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# Corporate diversification, real activities manipulation, and firm value

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ABSTRACT

We examine the relation between corporate diversification, real earnings management, and firm value. Our analysis indicates that industrial diversification and the combination of industrial and global diversification exacerbate real activities manipulation, whereas global diversification mitigates it. The evidence also shows that real earnings management is inversely related to firm valuation, and that it influences the excess value ascribed to diversification. We find that the reduction in value caused by real activities manipulation is more pronounced among industrially diversified firms and among firms that are both industrially and globally diversified, but not firms that are only globally diversified. Consequently, as the extent of real earnings management increases, the discount associated with industrial diversification becomes larger. These findings help to explain why some diversified firms have lower valuations not only across different diversification profiles, but also within the same diversification category. Our results also reconcile past literature by helping to explain discrepancies in previous findings. Therefore, our study provides a more unifying view of how the diversification discount can vary among firms and how it can change over time.



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## 1. Introduction

Whether corporate diversification exacerbates or mitigates earnings management is a topic of continuing debate. For instance, Lim et al. (2008), Rodríguez-Pérez and Hemmen (2010), and Chin et al. (2009) find a positive relation between discretionary accruals and firm diversification, implying that earnings management is more severe in diversified firms. Their finding supports the view that corporate diversification increases information asymmetry by way of greater size and complexity, which managers exploit to manipulate earnings. In contrast, Jiraporn et al. (2008) argue that corporate diversification reduces earnings management because diversified firms generate uncorrelated cash flows from varied sources that offset accruals. They report that discretionary accruals decrease with industrial diversification, as well as with a combination of industrial and global diversification, but not with global diversification alone. El Mehdi and Seboui (2011) argue that industrial diversification mitigates accrual manipulation while global diversification exacerbates it.

However, while managers may use accounting maneuvers to manage earnings, they also manipulate earnings through real economic actions that change the timing or structuring of an operation, investment, or financing transaction (Graham et al., 2005; Badertscher, 2011; Zang, 2012). Yet, earlier studies focus exclusively on relating diversification to accrual management. Notwithstanding, several studies provide evidence that managers cut discretionary spending, sell fixed assets, postpone new projects, use sales manipulation, and engage in overproduction to manipulate their reported earnings (Baber et al., 1991; Dechow and Sloan, 1991; Bartov, 1993; Bange and De Bondt, 1998; Bens et al., 2002; Thomas and Zhang, 2002; Cheng, 2004; Graham et al., 2005; Roychowdhury, 2006).

Cohen et al. (2008) and Badertscher (2011) suggest that firms use operational activities and accrual manipulation as substitutes. In fact, Zang (2012) finds a sequential substitutive relationship between the two strategies, wherein managers adjust discretionary accruals at fiscal year-end based on the outcome of their real activities manipulation during the fiscal year.[1] She shows that an unexpectedly high (low) level of real activities manipulation is directly offset by a lower (higher) level of abnormal accruals, indicating that decisions to manage earnings through real economic actions are made before decisions to manage earnings through accruals.

To date, only limited research has been done on the relationship between corporate diversification and operational activities to manage earnings. This is a significant oversight because real activities manipulation is quite pervasive, as documented by Gunny (2010), Cohen and Zarowin (2010) and Zang (2012). Consequently, previous studies are missing critical information that may lead to spurious conclusions about the relation between corporate diversification and earnings management. To the extent that real activities manipulation precedes accrual manipulation (see Zang, 2012), the relation between diversification and discretionary accruals may be illusory given that accounting manipulation is possibly a secondary earnings management tool. This observation may help to explain why the prevailing research on the topic finds mixed results.

The literature also suggests that real activities manipulation is harder to detect than accrual manipulation because real earnings management can be disguised as sincere "operating" business decisions (Gunny, 2010; Li et al., 2012). Graham et al. (2005) point out that while auditors can second-guess a firm's accounting practices, they cannot challenge real economic actions taken in the ordinary course of business to meet earnings targets. So naturally, after the passage of the Sarbanes-Oxley Act (SOX), managers shifted away from accounting maneuvers to manipulate reported earnings to more operational activities because of the enhanced regulatory scrutiny of financial reports by auditors and regulators (Cohen et al., 2008).

[1] Since real activities manipulation changes the timing and/or structuring of business transactions, such actions have to take place during the fiscal year. However, after the fiscal year-end but before the earnings announcement date, managers can adjust accruals. Thus, when managers observe the impact of real activities manipulation on earnings at fiscal year-end, they can offset an unexpectedly high (low) impact by using less (more) accrual management.

In addition, while the manipulation of accruals has no direct cash flow consequences, the operational activities undertaken to meet earnings targets affect cash flows because real activities manipulation involves deviations from normal business practices (Graham et al., 2005; Gunny, 2010; Li et al., 2012). Roychowdhury (2006) advises that real activities manipulation can reduce firm value because actions taken in the current period to increase earnings can have a negative effect on cash flows in future periods. Graham et al. (2005) provide survey evidence that managers are willing to use operational activities to meet earnings targets even when the manipulation decreases firm value. As an example, 80% of managers disclose that they would cut discretionary expenses to meet an earnings target, while 55% candidly admit that they would shelve a new project even though the delay would reduce value.

As a result, real activities manipulation may itself be value-reducing.[2] To the extent that corporate diversification facilitates operational activities to manipulate earnings, real activities manipulation may influence the valuation loss attributed to corporate diversification. That is, the highly publicized diversification discount[3] may be related to the degree of operational activities undertaken by diversified firms to manage earnings. Accordingly, this paper takes an analytical look at the correlations between diversification, real activities manipulation, and firm value.

Collectively, a number of studies indicate that managers in diversified firms are subject to less oversight and so have fewer incentives to make optimal operating decisions.[4] Since real activities manipulation involves suboptimal actions that deviate from normal business practices, agency theory predicts that diversified firms engage in more real earnings management than undiversified firms. In this perspective, managers of diversified firms have more discretionary power to "burn" actual cash flows primarily to keep up accounting appearances than managers of undiversified firms. Notably, the evidence in favor of agency theory is stronger for industrial diversification than for global diversification (Jiraporn et al., 2006).

We further theorize that, on average, operational activities undertaken essentially to meet earnings targets are likely to have an adverse effect on valuation. Under agency theory, managers are more likely to deviate from optimal business decisions to meet earnings targets when they perceive net private benefits from these activities.[5] For this reason, we anticipate an inverse relation between excess value and the level of real activities manipulation. Additionally, we posit that the value loss accredited to firm diversification is partially due to the adverse cash flow effects of real activities manipulation. Consequently, we expect to find larger diversification discounts among firms where managers engage in more real activities manipulation.

We empirically test our predictions using an unbalanced panel dataset of 45,170 firm-year observations over the period from 1990 to 2010. Our sample is well suited for the study because it includes firms of different sizes and industries incasing two decades. We provide evidence that industrial diversification and the combination of industrial and global diversification exacerbate real activities manipulation, whereas global diversification mitigates it. These findings are highly significant and robust even after we take into account the firms' endogenous choices to diversify, as well as alternative definitions for corporate diversification.

