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A Cross-Country Study on the Relationship between Financial Development and Earnings Management

Abstract

This paper investigates whether a country's level of financial development is associated with earnings management in an international setting. Financial development is likely to heighten the monitoring and scrutiny of accounting numbers because of strengthened investor protection laws and regulations as well as sophisticated market participants. Therefore, we first hypothesize that both accrual-based and real earnings management decrease with greater financial development. However, research shows that managers tend to apply real earnings management, instead of accrual-based earnings management, under strict accounting standards, regulations, and close auditor scrutiny. Thus, we explore the alternative hypothesis that accrual-based earnings management decreases but real earnings management increases along with higher financial development. We examine the relationship between financial development and both types of earnings management using 56,830 observations in 37 countries covering the period 2009 to 2012. The results indicate that both types of earnings management are more restrained under higher levels of financial development.

Keywords: financial development, accounting institution, accrual-based earnings management, real earnings management

JEL classification: M41

1. Introduction

This paper investigates whether a country's level of financial development is associated with earnings management. Beck and Levine (2002) define "financial development" as the degree to which national financial systems assess firms, monitor managers, facilitate risk management, and mobilize savings. Financial accounting is required to provide investors with useful information on decision-making under the accounting system of each country and assist in furthering financial development.

However, it is not clear whether higher-quality accounting information is available in countries with higher levels of financial development. For instance, several countries with highly developed financial systems have suffered accounting scandals such as those involving Enron and WorldCom (the U.S.), Tesco (the U.K.), Biovail (Canada), One.Tel (Australia), and Olympus (Japan). In response to such scandals, national financial authorities and legislatures have enacted laws to strengthen audits and internal control systems (Brown et al., 2014a), which have improved the transparency of firms and enabled stakeholders to obtain high-quality accounting information. These events illustrate how levels of financial development are associated with advances in financial accounting regulation. Financial development is likely to promote enhanced monitoring and scrutiny through the legal/regulator system, as well as incentives for transparency and reduced information asymmetry. Hence, financial development probably influences the financial accounting information provided by managers.

According to Dechow et al. (2010), earnings management is a crucial factor affecting accounting information quality. The research shows that earnings management is related to monitoring, transparency, and information asymmetry, which are potential effects of financial development. For example, Yu (2008) finds that firms followed by more analysts engage less in earnings management, indicating that earnings management is restrained by analyst monitoring. Abad et al. (2016) find that real earnings management is associated with higher information asymmetry. Jo and Kim (2007) indicate that transparency-increasing disclosure reduces managers' incentives to manage earnings. Thus, it is useful to investigate the relationship between financial development and earnings management.

Earnings management can be divided into accrual-based earnings management (AEM) and real earnings management (REM). AEM alters the accrual process in order to manage earnings. This leads to a reversal of accruals in subsequent periods but does not have a direct effect on cash flows. REM reflects a firm's real activities and manages earnings by changing the timing and/or structure of an operating,

investment, or financial decision. REM can reduce future cash flows via non-optimal decisions such as opportunistic reductions in R&D and advertising costs.

Cross-country research on earnings management has often considered investor protection as one of the important factors affecting managerial behaviors. Leuz et al. (2003) show that earnings management is negatively associated with the quality of minority shareholder rights. They use an anti-director rights index from La Porta et al. (1997) and a legal enforcement index, measured as the average score of three legal variables, used by La Porta et al. (1998). Although the legal aspects of investor protection are the most important factors in financial development (Beck et al., 2001), they do not capture all financial development factors. We adopt the index provided by the World Economic Forum (WEF) to measure financial development. The WEF defines "financial development" as the factors, policies, and institutions that lead to effective financial intermediation and markets, as well as deep and broad access to capital and financial services (World Economic Forum, 2012). The WEF index consists of 121 comprehensive financial development variables and thus covers more financial development aspects than are considered in prior research. Our financial development scores consider the evaluation of laws and regulations and the economic impacts of banking and security market systems.

Financial development is likely to heighten the monitoring and scrutiny of accounting figures because it involves strengthened investor protection laws and regulations and increases the number of sophisticated market participants. Here, financial development would likely act to discipline managers, thereby reducing their involvement in earnings management. We therefore hypothesize that both AEM and REM decrease with greater financial development. However, the research shows that managers tend to apply REM instead of AEM when facing stricter accounting standards and related regulations (Ewert and Wagenhofer, 2005; Cohen et al., 2008; Enomoto et al., 2015). We thus alternatively hypothesize that, while AEM decreases, REM increases with higher financial development.

This paper examines the relationship between two types of earnings management and financial development using 56,830 observations in 37 countries covering the period 2009 to 2012. Our results show that managers are more restrained from using both AEM and REM in countries with higher financial development. Our empirical results withstand several robustness checks.

We extend earnings management research by investigating the relationship between financial development measures and two types of earnings management. Our financial development score, based on

WEF as the institutional factor, is more comprehensive than the scores used in other studies (e.g., Leuz et al., 2003; Degeorge et al., 2013). This score includes the economic dimensions of financial systems as well as the quality of relevant laws and regulations, which is the focus of La Porta et al. (1997, 1998). Moreover, we add REM measures to capture managers' real activities, which are predicted to vary according to national financial development levels.

To the best of our knowledge, our study is the first to show that financial development restrains both AEM and REM. The results indicate that financial reporting processes improve as financial development levels increase by reducing managerial intervention in the accounting accrual process and that firm activities become more appropriate through reduced myopic behavior, such as lower R&D costs.

Our study should be important to wider audiences. Previous studies have shown that tighter accounting standards restrict AEM but increase REM (Ewert and Wagenhofer, 2005; Cohen et al., 2008). Considering that REM likely has a negative impact on firm performance (Bhojraj, 2009; Cohen and Zarowin, 2010), regulatory authorities and researchers should be interested in exploring the institutional environment that restrains both AEM and REM simultaneously. Our findings also suggest that accounting numbers reported by firms in countries with lower financial development are managed more extensively, which should be a serious concern for the globally oriented investor.

The remainder of the paper is organized as follows. Section 2 reviews the literature and considers the relationship between earnings management and financial development. Section 3 presents the research design of the study. Section 4 describes the results of our econometric analysis. Finally, section 5 concludes the paper and discusses suggestions for future research.

2. Literature Review and Hypotheses

2.1 Literature review

Bushman and Smith (2001, 305) state that powerful interactions occur between financial accounting regimes and other institutional characteristics, including auditing regimes, communication infrastructures, analyst followings, financial architectures, legal environments, and human capital. Similarly, Wysocki (2011) and Leuz and Wysocki (2016) describe "new institutional accounting research" focusing on the links between accounting institutions (such as accounting standards, disclosure systems, and audit) and non-accounting institutions (such as legal systems, corporate governance mechanisms, and the

enforcement of laws governing investor protection). They point out that accounting institutions are key economic institutions and that a link exists between accounting institutions and non-accounting institutions. Bartov et al. (2001) also find that both national financial accounting regimes and institutional factors play important roles in the informativeness of earnings.

In new institutional accounting research, cross-country research on earnings management is one of the most important streams. Leuz et al. (2003) present comparative evidence on corporate earnings management across 31 countries from 1990 to 1999, and show that earnings management will decrease under strong legal protection. Using a sample of firms in 42 countries from 1994 to 2004, Francis and Wang (2008) find that earnings quality increases for firms with Big 4 auditors in countries with stronger investor protection, whereas the earnings quality of firms with non-Big 4 auditors are largely unaffected by regimes' investor protection levels. By contrast, Jaggi et al. (2012) indicate that audits by industry specialists are associated with higher earnings quality in countries with weak (rather than strong) investor protection. Most of the cross-country research on earnings management has dealt with the relationship between the legal aspects of institutional factors and AEM.

Degeorge et al. (2013) shed more light on financial development as an institutional factor, analyzing the effect of financial development and analyst coverage on AEM in various countries. For a sample of firms from 21 countries covering 1994 to 2002, they find that increased analyst coverage is associated with less earnings management in countries with high levels of financial development, while, in countries with low levels of financial development, analyst coverage is not associated with reductions in earnings management.

Several cross-country studies focus on both AEM and REM. Doukakis (2014) analyzes a sample of 15,206 firm-years from 22 countries covering 2000 to 2010. However, he does not find a significant effect of mandatory IFRS adoption on either real or accrual-based earnings management. Bramm et al. (2015) suggest that political connections relate to the choice of earnings management methods. Using data from 30 countries covering 1997 to 2001, they show that politically connected firms tend to substitute more costly but invisible REM for AEM than do non-connected firms. Enomoto et al. (2015) examine the relationships between two types of earnings management and investor protection using data from 222,513 firm-year observations covering 1991 to 2010, finding that outside investor rights are negatively correlated with REM and positively correlated with AEM. Francis et al. (2016) show that REM is encouraged and

AEM discouraged in countries with stronger legal environments using a sample of 38 countries covering 1994 to 2009.

These studies do not investigate the relationship between financial development and REM, although they focus on AEM and REM in an international setting. The financial development score of this study is more comprehensive than the scores used in other studies, providing new insights into the relationship between financial development and earnings management.

2.2 Hypothesis development

Financial development is known to be a crucial factor in economic growth (Beck and Levine, 2002) and, as mentioned, is probably related to managers' accounting behaviors. In this subsection, we develop our hypothesis on the relationship between financial development and earnings management from the perspective of stakeholders, such as regulatory authorities, auditors, and investors.

First, financial development generates a greater variety and number of stakeholders. To balance interests among them, regulatory authorities create relevant laws and regulations that require a sophisticated accounting system. As a result, financial development increases the importance of the accounting system through laws and regulations and improves stakeholders' general ability to process accounting information. Leuz et al. (2003, 506) explain that "strong and well-enforced outsider rights limit insiders' acquisition of private control benefits and, consequently, mitigate insiders' incentives to manage accounting earnings because they have little to conceal from outsiders." The mitigation of managers' opportunistic incentives may reduce overall managerial discretionary behaviors (i.e., AEM and REM). Following the arguments and findings of Leuz et al. (2003), the strengthening of various laws and regulations resulting from the development of financial systems discipline managers and thus mitigate managers' earnings management incentives.[1]

Like regulatory authorities, auditors play a key function in the governance of financial development environments and in restraining earnings management. For example, Becker et al. (1998) and Francis et al. (1999) have found that the degree of AEM among firms with Big 6 auditors tends to be lower than among those with non-Big 6 auditors. Moreover, to foster financial development, firms should provide investors and debt holders with high-quality accounting information that allows them to make rational investment decisions. They are also likely to be concerned with a firm's earnings management. Lambert et al. (2007)

have demonstrated that accounting information quality can affect the cost of capital. Investors tend to regard earnings management as an undesirable behavior and thus seek to detect it, which is reflected in pricing. Francis et al. (2004) indicate that firms with low accruals quality have higher equity cost than do firms with high accruals quality. In addition, Francis et al. (2005) have found that lower accruals quality is associated with higher costs of debt. Because earnings management reduces earnings quality (Dechow and Schrand, 2004), the quality of accounting (earnings) information examined in these studies is strongly related to earnings management.

