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### Insider trading restrictions and real earnings management: International evidence

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## Insider trading restrictions and real activities earnings management: International evidence

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### ABSTRACT

We examine the implications of insider trading restrictions on firms' real activities earnings management in an international setting. Using a sample of 28 countries over the period from 1992 to 2007, we find evidence that is supportive of the substitution hypothesis, in that managers have incentives to substitute accruals earnings management for real activities earnings management. This effect is found to be more pronounced for firms in countries with more restrictive insider trading regulation. Our result is robust to alternative measures of real activities earnings management and insider trading restrictions, alternative sub-samples, alternative regression specifications, and controlling for endogeneity. In addition, we find that the positive association between insider trading restrictions and the substitution effect is more prominent for firms in countries with strong institutional infrastructure. Overall, our results are important in highlighting the role of insider trading restrictions in shaping corporate financial reporting policies. In particular, we find strong evidence to suggest that the extent of restriction of such laws influence managerial incentives to engage in earnings manipulation through real activities.

## 1. Introduction

Recent studies in accounting and finance (such as Fernandes and Ferreira, 2009; Jayaraman, 2012; Chen et al., 2017) have documented evidences that enforcement of insider trading laws are relevant for informativeness of stock prices, earnings quality, and capital allocation decision. At the same time, the findings of a survey by Graham et al. (2005) reveal that top executives have more incentives to engage in real activities earnings management than in accruals earning management. These studies have ignited renewed interests in the strand of research on real activities earnings management.<sup>1</sup>

This study aims to investigate the impact of insider trading laws enforcement on real activities earning management. Most of the studies on real activities earnings management have only focused on the U.S. market. Our international sample that comprises of more than 70,000 firm-year observations from 28 countries provides an excellent setting for us to explore whether variations in the insider trading restrictions, in addition to the existing institutional mechanisms, will impact managerial incentives to engage in real activities

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<sup>1</sup> See Roychowdury (2006), Cohen et al. (2008), Cohen and Zarowin (2010), Gunny (2010), Zang (2012), Doukakis (2014), Braam et al. (2015), Guo et al. (2015), Cheng et al. (2016), Cohen et al. (2016), Zhou et al. (2018), Garcia Osma et al. (2000), and Jiang et al. (2020) for discussions on how various firm-specific and country-level variables affect real activities earnings management.

earnings management. This is an important and interesting research question, which has yet been empirically examined using an international cross-country sample.

Using the data from the survey on executives compiled in the Global Competitiveness Reports, we create an insider trading restrictions index (*ITR*) and examine whether the *ITR* index is associated with real activities earnings management.<sup>2</sup> The empirical finding demonstrates that our measures of real activities earnings management are positively related to the *ITR* index. This result is not only statistically significant but also economically significant. A one standard deviation increase in the *ITR* index results in an increase in the value of real activities earnings management by 0.024, which is about 39 % relative to the value of standard deviation of the measure of real activities earnings management in our sample.

We continue to explore whether restrictions in insider trading laws influence the earnings management strategies - accruals earnings management versus real activities earnings management. We find that real activities earnings management is negatively associated with accruals earnings management, suggesting that our results are consistent with the substitution hypothesis that is proposed in prior studies. Moreover, the interaction coefficient between the *ITR* index and the measure of accruals earnings management is negatively significant. In particular, our results imply that the substitution effect is found to be more pronounced in firms in countries with more restrictive insider trading regulation. Our findings complement that in the prior literature which has documented that the switching effect is a response by managers to moves by regulators to tighten disclosure requirements (Cohen et al, 2008, Choi et al., 2018).

In our additional analyses, we find that the main results documented above are qualitatively and quantitatively unchanged to using alternative measures of insider trading restrictions and real activities earnings management, alternative samples, and regression specification. We also control for the possibility of endogeneity and obtain similar results. Therefore, our main finding of a positive association between insider trading restrictions and real activities earnings management is relatively robust. In addition, our finding of the reinforcing role played by insider trading restrictions on the switching effect from accruals based to real activities earnings management provides a new insight into how insider trading laws can shape managerial financial reporting choice.

We also find that the interaction term between the *ITR* index and the measure of accruals earnings management is negatively significant only for firms in common law countries and countries with high anti-director rights index (*ANTIDIR*) and anti self-dealing index (*ANTISELF*). This finding corroborates those in prior studies in that the decision by managers of international firms to engage in real activities earnings management is also influenced by the strength of institutional infrastructure in each country.<sup>3</sup>

Overall, this study provides several important contributions to the extant literature. First, it is the first large-sample international study that examines the consequence of insider trading laws on firms' real activities earnings management. Different from the combined index of legal regime used by Choi et al. (2018) and Enomoto et al. (2015), we adopt the enforcement of insider trading laws as exogenous shock to the securities market. This shock has direct impact on the infrastructure of capital market. The findings provide insights on corporate managers' decisions to decide between accruals and real activities earnings management given this fundamental change in information environment. Second, it complements the growing literature on the effect of insider trading laws on corporate policies. This is important not only to academics but also to investors and regulators, especially as the recent debacles involving high-profile insider trading in some of the largest firms in the U.S. and around the world have renewed calls for more stringent enforcement of insider trading laws. Finally, the research findings further contribute to the established literature on how country-level institutional infrastructure shapes firms' financial reporting incentives (Ball et al., 2000; Bushman and Piotroski, 2006).

The remainder of the paper is organized as follows. Section 2 reviews the related literatures on the implications of insider trading restrictions as well as on real activities earnings management; and develops the main hypotheses of the paper. Section 3 outlines the sample selection procedures and construction of the main variables. Section 4 describes the empirical regression models used in the analysis to explore the relation between insider trading restrictions and real activities earnings management. Section 5 provides the concluding remarks.

## 2. Literature review and hypothesis development

### 2.1. Insider trading restrictions and implications

Regulation on insider trading is one of the most controversial and important securities regulations in the world (Newkirk and Robertson, 1998). The focus of the debate among scholars in law and economics has revolved around the economic efficiency of insider trading. Until now, there is still no clear consensus on whether allowing or restricting insider trading will be beneficial or detrimental for firms and more importantly for the interests of minority shareholders.

The empirical findings in the accounting and finance literature have suggested that while insider trading laws exist in most of the countries around the world, it has only been enforced in less than half of the countries (Bhattacharya and Daouk, 2002). In addition, the first-time enforcement of insider trading laws in these countries leads to reduction in the cost of equity as well as increases in

<sup>2</sup> Several studies (Du and Wei, 2004; Kusnadi, 2015) have utilized the same *ITR* index in examining other important issues in an international setting. Du and Wei (2004) examine how the insider trading impacts market volatility. Kusnadi (2015) find that corporate risk taking activities are associated with insider trading restrictions.

<sup>3</sup> While we find that the positive effect of insider trading restrictions on the substitution effect between accruals and real activities earnings management is stronger in countries with strong institutional infrastructure, Jiang et al. (2020) find that the deterring effect played by short-sale constraint on real activities earnings management is stronger in countries with weak institutional infrastructure.

analyst following (Bushman et al., 2005), stock price informativeness (Fernandes and Ferreira, 2009), stock price synchronicity and liquidity (Beny, 2007), timely loss recognition (Jayaraman, 2012); and capital allocation efficiency (Chen et al., 2017).

There are also related papers which have examined how insider trading restrictions impact stock market volatility (Du and Wei, 2004), managerial compensation (Denis and Xu, 2013), and risk-taking incentives (Kusnadi, 2015). Interestingly, the effects are not uniform across all countries. More specifically, the increase in analyst following is found to be more prominent for firms in emerging markets; while the increase in stock price informativeness, stock price synchronicity and liquidity, capital allocation efficiency are stronger for firms in countries with strong institutional infrastructures such as developed markets and common-law countries. These findings highlight that there are important cross-sectional variations in the effects of insider trading restrictions on various issues in accounting and finance.

## 2.2. Real activities and accruals earnings management

Meanwhile, studies on the determinants and consequences of earnings management are voluminous and the majority of these studies tend to focus on accruals-based earnings management. Recently, several studies have examined the importance of real activities earnings management. Real activities manipulation is defined as “departures from normal operational practices, motivated by managers’ desire to mislead at least some stakeholders into believing certain financial goals have been met in the normal course of operation.” (Roychowdhuri, 2006). Typically, managers engage in real activities manipulation to meet certain earnings threshold. Thus, these activities may be regarded as detrimental to shareholders’ values.

The findings from several subsequent studies further imply that manager trades off the relative costs of accruals-based versus real activities earnings management. In particular, managers adjust the level of accruals-based earnings management according to the level of real activities manipulation realized (Zang, 2012). Accruals manipulation raises higher political costs than real activities earnings managements since they are more likely to draw auditors’ or regulators’ scrutiny. By this reasoning, prior studies find that firms switch from accruals-based to real activities manipulation surrounding events such as the introduction of the Sarbanes-Oxley Act (Cohen et al., 2008) and seasoned equity offerings (Cohen and Zarowin, 2010). On the other hand, real activities manipulation is found to have negative implications on future firms’ performance (Gunny, 2010; Cohen and Zarowin, 2010). Kim and Sohn (2013) also discover that real activities earnings management is positively associated with cost of equity capital. This implies that real activities manipulation increases the risk premium demanded by investors. A recent paper by Cheng et al. (2016) also explores the role of internal governance in influencing managers’ incentives for real activities earnings management.

A related paper by Garcia Osma et al. (2020) examines the effect of insider trading laws on earnings management. However, their study focuses on the voluntary restrictions of insider trading laws for firms in the US. They document that voluntary adoption of insider trading laws is negatively associated with the tendencies to engage in accruals earnings management. Moreover, they do not find that there exists a substitution effect between accruals and real activities earnings management. Overall, their findings suggest that an increase in the restrictions of insider trading laws helps to lessen the incidence of accruals earnings management and has the effect of increasing the quality of reported earnings.

Meanwhile, several recent papers using an international sample like ours examine the role of mandatory adoption of IFRS (Doukakis, 2014), political connections (Braam et al., 2015), legal regime (Choi et al., 2018), investor protection (Enomoto et al., 2015) and short-selling threat (Jiang et al., 2020) on the choice of international firms to engage in accruals and real activities earnings management. Using a difference-in-difference research design, Doukakis (2014) documents that mandatory adoption of IFRS does not affect firms’ choices between accruals and real activities earnings management. In particular, he emphasizes that his finding is suggestive of the importance that managers place on firm-level reporting incentives rather than mandatory accounting standards such as IFRS in influencing their choice of earnings manipulation to influence reporting earnings.

The findings by Braam et al. (2015) further confirm the important role of firm-level political connections in shaping managerial incentives to engage in accruals vs real activities earnings management. Specifically, they report that politically-connected firms have greater tendencies to switch from accruals-based to real activities earnings management, which is supportive of the substitution hypothesis. One strong compelling reason for the incentives to engage in real activities earnings management is due to the fact that these strategies are more difficult to uncover, as compared to accruals-based earnings management. Moreover, employing real activities earnings management helps to mask potential rent-seeking motives that politicians usually seek from firms from being disclosed to the public.

Choi et al. (2018) examine whether and how a firm’s real activities earnings management is influenced by the strength of a country’s legal regime and the presence of a Big 4 auditor. They measure the strength of the legal regime using two combined index pertaining to the liability standards of the auditors. Enomoto et al. (2015) examine the differences in accrual-based and real activities earnings management across countries from the perspective of investor protection. Their variables of investor protection are also based on the combined index including the anti-director right index, legal enforcement and analyst following. The index used in those two prior studies can be endogeneously determined by the corporate information disclosure in the capital markets.

Meanwhile, Jiang et al. (2000) contend that short-selling threat acts as an additional monitoring and disciplining mechanism on managerial decisions, and serves to deter managers from engaging in real activities earnings management. Moreover, this finding is found to be more pronounced for firms in countries with strong investor protection as well as those in countries where short-selling is viable.

### 2.3. Hypothesis development

Corporate insiders' incentives to disclose information is affected by whether or not there are opportunities for them to obtain insider trading profits from these information. Moreover, studies by [Cheng and Warfield \(2005\)](#) and [McVay et al. \(2006\)](#) document that the opportunities for corporate managers to sell their shares provide incentives for them to engage in earnings management in order to increase share prices and the value of the shares that are being sold. As such, a recent paper by [Zhang and Zhang \(2018\)](#) reports that opacity in the quality of financial reporting (as measured by earnings smoothness) is negatively and significantly associated with the enforcement of insider trading laws. This effect is also found to be more pronounced in countries with strong legal institutions.

An increase in litigation risks creates higher demand for higher quality financial reporting, which subsequently results in auditors' and regulators' intensive scrutiny on accruals manipulations. Managers would switch to real activities earnings management, which are relatively more difficult to be detected than accruals earnings management ([Cohen et al., 2008](#); [Cohen and Zarowin, 2010](#); [Zang, 2012](#)). In this respect, more restrictive insider trading regulations are likely to result in higher prevalence of real activities earnings management.