Overall, our findings conflict with Jiraporn et al. (2008), who report that corporate diversification is negatively related to discretionary accruals. However, Dechow et al. (2011) show that the conventional approaches of estimating discretionary accruals suffer from notable measurement errors and that financial information beyond abnormal accruals is useful for identifying earnings manipulation. McNichols (2000) mentions that by focusing on accruals, the accuracy of detecting earnings management is reduced since the manipulation of other items is overlooked. Moreover, managers generally

[2] Although Roychowdhury (2006) suggests that certain real activities manipulation methods, such as price discounts and reduction of discretionary expenditures, are possibly optimal actions in certain economic circumstances.

[3] See studies by <***>John and Ofek (1995), Bodnar et al. (1999), and Denis et al. (2002).

[4] For example, see Amihud and Lev (1981), Jensen (1986), Jensen and Meckling (1986), Shleifer and Vishny (1989), Jensen and Murphy (1990), Denis et al. (1997), Houston et al. (2001), Lins and Servaes (2002), Aggarwal and Samwick (2003), Fauver et al. (2003), Jiraporn et al. (2006), Berry et al. (2006), Laeven and Levine (2007), and Hoechle et al. (2012).

[5] Managers may also engage in these activities because they are acting as agents in value-transfers amongst stakeholders. For instance, managers may manipulate earnings to avoid debt covenant violation or to avoid governmental intervention (Roychowdhury, 2006).

adjust their discretionary accruals at fiscal year-end based on the outcome of their real activities manipulation during the fiscal year (Zang, 2012).

While these findings are interesting in their own right, we also document a strong negative relation between excess firm value and real activities manipulation. This implies that shareholders suffer a tangible loss from managers' endeavors to use operational activities to manipulate earnings. This result is consistent with agency theory, which suggests that on average, real economic actions to meet earnings benchmarks reduce firm value because these activities deviate from optimal business practices. Our finding is supported by Graham et al. (2005), who provide evidence that managers are willing to use operational activities to meet earnings targets even when the manipulation reduces firm value. By the same token, Li et al. (2012) show that during management buyouts, managers distort valuation via real activities manipulation to acquire the firm's assets "on the cheap" from their incumbent shareholders.

We provide additional evidence showing that the negative valuation effect of operational activities undertaken to manipulate earnings is sensitive to firms' diversification profiles. In particular, our findings indicate that the reduction in value caused by real activities manipulation is more pronounced among industrially diversified firms and among firms that are both industrially and globally diversified. In sharp contrast, firms that are globally but not industrially diversified appear to enjoy positive wealth gains from the operational activities undertaken to manipulate earnings. Gande et al. (2009) argue that this is because global diversification is inherently different from industrial diversification. Our results are also supported by studies suggesting that industrially diversified firms suffer more agency problems than globally diversified firms (Jiraporn et al., 2006).

Moreover, our findings help to explain why some empirical studies argue that global diversification increases firm value (Bodnar et al., 1999), while others contend that it does not (Denis et al., 2002). We underscore that these assorted results are the byproducts of operational activities used to manipulate reported earnings. For instance, as in Denis et al. (2002), we find a diversification discount regardless of a firm's diversification profile. Our empirical results show that industrial diversification, global diversification, and the combination of both industrial and global diversification are all inversely related to excess value.

Yet, the interaction between global diversification and real activities manipulation has a strong positive and significant effect on firm valuation. Not only are our findings highly significant, but they are also robust after controlling for variables known to influence firm value. Transfer pricing and other intra-firm profit sharing activities to exploit cross-country differences may help to explain why real earnings management enhances value in single-segment globally diversified firms compared to firms that are industrially diversified.

Speaking generally, our results lend credence to the argument that the operational actions undertaken to manage earnings reduce firm value and are inconspicuous factors contributing to the diversification discount. This supposition helps explain why some diversified firms have lower valuations not only across different diversification profiles, but also within the same diversification category. Consequently, our findings have major implications for shareholders in the cross-section of firms.

Our research extends the literature in significant ways. The evidence to date on the association between real activities manipulation and corporate diversification is limited. Hence, our emphasis on operational activities undertaken to meet earnings targets sets this paper apart from earlier research. Additionally, our study provides new insights into the economic impact of real activities manipulation. We not only document a direct relation between real activities manipulation and firm valuation, but we also show that real activities manipulation partially explains why some diversified firms have lower valuation than others. Notwithstanding a wealth of research on corporate diversification, our results provide a more unifying view of how the diversification discount can vary among firms and how it can change over time.

The paper is organized as follows. Section 2 discusses the documented evidence of real earnings management in the extant literature. Section 3 outlines our hypotheses. We present our data and methodology in Sections 4 and 5, respectively. In Section 6, we present our empirical findings and discuss the implications of our results. We offer our closing remarks in Section 7.

## 2. Evidence of real earnings management

Earnings management can be grouped into two categories: accrual manipulation and real activities manipulation. Accrual manipulation involves accounting choices to distort a firm's true performance (Dechow and Skinner, 2000), while real activities manipulation involves actions that change the timing or structuring of an operation, investment, and/or financing transaction (Badertscher, 2011). Because real activities manipulation changes actual business transactions, such activities take place during the fiscal year, whereas accruals are manipulated after the fiscal year-end, but before the earnings announcement date (Zang, 2012).

Graham et al. (2005) provide survey evidence that managers prefer to manipulate operational activities over accruals because real activities manipulation is harder to detect. The rational is that operating decisions are controlled by managers, whereas accounting choices are subject to the scrutiny of auditors and regulators. Indeed, Cohen et al. (2008) find that managers have shifted away from accounting manipulation to real activities manipulation after the passage of SOX because of heightened scrutiny of accounting practices. Evidently, the degree of accounting manipulation depends on how successful managers are in using operational actions to meet earnings targets (Zang, 2012).

Roychowdhury (2006) report evidence that managers try to avoid losses by offering price discounts to temporarily increase sales, by engaging in overproduction to lower cost of goods sold, and by reducing discretionary expenditures aggressively to improve margins. Thomas and Zhang (2002) also find that managers overproduce to distort the cost of production. Dechow and Sloan (1991), Baber et al. (1991), Bange and De Bondt (1998), Bens et al. (2002), and Cheng (2004) suggest that manages bolster reported earnings by reducing discretionary expenditures, such as cutting advertising, research and development, and selling, general, and administrative expenses.

Studies by Cohen et al. (2008), Gunny (2010), Cohen and Zarowin (2010), Badertscher (2011), Zang (2012), and Li et al. (2012) all confirm that managers cut discretionary expenses and overproduce to manipulate earnings. Bartov (1993) argue that managers also sell fixed assets to avoid negative earnings growth and debt covenant violations. Graham et al. (2005) find that managers are also willing to postpose a new value-added project simply to manipulate reported earnings, even though this is clearly not a value maximizing decision.