Meanwhile, sophisticated investors have both the incentive and ability to constrain a manager's REM in order to avoid reductions in future cash flow.[2] They can consider a firm's AEM and REM when making decisions pertaining to the pricing of securities. Wongsunwai (2013) and Kim and Sohn (2013) indicate that sophisticated U.S. market participants monitor managers' value-destroying behaviors and effectively restrain managers from engaging in AEM and REM. In financially developed countries such as the U.S., stakeholders are typically more sophisticated than are those in less developed countries, and demand the least-managed earnings possible. As such, managers face stricter monitoring and scrutiny in these countries and are likely to be prevented from carrying out value-destroying behaviors involving AEM and REM.[3]

While the above explanation indicates that financial development suppresses managers' incentives to manage earnings owing to stakeholders' heightened monitoring and scrutiny abilities, financial development also curbs earnings management via accounting and audit standards. For instance, new accounting standards that narrow a manager's discretion in achieving a target income can result in greater constraints on the manipulation of accruals (i.e., AEM). Thus, countries with high levels of financial development are likely to have higher quality and tighter standards resulting from stakeholder demands. Managers therefore face more difficulty in implementing AEM in countries with greater financial development.[4] We thus hypothesize that earnings management, including both AEM and REM, decreases as financial development levels increase because managers tend to be disciplined in such cases. We therefore propose the following:

H1. Both AEM and REM decrease as financial development levels increase.

Since the growing use of accounting information due to financial development produces greater

private benefits for managers engaging in earnings management, managers may continue to have sufficient incentives to carry out earnings management. We assume that financial development heightens the monitoring and scrutiny of accounting figures and that AEM is less (more) prevalent under conditions of high (low) financial development. This is why AEM becomes more costly than REM when revealed. Managers are more likely to engage in REM when the incentives to manage earnings are not weakened and only AEM is restrained.

Many studies have examined the substitution between AEM and REM. Some have found that, when stricter accounting standards and other regulations become effective, managers tend to apply REM instead of AEM (Ewert and Wagenhofer, 2005; Cohen et al., 2008; Enomoto et al., 2015) and that higher-quality audit conditions lead to similar results (Chi et al., 2011). It is more difficult for regulatory authorities and auditors than for investors to interfere in a firm's real activities because they are independent of the firm. Many studies have pointed out that managers tend to employ REM rather than AEM to achieve the target income, since AEM is more likely to face scrutiny from auditors, regulators, and other parties (Graham et al., 2005). Kothari et al. (2012) argue that REM is easier to camouflage as a normal activity than AEM is and that discretion relating to operating and investment activities is inherently provided to managers by shareholders. Based on interviews with executives, Graham et al. (2005) indicated that managers prefer REM to AEM because they fear overzealous regulators. The research argues that managers may also prefer REM because they hope to avoid the scrutiny and oversight of stakeholders, in spite of the higher future costs their firms may incur.

Therefore, if the substitution effect between the two types of earnings management occurs and has a dominant effect on REM, despite monitoring constraints and scrutiny in countries with high levels of financial development, AEM (REM) will be less (more) prevalent in countries with higher levels of financial development. We thus propose the following:

H2. AEM decreases, while REM increases, as financial development levels increase.

3. Research Design

3.1 Earnings management measures

3.1.1 Accrual-based earnings management measure

Following many earnings management studies (e.g., Warfield et al., 1995; Becker et al., 1998;

Cohen et al., 2008), we use the absolute value of abnormal accruals as an AEM measure in order to capture the effects of both income-increasing and income-decreasing AEM. To measure abnormal accruals, we use the cross-sectional modified Jones (1991) model (Dechow et al., 1995). Specifically, we estimate the following regression model for each industry-year combination in each country, where the industry is identified by a two-digit SIC code:

$$ACC_{ijt} / A_{ijt-1} = \beta_0 + \beta_1 (1 / A_{ijt-1}) + \beta_1 ((\Delta S_{ijt} - \Delta AR_{ijt}) / A_{ijt-1}) + \beta_3 (PPE_{ijt} / A_{ijt-1}) + \varepsilon_{ijt} \quad (1)$$

where *ACC* is accruals, calculated as net income minus operating cash flow reported in the statement of cash flow; *A* is total assets; Δ*S* is the change in net sales; Δ*AR* is the change in accounts receivable; *PPE* is net property, plant, and equipment; and the subscripts refer to firm *i*, country *j*, and time *t*. Abnormal accruals are calculated as the estimated residuals from equation (1), and the absolute value is our proxy for AEM (|*A_ACC*|). Definitions of all variables are provided in the appendix.

3.1.2 Real earnings management measures

Following Roychowdhury (2006), Cohen et al. (2008), Cohen and Zarowin (2010), and Ho et al. (2015), we develop a proxy for three REM methods: (1) sales manipulation, (2) reduction of discretionary expenses, and (3) overproduction. According to Roychowdhury (2006), sales manipulation and overproduction lead to abnormally high production costs relative to sales and abnormally low cash flow from operating activities relative to sales, while the reduction of discretionary expenditures leads to abnormally low discretionary expenses.[5]

To measure an abnormal level of CFO (*A_CFO*), discretionary expenses (*A_DE*), and production costs (*A_PD*), we estimate the following regression models. Similar to equation (1), the models are estimated for each industry-year combination in each country, where the industry is identified by a two-digit SIC code:

$$CFO_{ijt} / A_{ijt-1} = \beta_0 + \beta_1 (1 / A_{ijt-1}) + \beta_2 (S_{ijt} / A_{ijt-1}) + \beta_3 (\Delta S_{ijt} / A_{ijt-1}) + \varepsilon_{ijt} \quad (2)$$

$$DE_{ijt} / A_{ijt-1} = \beta_0 + \beta_1 (1 / A_{ijt-1}) + \beta_2 (S_{ijt-1} / A_{ijt-1}) + \varepsilon_{ijt} \quad (3)$$

$$PD_{ijt} / A_{ijt-1} = \beta_0 + \beta_1 (1 / A_{ijt-1}) + \beta_2 (S_{ijt} / A_{ijt-1}) + \beta_3 (\Delta S_{ijt} / A_{ijt-1}) + \beta_4 (\Delta S_{ijt-1} / A_{ijt-1}) + \varepsilon_{ijt} \quad (4)$$

where *CFO* represents the operating cash flow reported in the statement of cash flow; *DE* represents selling, general, and administrative expenses; *PD* represents production costs and is calculated as the cost

of goods sold plus change in inventory; and *S* represents net sales.[6] *A_CFO*, *A_DE*, and *A_PD* are calculated as the estimated residuals from equations (2), (3), and (4), respectively.

Since the three types of REM described above might be implemented to decrease earnings, consistent with Francis et al. (2016) and Kim and Sohn (2013), we convert *A_CFO*, *A_DE*, and *A_PD* to absolute values and use them as our REM proxies (|*A_CFO*|, |*A_DE*|, and |*A_PD*|, respectively).[7] In addition, we combine these three measures to capture the total effect of REM. Consistent with Cohen and Zarowin (2010), we multiply *A_CFO* and *A_DE* by negative one and add them to *A_PD*, so that higher values indicate greater income-increasing earnings management. Again, considering the possibility of income-decreasing REM, we convert the aggregated REM measure to an absolute value and use it as our fourth REM proxy (|*REM*|).

3.2 Financial development measures

We adopt the financial development score used by the WEF because it takes a comprehensive view when assessing the factors contributing to the long-term development of financial systems (World Economic Forum, 2012, xiii). It also includes various factors used in prior cross-country research on financial accounting, such as corporate governance, legal and regulatory issues, and contract enforcement. The WEF has provided a score and rank for the breadth, depth, and efficiency of 62 of the world's leading financial systems and capital markets since 2008. The index analyzes drivers of financial system development that support economic growth and thus compares the overall competitiveness of financial systems (World Economic Forum, 2012, xiii).

As shown in Panel A of Table 1, World Economic Forum (2012, 4-5) defines seven pillars grouped into three broad categories (Factors, policies, and institutions; Financial intermediation; Financial access). (1) **Institutional environment** encompasses financial sector liberalization, corporate governance, legal and regulatory issues, and contract enforcement. (2) **Business environment** considers human capital, taxes, infrastructure, and costs of doing business. (3) **Financial stability** captures the risk of currency crises, systemic banking crises, and sovereign debt crises. (4) **Banking financial** services measure size, efficiency, and financial information disclosure. (5) **Non-banking financial services** include IPO and M&A activity, insurance, and securitization. (6) **Financial markets** encompass foreign exchange and derivatives markets as well as equity and bond market development. (7) **Financial access** evaluates

commercial and retail access. Each pillar is scored from one to seven. The financial development score is the average of the scores for all seven pillars. Panel B of Table 1 reports their correlation matrix. Institutional environment and Financial markets are highly associated with other pillars. Although all of the correlations have positive coefficients, some correlation coefficients are not high. Non-banking financial services have relatively low correlations with other pillars.

[Insert Table 1 here]

Since not all of the pillars are associated with financial accounting (and resulting earnings management), we extracted scores from four of the seven pillars (Institutional environment, Banking financial services, Non-banking financial services, and Financial markets) as the factors most closely related to financial accounting. In our study, these four pillars include much broader factors than do the institutional factors examined in prior research. First, (1) **Institutional environment** involves not only the index of minority shareholders' interests, legal enforcement, and corporate governance, as measured in La Porta et al. (1998) and Leuz et al. (2003), but also financial sector liberalization, regulation of securities exchanges, and the ethical behavior of firms. Financial accounting is essential for all of these to work efficiently. Next, (4) **Banking financial services** reflect efficiency and financial information disclosure as well as the extent of banking services, such as the ratio of the sum of bank debt in the private sector and outstanding nonfinancial bonds to GNP (La Porta et al., 1997) and the ratio of GDP to claims from the banking sector on the private sector (Beck and Levine, 2002). (5) **Non-banking financial services** consist of the extent of M&A activities and the size of initial public offerings (e.g., La Porta et al., 1997 and 1998), measured by the ratio of equity issued by newly listed firms to population or GDP. Finally, the (6) **Financial market** pillar includes the level of bond market development in addition to the size of the stock market, represented by the ratio of domestic firms listed in a given country to its population (La Porta et al., 1997), the value of listed shares divided by GDP, and the value of stock transactions as a share of national output (Beck and Levine, 2002).