On the other hand, [Huang et al. \(2020\)](#) employ an exogenous shock in the form of an unanticipated court ruling that reduced litigation risk for firms headquartered in the Ninth Circuit to test how such change impacts real activities earnings management. They find that litigation risks are negatively associated with real activities earnings management. In the same vein, as insider trading law becomes more restrictive, the enforcement of such law increases the litigation risks that managers will likely face. This may restrict managers' incentives to engage in real activities earnings management due to the higher costs that could be incurred in the litigation process.

From the above argument, the effect of more restrictive insider trading regulation on real activities earnings management becomes an open empirical question. Hence we state the first hypothesis in the null form as follows:

**H1.** Insider trading restrictions are not associated with real activities earnings management.

As a consequence of Hypothesis 1 above, whether insider trading restrictions will incentivize managers to trade off between accruals earnings management and real activities earnings management is also an open empirical question. One possibility is that insider trading restrictions constrain both accruals earnings management and real activities earnings management as both are perceived as detrimental to the financial reporting quality (*simultaneous hypothesis*). Another possibility is managers switch from accruals earnings management to real activities earnings management since the latter is harder to detect (*substitution hypothesis*). Hence we state our second hypothesis in the null form as follows:

**H2.** Insider trading restrictions are not associated with the tendencies to substitute accruals earnings management with real activities earnings management.

Finally, we also examine whether the effect of insider trading restrictions on real activities earnings management will be influenced by cross-country differences in institutional infrastructures which have been found in prior international studies ([La Porta et al., 1998](#); [La Porta et al., 2006](#); [Djankov et al., 2008](#)) to be important determinants of financial reporting quality.

In this study, we use a dummy variable (*LO*) that equals one for common law countries, and 0 for civil law countries. Common law countries are often denoted to offer stronger legal protection to minority shareholders, as compared to civil law countries. In addition, we employ two alternative measures of country-level institutional infrastructure, the anti-director rights index (*ANTIDIR*) and the anti self-dealing index (*ANTISELF*) as robustness tests.<sup>4</sup> As we express our first and second hypothesis in null form, this leads to our third hypothesis in the null form as follows:

**H3.** The effect of insider trading restrictions on real activities earnings management is not different between firms in countries with strong vs weak institutional infrastructure.

### 3. Sample data and variables

In this section, we describe the sample selection procedure and the design of our dependent and independent variables. The sample selection procedure is outlined in Panel A of [Table 1](#). We provide the detailed definition of each variable in the Appendix.

#### 3.1. Sample data

We collect the firm-specific financial data of international firms from the Compustat Global database and then merge the data with the insider trading restrictions (*ITR*) variable (to be described in the next sub-section). The sample period is from 1992 to 2007.<sup>5</sup> For each firm-year observation, we obtain the firm-level financial variables and employ regression analysis to estimate proxies for real activities earnings management as well as accruals earnings management. To be consistent with prior studies, we require our sample to have non-missing firm-year observations on the measures of accruals and real activities earnings management that will be explained in more details in the next sub-section. We also exclude firms in countries with no *ITR* data, firms operating in the financial industries (SIC 6000 to 6999), and firms with book values of total assets of less than US\$10 million and those with missing control variables. The industry classification follows [Fama and French \(1997\)](#). Before performing any empirical tests, we winsorize all the control variables at

<sup>4</sup> Higher values of the *ANTIDIR* and *ANTISELF* indices imply stronger level of institutional infrastructure.

<sup>5</sup> We choose this sample period because the financial data in Compustat Global is available since 1992, and until 2007 the sample has not been impacted by global financial crisis (GFC).

**Table 1**  
Sample distribution.

| Panel A: Sample selection procedures                                     |                    |        |                 |                 |                 |            |            |           |                |                  |                      |                     |                 |
|--------------------------------------------------------------------------|--------------------|--------|-----------------|-----------------|-----------------|------------|------------|-----------|----------------|------------------|----------------------|---------------------|-----------------|
|                                                                          |                    |        |                 |                 |                 |            |            |           |                | No. Observations |                      | No. Firms           |                 |
| Firm-year observations from Compustat between 1992 and 2007              |                    |        |                 |                 |                 |            |            |           |                | 219,236          |                      | 36,297              |                 |
| Less: Observations in countries with no <i>ITR</i> data:                 |                    |        |                 |                 |                 |            |            |           |                | (29,716)         |                      | (6,788)             |                 |
| Observations with missing values of earnings management:                 |                    |        |                 |                 |                 |            |            |           |                | (42,566)         |                      | (2,454)             |                 |
| Observations with firms in finance industry (SIC between 6000 and 6999): |                    |        |                 |                 |                 |            |            |           |                | (2,333)          |                      | (338)               |                 |
| Observations with missing control variables for the main tests:          |                    |        |                 |                 |                 |            |            |           |                | (72,210)         |                      | (10,190)            |                 |
| Total usable observations                                                |                    |        |                 |                 |                 |            |            |           |                | 72,411           |                      | 16,527              |                 |
| Panel B: Sample Distribution by Countries                                |                    |        |                 |                 |                 |            |            |           |                |                  |                      |                     |                 |
| Country                                                                  | Country Code       | N      | <i>ITR</i> 1996 | <i>ITR</i> 1998 | <i>ITR</i> 1999 | <i>ITL</i> | <i>ENF</i> | <i>LO</i> | <i>ANTIDIR</i> | <i>ANTISELF</i>  | <i>STKMKT</i> CAPGDP | <i>LISTED</i> FIRMS | <i>IPOTOGDP</i> |
| Australia                                                                | AUS                | 1,705  | 5.04            | 5.27            | 5.59            | 3          | 1996       | 1         | 4              | 0.76             | 101.97               | 68.35               | 8.71            |
| Brazil                                                                   | BRA                | 84     | 3.14            | 3.8             | 3.72            | 2          | 1978       | 0         | 3              | 0.27             | 38.35                | 2.48                | 0.05            |
| Canada                                                                   | CAN                | 986    | 4.45            | 5.03            | 5.55            | 3          | 1976       | 1         | 5              | 0.64             | 106.18               | 73.79               | 8.57            |
| Chile                                                                    | CHL                | 123    | 4.56            | 4.56            | 4.16            |            | 1996       | 0         | 5              | 0.63             | 89.70                | 16.72               | 0.51            |
| Finland                                                                  | FIN                | 98     | 4.58            | 5.26            | 5.53            | 3          | 1993       | 0         | 3              | 0.46             | 177.11               | 28.61               | 3.78            |
| France                                                                   | FRA                | 1,813  | 3.87            | 4.69            | 5.17            | 3          | 1975       | 0         | 3              | 0.38             | 89.49                | 13.73               | 2.31            |
| Germany                                                                  | DEU                | 2,346  | 4.35            | 5.8             | 5.24            | 3          | 1995       | 0         | 1              | 0.28             | 54.69                | 10.55               | 2.78            |
| Greece                                                                   | GRC                | 39     | 3.46            | 3.5             | 3.41            | 2          | 1996       | 0         | 2              | 0.22             | 91.38                | 29.69               | 8.78            |
| Hong Kong                                                                | HKG                | 2,307  | 4.17            | 4.32            | 3.94            | 2          | 1994       | 1         | 5              | 0.96             | 360.98               | 129.21              | 9.12            |
| India                                                                    | IND                | 1,412  | 2.49            | 3.42            | 3.53            | 2          | 1998       | 1         | 5              | 0.58             | 33.80                | 5.60                | 0.60            |
| Indonesia                                                                | IDN                | 230    | 2.82            | 3.33            | 3.56            | 2          | 1996       | 0         | 2              | 0.65             | 24.70                | 1.48                | 1.67            |
| Israel                                                                   | ISR                | 72     | 4.4             | 5.58            | 5.19            | 2          | 1989       | 1         | 3              | 0.73             | 53.04                | 97.72               | 0.39            |
| Italy                                                                    | ITA                | 26     | 2.92            | 3.88            | 4.38            | 3          | 1996       | 0         | 1              | 0.42             | 52.77                | 4.91                | 5.94            |
| Japan                                                                    | JPN                | 18,910 | 4.85            | 5.05            | 5.26            | 2          | 1990       | 0         | 4              | 0.50             | 69.17                | 21.51               | 2.39            |
| Malaysia                                                                 | MYS                | 2,759  | 3.69            | 3.65            | 3.42            | 2          | 1996       | 1         | 4              | 0.95             | 148.42               | 34.60               | 6.18            |
| Netherlands                                                              | NLD                | 90     | 4.63            | 4.62            | 5.2             | 3          | 1994       | 0         | 2              | 0.20             | 131.74               | 12.34               | 2.63            |
| Norway                                                                   | NOR                | 169    | 4.08            | 4.67            | 4.24            | 1          | 1990       | 0         | 4              | 0.42             | 39.69                | 40.22               | 2.20            |
| Philippines                                                              | PHL                | 12     | 2.79            | 3.32            | 3.48            | 3          |            | 0         | 3              | 0.22             | 48.00                | 2.95                | 2.22            |
| Singapore                                                                | SGP                | 1,037  | 5.1             | 5.54            | 5.58            | 3          | 1978       | 1         | 4              | 1.00             | 164.75               | 100.55              | 5.94            |
| South Africa                                                             | ZAF                | 134    | 3.76            | 3.87            | 3.74            | 2          |            | 1         | 5              | 0.81             | 155.77               | 12.04               | 0.65            |
| South Korea                                                              | KOR                | 723    | 3.81            | 3.73            | 4.1             | 3          | 1988       | 0         | 2              | 0.47             | 54.14                | 29.39               | 5.32            |
| Sweden                                                                   | SWE                | 403    | 4.35            | 5.48            | 5.58            | 2          | 1990       | 0         | 3              | 0.33             | 112.27               | 31.38               | 6.33            |
| Switzerland                                                              | CHE                | 190    | 4.8             | 5.3             | 4.67            | 3          | 1995       | 0         | 2              | 0.27             | 248.96               | 35.95               | 7.11            |
| Taiwan                                                                   | TWN                | 3,784  | 3.1             | 3.42            | 3.18            |            | 1989       | 0         | 3              | 0.56             | 101.89               | 25.81               | 10.07           |
| Thailand                                                                 | THA                | 583    | 4.24            | 3.25            | 3.29            | 3          | 1993       | 1         | 2              | 0.81             | 44.79                | 6.62                | 0.82            |
| Turkey                                                                   | TUR                | 38     | 3               | 4.26            | 3.58            |            | 1996       | 0         | 2              | 0.43             | 35.30                | 4.33                | 1.48            |
| UK                                                                       | GBR                | 8,176  | 4.47            | 5.64            | 5.85            | 3          | 1981       | 1         | 5              | 0.95             | 157.70               | 33.13               | 11.27           |
| US                                                                       | USA                | 24,162 | 4.63            | 5.13            | 5.64            | 3          | 1961       | 1         | 5              | 0.65             | 142.14               | 22.83               | 5.47            |
|                                                                          | TOTAL              | 72,411 |                 |                 |                 |            |            |           |                |                  |                      |                     |                 |
|                                                                          | Mean               |        | 3.98            | 4.48            | 4.49            | 2.52       |            |           |                |                  |                      |                     |                 |
|                                                                          | Standard Deviation |        | 0.75            | 0.85            | 0.91            | 0.59       |            |           |                |                  |                      |                     |                 |

Note: Panel A of the table outlines the process in obtaining the final sample of 72,411 firm-years observations from 1992 to 2007. Panel B presents the sample distribution by countries and the country-level variables.

the 1 and 99 percent levels to ensure that the results are not attributed to outliers in the data.

After the sample selection procedure, which is outlined in Panel A of Table 1, our international sample comprises of 72,411 firm-year observations for 16,527 firms from 28 countries. Countries that dominate our sample are UK (8,176 observations), Japan (18,910 observations), and US (24,162 observations). In one of the robustness tests, we examine whether the results are influenced by these three countries.

### 3.2. Insider trading restrictions and other country-level variables

Consistent with prior study (Dennis and Xu, 2013), we construct the main independent variable – the insider trading restrictions (*ITR*) index from the Global Competitiveness Report (GCR) for 1996, 1998, and 1999. The reports are based on the survey results of executives carried out by the World Economic Forum annually and capture the insight provided by business leaders on countries around the world with regards to various topics.<sup>6</sup> Specifically, with regards to insider trading regulation, the survey responses to the following question form the basis of the *ITR* index, which is the main insider trading restriction variable that is used in this study:

Insider trading is not common in the domestic market (1 = strongly disagree, 7 = strongly agree).

For each country, we measure the *ITR* index as the mean score of all the survey responses done by the executives in that country. Since our sample period is from 1992 to 2007 and the responses to the survey questions were only provided for 3 years (1996, 1998, and 1999), for each country, we use the index value for 1996 as the corresponding value for 1992 to 1997. Similarly, the index value for 1998 is used as the corresponding value for 1998. Finally, the index value for 1999 is used as the corresponding value for 1999 to the end of the sample period (2007). Countries with higher values of the *ITR* index are regarded to be countries with more restrictive in terms of their insider trading regulations, since insider trading is deemed to be not prevalent by the executives in those countries.