## 3. Hypothesis development

### 3.1. Real activities manipulation and corporate diversification

Empirical research shows that managers are willing to "burn" actual cash flows through operational activities in order to keep up accounting appearances (Graham et al., 2005), which may represent substantive agency costs. To the degree that diversified firms exhibit more agency related conflicts than undiversified firms, we posit that diversified firms engage in more real activities manipulation. Our hypothesis is motivated by prior studies indicating that agency problems are more pronounced in diversified firms than in undiversified firms.[6] These studies indicate that managers of diversified firms are subject to less oversight and so have fewer incentives to make optimal decisions. According to this line of argument, managers have more discretionary power in diversified firms than their counterparts in undiversified firms.

For instance, Jiraporn et al. (2006) suggest that the strength of shareholder rights is inversely related to the propensity to diversify. Berry et al. (2006) find that diversified firms experience significantly fewer involuntary CEO turnovers than undiversified firms. Denis et al. (1997) show that diversification is negatively related to managerial and outside block ownership. Other studies argue that managers pursue diversification at the firm level to enhance their own private benefits (Amihud and Lev, 1981;

[6] see Amihud and Lev (1981), Jensen (1986), Jensen and Meckling (1986), Shleifer and Vishny (1989), Jensen and Murphy (1990), Denis et al. (1997), Houston et al. (2001), Cronqvist et al. (2001), Lins and Servaes (2002), Doukas and Pantzalis (2003), Fauver et al. (2003), Aggarwal and Samwick (2003), Nam et al. (2006), Jiraporn et al. (2006), Berry et al. (2006), Laeven and Levine (2007), Hoechle et al. (2012) and Goetz et al. (2013).

Shleifer and Vishny, 1989; Jensen and Murphy, 1990; Denis et al., 1997). Hoechle et al. (2012) argue that the loss in firm value associated with corporate diversification is partly attributable to poor corporate governance.

However, the evidence in favor of agency theory is stronger for industrial diversification than for global diversification. Jiraporn et al. (2006) find that the suppression of shareholder rights is correlated with a higher degree of industrial diversification and the combination of both industrial and global diversification, but not global diversification alone. Hence, an alternative hypothesis is that real activities manipulation is more pronounced in firms that are industrially diversified and in firms that are both globally and industrially diversified, but not in firms that are only globally diversified.

### 3.2. Real activities manipulation and firm value

According to agency theory, managers deviate from optimal business decisions to meet earnings targets when they perceive net private benefits. Thus, real activities manipulation, as a departure from optimal operational decisions, is likely to decrease long-term value. For this reason, we anticipate an inverse relation between excess value and real activities manipulation. This hypothesis is further motivated by Li et al. (2012), who show that managers use operational activities in the year prior to management buyouts to acquire the firm from shareholders at a substantial discount. Yet, Gunny (2010) argues that managers may use the operational discretion associated with real activities manipulation to attain benefits that allow for better performance.

### 3.3. Real activities manipulation and the diversification discount

Shleifer and Vishny (1989) argue that managers may entrench themselves by diversifying firm assets to match their specific human capital. Amihud and Lev (1981) suggest that managers diversify to reduce their employment risk. Hence, agency theory suggests that diversification is correlated with managerial entrenchment (Denis et al., 1997; Lins and Servaes, 2002; Fauver et al., 2003). Then again, diversification could be the outcome of already entrenched managers. Several studies argue that managers seek to diversify in order to increase their compensation, to enhance their power and prestige, and to augment their ability to extract private benefits.[7]

Empirical studies find that diversified firms trade at a discount relative to a portfolio of comparable single-segment firms (Lang and Stulz, 1994; Berger and Ofek, 1995). Comment and Jarrell (1995) and Berger and Ofek (1996) argue that diversification itself causes this discount. Cronqvist et al. (2001) argue that the major cause of the discount is not diversification per se but anticipated agency costs. Whited (2001), Mansi and Reeb (2002) and Villalonga (2004a) suggest that the discount may reflect data bias and measurement error. Yet, Campa and Kedia (2002) and Villalonga (2004b) suggest that diversified firms may trade at a discount prior to diversifying.

To the extent that diversification facilitates operational activities to manage earnings, we posit that real activities manipulation may be related to the diversification discount. Under agency theory, managers in diversified firms are more likely to deviate from optimal business decisions because they enjoy more discretionary power. We theorize that the value loss accredited to firm diversification is partially due to the adverse cash flow effects of real activities manipulation. Consequently, we expect to find larger diversification discounts among firms where managers engage in more operational activities to manipulate earnings.

Yet, Bodnar et al. (1999) and Gande et al. (2009) suggest that global diversification increases firm value, whereas industrial diversification decreases firm value. Therefore, an alternative hypothesis is that the negative relation between real activities manipulation and excess value is more pronounced only among firms that are industrially diversified and those that are both industrially and globally diversified.

[7] To name a few, e.g. see Jensen and Murphy (1990), Jensen (1986), Jensen and Meckling (1986), Houston et al. (2001), Aggarwal and Samwick (2003), Laeven and Levine (2007).

**Table 1**
Frequency distribution.

**Panel A – Number of firm-years observations by year**

| Year | *N* | Percent | Year | *N* | Percent |
|---|---|---|---|---|---|
| 1990 | 1588 | 3.52% | 2001 | 2123 | 4.70% |
| 1991 | 2038 | 4.51% | 2002 | 2135 | 4.73% |
| 1992 | 2123 | 4.70% | 2003 | 2076 | 4.60% |
| 1993 | 2218 | 4.91% | 2004 | 2052 | 4.54% |
| 1994 | 2420 | 5.36% | 2005 | 1992 | 4.40% |
| 1995 | 2623 | 5.81% | 2006 | 1939 | 4.29% |
| 1996 | 2807 | 6.21% | 2007 | 1873 | 4.15% |
| 1997 | 2842 | 6.29% | 2008 | 1789 | 3.96% |
| 1998 | 2480 | 5.49% | 2009 | 1756 | 3.89% |
| 1999 | 2289 | 5.07% | 2010 | 1804 | 3.99% |
| 2000 | 2203 | 4.88% | | | |

**Panel B – Number of firm-years observations by diversification profile**

| | *N* | Percent |
|---|---|---|
| Number of firms | | |
| Single-segment domestic (SD) | 3755 | 38.69% |
| Multi-segment domestic (MD) | 1754 | 18.07% |
| Single-segment global (SG) | 2454 | 25.29% |
| Multi-segment global (MG) | 1742 | 17.95% |
| Total number of firms | 9705 | 100.00% |
| Number of firm-years observations | | |
| Single-segment domestic (SD) | 18,162 | 40.20% |
| Multi-segment domestic (MD) | 7222 | 15.99% |
| Single-segment global (SG) | 11,919 | 26.39% |
| Multi-segment global (MG) | 7867 | 17.42% |
| Total firm-years observations | 45,170 | 100.00% |

This table provides a description of the sample. The data comes from the industry and geographic segment data in Compustat. We delete financial firms and utilities (primary SIC codes 6000–6999 and 4900–4999) because their regulated status and firms with sales less than $20 million (Berger and Ofek, 1995; Jiraporn et al., 2008). We also discard firm-years where the difference between the sum of the segment sales and total sales exceed 1% and firm-years with insufficient information to calculate the real earnings management and excess value variables.