As shown in Table 1, Financial intermediation includes (4) **Banking financial services**, (5) **Non-banking financial services**, and (6) **Financial markets**. Financial intermediation is defined as the variety, size, depth, and efficiency of the financial intermediaries and markets that provide financial services. Our financial development score can therefore be interpreted as the financial intermediaries and the institutional environment supporting them.

Unlike the four pillars, (2) **Business environment**, (3) **Financial stability**, and (7) **Financial access** can be considered to not have a direct linkage to the financial accounting of listed (relatively large) firms in our sample, as per their definition in WEF (2012, 7-11). (3) **Financial stability** is excluded because this pillar focuses on the financial crises that affect economic growth. Similarly, (7) **Financial access** is dropped because it is an indicator built from the viewpoint of individuals and small and medium-sized enterprises. At first glance (2) **Business environment**, including taxation policy and the costs of doing business, seems to relate to financial accounting, but it focuses on the availability of human capital and state of physical capital. Judging from the definition of the indices that constitute the pillar, major parts of the index are remotely related to the necessity for financial accounting among the firms in our sample. It is therefore eliminated from our financial development score.[8]

Through this process, we can calculate a comprehensive score reflecting not only laws and regulations but also the economic impact of banking and security market systems.

3.3 Models for hypothesis tests

To examine the relationship between financial development and earnings management, we estimate the following regression model:

$$EM_{ijt} = \beta_0 + \beta_1 FD_{jt} + \beta_2 Leverage_{ijt\text{-}1} + \beta_3 Size_{ijt\text{-}1} + \beta_4 MTB_{ijt\text{-}1} + \beta_5 ROA_{ijt} + \beta_6 NOA_{ijt\text{-}1} + \Sigma\, \beta\, Year\_Fixed\_Effect + \Sigma\, \beta\, Firm\_Fixed\_Effect + \varepsilon_{ijt} \quad (5)$$

where *EM* represents earnings management proxies, either |*A_ACC*|, |*A_CFO*|, |*A_DE*|, |*A_PD*| or |*REM*|; *FD* is the mean value of the four pillars (Institutional environment, Banking financial Services, Non-banking financial services, and Financial markets) in the financial development report of the WEF; *Leverage* is total debt divided by total assets; *Size* is the natural logarithm of the market value of equity; *MTB* is the market-to-book ratio; *ROA* is net income divided by lagged total assets; and *NOA* is net operating assets divided by sales.[9]

When the dependent variable is the proxy for AEM (i.e., |*A_ACC*|), we predict that the coefficient of *FD* will have a negative sign. On the other hand, when the dependent variable is the proxy for REM (i.e., |*A_CFO*|, |*A_DE*|, |*A_PD*|, or |*REM*|), the sign of the coefficient of *FD* should be negative (positive) if REM decreases (increases) in countries with higher levels of financial development. In addition to *FD*,

other variables are included to control for other factors likely to affect earnings management proxies. *Leverage* is included because the research shows that it is related to earnings management measures (e.g., DeFond and Jiambalvo, 1994; Becker et al., 1998; Roychowdhury, 2006). Following Roychowdhury (2006) and Gunny (2010), we include *SIZE*, *MTB*, and *ROA*. *SIZE* and *MTB* are included to control for size effects and growth opportunity, respectively. *ROA* is added to control for firm performance. Following Barton and Simko (2002) and Zang (2012), we include *NOA* as a proxy for the extent of AEM in previous periods. Due to limited flexibility within GAAP and the reversal of accruals, AEM in previous periods affects managers' ability to manipulate accruals, with a consequent impact on REM (Zang, 2012). Finally, consistent with approaches taken by Degeorge et al. (2013), *Year_Fixed_Effect* and *Firm_Fixed_Effect* are also included in our regression to control for firm effects and year effects.

3.4 Sample selection

Financial development and other relevant data covering 2009 to 2012 are obtained from *Global Note*.[10] The sample period is chosen because the WEF's Financial Development Score (*FD*) is available in *Global Note* from 2009. The countries in this paper are selected from among the 49 used in La Porta et al. (1998). Ecuador, New Zealand, Taiwan, Uruguay, Sri Lanka, and Zimbabwe are dropped, as their FD scores are not included in the WEF report. Zimbabwe is also eliminated due to hyperinflation during the sample period.[11]

The sample comprises data from *Capital IQ*, from which we obtain 81,317 firm-year observations, covering sales and total assets of over 1 million dollars. Next, the data for financial services firms (2,108 firm-years) are eliminated. To calculate earnings management measures, we require at least seven firm-year observations for each industry-year combination in each country (13,825 firm-years are excluded). To calculate other measures, we exclude Austria, Colombia, Egypt, Kenya, Portugal, and Venezuela (8,326 firm-years) from our sample due to data availability issues. Using this sample selection process, we obtain 56,830 observations from 37 countries after excluding observations with missing data to compute the independent and dependent variables.

4. Empirical Results

4.1 Descriptive statistics

Panel A of Table 2 shows the number of firm-years in 37 countries and the mean value of *FD*. The U.S. has the highest number of firm-years (10,750 observations, 18.9%) while Japan is a close second. Observations for the U.S. and Japan account for 37.7% of total observations. Greece has the lowest number of firm-years (31 observations). The third column of Panel A reports the mean values of the financial development scores (*FD*). *FD* is the mean value of the four pillars (Institutional environment, Banking financial services, Non-banking financial services, and Financial markets). The U.K. has the highest score, at 5.45, while the U.S. has the second-highest (5.39). The lowest score is 2.11, for Nigeria. Only the U.K. and the U.S. have scores exceeding five.[12] These ranking results are similar to those of Beck and Levine (2002) and Degeorge et al. (2013). Panel B presents the number of firm-years in the sample period.

[Insert Table 2 here]

Table 3 shows the descriptive statistics for the dependent and independent variables in equation (5). The mean values of |*A_ACC*|, |*A_CFO*|, |*A_DE*|, |*A_PD*|, and |*REM*| are 6.6%, 7.5%, 9.5%, 11.4%, and 22.1%, respectively. These values are slightly larger than in Francis et al. (2016) and smaller than in Kim and Sohn (2013).[13]

[Insert Table 3 here]

Table 4 is the correlation matrix. Since no high correlation coefficient is observed, the results of the regressions in this section will not be influenced by multicollinearity.[14] *FD* is negatively associated with |*A_ACC*|, but positively correlated with |*A_CFO*|, |*A_DE*|, |*A_PD*|, and |*REM*|.

[Insert Table 4 here]

4.2 Regression results

Table 5 reveals evidence of the influence of financial development on managerial behavior.[15] Five types of dependent variables are used in the analyses. Column (1) in Table 5 displays the regression results of |*A_ACC*|. The coefficient of *FD* is significantly negative, supporting our prediction that AEM is restrained in countries that are highly financially developed.

This result implies that an increase in the financial development score by one (e.g., the difference in

score between the U.S. and Germany) is associated with a 0.008 decrease in the absolute value of discretionary accruals. When considering financial development as an institutional factor, this result is consistent with Leuz et al. (2003) in that earnings management is negatively associated with the development of the institutional environment. Financial development serves as an institutional factor that inclines managers to avoid accrual-based discretionary behaviors for earnings management purposes.[16]

[Insert Table 5 here]

In the regression where the dependent variable is |*A_CFO*| (column [2] of Table 5), *FD* also has a significantly negative coefficient. When the dependent variables are |*A_DE*|, |*A_PD*|, and |*REM*| (columns [3], [4], and [5] respectively), the coefficients of *FD* are also significantly negative. These results indicate that both AEM and REM are negatively associated with higher levels of financial development. In more highly financially developed economies, managers presumably reduce noise in earnings and avoid reductions in future revenues caused by earnings management for fear that stakeholders would have a negative view of these behaviors.

Taken together, these results may indicate that stakeholders pay more attention to accounting numbers under higher financial development and therefore that managers try to avoid the costs resulting from earnings management, such as scrutiny from auditors and regulators, litigation, declines in future sales, and increasing costs of capital. This evidence supports our hypothesis (H1) that both types of earnings management are restrained under higher levels of financial development. However, this is not consistent with prior research showing that substitution occurs between AEM and REM (e.g., Zang 2012; Francis et al., 2016). We infer that managers are disciplined and that their earnings management (both AEM and REM) is limited under conditions of high financial development.

4.3 Additional tests

To capture the financial development affecting accounting information, we calculate *FD* as the mean value of the four components: Institutional environment, Banking financial services, Non-banking financial services, and Financial markets.[17] However, the original financial development score has three additional components: Business environment, Financial stability, and Financial access. Hence, we re-estimate equation (5) with *Original_FD* instead of *FD*, where *Original_FD* is the mean value of the seven components mentioned above. The results in Table 6 show that the coefficients of *Original_FD* in all

regressions are significantly negative, supporting the results of Table 5. Therefore, even when Business environment, Financial stability, and Financial access are added to the measure of financial development, the results again indicate that both AEM and REM decrease under higher financial development.

[Insert Table 6 here]

Although *FD* includes the Institutional environment component, Leuz et al. (2003) find that the institutional factor of investor protection has a restraining effect on earnings management. We are concerned that our primary results may be driven only by the institutional factor in *FD*. Therefore, we divide *FD* into two variables: *Institutional environment* and *Financial Intermediation*. The following regressions are estimated:

$$EM_{ijt} = \beta_0 + \beta_1\, Institutional\_Environment_{jt} + \beta_2\, Financial\_Intermediation + \beta_3\, Leverage_{ijt\text{-}1} + \beta_4\, Size_{ijt\text{-}1} + \beta_5\, MTB_{ijt\text{-}1} + \beta_6\, ROA_{ijt} + \beta_7\, NOA_{ijt\text{-}1} + \Sigma\, \beta\, Year\_Fixed\_Effects + \Sigma\, \beta\, Firm\_Fixed\_Effect + \varepsilon_{ijt} \quad (6)$$

Institutional_Environment is the score for Institutional environment as reported by WEF; *Financial_Intermediation* is the mean value of the Banking financial Services, Non-banking financial services, and Financial markets scores as reported by WEF.[18] *Financial intermediation* represents the variety, size, depth, and efficiency of the financial intermediaries and markets that provide financial services (World Economic Forum, 2012, 5).