Panel B of Table 1 presents the sample distribution by countries. There exists significant variation in the extent of insider trading restrictions in our cross-country sample, with the minimum value of 2.49 in India (1996) to the maximum value of 5.85 in the UK (1999). Moreover, we further observe that the *ITR* index has increased over the years in most countries, with the exception of Chile, Greece, Hong Kong, Malaysia, Thailand, South Africa, and Switzerland. Overall, there is a marked increase in the mean value (standard deviation) of the *ITR* index from 1996 to 1999, from 3.98 (0.75) to 4.49 (0.91). This finding is consistent with the notion that insider trading regulations have become more restrictive over the years.

In addition, we use the insider trading law (*ITL*) index obtained from Beny (2005) in the robustness test. The *ITL* index is created by taking the sum of three dummy variables: *Tippee*, *Tipping*, and *Criminal*; each of which represents the main elements involved in insider trading laws. Specifically, *Tippee* equals one if a corporate insider is prohibited from engaging in insider trading transaction (such as divulging price sensitive or private information), and zero otherwise. *Tipping* equals one if a corporate insider is found to be guilty of engaging in insider trading transaction which influences an outsider to trade on those information, and zero otherwise. *Criminal* equals one if engaging in insider trading is regarded as a criminal activity in a particular country, and zero otherwise.

Similarly, higher value of the *ITL* index is reflective of more restrictive insider trading regulation. Panel B of Table 1 shows that the *ITL* index is available for 25 out of the 28 countries in our sample, with the value ranging from 1 (1 country, Norway) to 3 (14 countries).<sup>7</sup> The mean value of the *ITL* index is 2.52 and the corresponding standard deviation is 0.59.

Moreover, we also obtain the first year of enforcement of insider trading laws (*ENF*) from Bhattacharya and Daouk (2002). From Panel B of Table 1, 26 out of the 28 countries in our sample have enforced insider trading laws, only Philippines and South Africa have not. The country with the earliest year of enforcement is the US (1961) and 14 countries have their first year of enforcement within the sample period. In our robustness test, we construct a variable (*ENF\_YEAR*) that equals the number of years since enforcement of insider trading laws as a measure of the intensity of the enforcement.

In Panel B of Table 1, we also present country-level institutional and market variables, obtained from La Porta et al. (1998), La Porta et al. (2006), and Djankov et al. (2008). *LO* is defined as one for a country with common law tradition and zero for a country with civil law tradition. Panel B shows that 11 countries such as Australia, Canada, UK, US are common law countries while the others such as Brazil, Germany, Japan are civil law countries. *ANTIDIR* and *ANTISELF* are the anti-director rights (ranges from 0 to 5) and anti-self-sealing indices (ranges from 0 to 1) that have been used by prior studies as measures of strength of institutional infrastructure. In general, common law countries tend to have higher *ANTIDIR* (mean of 4.25) as well as *ANTISELF* scores (mean of 0.80), compared to civil law countries (mean *ANTIDIR* of 2.65 and mean *ANTISELF* of 0.39).

*STKMTCAPGDP*, *LISTEDFIRMS*, and *IPOTOGDP* are country-level market variables that we will include as control variables in the main regression tests. *STKMTCAPGDP* is the ratio of stock market capitalization to gross domestic product (GDP) for the period 1999 to 2003, obtained from the World Development Indicators. *LISTEDFIRMS* is the average ratio of the number of listed firms in a given country (in thousands) to its GDP (in millions) over the period 1996 to 2000, obtained from La Porta et al. (2006). *IPOTOGDP* is the average ratio of the equity issued by newly listed firms in a given country (in thousands) to its GDP (in millions) over the period 1996 to 2000, obtained from La Porta et al. (2006).

<sup>6</sup> Interestingly, Du and Wei (2004) observe that most of the respondents were executives from multinational corporations and not those from financial firms and that these executives were regarded as experts in financial issues.

<sup>7</sup> Three countries: Chile, Turkey, and Taiwan have no *ITL* index.

### 3.3. Measures of real activities earnings management

Our measures of real activities earnings management closely follow that of [Dechow et al. \(1998\)](#), [Roychowdhury \(2006\)](#) and [Zang \(2012\)](#). In particular, we focus on manipulation through real operational activities that are manifested through three channels: (i) **Sales manipulation**: sales manipulation can be done through providing sales discount and/or more liberal credit terms to customers in order to accelerate the recognition of sales. These strategies result in a temporary increase in sales volume, which is not sustainable in the long run once the price and credit terms revert back to normal in the near future. The real implications of engaging in these sales manipulation is that while sales revenue may be higher, the firm will realize lower cash flows from operations in the current year, as the margin from these discounted sales will be lower. Consequently, the production costs from manipulating sales are also likely to be higher; (ii) **Engaging in overproduction**: engaging in overproduction is one way for a firm to allocate the fixed overhead costs to more units. As a result, the fixed costs and also the total costs per unit produced will be lower. The cost of goods sold will also decline and the firm can report higher earnings. However, there are additional inventory holding costs due to the additional units produced which are likely to lead to lower cash flows from operations (relative to normal production and sales level); and (iii) **Reducing discretionary expenditures**: discretionary expenditures refer to expenditures on R&D, advertising, maintenance, as well as selling and general administrative (SG&A).<sup>8</sup> The operating costs are expensed immediately in the same year that they are incurred. Therefore, by spending less on these discretionary expenditures, a firm can manage current year earnings upwards, which may be at the expense of future earnings.<sup>9</sup> The resulting effect is that the current year's cash flows from operations will be higher.

To measure the earnings manipulation from the three channels described above, we construct three measures of real activities earnings management. We first obtain the normal level of cash flow from operations (CFO), by estimating the following cross-sectional regression for each country, industry, and year:

$$\frac{CFO_{i,t}}{TA_{i,t-1}} = a_0 + a_1 \left( \frac{1}{TA_{i,t-1}} \right) + a_2 \left( \frac{SALES_{i,t}}{TA_{i,t-1}} \right) + a_3 \left( \frac{\Delta SALES_{i,t}}{TA_{i,t-1}} \right) + \epsilon_{i,t} \quad (1)$$

where  $TA$  is total assets;  $SALES$  is total sales;  $\Delta SALES$  is the change in sales over the past one year.

Meanwhile, production cost ( $PROD$ ) is defined as the sum of cost of goods sold ( $COGS$ ) and the change in inventory ( $\Delta INV$ ) over the past one year; and discretionary expenses ( $DISCEXP$ ) is defined as selling, general, administrative ( $SGA$ ) expenses. Both  $COGS$  and  $\Delta INV$  are modelled by the following specifications:

$$\frac{COGS_{i,t}}{TA_{i,t-1}} = a_0 + a_1 \left( \frac{1}{TA_{i,t-1}} \right) + a_2 \left( \frac{SALES_{i,t}}{TA_{i,t-1}} \right) + \epsilon_{i,t} \quad (2)$$

$$\frac{\Delta INV_{i,t}}{TA_{i,t-1}} = a_0 + a_1 \left( \frac{1}{TA_{i,t-1}} \right) + a_2 \left( \frac{SALES_{i,t}}{TA_{i,t-1}} \right) + a_3 \left( \frac{\Delta SALES_{i,t}}{TA_{i,t-1}} \right) + \epsilon_{i,t} \quad (3)$$

Using (2) and (3), we estimate the normal level of production cost ( $PROD$ ) by the sum of  $COGS$  and ( $\Delta INV$ ), using the following specification:

$$\frac{PROD_{i,t}}{TA_{i,t-1}} = a_0 + a_1 \left( \frac{1}{TA_{i,t-1}} \right) + a_2 \left( \frac{SALES_{i,t}}{TA_{i,t-1}} \right) + a_3 \left( \frac{\Delta SALES_{i,t}}{TA_{i,t-1}} \right) + \epsilon_{i,t} \quad (4)$$

Similarly, the normal level of discretionary expenses ( $DISCEXP$ ) is estimated as follows<sup>10</sup>:

$$\frac{DISCEXP_{i,t}}{TA_{i,t-1}} = a_0 + a_1 \left( \frac{1}{TA_{i,t-1}} \right) + a_2 \left( \frac{SALES_{i,t-1}}{TA_{i,t-1}} \right) + \epsilon_{i,t} \quad (5)$$

The abnormal levels of  $CFO$ ,  $PROD$ ,  $DISCEXP$  are computed as the residuals of equation (1), (4), and (5) respectively. We denote the residuals of equation (4) as  $RM\_PROD$ . Higher values on  $RM\_PROD$  imply higher abnormal value of production costs due to overproduction. This results in higher reported earnings in the current year through reduction in cost of goods sold.

Meanwhile, following [Zang \(2012\)](#) and [Doukakis \(2014\)](#), we multiply the residuals of equations (1) and (5) by  $-1$  and denote them as  $RM\_CFO$  and  $RM\_DISCEXP$  respectively. Higher values on these two variables suggest more prevalent use of sales discounts and/or more lenient credit terms to manipulate sales level; as well as greater reduction of discretionary expenditures.

Overall, we employ these three variables ( $RM\_CFO$ ,  $RM\_PROD$  and  $RM\_DISCEXP$ ) to represent (i) - (iii) measures respectively for real activities earnings management. To be consistent with prior studies, we also construct an aggregate measure of real activities earnings management,  $REAL\_EM$ , by taking the sum of the three measures. Similarly, higher values of  $REAL\_EM$  indicate that managers are more likely to engage in real activities manipulation.

<sup>8</sup> Roychowdhury (2006) argues that SG&A should be included as part of the discretionary expenses as it includes relevant expenses such as maintenance costs, training and development costs, and others.

<sup>9</sup> This is especially true for R&D and advertising expenses. Reducing these discretionary expenses may have detrimental effect on future sales and earnings.

<sup>10</sup> Both Roychowdhury (2006) and [Zang \(2012\)](#) use lagged sales ( $SALES_{i,t-1}$ ) as the numerator in the asset turnover ratio in equation (5) to mitigate the problem of having unusually low residuals in equation (5), even in the case when there is no decline in the discretionary expense in a particular year.

**Table 2**

Descriptive statistics of firm-specific financial variables.

|            | N      | Mean   | Std.Dev. | Q1     | Median | Q3    |
|------------|--------|--------|----------|--------|--------|-------|
| DA         | 72,411 | 0.085  | 0.115    | 0.021  | 0.049  | 0.102 |
| REAL_EM    | 72,411 | 0.006  | 0.061    | -0.017 | 0.004  | 0.031 |
| RM_CFO     | 72,411 | -0.020 | 0.131    | -0.077 | -0.012 | 0.038 |
| RM_PROD    | 72,411 | 0.009  | 0.191    | -0.091 | 0.000  | 0.102 |
| RM_DISCEXP | 72,411 | 0.026  | 0.180    | -0.039 | 0.029  | 0.114 |
| SIZE       | 72,411 | 6.792  | 2.846    | 4.545  | 6.657  | 8.873 |
| MTB        | 72,411 | 2.242  | 2.985    | 0.806  | 1.450  | 2.639 |
| LEV        | 72,411 | 0.507  | 0.243    | 0.328  | 0.505  | 0.663 |
| ROA        | 72,411 | 0.003  | 0.168    | -0.012 | 0.027  | 0.073 |
| BIG4       | 72,411 | 0.525  | 0.499    | 0.000  | 1.000  | 1.000 |

Note: This table reports the summary descriptive statistics for all the firm-specific variables. The sample period is from 1992 to 2007. The definitions of these variables are in the Appendix. All continuous variables are winsorized at 1% and 99%.

### 3.4. Measures of accruals-based earnings management

Although the focus on our paper is on real activities earnings management, we also examine whether there is a shift from accruals to real activities earnings management as insider trading laws become more restrictive. In this respect, we follow the existing literature in constructing measure of accruals earnings management.

We employ the modified cross-sectional Jones model (Dechow et al., 1995) that controls for industry and time effects (DeFond and Jiambalvo, 1994) to estimate total accruals (*TACC*). Specifically, we use the following cross-section regression for every country, industry, and year:

$$\frac{TACC_{i,t}}{TA_{i,t-1}} = a_0 + a_1 \left( \frac{1}{TA_{i,t-1}} \right) + a_2 \left( \frac{\Delta SALES_{i,t}}{TA_{i,t-1}} \right) + a_3 \left( \frac{PPE_{i,t}}{TA_{i,t-1}} \right) + \epsilon_{i,t} \quad (6)$$

where *TACC* is defined as earnings before extraordinary items and discontinued operations minus *CFO* (operating cash flows); *PPE* is the gross property, plant, and equipment. Discretionary accruals (*DA*) are computed as the residuals of the regression equation (6). Higher absolute values of *DA* are indicative of greater tendencies to engage in accruals-based earnings management.