## 4. Data and sample selection

The data is compiled from the industry and geographic segment data in Compustat over the period from 1990 to 2010.[8] We delete financial and utilities firms (primary SIC codes 6000–6999 and 4900–4999) because of their regulated status. We also delete firm-years where the difference between the sum of the segment sales and total sales exceeds 1%, as suggested by Jiraporn et al. (2008). Firms with total sales less than $20 million are also excluded (Berger and Ofek, 1995; Jiraporn et al., 2008). Finally, we discard all firm-year observations with insufficient information to compute the relevant real activities manipulation variables and excess firm value.

These search criteria result in 45,170 firm-year observations for 9705 different firms, as shown in Table 1. Pursuant to Jiraporn et al. (2008), we distinguish industrial and global diversification. A firm is classified as industrially diversified if it reports more than one business segment. Likewise, a firm is regarded as globally diversified if it reports foreign sales from more than one foreign segment. If the firm is only industrially diversified, it is denoted multi-segment domestic (MD). The table shows

[8] FASB No.14 and SEC Regulation S-K require firms to report information on segments whose sales, assets, or profits exceed 10% of the consolidated totals.

**Table 2**
Descriptive statistics.

| | Full sample | Domestic diversification | | | Global diversification | | |
|---|---|---|---|---|---|---|---|
| | | SD | MD | *t*-Statistics | SG | MG | *t*-Statistics |
| *IHERF* | 0.860 | 1.000 | 0.616 | −175.7*** | 1.000 | 0.550 | −214.3*** |
| *GHERF* | 0.826 | 1.000 | 1.000 | 0.00 | 0.597 | 0.613 | 5.08*** |
| *ASSETS* ($ millions) | 1460.140 | 871.13 | 1150.91 | 3.17*** | 1563.72 | 2946.91 | 12.43*** |
| *FSIZE* | 5.499 | 5.041 | 5.347 | 13.54*** | 5.642 | 6.483 | 33.28*** |
| *RND/SALES* | 0.045 | 0.033 | 0.017 | −12.59*** | 0.080 | 0.043 | −24.59*** |
| *CAPX/SALES* | 0.077 | 0.095 | 0.072 | −7.46*** | 0.065 | 0.061 | −1.52 |
| *EBIT/SALES* | 0.039 | 0.030 | 0.042 | 3.43*** | 0.038 | 0.058 | 5.99*** |
| *DEBT/ASSETS* | 0.514 | 0.523 | 0.539 | 4.18*** | 0.474 | 0.533 | 12.37*** |

This table provides the descriptive statistics for the 45,170 firm-year observations in our sample. We distinguish industrial and global diversification. Firms are regarded as industrially diversified if it reports more than one business segment and as globally diversified if it reports foreign sales from more than one foreign segment. Domestic firms with only one business segment are designated as single-segment domestic (*SD*). If the firm is only industrially diversified, it is denoted multi-segment domestic (*MD*). If the firm is only globally diversified, it is designated single-segment global (SG). If the firm is both industrially and globally diversified, it is denoted multi-segment global (MG). Alternatively, we use the sales-based Herfindahl index as a proxy for diversification. For consistency, we distinguish the firm's industrial Herfindahl Index (*IHERF*) from its geographic Herfindahl Index (*GHERF*). *ASSETS* represents total assets (in millions of dollars), while *FSIZE* is the natural logarithm of total assets used to proxy firm size. *RND/SALES* is the ratio of research and development expenses to total sales. *CAPX/SALES* is capital expenditures divided by total sales, which proxy for growth opportunities. Accounting performance is measured as earnings before interest and taxes divided by total sales, denoted as *EBIT/SALES*. The ratio of total debt to total assets (*DEBT/ASSETS*) is used to proxy financial leverage.

that our sample consists of a total of 1754 MD firms accounting for 7222 firm-year observations and representing 15.99% of the full sample.

If the firm is only globally diversified, it is designated single-segment global (SG). Single segment globally diversified firms account for 26.39% of the whole sample, which represents 11,919 firm-year observations from 2454 different firms. If the firm is both industrially and globally diversified, it is denoted multi-segment global (MG). We have a total of 1742 MG firms representing 17.42% of our sample (or 7867 firm-year observations). Domestic firms with only one business segment are designated as single-segment domestic (SD); we use this group as the benchmark in our empirical analyses. Our sample consists of a total of 3755 SD firms representing 18,162 firm-year observations, or 40.20% of our sample.

We use the sales-based Herfindahl index as an alternative proxy for diversification. The Herfindahl Index for the *i*th firm in year *t* is computed as:

$$HERF_{i,t} = \sum (SEG\_SALES_t / FSALES_t)^2 \quad (1)$$

where *SEG_SALES* denote the segment sales for the firm in year *t* and *FSALES* is the firm's total sales across all reported segments in that year. The Herfindahl Index is equal to 1 for single-segment firms, and is less than 1 for multiple-segment firms. Therefore, a smaller index value indicates a higher degree of diversification. For consistency, we distinguish the firm's industrial Herfindahl Index (*IHERF*) from its geographic Herfindahl Index (*GHERF*).

The descriptive statistics in Table 2 show that among multi-segment domestic and multi-segment global firms, the *IHERF* is 0.616 and 0.550 respectively, indicating that these firms have a broad scope of operations. Provided that single-segment domestic and single-segment global firms have an *IHERF* of 1, the overall estimate for the whole sample is on average 0.860. Likewise, on average the overall *GHERF* is 0.826. However, among single-segment global firms it is 0.597 and among multi-segment global firms it is 0.613, suggesting that these firms have ongoing operations in several countries.

Table 2 shows additional descriptive statistics. The firms in our sample have average assets of approximately $1.5 billion. We use the natural logarithm of total assets as a proxy for firm size. The table indicates that diversified firms tend to be significantly larger than their single-segment counterparts. Not surprisingly, MG firms represent the largest category for firms, with assets averaging approximately $3 billion.

In addition, we report descriptive statistics on key variables based on prior studies of diversification (see Berger and Ofek, 1995; Denis et al., 2002). Research and development (R&D) expenditures as a percentage of sales average about 4.5% for the full sample. However, diversified firms tend to spend significantly less on R&D than their single-segment counterparts. Diversified firms also have lower capital expenditures to sales ratios, suggesting that they have fewer growth opportunities. We measure accounting performance as earnings before interest and taxes divided by sales. The mean accounting performance score is 3.9%; also, diversified firms exhibit higher accounting performance scores than focused firms. The ratio of total debt to total assets is used to proxy financial leverage. The average debt ratio is approximately 51.4%. Yet, diversified firms use significantly more leverage than their single-segment counterparts.

