). 'The effect of the set of comparable firms on the accuracy of the price–earnings valuation method'. *Journal of Accounting Research, 301*, 94–108.
Ali, A., & Hwang, L. (2000). Country-specific factors related to financial reporting and the value relevance of accounting data. *Journal of Accounting Research, 38*(1), 1–21.
Ball, R., Robin, A., & Sadka, G. (2008). Is financial reporting shaped by equity markets or debt markets? An international study of timeliness and conservatism. *Review of Accounting Studies, 13*(2–3), 168–205.
Barth, M. E., Konchitchki, Y., & Landsman, W. R. (2013). Cost of capital and earnings transparency. *Journal of Accounting and Economics, 55*(2-3), 206–224.
Beneish, M. D., & Vargus, M. E. (2002). Insider trading, earnings quality and accrual mispricing. *The Accounting Review, 77*(4), 755–791.
Bhattacharya, N., Desai, H., & Venkataraman, K. (2013). Does earnings quality affect information asymmetry? Evidence from trading costs. *Contemporary Accounting Research, (June), 30*(2), 482–516.
Botosan, C. A. (1997). Disclosure level and the cost of equity capital. *The Accounting Review*, 323–349 (July).
Botosan, C. A., & Plumlee, M. A. (2002). A re-examination of disclosure level and the expected cost of equity capital. *Journal of accounting research, 40*(1), 21–40.
Callen, J. L., & Segal, D. (2004). Do accruals drive firm-level stock returns? A variance decomposition analysis. *Journal of Accounting Research, 42*(3), 527–560.
Chen, X., Harford, J., & Li, K. (2007). Monitoring: Which institutions matter? *Journal of Financial Economics, 86*(2), 279–305.
Chung, R., Firth, M., & Kim, J. (2002). Institutional monitoring and opportunistic earnings management. *Journal of Corporate Finance, 8*(1), 29–48.
Cohen, D. (2008). Does information risk really matter? An analysis of the determinants and economic consequences of financial reporting quality. *Asia-Pacific Journal of Accounting and Economics, 15*(2), 69–90.
Core, J. E., Guay, W. R., & Verdi, R. (2008). Is accruals quality a priced risk factor? *Journal of Accounting and Economics, 46*(1), 2–22 (September).
Covrig, V., Lau, S. T., & Ng, L. (2006). Do domestic and foreign fund managers have similar preferences for stock characteristics? A cross-country analysis. *Journal of International Business Studies, 37*(3), 407–429.
Daske, H. (2006). Economic benefits of adopting IFRS or US-GAAP: Have the expected costs of equity capital really decreased. *Journal of Business Finance & Accounting, 33*(3–4), 329–372 (May).
Dechow, P., & Dichev, I. (2002). The quality of accruals and earnings: The role of accrual estimation errors. *The Accounting Review, 77*, 35–59.
Diamond, D. W., & Verrecchia, R. E. (1991). Disclosure, liquidity and the cost of capital. *The Journal of Finance, 46*(4), 1325–1359 (September).
Fama, E. F., & French, K. R. (1993). Common risk factors in the returns on stocks and bonds. *Journal of Financial Economics, 33*(1), 3–56.
Ferreira, M. A., & Matos, P. (2008). 'The colors of investors' money: The role of institutional investors around the world'. *Journal of Financial Economics, 88*(3), 499–533.
Francis, J., LaFond, R., Olsson, P. M., & Schipper, K. (2004). Costs of equity and earnings attributes. *The Accounting Review, 79*(4), 967–1010.
Francis, J., LaFond, R., Olsson, P. M., & Schipper, K. (2005). The market pricing of accruals quality. *Journal of Accounting and Economics, 39*(2), 295–327 (June).
Garcia-Teruel, P. J., Martinez-Solano, P., & Sanchez-Ballesta, J. P. (2010). Accruals quality and debt maturity structure. *Abacus, 46*(2), 188–210.
Gaspar, J.-M., Massa, M., & Matos, P. (2005). Shareholder investment horizons and the market for corporate control. *Journal of Financial Economics, 76*(1), 135–165.
Gonzalez, A., Teräsvirta, T., & van Dijk, D. (2005). In *Panel smooth transition regression models', research paper series 165*. Sydney: Quantitative Finance Research Centre, University of Technology.
Grinblatt, M., & Keloharju, M. (2000). The investment behavior and performance of various investor types: A study of Finland unique data set. *Journal of Financial Economics, 55*(1), 43–67 (January).