### 3.5. Descriptive statistics and univariate analysis

The descriptive statistics of the firm-specific financial variables that are used in this study are presented in Table 2. Apart from the measures of the real activities and accruals earnings management that are described in the previous sub-sections, we also obtain other firm-specific financial variables that are used as control variables in the empirical tests, such as: firm size (*SIZE*), market-to-book ratio (*MTB*), leverage ratio (*LEV*), and return on assets (*ROA*). We also construct a dummy variable that equals one if the sample firm is audited by a Big-4 auditor (*BIG4*), and 0 otherwise.

The mean (standard deviation) of the main measure of real activities earnings management, *REAL\_EM*, is 0.006 (0.061), with an interquartile range value of 0.048. As for the other measures of the real activities earnings management, the mean (standard deviation) of *RM\_CFO*, *RM\_PROD*, and *RM\_DISCEXP* are -0.02 (0.131), 0.009 (0.191), and 0.026 (0.18), respectively. Meanwhile, the mean (standard deviation) of the accruals earnings management measure, *|DA|* is 0.085 (0.115), with an interquartile range value of 0.081.

In an unreported univariate test (available upon request), we find that the value of *REAL\_EM* is higher in the sample of firms in countries with above median *ITR* (0.013) than for those in countries with below median *ITR* (-0.001).<sup>11</sup> This finding is indicative of a preliminary evidence of a positive association between *ITR* and *REAL\_EM*, which we will formally test in the subsequent empirical regression.

The correlation analysis between firm-specific financial variables and the main independent variable of concern (*ITR*) is presented in Table 3. We observe that insider trading restrictions (*ITR*) is positively and significantly associated with accruals earnings management (*|DA|*) as well as the aggregate measure of real activities earnings management (*REAL\_EM*). Meanwhile, although the correlation between *|DA|* and *REAL\_EM* is negative, the magnitude is small and the value is not statistically significant. In addition, we also find that *REAL\_EM* is negatively and significantly correlated to the other firm-specific control variables, with the exception of *Big4*.

## 4. Regression models and empirical tests

In this section, we construct regression models and perform empirical tests to test the three main hypotheses we have developed in Section 2.

<sup>11</sup> The difference is statistically significant at the 1% level.

**Table 3**

Correlation analysis.

|            | DA       | REAL_EM  | RM_CFO   | RM_PROD  | RM_DISCEXP | ITR      | SIZE     | MTB      | LEV      | ROA      | BIG4     |
|------------|----------|----------|----------|----------|------------|----------|----------|----------|----------|----------|----------|
| DA         | 1.00     | 0.09***  | 0.00     | 0.01     | 0.07***    | 0.17***  | −0.31*** | 0.12***  | −0.06*** | −0.05*** | 0.17***  |
| REAL_EM    | −0.00    | 1.00     | 0.10***  | 0.41***  | 0.39***    | 0.15***  | −0.06*** | 0.03***  | −0.05*** | −0.11*** | 0.09***  |
| RM_CFO     | 0.09***  | 0.14***  | 1.00     | −0.35*** | −0.19***   | −0.15*** | −0.07*** | −0.24*** | 0.19***  | −0.39*** | −0.15*** |
| RM_PROD    | −0.01*** | 0.44***  | −0.34*** | 1.00     | −0.32***   | 0.06***  | 0.06***  | 0.20***  | −0.15*** | 0.16***  | 0.06***  |
| RM_DISCEXP | −0.07*** | 0.42***  | −0.26*** | −0.35*** | 1.00       | 0.20***  | −0.07*** | −0.02*** | −0.01*** | 0.00     | 0.13***  |
| ITR        | 0.08***  | 0.08***  | −0.08*** | 0.05***  | 0.09***    | 1.00     | −0.34*** | 0.20***  | −0.03*** | −0.06*** | 0.27***  |
| SIZE       | −0.26*** | −0.03*** | −0.09*** | 0.06***  | −0.03***   | −0.18*** | 1.00     | 0.11***  | 0.08***  | 0.21***  | −0.29*** |
| MTB        | 0.10***  | −0.01**  | −0.12*** | 0.17***  | −0.10***   | 0.08***  | 0.08***  | 1.00     | −0.05*** | 0.32***  | 0.20***  |
| LEV        | −0.02*** | −0.04*** | 0.16***  | −0.14*** | −0.01**    | 0.05***  | 0.03***  | −0.01*   | 1.00     | −0.19*** | −0.10*** |
| ROA        | −0.28*** | −0.07*** | −0.45*** | 0.11***  | 0.17***    | −0.14*** | 0.24***  | 0.03***  | −0.10*** | 1.00     | 0.11***  |
| BIG4       | 0.10***  | 0.05***  | −0.13*** | 0.05***  | 0.10***    | 0.03***  | −0.30*** | 0.12***  | −0.08*** | 0.00     | 1.00     |

Note: This table reports the Pearson's correlation (below the diagonal) and Spearman's correlation (above the diagonal) between the firm level financial variables and the country-level ITR variable. The sample period is from 1992 to 2007. The definitions of the variables are in the Appendix. All continuous variables are winsorized at 1% and 99%.

\*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10%, respectively.

**Table 4**

The impact of insider trading restrictions on real activities earnings management.

|                     | (1)<br><i>REAL_EM</i> | (2)<br><i>RM_CFO</i> | (3)<br><i>RM_PROD</i> | (4)<br><i>RM_DISCEXP</i> |
|---------------------|-----------------------|----------------------|-----------------------|--------------------------|
| <i>ITR</i>          | 0.003***<br>(0.000)   | −0.019***<br>(0.001) | 0.005***<br>(0.001)   | 0.023***<br>(0.001)      |
| <i>SIZE</i>         | −0.000<br>(0.000)     | −0.002***<br>(0.000) | 0.001***<br>(0.000)   | 0.000<br>(0.000)         |
| <i>MTB</i>          | −0.001***<br>(0.000)  | −0.002***<br>(0.000) | 0.009***<br>(0.000)   | −0.010***<br>(0.000)     |
| <i>LEV</i>          | −0.006***<br>(0.001)  | 0.040***<br>(0.002)  | −0.091***<br>(0.003)  | 0.031***<br>(0.003)      |
| <i>ROA</i>          | −0.014***<br>(0.003)  | −0.393***<br>(0.005) | 0.144***<br>(0.005)   | 0.242***<br>(0.008)      |
| <i>BIG4</i>         | 0.009***<br>(0.001)   | −0.024***<br>(0.001) | 0.020***<br>(0.002)   | 0.031***<br>(0.002)      |
| <i>STKMKTCAPGDP</i> | 0.000***<br>(0.000)   | −0.000***<br>(0.000) | 0.000***<br>(0.000)   | 0.000***<br>(0.000)      |
| <i>LISTEDFIRMS</i>  | −0.000***<br>(0.000)  | 0.000***<br>(0.000)  | −0.000***<br>(0.000)  | −0.001***<br>(0.000)     |
| <i>IPOTOGDP</i>     | −0.002***<br>(0.000)  | 0.002***<br>(0.000)  | −0.005***<br>(0.000)  | −0.004***<br>(0.000)     |
| <i>Constant</i>     | −0.007***<br>(0.002)  | 0.112***<br>(0.004)  | 0.004<br>(0.007)      | −0.139***<br>(0.005)     |
| Observations        | 72,411                | 72,411               | 72,411                | 72,411                   |
| Country FE          | Yes                   | Yes                  | Yes                   | Yes                      |
| Industry FE         | Yes                   | Yes                  | Yes                   | Yes                      |
| Year FE             | Yes                   | Yes                  | Yes                   | Yes                      |
| Adj R <sup>2</sup>  | 0.053                 | 0.320                | 0.097                 | 0.102                    |

Note: This table presents the cross-sectional differences in the regression results of real activities earnings management (*REAL\_EM*, *RM\_CFO*, *RM\_PROD*, *RM\_DISCEXP*) on insider trading restrictions (*ITR*) and other firm-specific as well as country control variables. The sample period is from 1992 to 2007. The definitions of the variables are described in the Appendix. The standard error for each coefficient is reported in parentheses and is based on the White's heteroskedasticity corrected standard errors, clustered by firm and year.

\*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10%, respectively.

#### 4.1. Insider trading restrictions and real activities earnings management

Our first empirical test is to examine the effect of insider trading regulation on international firms' real activities earnings management. Specifically, we estimate the following multivariate panel data regression specification:

$$REM_{i,t} = a_0 + a_1 ITR_{i,t} + a_2 SIZE_{i,t} + a_3 MTB_{i,t} + a_4 LEV_{i,t} + a_5 ROA_{i,t} + a_6 BIG4_{i,t} + Country - Level + \sum Country + \sum Industry + \sum Year + \epsilon_{i,t} \quad (7)$$

where for each firm (*i*)-year (*t*) observation, *REM* is one of the measures of real activities earnings management; *ITR* is the insider trading restrictions index; *SIZE* is the firm size, *MTB* is the market-to-book-ratio; *LEV* is the leverage ratio; *ROA* is the profitability ratio; and *BIG4* is the Big 4 auditor dummy variable. *Country-Level* refer to the 3 country-level market variables (*STKMKTAPGDP*, *LIS-TEDFIRMS*, and *IPOTOGDP*).

We estimate equation (7) using ordinary least squares (OLS) regression model with additional country, industry, as well as year fixed effects.<sup>12</sup> This is because our sample is an international sample spread across many industries and over a relatively long sample period of 16 years. As a result, it will be prudent to control for potential country-level, industry-level or time-invariant omitted variables. Moreover, we use the industry classification from Fama and French (1997) and the standard error for each coefficient is estimated using the White's heteroscedasticity corrected standard errors, clustered by firm and year. This is done to mitigate the problem of multicollinearity and heteroskedasticity that may influence our findings.

We are interested in the sign and statistical significance of  $a_1$ , the coefficient on *ITR*, which is the main insider trading restrictions variable of interest. Table 4 presents the regression estimates of equation (7) using different measures of real activities earnings management as the dependent variable. Column (1) displays the results for the aggregate measure of real activities earnings management (*REAL\_EM*). We find that coefficient  $a_1$  is **positive** (coefficient value = 0.003) and statistically significant at the 1 percent level (standard error = 0.000).<sup>13</sup>

To measure the economic significance of the result, holding other variables constant, we multiply the coefficient estimate of  $a_1$  (0.003) by the standard deviation increase in the *ITR* index (0.789) and obtain an increase in the value of *REAL\_EM* of 0.0024. This

<sup>12</sup> We also estimate the main equation using firm fixed effects model and obtained similar results (unreported).

<sup>13</sup> The positive value of coefficient  $a_1$  is consistent with the positive correlation between *ITR* and *REAL\_EM* that we find in Table 2 and the positive difference in the mean value of *REAL\_EM* in countries with high vs low *ITR*.

represents about 39 % of the mean of *REAL\_EM* (which is 0.006, as observed from Table 2). Hence, not only is the result statistically significant, it is also material economically.

Columns (2) to (4) of Table 4 display the results when the dependent variable is replaced by various channels through which real activities earnings management is realized (sales manipulation, overproduction, and reducing discretionary expenses). The sign of coefficient  $\alpha_1$  remains positive and it is statistically significant (at least at the 1 % percent level) for two components of real activities earnings management (*RM\_PROD* and *RM\_DISCEXP*). However, we find that the coefficient  $\alpha_1$  is negatively associated with *ITR* in Column (2), when we use *RM\_CFO* as the dependent variable. In general, we find strong evidence to suggest that there exists a positive relation between insider trading restrictions and incentives of managers to engage in overproduction and reducing discretionary expenses. On the other hand, we find that insider trading restrictions is negatively related to real activities earnings management through sales manipulation.

In terms of the other control variables, *MTB*, *LEV*, and *ROA* are negatively associated with *REAL\_EM*, implying that growth firms, highly levered firms, and profitable firms are less likely to engage in real activities earnings management. As expected, we find that *BIG4* is positively associated with *REAL\_EM*. This result is also found by Chi et al. (2010). Because accruals earnings management is more likely to be detected by high quality auditor (Big 4), firms which are audited by the Big 4 auditors may shift to more real activities earnings manipulation, which are presumably harder to detect. For the country-level market variables, we find that *STKMKTCPGDP* is positively associated with *REAL\_EM*, while *LISTEDFIRMS* and *IPOTOGDP* are negatively associated with *REAL\_EM*.

Overall, the results in Table 4 show that firms in countries with more restrictive insider trading regulation are more likely to engage in real activities earnings management, than their counterparts in countries with less restrictive insider trading regulation.