## 5. Methodology

### 5.1. Real earnings management

Roychowdhury (2006) suggests three metrics for real activities manipulation: abnormal production costs, abnormal discretionary expenses, and abnormal cash flow from operations. However, Zang (2012) cautions that the net effect of real activities manipulation on abnormal cash flow is ambiguous. Pursuant to Zang (2012), we use abnormal production costs and abnormal discretionary expenses to measure real earnings management activities. Cohen and Zarowin (2010) and Cohen et al. (2008) show that these two measures effectively capture real activities manipulation.

As in earlier studies, the normal level of production costs is measured as:

$$PROD_{i,t}/A_{i,t-1} = \alpha_0 + \alpha_1(1/A_{i,t-1}) + \alpha_2(S_{i,t}/A_{i,t-1}) + \alpha_3(\Delta S_{i,t}/A_{i,t-1}) + \alpha_4(\Delta S_{i,t-1}/A_{i,t-1}) + \varepsilon_{it} \quad (2)$$

where $PROD_{i,t}$ is the sum of the cost of goods sold in year $t$ and the change in inventory from year $t-1$ to year $t$ for firm $i$. Likewise, $A_{i,t-1}$ is the total assets in year $t-1$, $S_{i,t}$ is the net sales in year $t$, while $\Delta S_{i,t}$ is the change in net sales from year $t-1$ to year $t$. We estimate the model cross-sectionally for each industry-year to account for time varying effects and industry-wide economic conditions on production costs; industry is defined by the Fama-French 48 sectors (Zang, 2012). Abnormal production cost is measured as the estimated residual from Eq. (2), which we denote $RM_{PROD}$. A higher $RM_{PROD}$ implies more overproduction of inventory, which decreases reported cost of goods sold, so the firm may report better operating margins.[9]

The normal level of discretionary expenditures is measured as:

$$DISX_{i,t}/A_{i,t-1} = \alpha_0 + \alpha_1(1/A_{i,t-1}) + \alpha_2(S_{i,t-1}/A_{i,t-1}) + \varepsilon_{i,t} \quad (3)$$

where $DISX_{i,t}$ is the discretionary expenditures (i.e., the sum of advertising, R&D, and SG&A expenses) in year $t$ for firm $i$. We also estimate Eq. (3) cross-sectionally for each industry-year to account for year and industry fixed effects on discretionary expenditures. The abnormal level of discretionary expenditures is measured as the estimated residual from the regression. As is customary in the literature, we multiply the residuals from Eq. (3) by $-1$ such that higher values indicate greater cuts in discretionary expenses to manage earnings upwards. We denote abnormal discretionary expenditures as $RM_{DISX}$.

We report separate results corresponding to each of our two individual proxies of real activities manipulation (i.e., $RM_{PROD}$ and $RM_{DISX}$). In addition, we aggregate these two measures into a composite score by taking their sum, denoted $RM_{TOTAL}$. This new variable captures the level of total real activities manipulation. Cohen and Zarowin (2010) and Zang (2012) argue that the higher $RM_{TOTAL}$, the higher the likelihood that the firm engaged in real earnings management. Following earlier studies, we winsorize the real earnings management variables at the 1% level to avoid noise in the data due to extreme observations.

[9] See Roychowdhury (2006), Cohen et al. (2008), Cohen and Zarowin (2010), Badertscher (2011), and Zang (2012).

**Table 3**
Correlation between real earnings management, excess value, and corporate diversification.

**Panel A – Earnings management measures and excess value**

| | *N* | Mean | Median | Std. Dev. | *t*-Statistic |
|---|---|---|---|---|---|
| Abnormal production cost [$RM_{PROD}$] | 45,170 | 0.004 | 0.034 | 0.259 | 3.65*** |
| Abnormal discretionary expense [$RM_{DISX}$] | 45,170 | −0.012 | −0.001 | 0.214 | −11.88*** |
| Real activities management [$RM_{TOTAL}$] | 45,170 | −0.007 | 0.039 | 0.432 | −3.37*** |
| Excess firm value [*EV*] | 45,170 | −0.061 | −0.059 | 0.752 | −17.13*** |

**Panel B – Pearson correlations**

| | $RM_{PROD}$ | $RM_{DISX}$ | $RM_{TOTAL}$ | *EV* | *SD* | *MD* | *SG* | *MG* |
|---|---|---|---|---|---|---|---|---|
| $RM_{PROD}$ | 1.000 | | | | | | | |
| $RM_{DISX}$ | 0.650*** | 1.000 | | | | | | |
| $RM_{TOTAL}$ | 0.883*** | 0.926*** | 1.000 | | | | | |
| *EV* | −0.173*** | −0.058*** | −0.122*** | 1.000 | | | | |
| *SD* | 0.033*** | 0.051*** | 0.046*** | 0.001 | 1.000 | | | |
| *MD* | 0.079*** | 0.085*** | 0.092*** | −0.091*** | −0.358*** | 1.000 | | |
| *SG* | −0.119*** | −0.141*** | −0.143*** | 0.091*** | −0.491*** | −0.261*** | 1.000 | |
| *MG* | 0.019*** | 0.016*** | 0.019*** | −0.017*** | −0.377*** | −0.200*** | −0.275*** | 1.000 |

This table shows descriptive and correlation statistics for the real activities manipulation, excess value, and diversification variables. Pursuant to Zang (2012), we use abnormal production costs and abnormal discretionary expenses to proxy real activities manipulation. Abnormal production cost ($RM_{PROD}$) is measured as the estimated residual from Eq. (2). Likewise, abnormal discretionary expenditures ($RM_{DISX}$) is measured as the estimated residual from Eq. (3) multiplied by −1. Total real activities manipulation ($RM_{TOTAL}$) is the sum of $RM_{PROD}$ and $RM_{DISX}$; it denotes the level of total real earnings management (Zang, 2012). We winsorize the real earnings management variables at the 1% level to avoid noise due to extreme observations. Excess value (*EV*) is measured as the natural logarithm of the ratio of the firm's actual value (market value of equity plus book value of debt) relative to the sum of the imputed values of its segments as stand-alone domestic firms. Pursuant to Bodnar et al. (1999), imputed segment values are computed by multiplying segment sales by the median market value to sales ratio of single-segment firms in the same industry. We drop observations with "extreme" excess values as suggested by Denis et al. (2002). The variable *SD* equals 1 if the firm is a single-segment domestic firm; zero otherwise. *MD* equals 1 if the firm is only industrially diversified; zero otherwise. *SG* equals 1 if the firm is only geographically; zero otherwise. *MG* equals 1 if the firm is both industrially and geographically diversified; zero otherwise. The symbol *** denotes statistically significance at the 1% level.