Table 7 shows the results of estimating equation (6) with *Institutional environment* and *Financial_Intermediation* instead of *FD*.[19] When the dependent variable is |*A_ACC*|, the coefficient of *Institutional environment* is significantly negative. This result is consistent with Leuz et al. (2003) and indicates that AEM is more restrained under more stringent financial institutions. The coefficient of *Financial_Intermediation* is significantly negative, indicating that AEM decreases as financial development increases, other than the institutional factor. For REM, while the coefficient of *Institutional environment* is marginally significantly negative only when the dependent variable is |*A_DE*| and |*REM*|, the coefficient of *Financial_Intermediation* is negative and significant at the 1% level for all dependent variables.

These results suggest that, under strong financial institutions, AEM is indeed restrained but REM is restrained to a lesser extent. In addition, not only AEM but also REM is restrained to a considerable extent under strong financial development other than financial institutions (i.e., financial intermediation). We can

thus say that financial development other than financial institutions is important in restraining REM, probably due to monitoring by sophisticated financial markets and financial service firms.

[Insert Table 7 here]

So far, we have used the simple average of four (seven) pillars as a financial development score, *FD* (*Original_FD*). Next, we conduct a principal components analysis in addition to a simple average to summarize each pillar's score. This should give us a new interpretation of the relationship between financial development and earnings management.

We input seven pillar values of 38 countries covering 2009 to 2012 (N = 142). Principal component analysis (not tabulated) reports that 67.5% (13.9%) of the variation is explained by the first (second) eigenvalue. Hence, 81.4% of the variation is explained by the first two eigenvalues together. This percentage is sufficiently high and acceptable at conventional levels. Hence, we employ the first two components in the regression analysis as summarized financial development indices.

Before carrying out the regression analysis, we interpret the two components. Since all of the coefficients of the first component have positive values (from 0.230 to 0.427), the coefficients can be interpreted as the level of each pillar's contribution to financial development. The second component has positive coefficients on Pillars 1, 2, 3, and 7 (from 0.096 to 0.720) and negative ones on Pillars 4, 5, and 6 (from -0.569 to -0.092). As stated in section 3.2., Pillars 1, 2, 3, and 7 capture the institutional or infrastructural aspect that forms the basis of financial development, while Pillars 4, 5, and 6 represent the aspect of financial intermediation that provides financial services. Hence, we can infer that this component represents the relative development of the financial intermediation compared to the strength of the institutional environment in each country. For simplicity, if the strength of the institutional environment is fixed, a country with stronger financial intermediation lowers this score because the coefficients of Pillars 4, 5, and 6 are negative. In fact, the U.S. (the U.K.) has the lowest (second-lowest) score for the second component in our sample.

Next, we compute the two principal component scores and replace *FD* with them in equation (5) (non-tabulated). The coefficients on the first component score are significantly negative when the dependent variable is |*A_ACC*|, |*A_DE*|, and |*REM*|. These results are consistent with our primary results, considering the first component as another summarized index of financial development. Next, the second

component score has significantly positive coefficients when the dependent variable is |*A_CFO*|, |*A_PD*|, and |*REM*|. This implies that the development of financial intermediation relative to the institutional environment is negatively associated with REM. We can thus infer that monitoring and scrutiny of financial intermediation are negatively associated with real activities manipulation. Overall, the results of the principal component analysis are consistent with our primary results.

Finally, we test for the potentially differential effect of financial development on AEM versus REM. Many studies have examined the tradeoff between AEM and REM (e.g., Cohen et al., 2008; Zang, 2012). To test the trade-off between AEM and REM, we examine the association between the ratio of AEM to REM and financial development. Following Evans et al. (2015), we calculate the ratio of |*REM*| to |*A_ACC*| and regress the ratio on *FD*. Specifically, we employ the ratio in place of the earnings management variables in equation (5). When a trade-off between AEM and REM occurs as financial development increases, a significantly positive coefficient on *FD* should be observed. However, the coefficient is positive but insignificant (untabulated), suggesting the possibility that both AEM and REM move in the same direction as financial development, which does not indicate that financial development has a differential effect on AEM and REM. These results are not inconsistent with our primary results.

4.4 Robustness checks

We provide ten robustness tests for the main results. First, we re-compute abnormal accruals using the cross-sectional Jones (1991) model. The coefficient of *FD* in the regression of |*A_ACC*| is similar to that observed before (not tabulated).

Second, we employ another CFO measure developed by Gordon et al. (2017), who point out that CFO could vary with the classification of interest paid, interest received, and dividends received within the statement of cash flow under IFRS (International Financial Reporting Standards). The classification of these items is at the manager's discretion. Gordon et al. (2017) claim that their model, based on lagged cash flow, could be more useful in an international setting. Hence, we calculate abnormal CFO using the model below based on Gordon et al. (2017) and take its absolute value (|*A_CFO_GHJL*|):

$$CFO_{ijt+1} / A_{ijt} = \beta_0 + \beta_1 ACC_{ijt} / A_{ijt-1} + \beta_2 CFO_{ijt} / A_{ijt-1} + \beta_4 Size_{ijt} + \beta_5 BM_{ijt} + \beta_6 EP_{ijt} + \varepsilon_{ijt+1} \quad (7)$$

We input |*A_CFO_GHJL*| as an independent variable in equation (5). We exclude *Size* and *MTB* (inverse of BM) from our main regression (equation [5]) to avoid repeatedly controlling them in both equations (5) and (9). When we replace |*A_CFO*| with |*A_CFO_ GHJL*| as a dependent variable, the coefficient of *FD* remains significantly negative, indicating that our main results are substantially unchanged even when employing this alternative abnormal CFO measure.

Third, Brown et al. (2014b) present a measure that reflects the institutional environment for financial reporting in each country. The measure is divided into two parts, the quality of the auditor's working environment for listed firms and the degree of enforcement of accounting activity. This measure could be substitutional to our Pillar 1 (Institutional environment). When we convert the index consistent with the calculation method of Pillar 1 and include it to compute *FD* in place of Pillar 1, the results are unchanged (not tabulated).[20]

Fourth, we add the absolute value of REM in equation (5) for the AEM test to control for the simultaneous use of the two types of earnings management (Cohen et al., 2008; Kuo et al., 2014), and AEM is also incorporated in the regression for REM measures in the same way (Achleitner et al., 2014; Kuo et al., 2014). The untabulated results are similar to the primary results reported in Table 5.

Fifth, we input the accounting standard dummies into our main regressions (equation [5]). Since different accounting standards are used in each country in our sample, our AEM and REM measures could be affected by them. This procedure reduces the sample size (from 56,830 to 49,990) due to the lack of accounting standard data. The untabulated results show that the coefficient of *FD* remains significantly negative when |*A_ACC*| is the dependent variable. For REM, the coefficients of three of the four dependent variables, |*A_DE*|, |*A_PD*|, and |*REM*|, are similar to those of Table 5. Thus, our primary results are not significantly affected by the accounting standard dummies.

Sixth, we employ country- , industry- , and year-fixed effects in place of firm-fixed effects in equation (5). While it is appropriate to use firm-fixed effect terms to control for time-invariant factors, some studies include country-, industry- , and year-fixed effects. The untabulated coefficients of FD in all regressions remain significantly negative, which is consistent with the results shown in Table 5.

Seventh, we delete all of the firm-years for the U.S. and Japan and re-estimate the models in Table 5. The observations for the U.S. and Japan total 21,447, or 37.7% of our sample (see Table 2). It is therefore of concern that the evidence in Table 5 is driven mainly by the data for these two countries. Table

8 displays the estimated coefficients from the sample, excluding observations for the U.S. and Japan. All of the coefficients of *FD* are negative and significant and are consistent with those shown in Table 5. The results are also robust even when we eliminate observations for either of these countries.

[Insert Table 8 here]

Eighth, we delete all 2009 data in the sample and re-estimated equation (5), as our sample periods include data from periods of global financial crisis. The untabulated results show that the coefficient of *FD* for |*A_ACC*| remains significantly negative. For REM, the coefficients of two of the three dependent variables, |*A_DE*| and |*A_PD*|, are similar to those shown in Table 5. Thus, our findings are not significantly influenced by financial crises.

Ninth, we conduct a country-weighted least square (WLS) regression as a robustness test to address countries that have few observations with small weights in the regressions. The weight of each observation is inversely proportional to the number of observations per country. Using WLS ensures that uneven country representation in the sample will not bias the results towards countries that are more heavily represented (Hope et al., 2009, 191). As shown in Table 9, while the coefficient of |*A_ACC*| is negative but insignificant, the coefficients of the four REM measures remain significantly negative. Thus, the primary results of REM are robust to change, while the results of AEM are slightly influenced by the countries with a greater number of firm-years.

[Insert Table 9 here]

Finally, we conduct regressions in changes to control for a factor related to financial development as well as earnings management that changes over time and is therefore not captured by firm-fixed effects. The regression model is as follows:

$$\Delta EM_{ijt} = \beta_0 + \beta_1 \Delta FD_{jt} + \beta_2 \Delta Leverage_{ijt\text{-}1} + \beta_3 \Delta Size_{ijt\text{-}1} + \beta_4 \Delta MTB_{ijt\text{-}1} + \beta_5 \Delta ROA_{ijt} + \beta_6 \Delta NOA_{ijt\text{-}1} + \Sigma \beta Year\_Fixed\_Effect + \varepsilon_{ijt}. \quad (8)$$

Δ is the change and is computed as the difference between time *t* and *t-1*.

The dependent and independent variables are the differences from last year's value in the regressions. From the regression, we can observe whether the changes in *FD* reduce earnings management levels. Table 10 shows that the coefficient of |*A_ACC*| and three of the four REM measures remain significantly negative, providing evidence that our main regression result does not suffer from unobserved

heterogeneity.