#### 4.2. Insider trading restrictions and substitution effect from accruals to real activities earnings management

Next, we are interested in testing whether firms switch from accruals to real activities earnings management.<sup>14</sup> To achieve this, we modify equation (7) by including an additional control variable, which is our measure of accruals earnings management. Then, we re-estimate the following regression specification using the OLS model that controls for country, industry and year fixed effects:

$$\begin{aligned} REM_{i,t} = & \alpha_0 + \alpha_1 ITR_{i,t} + \alpha_2 |DA|_{i,t} + \alpha_3 SIZE_{i,t} + \alpha_4 MTB_{i,t} + \alpha_5 LEV_{i,t} + \alpha_6 ROA_{i,t} + \alpha_7 BIG4_{i,t} + Country - Level \\ & + \sum Country + \sum Industry + \sum Year + \epsilon_{i,t} \end{aligned} \quad (8)$$

where  $|DA|$  is the absolute value of discretionary accruals and all other variables are as defined earlier.

Panel A of Table 5 presents the regression estimates of equation (8) using different measures of real activities earnings management as the dependent variable. Similar to Table 4, Column (1) displays the results for the aggregate measure of real activities earnings management (*REAL\_EM*). Even after controlling for the measure of accruals-based earnings management, the value of coefficient  $\alpha_1$  continues to be positive (coefficient value = 0.003) and statistically significant at the 1 percent level (standard error = 0.000). More interestingly, we now find that coefficient  $\alpha_2$  is **negative** (-0.023) and statistically significant at the 1 % level. This result shows that even after controlling for the presence of insider trading laws, there exists a switching effect from accruals to real activities earnings management and corroborates the findings that have been documented in the prior literature as well (Cohen et al, 2008; Cohen and Zarowin, 2010; Zang, 2012; Braam et al, 2015; Jiang et al., 2020).

Moreover, the results in Columns (2) to (4) further support the earlier findings in Table 4 that the substitution effect only takes place for real activities earnings management that are achieved through overproduction (*RM\_PROD*) and reducing discretionary expenses (*RM\_DISCEXP*). In contrast, we do not find evidence of a substitution effect between discretionary accruals and sales manipulation. In fact, we document that coefficient  $\alpha_2$  turns out to be positive (value = 0.004) but insignificant, when *RM\_CFO* is the dependent variable. In other words, we do not find evidence of a substitution effect between accruals earnings management and sales manipulation.

Subsequently, we wish to investigate if the substitution effect that we document in Panel A of Table 5 is more or less pronounced for firms in countries with more restrictive insider trading regulation. We introduce an interaction term between *ITR* and  $|DA|$  and include it as an additional variable in equation (9) below. We continue to use the specification that controls for country, industry and year fixed effects:

$$\begin{aligned} REM_{i,t} = & \alpha_0 + \alpha_1 ITR_{i,t} + \alpha_2 |DA|_{i,t} + \alpha_3 (ITR_{i,t} \times |DA|_{i,t}) + \alpha_4 SIZE_{i,t} + \alpha_5 MTB_{i,t} + \alpha_6 LEV_{i,t} + \alpha_7 ROA_{i,t} + \alpha_8 BIG4_{i,t} + Country - Level \\ & + \sum Country + \sum Industry + \sum Year + \epsilon_{i,t} \end{aligned} \quad (9)$$

where all other variables are as defined earlier.

The estimates of equation (9) are displayed in Panel B of Table 5. By looking at the result in Column (1), we find that coefficient  $\alpha_1$  retains its positive value (coefficient value = 0.005) and remains statistically significant at the 1 % level. More relevantly though, we find that interaction coefficient  $\alpha_3$  is **negative** (value = -0.025) and statistically significant at the 1 % level (standard error = 0.005). Since the interaction coefficient ( $ITR \times |DA|$ ) captures the incremental effect of more restrictive insider trading regulation on the

<sup>14</sup> In another unreported test (available upon request), we regress  $|DA|$  on *REM* and other control variables. We find that the coefficient estimate of *REM* is negative and statistically significant at the 1% level, which confirms that the substitution effect exists in general.

Table 5

The impact of insider trading restrictions on shift of earnings management.

| Panel A: Without the interaction term |                      |                      |                      |                      |
|---------------------------------------|----------------------|----------------------|----------------------|----------------------|
|                                       | (1)                  | (2)                  | (3)                  | (4)                  |
|                                       | <i>REAL_EM</i>       | <i>RM_CFO</i>        | <i>RM_PROD</i>       | <i>RM_DISCEXP</i>    |
| <i>ITR</i>                            | 0.003***<br>(0.000)  | −0.019***<br>(0.001) | 0.005***<br>(0.001)  | 0.023***<br>(0.001)  |
| $ DA $                                | −0.023***<br>(0.004) | 0.004<br>(0.008)     | −0.010*<br>(0.004)   | −0.068***<br>(0.010) |
| <i>SIZE</i>                           | −0.000**<br>(0.000)  | −0.002***<br>(0.000) | 0.001***<br>(0.000)  | −0.000<br>(0.000)    |
| <i>MTB</i>                            | −0.001***<br>(0.000) | −0.002***<br>(0.000) | 0.009***<br>(0.000)  | −0.009***<br>(0.000) |
| <i>LEV</i>                            | −0.006***<br>(0.001) | 0.040***<br>(0.002)  | −0.091***<br>(0.003) | 0.031***<br>(0.003)  |
| <i>ROA</i>                            | −0.017***<br>(0.002) | −0.393***<br>(0.005) | 0.142***<br>(0.006)  | 0.232***<br>(0.007)  |
| <i>BIG4</i>                           | 0.009***<br>(0.001)  | −0.024***<br>(0.001) | 0.020***<br>(0.002)  | 0.031***<br>(0.002)  |
| <i>STKMKTCPGDP</i>                    | 0.000***<br>(0.000)  | −0.000***<br>(0.000) | 0.000***<br>(0.000)  | 0.000***<br>(0.000)  |
| <i>LISTEDFIRMS</i>                    | −0.000***<br>(0.000) | 0.000***<br>(0.000)  | −0.000***<br>(0.000) | −0.001***<br>(0.000) |
| <i>IPOTOGDP</i>                       | −0.002***<br>(0.000) | 0.002***<br>(0.000)  | −0.005***<br>(0.000) | −0.004***<br>(0.000) |
| <i>Constant</i>                       | −0.005**<br>(0.002)  | 0.112***<br>(0.004)  | 0.005<br>(0.007)     | −0.134***<br>(0.005) |
| Observations                          | 72,411               | 72,411               | 72,411               | 72,411               |
| Country FE                            | Yes                  | Yes                  | Yes                  | Yes                  |
| Industry FE                           | Yes                  | Yes                  | Yes                  | Yes                  |
| Year FE                               | Yes                  | Yes                  | Yes                  | Yes                  |
| Adj R <sup>2</sup>                    | 0.055                | 0.320                | 0.097                | 0.104                |
| Panel B: With interaction term        |                      |                      |                      |                      |
|                                       | (1)                  | (2)                  | (3)                  | (4)                  |
|                                       | <i>REAL_EM</i>       | <i>RM_CFO</i>        | <i>RM_PROD</i>       | <i>RM_DISCEXP</i>    |
| <i>ITR</i>                            | 0.005***<br>(0.000)  | −0.015***<br>(0.001) | 0.003**<br>(0.001)   | 0.027***<br>(0.001)  |
| $ DA $                                | 0.108***<br>(0.026)  | 0.259***<br>(0.062)  | −0.145***<br>(0.054) | 0.149***<br>(0.046)  |
| <i>ITR</i> × $ DA $                   | −0.025***<br>(0.005) | −0.048***<br>(0.012) | 0.025**<br>(0.010)   | −0.041***<br>(0.009) |
| <i>SIZE</i>                           | −0.000***<br>(0.000) | −0.002***<br>(0.000) | 0.001***<br>(0.000)  | −0.000<br>(0.000)    |
| <i>MTB</i>                            | −0.001***<br>(0.000) | −0.002***<br>(0.000) | 0.009***<br>(0.000)  | −0.009***<br>(0.000) |
| <i>LEV</i>                            | −0.007***<br>(0.001) | 0.039***<br>(0.002)  | −0.090***<br>(0.003) | 0.030***<br>(0.003)  |
| <i>ROA</i>                            | −0.018***<br>(0.002) | −0.394***<br>(0.005) | 0.143***<br>(0.006)  | 0.231***<br>(0.007)  |
| <i>Big4</i>                           | 0.009***<br>(0.001)  | −0.024***<br>(0.001) | 0.020***<br>(0.002)  | 0.031***<br>(0.002)  |
| <i>STKMTCAPGDP</i>                    | 0.000***<br>(0.000)  | −0.000***<br>(0.000) | 0.000***<br>(0.000)  | 0.000***<br>(0.000)  |
| <i>LISTEDFIRMS</i>                    | −0.000***<br>(0.000) | 0.000***<br>(0.000)  | −0.000***<br>(0.000) | −0.001***<br>(0.000) |
| <i>IPOTOGDP</i>                       | −0.002***<br>(0.000) | 0.002***<br>(0.000)  | −0.005***<br>(0.000) | −0.004***<br>(0.000) |
| <i>Constant</i>                       | −0.186***<br>(0.050) | 0.018<br>(0.044)     | −0.390***<br>(0.120) | −0.187***<br>(0.058) |
| Observations                          | 72,411               | 72,411               | 72,411               | 72,411               |
| Country FE                            | Yes                  | Yes                  | Yes                  | Yes                  |
| Industry FE                           | Yes                  | Yes                  | Yes                  | Yes                  |
| Year FE                               | Yes                  | Yes                  | Yes                  | Yes                  |
| Adj R <sup>2</sup>                    | 0.056                | 0.321                | 0.097                | 0.104                |

Note: This table presents the cross-sectional differences in the regression results of real activities earnings management (*REAL\_EM*, *RM\_CFO*, *RM\_PROD*, *RM\_DISCEXP*) on insider trading restrictions (*ITR*), accruals earnings management ( $|DA|$ ) and other firm-specific as well as country control variables. The sample period is from 1992 to 2007. The definitions of the variables are described in the Appendix. The standard error for each coefficient is reported in parentheses and is based on the White's heteroskedasticity corrected standard errors, clustered by firm and year.

\*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10%, respectively.

substitution effect, our findings imply that insider trading restrictions reinforces the negative association between real activities and accruals earnings management that we uncover in Panel A of Table 5. Looking at the results in other columns in Panel B of Table 5, we find that coefficient  $a_3$  is found to be negatively significant (at least at the 5 % level) in two ( $RM\_CFO$  and  $RM\_PROD$ ) out of the three measures of real activities earnings management.

Taken collectively, the results in Tables 4 and 5 are consistent with the notion that insider trading restrictions are positively associated with the incentives to switch from accruals to real activities earnings management.

#### 4.3. Robustness tests

We conduct a series of robustness tests to examine if the positive effect played by insider trading restrictions on the substitution effect from accruals to real activities earnings management is sensitive to changes in alternative specifications, alternative measures of insider trading restrictions, and alternative samples.<sup>15</sup> First, we calculate the mean value for all the firm-specific variables for each firm and use the aggregated observations to estimate equation (8) using OLS regression model with country and industry fixed effect.<sup>16</sup> The results are presented in Panel A of Table 6. The finding from Column (1) of Panel A indicates that the coefficient  $a_1$  remains positively significant in all four measures (values ranging from 0.003 to 0.027) of real activities earnings management. The interaction coefficient  $a_3$  is also negative and statistically significant in three out of the four measures (values ranging from  $-0.041$  to  $-0.025$ ). Therefore, our main results are not affected by changes in the value of dependent and independent variables from yearly value to an aggregated value.

Next, we are concerned of the potential endogeneity concern that may influence our results. To mitigate this concern, we follow Kusnadi (2015) and construct a variable that captures the change in the insider trading restriction over the sample period ( $CH\_ITR$ ). This change can be regarded as an “exogenous” shock in the value of the  $ITR$  index. In particular the value of  $CH\_ITR$  for 1998 is computed as the difference between the  $ITR$  values in 1998 and 1996. Correspondingly, the value for 1999 onwards is computed as the difference between the values in 1999 and 1998. We replace  $ITR$  and the interaction coefficient  $ITR \times |DA|$  with  $CH\_ITR$  and  $CH\_ITR \times |DA|$ , and re-estimate equation (9) using OLS regression model that controls for country, industry, and year fixed effects for the smaller sub-sample from 1998 to 2007. The estimation results are presented in Column (1) of Panel B of Table 6. We find that change in insider trading restrictions index leads to higher incentives for managers to switch from accruals to real activities earnings management. Therefore, our results are robust after controlling for the change in insider trading restrictions.

Subsequently, we examine if the results are sensitive to alternative measures of insider trading restrictions. For this purpose, we replace the  $ITR$  index with the insider trading law ( $ITL$ ) index and re-estimate equation (9). The results are presented in Column (2) of Panel B. We find that the coefficient on the  $ITL$  index continues to be positive and significant (value = 0.019) and the interaction coefficient between  $ITL$  and  $|DA|$  remains negative and significant (value =  $-0.057$ ). These results are consistent with the findings we reported in the first two hypotheses.