### 5.2. Measure of excess value

Excess value is measured as the natural logarithm of the ratio of the firm's actual value (market value of equity plus book value of debt) to its hypothetical imputed value as if its segments were operated as stand-alone entities. Berger and Ofek (1995) and Bodnar et al. (1999), among others, suggest that imputed segment values be calculated by multiplying segment sales by the median market value to sales ratio of single-segment firms in the same industry. We use the Fama-French 48 sectors for industry classification. Following Denis et al. (2002), we drop observations with "extreme" excess values where actual firm value is either more than four times the imputed value or less than one-fourth the imputed value.

### 5.3. Descriptive and correlation matrix

Table 3 shows descriptive and correlation statistics for the real activities manipulation, excess value, and diversification variables used in the study. Panel A reports evidence of real earnings management activities. The mean abnormal production cost is 0.004 (*t*-statistic = 3.65) and the mean abnormal discretionary expenses is −0.012 (*t*-statistic = −11.88). On average, total real activities manipulation is −0.007 (*t*-statistic = −3.37). These estimates are consistent with earlier studies (see Cohen and Zarowin, 2010). Hence, the means of the real activities proxies are not zero. Panel A also shows that the excess value for average firm in our sample is −0.061, which is significant at the 1% level (*t*-statistic = −17.13).

The Pearson correlations between real earnings management, firm value, and corporate diversification are shown in Panel B. There is a significant positive correlation of 0.650 between $RM_{PROD}$ and $RM_{DISX}$; other studies also find a positive correlation (Zang, 2012). There is also a strong association between $RM_{PROD}$ and $RM_{TOTAL}$ (a correlation of 0.883) and between $RM_{DISX}$ and $RM_{TOTAL}$ (a correlation of 0.926). As expected, the correlation between excess value and each of the three measures of real earnings management is significantly negative, suggesting that real earnings management reduces firm value. This negative correlation is consistent with the observation that real activities manipulation involves deviations from normal business practices that may reduce firm value (Graham et al., 2005; Roychowdhury, 2006).

As anticipated, the correlations between measures of corporate diversification and real activities manipulation are generally positive and highly significant, implying that real earnings management tends to be more severe in diversified firms. For instance, the correlation between $RM_{TOTAL}$ and industrial diversification is 0.092, while the correlation between $RM_{TOTAL}$ and a combination of industrial and global diversification is 0.019. Yet, global diversification by itself elicits a significantly negative relation with all three measures of real earnings management (a correlation of about −0.14), implying that real earnings management is mitigated when firms only diversify geographically.

Consistent with previous studies, we also find significantly negative correlations between excess value and corporate diversification (with the exception of global diversification). As an example, there is a strong −0.091 correlation between excess value and industrial diversification, and a −0.017 correlation between excess value and a combination of industrial and global diversification. Consequently, the correlation matrix shows that industrially diversified firms, as well as industrially and globally diversified firms, have notably higher levels of real earnings management and considerably lower valuations than their single-segment counterparts.

### 5.4. Real earnings management regression model

To examine the relation between corporate diversification and real earnings management, we take advantage of the model developed by Zang (2012) that accounts for the trade-off between real and accrual-based earnings management based on relative costs. Consequently, we estimate the following real earnings management equation:

$$\begin{aligned} RM_{TOTAL,i,t} = {} & \alpha_0 + \beta_1 MD_{i,t} + \beta_2 SG_{i,t} + \beta_3 MG_{i,t} + \beta_4 MKTSHARE_{i,t-1} + \beta_5 ZSCORE_{i,t-1} \\ & + \beta_6 INST_{i,t-1} + \beta_7 MTR_{i,t} + \beta_8 BIG8_{i,t} + \beta_9 ATENURE_{i,t} + \beta_{10} SOX_t + \beta_{11} NOA_{i,t-1} \\ & + \beta_{12} CYCLE_{i,t-1} + \beta_{13} FSIZE_{i,t} + \beta_{14} RNDR_{i,t} + \beta_{15} DEBTR_{i,t} + \beta_{16} MTB_{i,t} \\ & + \beta_{17} ROA_{i,t-1} + \varepsilon_{i,t} \end{aligned} \tag{4}$$

where $MD_{i,t}$ is an indicator variable equal to 1 if the firm is only industrially diversified (Multi-segment Domestic); zero otherwise. $SG_{i,t}$ is an indicator variable that takes the value 1 if the firm is only geographically diversified (Single-segment Global); zero otherwise. $MG_{i,t}$ is an indicator variable equal to 1 if the firm is both industrially and geographically diversified (Multi-segment Global); zero otherwise.

Zang (2012) suggests that real activities manipulation is constrained by its own costs; however, when the costs associated with real activities manipulation are high, firms use more accrual manipulation (and vice versa). Consequently, the level of real activities manipulation is expected to be negatively related to the costs associated with real activities manipulation, but positively related to the costs associated with accrual-based earnings management.

She identifies four proxies for the costs of real activities manipulation. Market share at the beginning of the year ($MKTSHARE_{i,t-1}$) is used to capture the firm's leader status in the industry. The Altman's $Z$-score at the beginning of the year ($ZSCORE_{i,t-1}$) is used as a proxy for the firm's financial health.[10] Zang also suggests that higher institutional ownership and higher marginal tax rates reflect higher real

[10] $ZSCORE_t = 0.3\frac{NI_t}{Asset_t} + \frac{Sales_t}{Asset_t} + 1.4\frac{\text{Retained Earnings}_t}{Asset_t} + 1.2\frac{\text{Working Capital}_t}{Asset_t} + 0.6\frac{Stock\ Price \times Shares\ Outstanding_t}{Total\ Liabilities_t}$, as suggested by Zang (2012).

activities manipulation costs. Therefore, we also control for the percent of institutional ownership at the beginning of the year ($INST_{i,t-1}$) and the marginal tax rate ($MTR_{i,t}$) for the fiscal year.

The costs associated with accrual manipulation reflect scrutiny by auditors and regulators (and the penalty of detection), as well as the flexibility within firms' accounting systems (Cohen et al., 2008; Cohen and Zarowin, 2010; Zang, 2012). Studies by Cohen and Zarowin (2010) and Zang (2012) argue that scrutiny increases with the presence of a Big 8 audit firm. $BIG8_{i,t}$ equals 1 if the firm's auditor is one of the Big 8, zero otherwise.[11] $ATENURE_{i,t}$ denotes auditor tenure. In addition, Cohen et al. (2008) show that managers have shifted away from accrual manipulation to real activities manipulation following the passage of SOX because of increased scrutiny of accounting practices. $SOX_{i,t}$ equals 1 if the fiscal year is after 2003; zero otherwise.