[Insert Table 10 here]

5. Conclusions

This paper has investigated whether levels of financial development in specific countries affect managers' earnings management based on 56,830 observations from 37 countries covering the period 2009 to 2012. Regarding earnings management, we focused on both AEM and REM, finding that a negative relationship exists between countries' levels of financial development and both types of earnings management. These results indicate that both AEM and REM are constrained in countries with high levels of financial development. These results show that (1) higher-quality accounting information is required in countries with more developed financial systems, (2) managers are disciplined and their earnings management incentives are mitigated under high financial development, and (3) there is a link between financial development and accounting institutions in each of the countries.

Previous studies show that AEM is restrained in countries with high levels of investor protection (Leuz et al., 2003) and that AEM and REM are used as substitutes for each other according to the strength of the legal system (Francis et al., 2016) and outside investor rights (Enomoto et al., 2015). We contribute to the earnings management literature by showing that, at the international level, both AEM and REM are restrained under high levels of financial development.

Given that AEM and REM are relevant to earnings quality, our results show that a country's financial development is positively related to the earnings quality of each firm in that country. In other words, with higher levels of financial development, financial reporting processes improve through the reduction of managerial intervention in the accounting accrual process, and managers engage in more appropriate activities by avoiding myopic behaviors such as reducing R&D costs.

Future study is needed in several areas. First, due to data availability issues, our sample period covers only four years, from 2009 to 2012. Obtaining more reliable evidence will require testing for a longer sample period. Second, since the applicable accounting standards vary not only among countries but also within each country, the model should be developed to adequately control for the accounting standards adopted by each firm in estimating AEM and REM in an international setting.[21] Third, we estimated the test models for AEM and REM separately, though the research indicates a substitution

between AEM and REM. Future studies should consider a simultaneous equation system approach for the two types of earnings management. Fourth, though we focused on earnings management as an important aspect of accounting quality, it would also be fruitful to analyze other aspects of accounting quality, such as smoothing, conservatism, and value relevance. Fifth, we did not clarify the linkage process between financial development and accounting institutions. Wysocki (2011, 312) notes the "chicken and the egg" problem of the endogeneity and complementarily between accounting institutions and non-accounting institutions, which may apply to the relationship between financial development and accounting institutions. It is difficult to determine which of these comes first, but it would be an interesting issue for further research to address.

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[1] The financial development scores in this paper include many institutional factors (see sections 3.2).
[2] Corporate governance mechanisms may also influence REM (Cheng et al., 2016).
[3] To put it another way, financial development heightens the costs imposed on managers through the detection of earnings management, depending on the sophistication level of stakeholders.
[4] If managers' incentives to manage earnings do not change, a substitution effect may occur between AEM and REM (Ewert and Wagenhofer, 2005). However, because the revision of accounting standards may influence real activities (e.g., stricter revenue recognition reduces sales manipulation) and as we assume that incentives are reduced with financial development, the effect of changes in accounting institutions on REM is unclear. The substitution effect is discussed in the next hypothesis.
[5] If the firm paid for discretionary expenses in cash, a reduction of discretionary expenses could also lead to abnormally high cash flow (Roychowdhury, 2006; Cohen and Zarowin, 2010).

[6] Following Bartov and Cohen (2009) and Gunny (2010), we use selling, general, and administrative expenses as discretionary expenses because they frequently include discretionary expenses such as R&D and advertising costs.

[7] For example, Francis et al. (2016) point out the possibility of income-decreasing real earnings management from an income-smoothing perspective. When a firm's performance is good in the current period, managers may choose to spend more on R&D, advertising, and employee training. These activities have an income-decreasing effect for the current year but an income-increasing effect for future periods (Francis et al., 2011, 9).

[8] In section 4.3, we also test using the original financial development score.

[9] Following Roychowdhury (2006), we use the values at the beginning of the year for *Size* and *MTB*, and use the values at the end of the year for *ROA*.

[10] *Global Note* is a website that collects various kinds of international statistics such as Gross Domestic Product (http://www.globalnote.jp/ [in Japanese]).

[11] We consider hyperinflation as inflation above 100% per year.

[12] Original financial development scores range from a low 2.51 for Nigeria to a high of 5.17 for the United States, and show the same trends as our financial development score (*FD*).

[13] These studies used the absolute value of abnormal accruals and three REM measures. The former uses international data and the latter uses U.S. data.

[14] The largest absolute value for the correlation coefficients among the independent variables in our analysis is 0.269 for Pearson correlations and 0.436 for Spearman correlations. These values are less than 0.8 and are thus not likely to result in multicollinearity (Kennedy, 2008).

[15] We winsorize all dependent and independent variables at the 1st and 99th percentiles.

[16] Another reason for the small |*abACC*| of financially developed countries is that financial development may affect accounting institutions. For example, stakeholders pursuing high accounting quality require tighter accounting standards in these countries.

[17] The original financial development score of the WEF is also the simple mean value of the seven components.

[18] See the explanation of the financial development measure components reported by the World Economic Report in section 3.2.

[19] Since the correlation between *Institutional environment* and *Financial_Intermediation* is relatively high (0.751), the results should be interpreted with caution. When each is singly included in the regression, although the coefficients of *Financial_Intermediation* are significantly negative for all dependent variables (as before), the coefficients of *Institutional environment* are significantly negative for only |*A_ACC*|, suggesting that, while financial institution restricts AEM but not REM, financial development other than financial institutions restricts both AEM and REM.

[20] Since Brown et al. (2014b) do not include Nigeria in their sample, it reduces our sample size by 71 firm-years.

[21] For example, Gordon et al. (2017) express caution about the usage of the abnormal CFO model by Roychowdhury (2006) under IFRS. Pownall and Wieczynska (2017) find that over 17% of firms in the Europe Union had not adopted IFRS in 2012. This means that more than one accounting standard is used in those countries.

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Appendix

Variable	*Definition*
ACC	Accruals, calculated as net income minus operating cash flow reported in the statement of cash flow
A	Total assets
AR	Accounts receivable
PPE	Net property, plant, and equipment
|*A_ACC*|	The absolute value of abnormal accruals, where abnormal accruals are calculated as the residuals from the following regression for each industry-year combination in each country: $ACC_{ijt} / A_{ijt-1} = \beta_0 + \beta_1 (1 / A_{ijt-1}) + \beta_1 ((\Delta S_{ijt} - \Delta AR_{ijt}) / A_{ijt-1}) + \beta_3 (PPE_{ijt} / A_{ijt-1}) + \varepsilon_{ijt}$
CFO	The operating cash flow reported in the statement of cash flow
S	Net sales
DE	The selling, general, and administrative expenses
PD	Production costs, calculated as the cost of goods sold plus the change in inventory
|*A_CFO*|	The absolute value of *A_CFO*, where *A_CFO* is the residuals from the following regression for each industry-year combination in each country: $CFO_{ijt} / A_{ijt-1} = \beta_0 + \beta_1 (1 / A_{ijt-1}) + \beta_2 (S_{ijt} / A_{ijt-1}) + \beta_3 (\Delta S_{ijt} / A_{ijt-1}) + \varepsilon_{ijt}$
|*A_DE*|	The absolute value of *A_DE*, where *A_DE* is the residuals from the following regression for each industry-year combination in each country: $DE_{ijt} / A_{ijt-1} = \beta_0 + \beta_1 (1 / A_{ijt-1}) + \beta_2 (S_{ijt-1} / A_{ijt-1}) + \varepsilon_{ijt}$
|*A_PD*|	The absolute value of *A_PD*, where *A_PD* is the residuals from the following regression for each industry-year combination in each country: $PD_{ijt} / A_{ijt-1} = \beta_0 + \beta_1 (1 / A_{ijt-1}) + \beta_2 (S_{ijt} / A_{ijt-1}) + \beta_3 (\Delta S_{ijt} / A_{ijt-1}) + \beta_4 (\Delta S_{ijt-1} / A_{ijt-1}) + \varepsilon_{ijt}$
|*REM*|	The absolute value of total of *A_CFO**-1, *A_DE**-1, and *A_PD*
EM	|*A_ACC*|, |*A_CFO*|, |*A_DE*|, |*A_PD*| or |*REM*|
FD	The mean value of the four pillars (Institutional environment, Banking financial Services, Non-banking financial services, and Financial markets) in the financial development report of World Economic Forum
Leverage	Total debt divided by total assets
Size	The natural logarithm of the market value of equity
MTB	The market to book ratio
ROA	Net income divided by lagged total assets
NOA	Net operating assets divided by sales, where net operating assets is defined as total assets less cash and trading asset securities
Original_FD	The mean value of the seven pillars (Institutional environment, Business environment, Financial stability, Banking financial Services, Non-banking financial services, Financial markets, and Financial access) in the financial development report of the WEF
Institutional_Environment	The score for the Institutional environment in the financial development report of the WEF

Financial_Intermediation	The mean value of the Banking financial Services, Non-banking financial services, and Financial markets scores in the financial development report of the WEF
|*A_CFO_GHJL*|	The absolute value of *A_CFO*, where *A_CFO* are the residuals from the following regression for each industry-year combination in each country: $CFO_{ijt+1} / A_{ijt} = \beta_0 + \beta_1 ACC_{ijt} / A_{ijt-1} + \beta_2 CFO_{ijt} / A_{ijt-1} + \beta_4 SIZE_{ijt} + \beta_5 BM_{ijt} + \beta_6 EP_{ijt} + \varepsilon_{ijt+1}$
BM	Book-to-market ratio, calculated as the ratio of shareholders' equity divided by market capitalization at the beginning of year
EP	Net income divided by market capitalization at the beginning of year

The measures of financial development (*FD, Original_FD, Institutional_Environment,* and *Financial_Intermediation*) are based on data from *Global Note*. The variables other than financial development measures are based on data from *Capital IQ*.