We also construct a variable ( $ENF\_YEAR$ ) that equals the number of years since the countries have enforced insider trading laws. Similarly, we replace  $ITR$  with  $ENF\_YEAR$  in the estimation of equation (9) and present the results in Column (3) of Panel B. While, coefficient  $a_1$  retains its positive significance (value = 0.001, significant at the 1 % level), the value of the interaction coefficient  $a_3$  is negative (value =  $-0.003$ ) and significant at the 1 % level. In this aspect, our findings are robust to the use of alternative measure of insider trading restrictions.

Apart from using alternative measures of insider trading restrictions, we are also interested in testing whether the results are robust to using alternative sample period and sample countries. In particular, we remove periods that correspond to the Asian financial crisis (1997–1998), the technology bubble period (2000). Observations in these years may confound the results as managers are likely to have more incentives to engage in earnings manipulation. We re-estimate equation (9) for the sample periods that excludes the crisis periods mentioned above and the results in Column (4) of Panel B demonstrate that the main findings are unchanged.

We observe that three countries dominate the sample (Japan, UK, and US), accounting for more than 51,000 firm year observations which represents more than 70 % of the total sample. In order to investigate whether the main results are driven by observations from these three countries, we exclude observations from these three countries and re-estimate equation (9) for the remaining observations from 25 countries. The results are presented in Column (5) of Panel B. The coefficient on  $ITR$  is positive and statistically significant. More relevantly, we continue to find that the interaction coefficient  $ITR \times |DA|$  displays negative and significant relation with  $REAL\_EM$  (value =  $-0.022$ , significant at the 1 % level). Therefore, insider trading restrictions index plays an important role in influencing managerial incentives to switch from accruals to real activities earnings management, even in the smaller sub-sample of 25 countries.<sup>17</sup>

We further consider using alternative measure of real activities earnings management, as proposed by Srivastava (2019). In his study, he argues that the traditional measures of real activities earnings management fail to take into account competitive strategies and industry peers. He develops an improved measure of real activities earnings management by including a set of additional control variables in the calculation of the proxies. We replace our original measures of real activities earnings management with the ones that are calculated using the methodologies in Srivastava (2019) and present the results in Panel C of Table 6. In general, the main findings

<sup>15</sup> We also test whether the finding from the baseline regression model of a positive effect between  $ITR$  and  $REAL\_EM$  is robust. In our unreported results (available upon request), the positive relation is materially unchanged.

<sup>16</sup> Essentially, instead of estimating a panel data regression, we estimate a cross-sectional regression model for all the firms in the sample.

<sup>17</sup> In our unreported tests, we estimate equation (9) for the sub-sample of 1992 to 1999 only, as well as using a weighted least-square (WLS) model as an alternative to the OLS model. Our inferences remain unchanged. We thank the referees for making these suggestions.

**Table 6**  
Robustness tests.

| Panel A: Cross-sectional regression model |                      |                      |                      |                      |
|-------------------------------------------|----------------------|----------------------|----------------------|----------------------|
|                                           | (1)                  | (2)                  | (3)                  | (4)                  |
|                                           | <i>REAL_EM</i>       | <i>RM_CFO</i>        | <i>RM_PROD</i>       | <i>RM_DISCEXP</i>    |
| <i>ITR</i>                                | 0.005***<br>(0.000)  | 0.006***<br>(0.001)  | 0.003**<br>(0.001)   | 0.027***<br>(0.001)  |
| <i>DA</i>                                 | 0.108***<br>(0.026)  | 0.160***<br>(0.038)  | −0.145***<br>(0.054) | 0.149***<br>(0.046)  |
| <i>ITR</i> ×  <i>DA</i>                   | −0.025***<br>(0.005) | −0.038***<br>(0.007) | 0.025**<br>(0.010)   | −0.041***<br>(0.009) |
| <i>SIZE</i>                               | −0.000***<br>(0.000) | −0.000<br>(0.000)    | 0.001***<br>(0.000)  | −0.000<br>(0.000)    |
| <i>MTB</i>                                | −0.001***<br>(0.000) | −0.001**<br>(0.000)  | 0.009***<br>(0.000)  | −0.009***<br>(0.000) |
| <i>LEV</i>                                | −0.007***<br>(0.001) | −0.008***<br>(0.003) | −0.090***<br>(0.003) | 0.030***<br>(0.003)  |
| <i>ROA</i>                                | −0.018***<br>(0.002) | −0.016<br>(0.011)    | 0.143***<br>(0.006)  | 0.231***<br>(0.007)  |
| <i>BIG4</i>                               | 0.009***<br>(0.001)  | 0.009***<br>(0.002)  | 0.020***<br>(0.002)  | 0.031***<br>(0.002)  |
| <i>STKMKTGDP</i>                          | 0.000***<br>(0.000)  | 0.000***<br>(0.000)  | 0.000***<br>(0.000)  | 0.000***<br>(0.000)  |
| <i>LISTEDFIRMS</i>                        | −0.000***<br>(0.000) | −0.000***<br>(0.000) | −0.000***<br>(0.000) | −0.001***<br>(0.000) |
| <i>IPOTOGDP</i>                           | −0.002***<br>(0.000) | −0.002***<br>(0.000) | −0.005***<br>(0.000) | −0.004***<br>(0.000) |
| <i>Constant</i>                           | −0.026***<br>(0.006) | 0.077<br>(0.051)     | −0.018<br>(0.020)    | −0.131***<br>(0.035) |
| Observations                              | 16,527               | 16,527               | 16,527               | 16,527               |
| Country FE                                | Yes                  | Yes                  | Yes                  | Yes                  |
| Industry FE                               | Yes                  | Yes                  | Yes                  | Yes                  |
| Year FE                                   | No                   | No                   | No                   | No                   |
| Adj R <sup>2</sup>                        | 0.040                | 0.362                | 0.089                | 0.130                |

| Panel B: Alternative measures of insider trading restrictions, alternative sample periods, and alternative sample countries |                      |                      |                      |                                       |                                  |
|-----------------------------------------------------------------------------------------------------------------------------|----------------------|----------------------|----------------------|---------------------------------------|----------------------------------|
|                                                                                                                             | (1)                  | (2)                  | (3)                  | (4)                                   | (5)                              |
|                                                                                                                             | <i>CH_ITR</i>        | <i>ITL</i>           | <i>ENF_YEAR</i>      | <i>Exclude Financial Crisis Years</i> | <i>Exclude US, UK, and Japan</i> |
| <i>ITR</i>                                                                                                                  |                      |                      |                      | 0.005***<br>(0.000)                   | 0.006***<br>(0.001)              |
| <i>CH_ITR</i>                                                                                                               | 0.005***<br>(0.000)  |                      |                      |                                       |                                  |
| <i>ITL</i>                                                                                                                  |                      | 0.019***<br>(0.001)  |                      |                                       |                                  |
| <i>ENF_YEAR</i>                                                                                                             |                      |                      | 0.001***<br>(0.000)  |                                       |                                  |
| <i>DA</i>                                                                                                                   | 0.114***<br>(0.026)  | 0.133***<br>(0.024)  | 0.045<br>(0.008)     | 0.118***<br>(0.026)                   | 0.108***<br>(0.032)              |
| <i>ITR</i> ×  <i>DA</i>                                                                                                     |                      |                      |                      | −0.026***<br>(0.005)                  | −0.022***<br>(0.007)             |
| <i>CH_ITR</i> ×  <i>DA</i>                                                                                                  | −0.026***<br>(0.005) |                      |                      |                                       |                                  |
| <i>ITL</i> ×  <i>DA</i>                                                                                                     |                      | −0.057***<br>(0.009) |                      |                                       |                                  |
| <i>ENF_YEAR</i> ×  <i>DA</i>                                                                                                |                      |                      | −0.003***<br>(0.000) |                                       |                                  |
| <i>SIZE</i>                                                                                                                 | −0.000**<br>(0.000)  | 0.000***<br>(0.000)  | 0.000***<br>(0.000)  | −0.000<br>(0.000)                     | 0.001***<br>(0.000)              |
| <i>MTB</i>                                                                                                                  | −0.001***<br>(0.000) | −0.001***<br>(0.000) | −0.001***<br>(0.000) | −0.001***<br>(0.000)                  | −0.001***<br>(0.000)             |
| <i>LEV</i>                                                                                                                  | −0.005***<br>(0.001) | −0.006***<br>(0.001) | −0.006***<br>(0.001) | −0.006***<br>(0.001)                  | −0.007***<br>(0.002)             |
| <i>ROA</i>                                                                                                                  | −0.018***<br>(0.002) | −0.021***<br>(0.002) | −0.019***<br>(0.002) | −0.021***<br>(0.002)                  | −0.011**<br>(0.005)              |
| <i>BIG4</i>                                                                                                                 | 0.009***<br>(0.001)  | 0.004***<br>(0.001)  | 0.004***<br>(0.001)  | 0.008***<br>(0.001)                   | −0.003***<br>(0.001)             |
| <i>STKMKTGDP</i>                                                                                                            | 0.000***<br>(0.000)  | 0.000***<br>(0.000)  | 0.000***<br>(0.000)  | 0.000***<br>(0.000)                   | 0.000**<br>(0.000)               |
| <i>LISTEDFIRMS</i>                                                                                                          | −0.000***<br>(0.000) | −0.000***<br>(0.000) | −0.000***<br>(0.000) | −0.000***<br>(0.000)                  | −0.000***<br>(0.000)             |

(continued on next page)

Table 6 (continued)

| Panel B: Alternative measures of insider trading restrictions, alternative sample periods, and alternative sample countries |                      |                      |                      |                      |                   |
|-----------------------------------------------------------------------------------------------------------------------------|----------------------|----------------------|----------------------|----------------------|-------------------|
|                                                                                                                             | (1)                  | (2)                  | (3)                  | (4)                  | (5)               |
| <i>IPOTOGDP</i>                                                                                                             | −0.002***<br>(0.000) | −0.004***<br>(0.000) | −0.002***<br>(0.000) | −0.002***<br>(0.000) | 0.000<br>(0.000)  |
| <i>Constant</i>                                                                                                             | −0.029***<br>(0.005) | −0.039***<br>(0.003) | −0.018***<br>(0.008) | −0.032***<br>(0.005) | −0.005<br>(0.012) |
| Observations                                                                                                                | 70,432               | 68,466               | 72,256               | 67,137               | 21,163            |
| Country FE                                                                                                                  | Yes                  | Yes                  | Yes                  | Yes                  | Yes               |
| Industry FE                                                                                                                 | Yes                  | Yes                  | Yes                  | Yes                  | Yes               |
| Year FE                                                                                                                     | Yes                  | Yes                  | Yes                  | Yes                  | Yes               |
| Adj R <sup>2</sup>                                                                                                          | 0.051                | 0.063                | 0.040                | 0.048                | 0.006             |

  

| Panel C: Using alternative measures of <i>REAL_EM</i> |                      |                      |                      |                      |  |
|-------------------------------------------------------|----------------------|----------------------|----------------------|----------------------|--|
|                                                       | (1)                  | (2)                  | (3)                  | (4)                  |  |
|                                                       | <i>REAL_EM</i>       | <i>RM_CFO</i>        | <i>RM_PROD</i>       | <i>RM_DISCEXP</i>    |  |
| <i>ITR</i>                                            | 0.011***<br>(0.001)  | −0.003***<br>(0.001) | 0.009***<br>(0.001)  | 0.028***<br>(0.001)  |  |
| <i> DA </i>                                           | 0.084***<br>(0.024)  | 0.194***<br>(0.049)  | −0.134**<br>(0.056)  | 0.213***<br>(0.046)  |  |
| <i>ITR</i> × <i> DA </i>                              | −0.020***<br>(0.005) | −0.036***<br>(0.009) | 0.021*<br>(0.011)    | −0.050***<br>(0.009) |  |
| <i>SIZE</i>                                           | 0.000<br>(0.000)     | 0.000*<br>(0.000)    | 0.001***<br>(0.000)  | −0.001***<br>(0.000) |  |
| <i>MTB</i>                                            | −0.001***<br>(0.000) | −0.003***<br>(0.000) | 0.008***<br>(0.000)  | −0.008***<br>(0.000) |  |
| <i>LEV</i>                                            | −0.012***<br>(0.001) | 0.033***<br>(0.002)  | −0.099***<br>(0.004) | 0.038***<br>(0.004)  |  |
| <i>ROA</i>                                            | 0.043***<br>(0.003)  | −0.222***<br>(0.005) | 0.118***<br>(0.006)  | 0.257***<br>(0.008)  |  |
| <i>BIG4</i>                                           | 0.015***<br>(0.001)  | −0.006***<br>(0.001) | 0.021***<br>(0.002)  | 0.027***<br>(0.002)  |  |
| <i>STKMKTCPGDP</i>                                    | 0.000***<br>(0.000)  | 0.000<br>(0.000)     | 0.000***<br>(0.000)  | 0.000***<br>(0.000)  |  |
| <i>LISTEDFIRMS</i>                                    | −0.001***<br>(0.000) | −0.000*<br>(0.000)   | −0.001***<br>(0.000) | −0.001***<br>(0.000) |  |
| <i>IPOTOGDP</i>                                       | −0.002***<br>(0.000) | 0.001***<br>(0.000)  | −0.004***<br>(0.000) | −0.004***<br>(0.000) |  |
| <i>Constant</i>                                       | −0.056***<br>(0.003) | 0.008*<br>(0.005)    | −0.030***<br>(0.009) | −0.151***<br>(0.007) |  |
| Observations                                          | 64,950               | 64,950               | 64,950               | 64,950               |  |
| Country FE                                            | Yes                  | Yes                  | Yes                  | Yes                  |  |
| Industry FE                                           | Yes                  | Yes                  | Yes                  | Yes                  |  |
| Year FE                                               | Yes                  | Yes                  | Yes                  | Yes                  |  |
| Adj R <sup>2</sup>                                    | 0.114                | 0.122                | 0.084                | 0.098                |  |