Cohen and Zarowin (2010) and Zang (2012) underscore that the ability to manipulate accruals is constrained by prior accrual management activities because of limited flexibility within GAAP. However, accrual flexibility is greater when firms have longer operating cycles because they have larger accrual accounts and a longer period for accruals to reverse (Zang, 2012). As advised by Cohen and Zarowin (2010) and Zang (2012), we use net operating assets at the beginning of the year ($NOA_{i,t-1}$) to reflect accrual management in the previous period and the length of the operating cycles ($CYCLE_{i,t-1}$) to control for accounting flexibility.[12]

We also control for the natural logarithm of total assets to proxy firm size ($FSIZE_{i,t}$) since larger firms have more information asymmetries that managers may use to manage earnings (Mohd and Ahmed, 2005; Chung et al., 2005; Othman and Zeghal, 2006). Yet, Chin et al. (2009) and Jiraporn et al. (2008) find that the larger firms are associated with less earnings management. We also use the ratio of research and development expenses to total sales ($RNDR_{i,t}$) to control for the level of informational asymmetry (Jiraporn et al., 2008). In addition, it is more difficult to manipulate earnings when firms have more debt (Rodríguez-Pérez and Hemmen, 2010); we account for financial leverage using the total debt to total assets ratio ($DEBTR_{i,t}$). We use the market-to-book ratio at the beginning of the year ($MTB_{i,t}$) to control for the firm's growth opportunities (Zang, 2012). Since firms are motivated to manipulate earnings because of poor performance (McNichols, 2000; Dechow et al., 2011), we use return on assets ($ROA_{i,t-1}$) as a proxy for profitability (Zang, 2012).

### 5.5. Excess value regression model

The correlation matrix (see Table 3) shows that real activities manipulation is influenced by firm diversification, and that the diversification and real activities manipulation variables all have a noticeable effect on excess value. Consequently, to assess the economic impact of real earnings management on excess value, we utilize a proxy for real activities manipulation that is unrelated with firm diversification. To the extent that corporate diversification affects real earnings management, by design, the residuals from Eq. (4) are uncorrelated with our firm diversification variables.

As a result, we use the unexpected total real activities manipulation (*URM*) along with the diversification variables to explain excess value. We anticipate an inverse relation between excess value and *URM*. To examine if the negative relation between the unexpected level of real activities manipulation and excess value is more pronounced among diversified firms, we construct interaction terms between *URM* and our diversification variables.

According to the literature, the diversification discount may be endogenous to the decision to diversify (Campa and Kedia, 2002; Graham et al., 2002; Villalonga, 2004b). Thus, we estimate an excess value model that controls for the self-selection of diversified firms. For instance, Campa and Kedia (2002) find that when the endogeneity of the diversification decision is considered, the discount drops, and sometimes turns into a premium. For our excess value analysis, we use a regression of the

[11] Or Big 6, Big 5, and Big 4 audit firms in recent years (see Zang, 2012).

[12] Net operating assets are computed as shareholders' equity less cash and marketable securities plus total debt. Operating cycle is computed as the days receivable plus the days inventory less the days payable at the beginning of the year (Dechow, 1994; Zang, 2012).

general form:

$$EV_{i,t} = \alpha_0 + \beta_1 MD_{i,t} + \beta_2 SG_{i,t} + \beta_3 MG_{i,t} + \beta_4 URM_{i,t} + \beta_5 URM_{i,t} \times MD_{i,t} + \beta_6 URM_{i,t} \times SG_{i,t} + \beta_7 URM_{i,t} \times MG_{i,t} + \beta_8 FSIZE_{i,t} + \beta_9 CAPXR_{i,t} + \beta_{10} EBITR_{i,t} + \beta_{11} DEBTR_{i,t} + \beta_{12} INVMILLS_{i,t} + \varepsilon_{i,t} \quad (5)$$

where $EV_{i,t}$ is the excess value measure. The variables $MD_{i,t}$, $SG_{i,t}$, $MG_{i,t}$, and $URM_{i,t}$ are previously specified and are as defined earlier. $URM_{i,t} \times MD_{i,t}$ is an interaction terms between the unexpected total real activities manipulation ($URM_{i,t}$) and the industrial diversification variables ($MD_{i,t}$). By the same token, $URM_{i,t} \times SG_{i,t}$ is an interaction term between $URM_{i,t}$ and the global diversification variable ($SG_{i,t}$). Likewise, $URM_{i,t} \times MG_{i,t}$ is an interaction term between $URM_{i,t}$ and the variable indicating a combination of both industrial and global diversification ($MG_{i,t}$).

As in earlier studies, we also control for other determinants of excess value. We control for firm size ($FSIZE_{i,t}$). To control for relative growth opportunities, we use the industry-adjusted capital expenditure-to-sales ratio ($CAPXR_{i,t}$). In addition, to control for firm profitability, we use the industry-adjusted earnings before interest and taxes relative to sales ($EBITR_{i,t}$). The industry-adjusted total debt to total assets ratio ($DEBTR_{i,t}$) is included as a proxy to control for relative financial leverage. Denis et al. (2012) also use industry-adjusted control variables.

*INVMILLS* is the inverse Mills ratio from the Heckman (1979) self-selection regression proposed by Campa and Kedia (2002) used to control for the endogeneity of the diversification decision. Campa and Kedia stress that since firms choose to diversify, it is important to consider the endogeneity of the decision in analyzing its effect on firm value. We adapt their model of the decision to diversify, given as:

$$DIV_{i,t} = \alpha_0 + \beta_1 LNASSET_{i,t} + \beta_2 EBIT/SALES_{i,t} + \beta_3 CAPX/SALES_{i,t} + \beta_4 LNASSET_{i,t-1} + \beta_5 EBIT/SALES_{i,t-1} + \beta_6 CAPX/SALES_{i,t-1} + \beta_7 SNP_{i,t} + \beta_8 PNDIV_t + \beta_9 PSDIV_t + \beta_{10} LOGMVOL_t + \beta_{11} MNUM_t + \beta_{12} REAL\_GDPG_t + \beta_{13} REAL\_GDPG_{t-1} + \beta_{14} MAJOREX_{i,t} + \beta_{15} FOREIGN_{i,t} + \varepsilon_{i,t} \quad (6)$$

We estimate the model using ordinal probit analysis in which the dependent variable $DIV_{it}$ takes the value 1 if the firm is only industrially diversified, 2 if the firm is only geographically diversified, and 3 if the firm is both industrially and geographically diversified; zero otherwise.

Campa and Kedia propose several control variables. *LNASSET* is the natural logarithm of total assets. *EBIT/SALES* is the *EBIT* to sales ratio. *CAPX/SALES* is the capital expenditures to sales ratio. *SNP* is a dummy for firms included in the S&P500 index. *PNDIV* is the fraction of all firms in the industry that are conglomerates, and *PSDIV* is the fraction of industry sales accounted for by conglomerates. *LOGMVOL* and *MNUM* are the dollar value and the number of mergers and acquisitions in a given year, respectively. *REAL_GDPG* is the real growth rate of gross domestic product. *MAJOREX* is a dummy for firms listed on Nasdaq, NYSE, or AMEX. *FOREIGN* is a dummy variable indicating firm incorporated outside the U.S. In addition, we control for year-fixed effects and correct the standard errors for firm clustering effects.