Table 1

Panel A: Composition of the financial development index

Group	Pillar
Factors, policies, and institutions	(1) Institutional environment
	(2) Business environment
	(3) Financial stability
Financial intermediation	(4) Banking financial services
	(5) Non-banking financial services
	(6) Financial markets
Financial access	(7) Financial access

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Panel B: Correlation matrix of seven pillars of financial development

	Pillar	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1)	Institutional environment	1						
(2)	Business environment	0.915	1					
(3)	Financial stability	0.478	0.481	1				
(4)	Banking financial services	0.843	0.821	0.303	1			
(5)	Non-banking financial services	0.418	0.466	0.159	0.535	1		
(6)	Financial markets	0.770	0.764	0.284	0.784	0.746	1	
(7)	Financial access	0.771	0.731	0.404	0.752	0.444	0.667	1

$N = 142$

Table 2
Data for each country and year
Panel A. The number of observations and the mean value of financial development scores in each country

Country	*N*	*FD*	P1	P2	P3	P4	P5	P6	P7	*Original_FD*
Argentina	88	2.44	3.22	3.83	3.32	2.84	2.33	1.36	2.22	2.73
Australia	1,607	4.80	5.49	5.58	5.23	5.07	4.14	4.51	5.15	5.02
Belgium	99	4.07	5.59	5.25	4.68	4.74	2.27	3.67	5.01	4.46
Brazil	474	3.17	3.68	3.74	5.03	3.39	3.46	2.15	3.43	3.55
Canada	2,339	4.72	5.82	5.78	5.16	4.71	4.19	4.16	4.83	4.95
Chile	188	2.86	4.47	4.80	5.45	3.35	1.97	1.68	3.54	3.61
Denmark	165	4.05	5.90	5.97	4.82	4.20	2.34	3.77	4.09	4.44
Finland	157	3.74	5.79	5.86	5.03	4.13	2.02	3.01	3.41	4.18
France	1,425	4.34	5.46	5.24	4.85	4.18	3.27	4.43	4.20	4.52
Germany	1,561	4.36	5.72	5.54	4.89	4.41	3.23	4.10	3.55	4.49
Greece	31	3.07	4.35	4.32	2.14	4.19	1.29	2.45	3.12	3.12
Hong Kong	2,544	4.86	5.71	5.93	5.58	5.58	3.60	4.54	4.92	5.12
India	7,284	3.17	3.23	3.42	4.06	3.11	3.69	2.65	2.81	3.28
Indonesia	633	2.44	3.49	3.38	4.42	2.69	2.18	1.41	2.85	2.92
Ireland	32	4.07	5.62	5.42	3.66	4.89	2.93	2.86	4.09	4.21
Israel	517	3.45	5.04	4.59	4.62	4.05	1.97	2.72	3.87	3.84
Italy	435	3.65	4.28	4.75	4.15	4.09	2.57	3.65	3.61	3.87
Japan	10,697	4.93	5.52	5.28	4.66	5.33	4.15	4.73	3.44	4.73
Jordan	32	3.90	4.73	4.12	3.79	4.42	2.58	3.85	3.72	3.89
Malaysia	2,435	3.83	5.05	4.69	5.40	4.64	3.01	2.62	3.73	4.16
Mexico	146	2.50	3.64	3.98	4.99	2.76	2.01	1.58	2.99	3.14
Netherlands	160	4.68	5.81	5.77	4.80	5.22	3.55	4.12	4.04	4.76
Nigeria	71	2.11	3.73	2.88	3.88	2.28	1.23	1.21	2.37	2.51
Norway	201	3.88	5.90	5.83	5.49	4.84	2.15	2.61	4.21	4.43
Pakistan	543	2.29	3.02	3.36	3.79	2.72	1.34	2.10	2.34	2.67
Peru	110	2.41	3.72	4.07	4.91	2.83	1.68	1.42	3.30	3.13
Philippines	121	2.74	3.73	3.38	4.13	2.95	2.30	1.97	2.65	3.02
Singapore	1,374	4.83	6.16	6.00	5.60	4.63	3.44	5.08	4.34	5.03
South Africa	395	3.27	4.53	4.15	4.76	3.62	2.44	2.51	3.15	3.59
South Korea	4,585	4.02	4.15	5.36	4.31	4.18	4.27	3.48	3.06	4.12
Spain	138	4.34	4.99	4.78	3.95	5.22	3.07	4.09	4.13	4.32
Sweden	731	4.20	5.98	5.83	4.82	4.83	2.33	3.68	4.57	4.58
Switzerland	440	4.46	5.68	5.83	5.75	4.54	2.90	4.72	3.87	4.76
Thailand	1,232	2.90	4.20	4.23	4.60	3.71	1.68	2.01	3.37	3.40
Turkey	541	2.70	3.80	4.50	3.54	3.29	1.74	1.97	3.25	3.16
U.K.	2,549	5.45	5.80	5.63	4.22	5.50	5.30	5.20	4.31	5.14
U.S.	10,750	5.39	5.61	5.55	4.35	4.17	6.03	5.75	4.69	5.17
Total / Mean	56,830	3.73	4.83	4.83	4.56	4.09	2.83	3.18	3.68	4.00

Panel B. The number of observations for each year

Year	*N*
2009	13,807
2010	13,951
2011	14,391
2012	14,681
Total	56,830

In Panel A, P1 to P7 are the seven pillars reported in World Economic Forum (2012): Institutional environment (P1), Business environment (P2), Financial stability (P3), Banking financial (P4), Non-banking financial services (P5), Financial markets (P6), and Financial access (P7). *FD* is the mean value of P1, P4, P5, and P6 and the measure of financial development in our main tests. *Original_FD* is the mean value of P1 to P7 and is employed in the additional tests. Each pillar's mean value in a country is calculated using only the data from the year for which all the dependent and independent variables are available. The mean value in the bottom line is computed by averaging each country's data.

Table 3
Descriptive statistics of dependent and independent variables

Variables	Mean	Q1	Median	Q3	SD	N
|*A_ACC*|	0.066	0.019	0.043	0.085	0.073	56,830
|*A_CFO*|	0.075	0.021	0.050	0.098	0.081	56,830
|*A_DE*|	0.095	0.024	0.058	0.123	0.109	56,830
|*A_PD*|	0.114	0.032	0.077	0.152	0.120	56,830
|*REM* |	0.221	0.065	0.150	0.294	0.230	56,830
FD	4.422	3.697	4.793	5.075	0.883	56,830
Leverage	0.307	0.172	0.283	0.417	0.172	56,830
Size	4.648	3.064	4.389	6.080	2.172	56,830
MTB	1.779	0.617	1.072	1.962	2.294	56,830
ROA	0.042	0.002	0.046	0.102	0.131	56,830
NOA	1.674	0.666	1.021	1.659	2.354	56,830

|*A_ACC*|, |*A_CFO*|, |*A_DE*|, |*A_PD*|, and |*REM*| are the absolute value of abnormal accruals (*A_ACC*), abnormal cash flow from operations (*A_CFO*), abnormal discretionary expenses (*A_DE*), abnormal production costs (*A_PD*), and aggregated REM measure (*REM*), respectively. *A_ACC*, *A_CFO*, *A_DE*, and *A_PD* are calculated as the estimated residuals in equations (1), (2), (3), and (4), respectively. *REM* equals the sum of *A_CFO* * (-1), *A_DE* * (-1), and *A_PD*. *FD* is the measure of financial development, which is the mean value of the index of Institutional environment, Banking financial services, Non-banking financial services, and Financial markets reported by the WEF. *Leverage* is total debt divided by total assets; *Size* is the natural logarithm of the market value of equity; *MTB* is the market-to-book ratio; *ROA* is net income divided by lagged total assets; and *NOA* is net operating assets divided by sales.

Table 4
Correlation matrix of dependent variables and independent variables

	|*A_ACC*|	|*A_CFO*|	|*A_DE*|	|*A_PD*|	|*REM*	*FD*	*Leverage*	*Size*	*MTB*	*ROA*	*NOA*
|*A_ACC*|	1	0.341	0.092	0.139	0.163	-0.062	0.057	-0.174	0.093	-0.034	-0.039
|*A_CFO*|	0.453	1	0.144	0.238	0.334	0.009	0.011	-0.119	0.177	0.038	-0.062
|*A_DE*|	0.152	0.222	1	0.460	0.552	0.168	0.096	-0.085	0.157	0.060	-0.290
|*A_PD*|	0.193	0.303	0.583	1	0.791	0.107	0.090	-0.073	0.138	0.078	-0.226
|*REM*		0.223	0.406	0.695	0.879	1	0.098	0.100	-0.087	0.150	0.072	-0.235
FD	-0.037	0.031	0.167	0.111	0.101	1	-0.156	0.273	0.146	-0.041	-0.122
Leverage	0.070	0.029	0.109	0.108	0.116	-0.139	1	-0.220	-0.023	-0.081	-0.379
Size	-0.182	-0.124	-0.101	-0.077	-0.089	0.264	-0.225	1	0.436	0.293	0.159
MTB	0.160	0.253	0.198	0.193	0.205	0.093	0.102	0.249	1	0.261	-0.014
ROA	-0.133	-0.102	-0.018	0.059	0.054	-0.099	-0.074	0.259	0.011	1	-0.154
NOA	0.015	-0.008	-0.156	-0.126	-0.126	-0.013	-0.269	0.086	-0.007	-0.159	1

The lower-left (upper-right) triangle of the correlation matrix displays Pearson (Spearman) correlations. |*A_ACC*|, |*A_CFO*|, |*A_DE*|, |*A_PD*| and |*REM*| is the absolute value of abnormal accruals (*A_ACC*), abnormal cash flow from operations (*A_CFO*), abnormal discretionary expenses (*A_DE*), abnormal production costs (*A_PD*), and aggregated REM measure (*REM*). *A_ACC*, *A_CFO*, *A_DE*, and *A_PD* are calculated as the estimated residuals in equation (1), (2), (3), and (4), respectively. *REM* equals the sum of *A_CFO* * (-1), *A_DE* * (-1), and *A_PD*. *FD* is the measure of financial development, which is the mean value of the index of Institutional environment, Banking financial services, Non-banking financial services, and Financial markets reported by the World Economic Forum. *Leverage* is the total debt divided by the total assets; *Size* is the natural logarithm of the market value of equity; *MTB* is the market to book ratio; *ROA* is net income divided by lagged total assets; *NOA* is net operating assets divided by the sales. *N*=56,830.