Note: Panel A of this table presents the regression results based on the mean values for all variables on each firm. Panel B of this table presents the cross-sectional differences in the regression results of real activities earnings management on alternative measures of on insider trading restrictions (*ITR*), accruals earnings management (*|DA|*) and other firm-specific control variables as well as country control variables. The dependent variable is the measure of real activities earnings management (*REAL\_EM*). Columns (1) to (3) use *CH\_ITR* (the change in the *ITR* index), *ITL* (the insider trading law index), and *ENF\_YEAR* (the number of years since the first year of insider trading law enforcement) measures the years since first-time enforcement of insider trading laws) as the measure of insider trading restrictions. Columns (4) and (5) exclude the financial crisis years (1998, 1999, 2000) and observations from the three biggest countries (US, UK, and Japan), respectively. Panel C of this table presents the regression results based on alternative measures of real activities earnings management from Srivastava (2019). The sample period is from 1992 to 2007 for Columns (2) and (3). The definitions of the variables are described in the Appendix. The standard error for each coefficient is reported in parentheses and is based on the White's heteroskedasticity corrected standard errors, clustered by firm and year.

\*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10%, respectively.

are unchanged and we continue to find that the interaction coefficient (*ITR* × *|DA|*) continues to be negatively and significantly associated with the new measures in three out of the four specifications.

#### 4.4. Suspect firm-years analysis

Following prior studies (Roychowdhury, 2006; Zang, 2012), we construct a dummy variable, *SUSPECT*, that equals one for firms with earnings before interest and taxes divided by total assets that are between 0 and 0.005; and zero otherwise. We investigate whether our main result is different for the sample of firms that are regarded to have strong incentives to manage their earnings (i.e. *SUSPECT* = 1) as compared to those that are regarded to have low incentives to manage their earnings (i.e. *SUSPECT* = 0). The results of the estimation of equation (9) for the two sub-samples, using OLS model that controls for country, industry, and year fixed effects are

**Table 7**  
Suspect firm-years analysis.

|                    | (1)<br><i>SUSPECT = 1</i> | (2)<br><i>SUSPECT = 0</i> |
|--------------------|---------------------------|---------------------------|
| <i>ITR</i>         | 0.003<br>(0.002)          | 0.005***<br>(0.000)       |
| $ DA $             | −0.158<br>(0.151)         | 0.111***<br>(0.026)       |
| $ITR \times  DA $  | 0.042<br>(0.029)          | −0.025***<br>(0.005)      |
| <i>SIZE</i>        | −0.000<br>(0.000)         | −0.000**<br>(0.000)       |
| <i>MTB</i>         | −0.000<br>(0.000)         | −0.001***<br>(0.000)      |
| <i>LEV</i>         | −0.000<br>(0.005)         | −0.007***<br>(0.001)      |
| <i>ROA</i>         | −0.152<br>(0.603)         | −0.018***<br>(0.002)      |
| <i>BIG4</i>        | 0.009***<br>(0.003)       | 0.009***<br>(0.001)       |
| <i>STKMTCAPGDP</i> | 0.000*<br>(0.000)         | 0.000***<br>(0.000)       |
| <i>LISTEDFIRMS</i> | −0.000**<br>(0.000)       | −0.000***<br>(0.000)      |
| <i>IPOTOGDP</i>    | −0.001<br>(0.001)         | −0.002***<br>(0.000)      |
| <i>Constant</i>    | −0.026<br>(0.031)         | −0.036***<br>(0.008)      |
| Observations       | 2,685                     | 69,726                    |
| Country FE         | Yes                       | Yes                       |
| Industry FE        | Yes                       | Yes                       |
| Year FE            | Yes                       | Yes                       |
| Adj R <sup>2</sup> | 0.052                     | 0.057                     |

*Note:* This table presents the effect of institutional variable on the regression results of real activities earnings management on insider trading restrictions, accruals earnings management ( $|DA|$ ) and other firm-specific as well as country control variables. The dependent variable is the measure of real activities earnings management (*REAL\_EM*). Column (1) presents the results for sample of firms with strong incentives to manage their earnings (*SUSPECT* = 1). Column (2) presents the results for sample of firms with less incentives to manage their earnings (*SUSPECT* = 0). The sample period is from 1992 to 2007. The definitions of the variables are described in the Appendix. The standard error for each coefficient is reported in parentheses and is based on the White's heteroskedasticity corrected standard errors, clustered by firm and year.

\*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10%, respectively.

presented in Table 7.

As shown in Column (1), the coefficient  $a_1$  continues to be positively significant (value = 0.003) but insignificant. The interaction coefficient  $a_3$  is also positive and insignificant. Therefore, there is no evidence of a substitution effect in the sample of firms that have the strongest incentives to manage their earnings.

In contrast, the coefficient  $a_1$  is positively significant (value = 0.005) and the interaction coefficient  $a_3$  is negatively significant (value = −0.025) in Column (2). These findings suggest that the insider trading restrictions is positively associated with the incentives to switch from accruals to real activities earnings management, only in the sub-sample of firms which are *not* suspected to have strong earnings management incentives (ie, *SUSPECT* = 0).

#### 4.5. Controlling for omitted variables

In this sub-section, we attempt to control for the potential concern of omitted variables. First, we use lagged values of the firm-specific independent variables and re-estimate equation (9) with country, industry and year fixed effects. In our unreported results, our main findings persist.

Second, we conduct a difference-in-difference (DID) test by estimating the following equation (10) below for the sample period between 1993 (−3 years from 1996) to 2002 (+3 years from 1999):

$$\begin{aligned}
 REM_{i,t} = & a_0 + a_1 ITR_{i,t} + a_2 |DA|_{i,t} + a_3 (POST_{i,t}) + a_4 (ITR_{i,t} \times POST_{i,t}) \\
 & + a_5 (ITR_{i,t} \times POST_{i,t} \times |DA|_{i,t}) + a_6 SIZE_{i,t} + a_7 MTB_{i,t}
 \end{aligned}$$

**Table 8**  
Difference-in-difference analysis.

|                                        | (1)                        |
|----------------------------------------|----------------------------|
|                                        | <b>REAL_EM</b>             |
| <i>ITR</i>                             | −0.004<br>(0.003)          |
| <i>POST</i>                            | −0.055***<br>(0.015)       |
| <i>ITR</i> × <i>POST</i>               | <b>0.012***</b><br>(0.003) |
| <i>DA</i>                              | 0.036<br>(0.023)           |
| <i>ITR</i> × <i>POST</i> ×   <i>DA</i> | −0.014***<br>(0.004)       |
| <i>SIZE</i>                            | −0.001***<br>(0.000)       |
| <i>MTB</i>                             | −0.001***<br>(0.000)       |
| <i>LEV</i>                             | −0.004*<br>(0.002)         |
| <i>ROA</i>                             | −0.019***<br>(0.004)       |
| <i>BIG4</i>                            | 0.010***<br>(0.001)        |
| <i>STKMKTGDP</i>                       | 0.000***<br>(0.000)        |
| <i>LISTEDFIRMS</i>                     | −0.000***<br>(0.000)       |
| <i>IPOTOGDP</i>                        | −0.005***<br>(0.000)       |
| <i>Constant</i>                        | 0.039***<br>(0.014)        |
| Observations                           | 23,402                     |
| Country FE                             | Yes                        |
| Industry FE                            | Yes                        |
| Year FE                                | Yes                        |
| Adj <i>R</i> <sup>2</sup>              | 0.076                      |

*Note:* This table presents the effect of institutional variable on the regression results of real activities earnings management on insider trading restrictions, accruals earnings management (|*DA*|) and other firm-specific as well as country control variables. The dependent variable is the measure of real activities earnings management (*REAL\_EM*). *POST* is a dummy variable that equals 1 for the period from 2000 to 2002. The sample period used in the difference-in-difference analysis is from 1992 to 2002. The definitions of the variables are described in the Appendix. The standard error for each coefficient is reported in parentheses and is based on the White's heteroskedasticity corrected standard errors, clustered by firm and year.

\*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10%, respectively.

$$+a_8LEV_{i,t} + a_9ROA_{i,t} + a_{10}BIG4_{i,t} + Country - Level$$

$$+ \sum Country + \sum Industry + \sum Year + \epsilon_{i,t} \quad (10)$$

where *POST* is a dummy variable that equals 1 for years 2000 to 2002; and 0 otherwise. All other variables are as defined earlier.

The results of the estimation of equation (10) using country, industry, and year fixed effects are presented in Table 8. The findings reveal that our main variable of interest, the interaction coefficient *ITR* × *POST* × |*DA*| is negative and statistically associated with *REAL\_EM*. Therefore, our finding of a positive association between insider trading restrictions and the switching effect from accruals to real earnings management is concentrated in the *POST* period.

#### 4.6. The effect of country-level institutional infrastructure

We further test whether the role of insider trading restrictions documented in the previous sub-section is influenced by the strength of country-level institutional infrastructure. We use the legal origin dummy variable from La Porta et al. (1998) and La Porta et al.

**Table 9**  
Effect of country-level institutional variable.

|                     | (1)<br>Civil Law<br>Countries | (2)<br>Common Law Countries | (3)<br>Civil Law<br>Countries | (4)<br>Common Law Countries |
|---------------------|-------------------------------|-----------------------------|-------------------------------|-----------------------------|
| <i>ITR</i>          | 0.003**<br>(0.002)            | 0.010***<br>(0.001)         | 0.004**<br>(0.002)            | 0.012***<br>(0.001)         |
| $ DA $              | <b>0.028***</b><br>(0.009)    | <b>-0.038***</b><br>(0.004) | 0.047<br>(0.056)              | <b>0.094***</b><br>(0.031)  |
| $ITR \times  DA $   |                               |                             | -0.004<br>(0.011)             | <b>-0.024***</b><br>(0.006) |
| <i>SIZE</i>         | -0.001***<br>(0.000)          | 0.000**<br>(0.000)          | -0.001***<br>(0.000)          | 0.000**<br>(0.000)          |
| <i>MTB</i>          | -0.000<br>(0.000)             | -0.001***<br>(0.000)        | -0.000<br>(0.000)             | -0.001***<br>(0.000)        |
| <i>LEV</i>          | -0.004***<br>(0.002)          | -0.007***<br>(0.001)        | -0.004***<br>(0.002)          | -0.008***<br>(0.001)        |
| <i>ROA</i>          | -0.016***<br>(0.006)          | -0.016***<br>(0.003)        | -0.016***<br>(0.006)          | -0.017***<br>(0.003)        |
| <i>BIG4</i>         | -0.005***<br>(0.002)          | 0.005***<br>(0.001)         | -0.005***<br>(0.002)          | 0.005***<br>(0.001)         |
| <i>STKMKTCAPGDP</i> | -0.000<br>(0.000)             | 0.000***<br>(0.000)         | -0.000<br>(0.000)             | 0.000***<br>(0.000)         |
| <i>LISTEDFIRMS</i>  | -0.000<br>(0.000)             | -0.000***<br>(0.000)        | -0.000<br>(0.000)             | -0.000***<br>(0.000)        |
| <i>IPOTOGDP</i>     | 0.001**<br>(0.001)            | -0.005***<br>(0.000)        | 0.001**<br>(0.001)            | -0.005***<br>(0.000)        |
| <i>Constant</i>     | -0.141<br>(0.154)             | -0.032<br>(0.031)           | -0.143<br>(0.154)             | -0.040<br>(0.031)           |
| Observations        | 29,078                        | 43,333                      | 29,078                        | 43,333                      |
| Country FE          | Yes                           | Yes                         | Yes                           | Yes                         |
| Industry FE         | Yes                           | Yes                         | Yes                           | Yes                         |
| Year FE             | Yes                           | Yes                         | Yes                           | Yes                         |
| Adj $R^2$           | 0.012                         | 0.095                       | 0.012                         | 0.096                       |

Note: This table presents the cross-sectional differences in the effect of institutional variable on the regression results of real activities earnings management on insider trading restrictions, accruals earnings management ( $|DA|$ ) and other firm-specific as well as country control variables. The dependent variable is the measure of real activities earnings management ( $REAL\_EM$ ). Columns (1) and (3) present the results for civil law countries ( $LO = 0$ ). Columns (2) and (4) present the results for common law countries ( $LO = 1$ ). The sample period is from 1992 to 2007. The definitions of the variables are described in the Appendix. The standard error for each coefficient is reported in parentheses and is based on the White's heteroskedasticity corrected standard errors, clustered by firm and year.