Habib, A. (2008). Corporate transparency, financial development and the allocation of capital: Empirical evidence. *Abacus, 44*(1), 1–21.
Hansen, B. E. (1999). Threshold effects in non-dynamic panels: Estimation, testing and inference. *Journal of Econometrics, 93*(2), 345–368.
Healy, P., Hutton, A., & Palepu, K. (1999). Stock performance and intermediation changes surrounding sustained increases in disclosure. *Contemporary Accounting Research, (Fall), 16*(3), 485–520.
Hellman, N. (2005). Can we expect institutional investors to improve corporate governance? *Scandinavian Journal of Management, 21*(3), 293–327 (September).
Hung, M. (2000). Accounting standards and value relevance of financial statements: An international analysis. *Journal of Accounting and Economics, 30*(3), 401–420.
Im, K. S., Pesaran, M., & Shin, Y. (2003). Testing for unit roots in heterogeneous panels. *Journal of Econometrics, 115*(1), 53–74.
Kang, J., & Stulz, R. (1997). Why is there a home bias? An analysis of foreign portfolio equity in Japan. *Journal of Financial Economics, 46*(1), 3–28.
Kothari, S., Leone, A., & Wasley, C. (2005). Performance-matched discretionary accrual measures. *Journal of Accounting and Economics, 39*(1), 163–197.
Lang, M., Raedy, J., & Wilson, W. (2006). Earnings management and cross-listing: Are reconciled earnings comparable to US earnings? *Journal of Accounting and Economics, 42*(1–2), 255–283.
Leuz, C., Lins, K. V., & Warnock, F. E. (2008). Do foreigners invest less in poorly governed firms? *The Review of Financial Studies, 23*(3), 3245–3285.
Leuz, C., Nanda, D., & Wysocki, P. (2003). Earnings management and investor protection: An international comparison. *Journal of Financial Economics, 69*(3), 505–527.
Leuz, C., & Verrecchia, R. E. (2000). The economic consequences of increased disclosure. *Journal of Accounting Research, 38*(supplement), 91–124.
Levin, A., Lin, C. F., & Chu, C. S. J. (2002). Unit root tests in panel data: Asymptotic and finite-sample properties. *Journal of Econometrics, 108*(1), 1–24.
McNichols, M. (2000). Research design issues in earnings management studies. *Journal of Accounting and Public Policy, 19*(4–5), 313–345.
Mitra, S., & Cready, W. (2005). Institutional stock ownership, accrual management, and information environment. *Journal of Accounting, Auditing and Finance, (July), 20*(3), 257–286.
Ng, J. (2011). The effect of information quality on liquidity risk. *Journal of Accounting and Economics, 52*(2–3), 126–143 (November).
Phillips, P. C. B., & Perron, P. (1988). Testing for unit roots in time series regressions. *Biometrika, 75*(2), 335–346, 335-346.
Pincus, M., Rajgopal, S., & Venkatachalam, M. (2007). The accrual anomaly: International evidence. *The Accounting Review, 82*(1), 169–203.
Rajgopal, S., & Venkatachalam, M. (1998). *'The role of institutional investors in corporate governance: An empirical investigation', working paper*. Stanford University.
Shan, Y.,S. L., Taylor, T. S., & Walter. (2015). Earnings management or measurement error? The effect of external financing on unexpected accruals. In *Asian finance association 2015 conference paper*. https://ssrn.com/abstract=1572164.
Shaw, K. W. (2003). Corporate disclosure quality, earnings smoothing and earnings timeliness. *Journal of Business Research, (December), 56*(12), 1043–1050.
Sloan, R. (1996). Do stock prices fully reflect information in accruals and cash flows about future earnings? *The Accounting Review, 71*(3), 289–315. July.
Voulteenaho, T. (2002). What drives firm-level stock returns? *The Journal of Finance, 57*(1), 233–264.
Walther, B. (1997). Investor sophistication & market earnings expectations. *Journal of Accounting Research, Autumn, 35*(2), 157–179.
Wurgler, J. (2000). Financial markets and the allocation of capital. *Journal of Financial Economics, 58*(1–2), 187–214.

Please cite this article as: Hsieh, T.-Y et al., Does institutional ownership affect the relationship between accounting quality and cost of capital? A panel smooth transition regression approach, Asia Pacific Management Review, https://doi.org/10.1016/j.apmrv.2018.12.002