Table 5
Financial development scores and earnings management

Variable	(1) |*A_ACC*|	(2) |*A_CFO*|	(3) |*A_DE*|	(4) |*A_PD*|	(5) |*REM* |
Intercept	0.119***	0.142***	0.179***	0.238***	0.424***
	(7.981)	(9.529)	(12.774)	(12.055)	(12.346)
FD	-0.008**	-0.010***	-0.013***	-0.021***	-0.032***
	(-2.441)	(-3.003)	(-4.155)	(-4.785)	(-4.216)
Leverage	0.026***	0.015**	0.005	-0.020**	-0.008
	(3.738)	(2.075)	(0.761)	(-2.363)	(-0.494)
Size	-0.006***	-0.007***	-0.009***	-0.009***	-0.019***
	(-5.319)	(-7.250)	(-9.140)	(-6.915)	(-8.261)
MTB	0.002***	0.003***	0.004***	0.004***	0.008***
	(4.266)	(6.029)	(7.139)	(6.333)	(6.693)
ROA	-0.029***	0.036***	0.013	0.094***	0.177***
	(-2.881)	(3.854)	(1.597)	(7.917)	(8.009)
NOA	-0.001*	-0.002***	-0.001***	-0.002***	-0.004***
	(-1.887)	(-3.868)	(-4.370)	(-3.253)	(-4.874)
Year_Fixed_Effects	*included*	*included*	*included*	*included*	*included*
Firm_Fixed_Effects	*included*	*included*	*included*	*included*	*included*
Adjusted R-squared	0.332	0.448	0.776	0.638	0.676
Observations	56,830	56,830	56,830	56,830	56,830

The *t*-statistics in parentheses are based on robust standard errors clustered by firm. ***, **, and * indicate significance at 1%, 5%, and 10% levels respectively (two-tailed). The following regressions are estimated:

$$EM_{ijt} = \beta_0 + \beta_1 FD_{jt} + \beta_2 Leverage_{ijt\text{-}1} + \beta_3 Size_{ijt\text{-}1} + \beta_4 MTB_{ijt\text{-}1} + \beta_5 ROA_{ijt} + \beta_6 NOA_{ijt\text{-}1} + \Sigma\, \beta Year\_Fixed\_Effect + \Sigma\, \beta\, Firm\_Fixed\_Effect + \varepsilon_{ijt} \quad (5)$$

EM represents the earnings management proxies, that is, |*A_ACC*|, |*A_CFO*|, |*A_DE*|, |*A_PD*|, or |*REM*|. |*A_ACC*|, |*A_CFO*|, |*A_DE*|, |*A_PD*|, and |*REM*| are the absolute values of abnormal accruals (*A_ACC*), abnormal cash flow from operations (*A_CFO*), abnormal discretionary expenses (*A_DE*), abnormal production costs (*A_PD*), and aggregated REM measures (*REM*), respectively. *A_ACC*, *A_CFO*, *A_DE*, and *A_PD* are calculated as the estimated residuals in equations (1), (2), (3), and (4), respectively. *REM* equals the sum of *A_CFO* * (-1), *A_DE* * (-1), and *A_PD*. *FD* is the measure of financial development that is the mean value of the index of Institutional environment, Banking financial services, Non-banking financial services, and Financial markets, as reported by the World Economic Forum. *Leverage* is total debt divided by total assets, *Size* is the natural logarithm of the market value of equity, *MTB* is the market to book ratio, *ROA* is net income divided by lagged total assets, and *NOA* is net operating assets divided by sales.

Table 6
Original financial development scores and earnings management

Variable	(1) |*A_ACC*|	(2) |*A_CFO*|	(3) |*A_DE*|	(4) |*A_PD*|	(5) |*REM* |
Intercept	0.135***	0.142***	0.185***	0.205***	0.402***
	(7.569)	(7.619)	(10.476)	(8.618)	(9.298)
Original_FD	-0.012***	-0.010**	-0.014***	-0.013**	-0.026***
	(-2.957)	(-2.360)	(-3.560)	(-2.484)	(-2.753)
Leverage	0.026***	0.014**	0.004	-0.020**	-0.009
	(3.692)	(2.031)	(0.693)	(-2.420)	(-0.551)
Size	-0.006***	-0.008***	-0.009***	-0.009***	-0.020***
	(-5.354)	(-7.355)	(-9.248)	(-7.198)	(-8.454)
MTB	0.002***	0.003***	0.004***	0.004***	0.008***
	(4.288)	(6.070)	(7.181)	(6.419)	(6.752)
ROA	-0.029***	0.037***	0.013*	0.094***	0.179***
	(-2.860)	(3.894)	(1.650)	(7.990)	(8.068)
NOA	-0.001*	-0.002***	-0.001***	-0.002***	-0.004***
	(-1.880)	(-3.882)	(-4.381)	(-3.304)	(-4.903)
Year_Fixed_Effects	*included*	*included*	*included*	*included*	*included*
Firm_Fixed_Effects	*included*	*included*	*included*	*included*	*included*
Adjusted R-squared	0.332	0.448	0.776	0.638	0.676
Observations	56,830	56,830	56,830	56,830	56,830

The *t*-statistics in parentheses are based on robust standard errors clustered by firm. ***, **, and * indicate significance at 1%, 5%, and 10% levels respectively (two-tailed). The following regressions are estimated:

$$EM_{ijt} = \beta_0 + \beta_1\, Original\_FD_{jt} + \beta_2\, Leverage_{ijt\text{-}1} + \beta_3\, Size_{ijt\text{-}1} + \beta_4\, MTB_{ijt\text{-}1} + \beta_5\, ROA_{ijt} + \beta_6\, NOA_{ijt\text{-}1} + \Sigma\, \beta Year\_Fixed\_Effect + \Sigma\, \beta\, Firm\_Fixed\_Effect + \varepsilon_{ijt}$$

EM represents the earnings management proxies, that is, |*A_ACC*|, |*A_CFO*|, |*A_DE*|, |*A_PD*|, or |*REM*|. |*A_ACC*|, |*A_CFO*|, |*A_DE*|, |*A_PD*|, and |*REM*| are the absolute values of abnormal accruals (*A_ACC*), abnormal cash flow from operations (*A_CFO*), abnormal discretionary expenses (*A_DE*), abnormal production costs (*A_PD*), and aggregated REM measures (*REM*), respectively. *A_ACC*, *A_CFO*, *A_DE*, and *A_PD* are calculated as the estimated residuals in equations (1), (2), (3), and (4), respectively. *REM* equals the sum of *A_CFO* * (-1), *A_DE* * (-1), and *A_PD*. *Original_FD* is the measure of financial development, the mean value of the index of Institutional environment, Banking financial services, Non-banking financial services, Financial markets, Business environment, Financial stability, and Financial access, as reported by the WEF. The latter three indices are added to *FD* in our primary results. *Leverage* is total debt divided by total assets, *Size* is the natural logarithm of the market value of equity, *MTB* is the market to book ratio, *ROA* is net income divided by lagged total assets, and *NOA* is net operating assets divided by sales.

Table 7
Effect of institutional environment and financial intermediation on earnings management

Variable	(1) |*A_ACC*|	(2) |*A_CFO*|	(3) |*A_DE*|	(4) |*A_PD*|	(5) |*REM* |
Intercept	0.184***	0.164***	0.194***	0.250***	0.487***
	(7.163)	(6.240)	(8.671)	(7.970)	(8.540)
Institutional_ Environment	-0.015***	-0.007	-0.006*	-0.007	-0.020**
	(-3.540)	(-1.570)	(-1.662)	(-1.418)	(-2.119)
Financial_ Intermediation	-0.006**	-0.007***	-0.010***	-0.016***	-0.025***
	(-2.521)	(-2.942)	(-4.157)	(-4.929)	(-4.308)
Leverage	0.025***	0.014**	0.005	-0.020**	-0.008
	(3.622)	(2.034)	(0.732)	(-2.368)	(-0.534)
Size	-0.006***	-0.007***	-0.009***	-0.009***	-0.019***
	(-5.296)	(-7.243)	(-9.125)	(-6.890)	(-8.237)
MTB	0.002***	0.003***	0.004***	0.004***	0.008***
	(4.353)	(6.056)	(7.162)	(6.333)	(6.722)
ROA	-0.029***	0.036***	0.013	0.093***	0.178***
	(-2.854)	(3.863)	(1.604)	(7.915)	(8.015)
NOA	-0.001*	-0.002***	-0.001***	-0.002***	-0.004***
	(-1.847)	(-3.853)	(-4.358)	(-3.244)	(-4.853)
Year_Fixed_Effects	*included*	*included*	*included*	*included*	*included*
Firm_Fixed_Effects	*included*	*included*	*included*	*included*	*included*
Adjusted R-squared	0.332	0.448	0.776	0.638	0.676
Observations	56,830	56,830	56,830	56,830	56,830

The *t*-statistics in parentheses are based on robust standard errors clustered by firm. ***, **, and * indicate significance at 1%, 5%, and 10% levels respectively (two-tailed). The following regressions are estimated:

$$EM_{ijt} = \beta_0 + \beta_1\, Institutional\_Environment_{jt} + \beta_2\, Financial\_Intermediation + \beta_3\, Leverage_{ijt\text{-}1} + \beta_4\, Size_{ijt\text{-}1} + \beta_5\, MTB_{ijt\text{-}1} + \beta_6\, ROA_{ijt} + \beta_7\, NOA_{ijt\text{-}1} + \Sigma\, \beta\, Year\_Fixed\_Effects + \Sigma\, \beta\, Firm\_Fixed\_Effect + \varepsilon_{ijt} \quad (6)$$

EM represents the earnings management proxies, that is, |*A_ACC*|, |*A_CFO*|, |*A_DE*|, |*A_PD*|, or |*REM*|. |*A_ACC*|, |*A_CFO*|, |*A_DE*|, |*A_PD*|, and |*REM*| are the absolute value of abnormal accruals (*A_ACC*), abnormal cash flow from operations (*A_CFO*), abnormal discretionary expenses (*A_DE*), abnormal production costs (*A_PD*), and aggregated REM measure (*REM*). *A_ACC*, *A_CFO*, *A_DE*, and *A_PD* are calculated as the estimated residuals in equations (1), (2), (3), and (4), respectively. *REM* equals the sum of *A_CFO* * (-1), *A_DE* * (-1), and *A_PD*. *Institutional_Environment* is the Institutional environment score reported by the WEF. *Financial_Intermediation* is the mean value of the Banking financial services, Non-banking financial services, and Financial markets scores reported by the WEF. *Leverage* is total debt divided by total assets; *Size* is the natural logarithm of the market value of equity; *MTB* is the market to book ratio; *ROA* is the net income divided by lagged total assets; *NOA* is the net operating assets divided by sales.