\*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10%, respectively.

(2006) as a proxy for the country-level institutions. We estimate equations (8) and (9) in civil law countries ( $LO = 0$ ) and common law countries ( $LO = 1$ ) separately to test our third hypothesis.

Columns (1) and (2) of Table 9 present the regression estimates of equation (8), without the interaction term  $ITR \times |DA|$ . We find that the coefficient of  $ITR$  ( $a_1$ ) is positive but insignificant in both columns. However, we find that the coefficient of  $|DA|$  ( $a_2$ ) is negative and statistically significant (value = -0.038) only in the sample of firms in common-law countries (Column (2)). In other words, managers of firms in countries characterized by stronger institutional infrastructure have more incentives to switch from accruals to real activities earnings management. This finding complements the prevalence of the substitution effect in studies examining the U.S. firms (Cohen and Zarowin, 2008; Zarowin, 2010; Zang, 2012) and one explanation for this result is that the substitution effect serves a potential response by managers to increasing disclosure requirements due to more restrictive regulations (such as SOX in the US) or stronger institutions.

Columns (3) and (4) of Table 9 present the regression estimates of equation (9), with the interaction term  $ITR \times |DA|$ . While we continue to find that the coefficient  $a_1$  is positive and insignificant, the coefficient on the interaction term ( $a_3$ ) is found to be negatively significant only for the sample of firms in countries with common law legal origin (value = -0.024).

As a robustness test, we employ two alternative measures of country-level institutional infrastructure: the *ANTIDIR* and *ANTISELF* indices from La Porta et al. (1998) and Djankov et al. (2008). We then classify the firms into *Low* and *High* samples based on the mean values of each index. We re-estimate equation (9) for each sample and present the findings in Table 10. The evidences reflect a consistent finding that the negative interaction coefficient ( $a_3$ ) continues to be significant only in the sample of firms in countries with high *ANTIDIR* (value = -0.030) and *ANTISELF* (value = -0.024) scores; which are the countries with strong institutional infrastructure.

Therefore, we provide additional evidence to suggest that the positive association between insider trading restrictions and the switching effect is more pronounced for firms in countries characterized by stronger legal regime and institution, highlighting the

**Table 10**

Robustness test using alternative measures of institutional infrastructure.

|                      | (1)<br>Low<br><i>ANTIDIR</i> | (2)<br>High<br><i>ANTIDIR</i> | (3)<br>Low<br><i>ANTISELF</i> | (4)<br>High<br><i>ANTISELF</i> |
|----------------------|------------------------------|-------------------------------|-------------------------------|--------------------------------|
| <i>ITR</i>           | 0.003***<br>(0.001)          | 0.021***<br>(0.001)           | 0.000<br>(0.001)              | 0.012***<br>(0.001)            |
| $ DA $               | 0.030<br>(0.038)             | 0.115***<br>(0.038)           | 0.033<br>(0.049)              | 0.091***<br>(0.033)            |
| $ITR \times  DA $    | -0.003<br>(0.008)            | -0.030***<br>(0.007)          | -0.001<br>(0.010)             | -0.024***<br>(0.006)           |
| <i>SIZE</i>          | -0.001***<br>(0.000)         | 0.000<br>(0.000)              | -0.001***<br>(0.000)          | 0.000<br>(0.000)               |
| <i>MTB</i>           | -0.000*<br>(0.000)           | -0.001***<br>(0.000)          | -0.000<br>(0.000)             | -0.001***<br>(0.000)           |
| <i>LEV</i>           | -0.004***<br>(0.001)         | -0.005***<br>(0.002)          | -0.005***<br>(0.002)          | -0.007***<br>(0.001)           |
| <i>ROA</i>           | -0.012**<br>(0.005)          | -0.016***<br>(0.003)          | -0.016***<br>(0.006)          | -0.016***<br>(0.003)           |
| <i>BIG4</i>          | -0.002**<br>(0.001)          | 0.005***<br>(0.001)           | -0.005***<br>(0.002)          | 0.005***<br>(0.001)            |
| <i>STKMKT CAPGDP</i> | -0.000<br>(0.000)            | -0.000<br>(0.000)             | 0.000<br>(0.000)              | 0.000***<br>(0.000)            |
| <i>LISTED FIRMS</i>  | -0.000***<br>(0.000)         | 0.000***<br>(0.000)           | -0.000*<br>(0.000)            | -0.000***<br>(0.000)           |
| <i>IPOTOGDP</i>      | 0.001***<br>(0.000)          | -0.006***<br>(0.000)          | 0.001<br>(0.000)              | -0.005***<br>(0.000)           |
| <i>Constant</i>      | -0.003<br>(0.005)            | -0.073***<br>(0.006)          | 0.000<br>(0.001)              | 0.012***<br>(0.001)            |
| Observations         | 35,111                       | 37,300                        | 30,260                        | 42,151                         |
| Country FE           | Yes                          | Yes                           | Yes                           | Yes                            |
| Industry FE          | Yes                          | Yes                           | Yes                           | Yes                            |
| Year FE              | Yes                          | Yes                           | Yes                           | Yes                            |
| Adj R <sup>2</sup>   | 0.010                        | 0.106                         | 0.009                         | 0.094                          |

Note: This table presents the cross-sectional differences in the effect of institutional variable on the regression results of real activities earnings management on insider trading restrictions, accruals earnings management ( $|DA|$ ) and other firm-specific as well as country control variables. The dependent variable is the measure of real activities earnings management (*REAL\_EM*). Columns (1) and (3) present the results for low *ANTIDIR* and *ANTISELF* countries. Columns (2) and (4) present the results for high *ANTIDIR* and *ANTISELF* countries. The sample period is from 1992 to 2007. The definitions of the variables are described in the Appendix. The standard error for each coefficient is reported in parentheses and is based on the White's heteroskedasticity corrected standard errors, clustered by firm and year.

\*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10%, respectively.

differential role played by insider trading restrictions in shaping corporate financial reporting quality.<sup>18</sup>

## 5. Conclusions

There is an increasing attention by academics in the accounting and finance literature on real activities earnings management. In addition, there is an existing debate on whether insider trading laws are beneficial or detrimental to shareholders values. Since real activities earnings management is more difficult to be detected by auditors, it is important to examine whether insider trading restrictions influence managerial incentives to engage in real activities earnings management. Using an international sample of 28 countries that covers the sample period from 1992 to 2007, we find that real activities earnings management increases with insider trading restrictions. Moreover, we find that accruals and real activities earnings management are negatively and significantly related, which is consistent with the substitution hypothesis. In other words, managers of international firms in our sample are inclined to substitute accruals earnings management for real activities earnings management.

More importantly, we find that the role played by insider trading restrictions on the substitution effect from accruals to real activities earnings management is found to be stronger for firms in countries with more restrictive insider trading regulation, than those in countries with less restrictive regulation. This finding complements those found in prior studies and one potential explanation for the substitution effect is that it serves as a response by managers to an increase in disclosure requirement or firm-specific incentives.

We perform a series of robustness tests and in general, our empirical findings remain unchanged to alternative measures of real activities earnings management and insider trading restrictions, alternative sample period as well as potential endogeneity concern. Additional analysis also reveals that the positive association between insider trading restrictions and the switching effect is found to be more prominent in countries with strong institutional infrastructure.

<sup>18</sup> Kusnadi (2015) also finds that the role of insider trading restrictions on corporate risk taking is asymmetric for firms located in countries with high vs low institutional infrastructure.

Overall, our results are important in highlighting the role of insider trading restrictions in shaping corporate financial reporting policies. In particular, we find strong evidence to suggest that the extent of restriction of such laws influence managerial incentives to engage in earnings manipulation through real activities. Moreover, such incentives are further influenced by the strength of country-level institutional infrastructure.

Our findings provide policy implications for lawmakers, in terms of outlining the benefits and drawbacks of more restrictive insider trading laws on incentives of corporate managers. This becomes more important especially as capital markets around the world become more liberalized and behave more like the established markets (such as the UK and US) and there could lead to increasingly more cases of insider trading activities.

### Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

### Data availability

Data will be made available on request.

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### Appendix

See [Table A1](#).

**Table A1**  
Variables definition.

| Variables                                | Definitions                                                                                                                                                                                                                                                                                                                              |
|------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>Country-level variables</i>           |                                                                                                                                                                                                                                                                                                                                          |
| <i>ITR</i>                               | Insider trading restriction index, obtained from the Global Competitiveness Report (1996, 1998, 1999).                                                                                                                                                                                                                                   |
| <i>ITL</i>                               | Insider trading law index, obtained from <a href="#">Beny (2005)</a> .                                                                                                                                                                                                                                                                   |
| <i>ENF</i>                               | The year of enforcement of insider trading law which is obtained from <a href="#">Bhattacharya and Daouk (2006)</a> .                                                                                                                                                                                                                    |
| <i>ENF_YEAR</i>                          | The number of years since first-year of enforcement of insider trading law, ie, year $t - ENF$ .                                                                                                                                                                                                                                         |
| <i>LO</i>                                | A dummy variable that equals 1 for common law countries, and 0 for civil law countries, obtained from <a href="#">La Porta et al. (1998, 1999)</a> .                                                                                                                                                                                     |
| <i>ANTIDIR</i>                           | Anti-directors rights index, obtained from <a href="#">La Porta et al. (1998)</a> .                                                                                                                                                                                                                                                      |
| <i>ANTIDRLF</i>                          | Anti self-dealing index, obtained from <a href="#">Djankov et al. (2008)</a> .                                                                                                                                                                                                                                                           |
| <i>STKMKTCAPGDP</i>                      | Average of the ratio of stock market capitalization to gross domestic product (GDP) for the period 1999–2003, obtained from the World Development Indicators.                                                                                                                                                                            |
| <i>LISTEDFIRMS</i>                       | Average ratio of number of listed firms in a given country (in thousands) to its GDP (in millions) over the period 1996–2000, obtained from <a href="#">La Porta et al. (2006)</a> .                                                                                                                                                     |
| <i>IPOTOGDP</i>                          | The average ratio of the equity issued by newly listed firms in a given country (in thousands) to its GDP (in millions) over the period 1996–2000, obtained from <a href="#">La Porta et al. (2006)</a> .                                                                                                                                |
| <i>Firm-specific financial variables</i> |                                                                                                                                                                                                                                                                                                                                          |
| <i> DA </i>                              | Absolute value of discretionary accruals, constructed using the modified cross-sectional Jones model ( <a href="#">Dechow et al., 1995</a> ) that controls for industry and time effects ( <a href="#">Defond and Jiambalvo, 1994</a> ) as described in equation (6) in the main text. This is a proxy for accruals earnings management. |
| <i>RM_CFO</i>                            | Abnormal value of cash flows from operations, obtained from estimation of cross-sectional regression of equation (1) in the main text, multiplied by $-1$ .                                                                                                                                                                              |
| <i>RM_PROD</i>                           | Abnormal value of production cost, obtained from estimation of cross-sectional regression of equation (4) in the main text.                                                                                                                                                                                                              |
| <i>RM_DISCEXP</i>                        | Abnormal value of production cost, obtained from estimation of cross-sectional regression of equation (5) in the main text, multiplied by $-1$ .                                                                                                                                                                                         |
| <i>REAL_EM</i>                           | Composite measure of real activities earnings management, measured as the average value of <i>RM_CFO</i> , <i>RM_PROD</i> and <i>RM_DISCEXP</i> .                                                                                                                                                                                        |
| <i>SIZE</i>                              | Firm size, defined as the natural logarithm of the market value of equity.                                                                                                                                                                                                                                                               |
| <i>MTB</i>                               | Market-to-book, defined as the ratio of market value of equity to book value of equity.                                                                                                                                                                                                                                                  |
| <i>ROA</i>                               | Return on assets, defined as earnings before extraordinary items divided by lagged total assets.                                                                                                                                                                                                                                         |
| <i>LEV</i>                               | Ratio of total liabilities to total assets.                                                                                                                                                                                                                                                                                              |
| <i>BIG4</i>                              | A dummy variable that equals 1 if the firm is audited by a Big 4 audit firm, and 0 otherwise.                                                                                                                                                                                                                                            |
| <i>SUSPECT</i>                           | A dummy variable that equals 1 for those firms with ROA between 0 and 0.005, and 0 otherwise.                                                                                                                                                                                                                                            |

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