Table 8
Financial development scores and earnings management: excluding observations for the U.S. and Japan

Variable	(1) |*A_ACC*|	(2) |*A_CFO*|	(3) |*A_DE*|	(4) |*A_PD*|	(5) |*REM*|
Intercept	0.126***	0.135***	0.155***	0.221***	0.392***
	(9.099)	(9.739)	(11.958)	(12.092)	(12.307)
FD	-0.009***	-0.009***	-0.011***	-0.021***	-0.031***
	(-2.642)	(-2.631)	(-3.580)	(-4.592)	(-3.920)
Leverage	0.013*	0.014*	0.003	-0.026***	-0.022
	(1.650)	(1.765)	(0.391)	(-2.794)	(-1.223)
Size	-0.007***	-0.009***	-0.009***	-0.009***	-0.020***
	(-5.238)	(-7.091)	(-8.042)	(-6.087)	(-7.153)
MTB	0.002***	0.003***	0.004***	0.003***	0.007***
	(3.718)	(5.011)	(5.564)	(4.555)	(4.992)
ROA	-0.048***	0.047***	0.018*	0.076***	0.166***
	(-3.936)	(4.369)	(1.915)	(6.008)	(6.787)
NOA	-0.001	-0.001***	-0.002***	-0.001*	-0.004***
	(-1.605)	(-3.445)	(-4.447)	(-1.952)	(-4.038)
Year_Fixed_Effects	*included*	*included*	*included*	*included*	*included*
Firm_Fixed_Effects	*included*	*included*	*included*	*included*	*included*
Adjusted R-squared	0.264	0.362	0.740	0.576	0.612
Observations	35,383	35,383	35,383	35,383	35,383

The *t*-statistics in parentheses are based on robust standard errors clustered by firm. ***, **, and * indicate significance at 1%, 5%, and 10% levels respectively (two-tailed). The following regressions are estimated:

$$EM_{ijt} = \beta_0 + \beta_1 FD_{jt} + \beta_2 Leverage_{ijt\text{-}1} + \beta_3 Size_{ijt\text{-}1} + \beta_4 MTB_{ijt\text{-}1} + \beta_5 ROA_{ijt} + \beta_6 NOA_{ijt\text{-}1} + \Sigma\, \beta Year\_Fixed\_Effect + \Sigma\, \beta\, Firm\_Fixed\_Effect + \varepsilon_{ijt} \quad (5)$$

EM represents earnings management proxies, that is, |*A_ACC*|, |*A_CFO*|, |*A_DE*|, |*A_PD*|, or |*REM*|. |*A_ACC*|, |*A_CFO*|, |*A_DE*|, |*A_PD*|, and |*REM*| are the absolute value of abnormal accruals (*A_ACC*), abnormal cash flow from operations (*A_CFO*), abnormal discretionary expenses (*A_DE*), abnormal production costs (*A_PD*), and aggregated REM measure (*REM*). *A_ACC*, *A_CFO*, *A_DE*, and *A_PD* are calculated as the estimated residuals in equation (1), (2), (3), and (4), respectively. *REM* equals the sum of *A_CFO* * (-1), *A_DE* * (-1), and *A_PD*. *FD* is the measures of financial development, which is the mean value of the index of Institutional environment, Banking financial services, Non-banking financial services, and Financial markets reported by the World Economic Forum. *Leverage* is the total debt divided by the total assets; *Size* is the natural logarithm of the market value of equity; *MTB* is the market to book ratio; *ROA* is the net income divided by lagged total assets; and *NOA* is the net operating assets divided by the sales.

Table 9
Financial development scores and earnings management: the country-weighted least square (WLS) regression

Variable	(1) |*A_ACC*|	(2) |*A_CFO*|	(3) |*A_DE*|	(4) |*A_PD*|	(5) |*REM* |
Intercept	0.100***	0.167***	0.173***	0.229***	0.475***
	(4.728)	(5.934)	(6.657)	(7.626)	(8.620)
FD	-0.008	-0.022***	-0.019***	-0.028***	-0.062***
	(-1.356)	(-2.949)	(-2.772)	(-3.406)	(-4.013)
Leverage	0.012	0.006	-0.000	-0.012	-0.009
	(1.212)	(0.548)	(-0.024)	(-0.768)	(-0.327)
Size	-0.004**	-0.006**	-0.005**	-0.008***	-0.017***
	(-1.989)	(-2.272)	(-2.225)	(-2.902)	(-3.383)
MTB	0.002**	0.003**	0.002*	0.003**	0.007***
	(2.284)	(2.455)	(1.891)	(2.028)	(3.115)
ROA	-0.020	0.001	0.020	0.058***	0.089***
	(-1.314)	(0.079)	(1.420)	(3.920)	(2.583)
NOA	0.000	-0.001**	-0.001**	-0.001	-0.002*
	(0.083)	(-2.006)	(-2.039)	(-1.221)	(-1.779)
Year_Fixed_Effects	*included*	*included*	*included*	*included*	*included*
Firm_Fixed_Effects	*included*	*included*	*included*	*included*	*included*
Adjusted R-squared	0.345	0.448	0.762	0.620	0.665
Observations	56,830	56,830	56,830	56,830	56,830

The coefficients were estimated using a country-weighted least square (WLS) method. The weight is inversely proportional to the number of observations per country. The *t*-statistics in parentheses are based on robust standard errors clustered by firm. ***, **, and * indicate significance at 1%, 5%, and 10% levels respectively (two-tailed). The following regressions are estimated:

$$EM_{ijt} = \beta_0 + \beta_1 FD_{jt} + \beta_2 Leverage_{ijt\text{-}1} + \beta_3 Size_{ijt\text{-}1} + \beta_4 MTB_{ijt\text{-}1} + \beta_5 ROA_{ijt} + \beta_6 NOA_{ijt\text{-}1} + \Sigma\, \beta Year\_Fixed\_Effect + \Sigma\, \beta\, Firm\_Fixed\_Effect + \varepsilon_{ijt} \quad (5)$$

EM represents the earnings management proxies, that is, |*A_ACC*|, |*A_CFO*|, |*A_DE*|, |*A_PD*|, or |*REM*|. Furthermore, |*A_ACC*|, |*A_CFO*|, |*A_DE*|, |*A_PD*|, and |*REM*| are the absolute values of abnormal accruals (*A_ACC*), abnormal cash flow from operations (*A_CFO*), abnormal discretionary expenses (*A_DE*), abnormal production costs (*A_PD*), and aggregated REM measures (*REM*), respectively. *A_ACC*, *A_CFO*, *A_DE*, and *A_PD* are calculated as the estimated residuals in equations (1), (2), (3), and (4), respectively. *REM* equals the sum of *A_CFO* * (-1), *A_DE* * (-1), and *A_PD*. *FD* is the measure of financial development that is the mean value of the index of Institutional environment, Banking financial services, Non-banking financial services, and Financial markets, as reported by the World Economic Forum. *Leverage* is total debt divided by total assets, *Size* is the natural logarithm of the market value of equity, *MTB* is the market to book ratio, *ROA* is net income divided by lagged total assets, and *NOA* is net operating assets divided by sales.

Table 10
Financial development scores and earnings management: differences regression

	(1)	(2)	(3)	(4)	(5)
Variable	*|A_ACC|*	*|A_CFO|*	*|A_DE|*	*|A_PD|*	*|REM |*
Intercept	0.003***	0.004***	0.008***	0.010***	0.021***
	(3.805)	(5.447)	(13.153)	(11.959)	(13.441)
ΔFD	-0.006*	-0.003	-0.010***	-0.021***	-0.027***
	(-1.658)	(-0.755)	(-3.884)	(-5.143)	(-3.811)
ΔLeverage	0.006	0.001	-0.006	-0.037***	-0.033**
	(0.851)	(0.122)	(-1.075)	(-4.713)	(-2.250)
ΔSize	-0.007***	-0.010***	-0.010***	-0.010***	-0.021***
	(-6.612)	(-9.507)	(-12.445)	(-8.982)	(-9.807)
ΔMTB	0.003***	0.004***	0.004***	0.004***	0.008***
	(5.191)	(6.623)	(8.655)	(6.376)	(5.930)
ΔROA	-0.030***	0.033***	0.002	0.090***	0.173***
	(-3.241)	(3.604)	(0.232)	(9.460)	(9.617)
ΔNOA	-0.001**	-0.002***	-0.002***	-0.003***	-0.005***
	(-2.360)	(-4.937)	(-5.854)	(-5.075)	(-5.966)
Year_Fixed_Effects	*included*	*included*	*included*	*included*	*included*
Adjusted R-squared	0.006	0.011	0.016	0.020	0.022
Observations	40,124	40,124	40,124	40,124	40,124

The *t*-statistics in parentheses are based on robust standard errors clustered by firm. ***, **, and * indicate significance at 1%, 5%, and 10% levels respectively (two-tailed). The following regressions are estimated:

$$\Delta EM_{ijt} = \beta_0 + \beta_1 \Delta FD_{jt} + \beta_2 \Delta Leverage_{ijt\text{-}1} + \beta_3 \Delta Size_{ijt\text{-}1} + \beta_4 \Delta MTB_{ijt\text{-}1} + \beta_5 \Delta ROA_{ijt} + \beta_6 \Delta NOA_{ijt\text{-}1} + \Sigma\, \beta Year\_Fixed\_Effect + \varepsilon_{ijt} \quad (8)$$

EM represents the earnings management proxies, that is, |*A_ACC*|, |*A_CFO*|, |*A_DE*|, |*A_PD*|, or |*REM*|. Furthermore, |*A_ACC*|, |*A_CFO*|, |*A_DE*|, |*A_PD*|, and |*REM*| are the absolute values of abnormal accruals (*A_ACC*), abnormal cash flow from operations (*A_CFO*), abnormal discretionary expenses (*A_DE*), abnormal production costs (*A_PD*), and aggregated REM measures (*REM*), respectively. *A_ACC*, *A_CFO*, *A_DE*, and *A_PD* are calculated as the estimated residuals in equations (1), (2), (3), and (4), respectively. *REM* equals the sum of *A_CFO* * (-1), *A_DE* * (-1), and *A_PD*. *FD* is the measure of financial development that is the mean value of the index of Institutional environment, Banking financial services, Non-banking financial services, and Financial markets, as reported by the World Economic Forum. *Leverage* is total debt divided by total assets, *Size* is the natural logarithm of the market value of equity, *MTB* is the market to book ratio, *ROA* is net income divided by lagged total assets, and *NOA* is net operating assets divided by sales. *Δ* is the change and is computed as the difference between time *t* and *t-1*.