## 6. Regression results

### 6.1. Relation between real earnings management and corporate diversification

In this section, we examine the relationship between real activities manipulation and corporate diversification. Table 4 presents multivariate regression results. In Panel A, we report the results from the estimation of Eq. (4). We include year-fixed effects to control for time dependent factors.

As expected, the coefficient for the *MD* variable is significantly positive; the point estimate suggests that industrial diversification exacerbates real earnings management by 4.1% ($t$-statistic = 7.31). The coefficient for the *MG* variable is also positive and significant at the 1% level ($t$-statistic = 4.47),

**Table 4**
Cross-sectional regression results on real activities manipulation.

| | Panel A | | Panel B | | | |
|---|---|---|---|---|---|---|
| | $RM_{TOTAL}$ | | $RM_{PROD}$ | | $RM_{DISX}$ | |
| | Coef. | *t*-Stat | Coef. | *t*-Stat | Coef. | *t*-Stat |
| *INTERCEPT* | 0.132 | 5.48*** | 0.081 | 4.42*** | 0.048 | 4.12*** |
| $MD_t$ | 0.041 | 7.31*** | 0.042 | 7.50*** | 0.031 | 5.68*** |
| $SG_t$ | −0.075 | −10.17*** | −0.056 | −8.63*** | −0.082 | −10.55*** |
| $MG_t$ | 0.024 | 4.47*** | 0.035 | 6.30*** | 0.010 | 1.77* |
| $MKTSHARE_{t-1}$ | 0.029 | 4.81*** | 0.037 | 5.83*** | 0.020 | 3.32*** |
| $ZSCORE_{t-1}$ | 0.015 | 3.30*** | 0.011 | 1.77* | −0.001 | −0.39 |
| $INST_{t-1}$ | −0.001 | −0.28 | 0.000 | 0.05 | −0.002 | −0.69 |
| $MTR_t$ | −0.020 | −1.72* | −0.041 | −2.77*** | 0.001 | 0.11 |
| $BIG8_t$ | −0.028 | −4.52*** | −0.019 | −3.08*** | −0.030 | −4.77*** |
| $ATENURE_t$ | −0.012 | −1.87* | −0.003 | −0.41 | −0.017 | −2.66*** |
| $SOX_t$ | 0.085 | 5.28*** | 0.063 | 3.64*** | 0.090 | 5.68*** |
| $NOA_{t-1}$ | 0.017 | 2.76*** | 0.010 | 1.63 | 0.018 | 4.08*** |
| $CYCLE_{t-1}$ | −0.031 | −5.08*** | −0.013 | −1.96* | −0.063 | −10.34*** |
| $FSIZE_t$ | −0.120 | −13.58*** | −0.112 | −14.20*** | −0.105 | −11.21*** |
| $RNDR_t$ | −0.190 | −6.15*** | −0.105 | −5.57*** | −0.223 | −6.31*** |
| $DEBT_t$ | −0.010 | −0.75 | 0.023 | 1.09 | −0.036 | −3.80*** |
| $MTB_{t-1}$ | −0.006 | −0.89 | −0.008 | −1.36 | −0.004 | −0.61 |
| $ROA_t$ | −0.065 | −3.47*** | −0.107 | −3.27*** | −0.022 | −2.43** |
| *F*-statistic | 54.94 | | 49.23 | | 50.60 | |
| Adjusted $R^2$ | 0.076 | | 0.061 | | 0.082 | |
| Number of Obs. | 38,836 | | 388,366 | | 38,836 | |
| Year fixed effects | YES | | YES | | YES | |

We report results corresponding to the abnormal production cost ($RM_{PROD}$), abnormal discretionary expenses ($RM_{DISX}$) and composite score for total real earnings management ($RM_{TOTAL}$). $MD_t$ equals 1 if the firm is only industrially diversified; zero otherwise. $SG_t$ equals 1 if the firm is only geographically; zero otherwise. $MG_t$ equals 1 if the firm is both industrially and geographically diversified; zero otherwise. $MKTSHARE_{t-1}$ is market share at the beginning of the year, $ZSCORE_{t-1}$ is the Altman's *Z*-score at the beginning of the year, $INST_{t-1}$ is the percent of institutional ownership at the beginning of the year and $MTR_t$ is the marginal tax rate for the year. $BIG8_t$ equals 1 if the firm's auditor is one of the Big 8; zero otherwise. $ATENURE_t$ is the log of the number of years the auditor has been with the firm. $SOX_t$ equals 1 if the fiscal year is after 2003; zero otherwise. $NOA_{t-1}$ is net operating assets at the beginning of the year, which is computed as shareholders' equity less cash and marketable securities plus total debt. $CYCLE_{t-1}$ is the length of the operating cycles, which is computed as the days receivable plus the days inventory less the days payable at the beginning of the year. $FSIZE_t$ is the natural logarithm of total assets. *RNDR* is the ratio of research and development expenses to total sales. $DEBT_t$ is the total debt to total assets ratio. $MTB_{t-1}$ is the market-to-book ratio at the beginning of the year. $ROA_t$ is the return on assets. ***, **, and * indicate statistically significance at the 1%, 5%, and 10% level, respectively.

indicating that a combination of industrial and global diversification increases real activities manipulation by 2.6%.

In contrast, the results show that the coefficient for the SG variable is negative and highly significant (*t*-statistic = −10.17). The estimated coefficient is −0.071, implying that real activities manipulation is 7.1% lower in firms that are globally but not industrially diversified. This result digresses from the result of industrial diversification, and is consistent with studies suggesting that industrial diversification and global diversification are inherently different. For instance, Jiraporn et al. (2006) find that while industrial diversification is motivated by managers taking advantage of weak shareholder rights, global diversification is not. Also, Bodnar et al. (1999) find that global diversification increases firm value, whereas industrial diversification decreases it. Gande et al. (2009) suggest that the value enhancement from global diversification is driven by both financial and real effects; industrial diversification relates only to real effects because it does not have a financial dimension.

To check the robustness of our findings, we separately assess the impact of corporate diversification on the two individual real activities manipulation proxies ($RM_{PROD}$ and $RM_{DISX}$). The corresponding results are reported in Panel B. Consistent with our earlier results, we again find significantly positive coefficients for both the MD and the MG variables, but a significantly negative coefficient for the SG

variable regardless of the measure used to proxy real activities manipulation. The coefficient for the MD variable indicates that industrial diversification has a more pronounced effect on $RM_{PROD}$ (about 4.2%) than on $RM_{DISX}$ (only about 3.1%). Likewise, the MG variable suggests that a combination of industrial and global diversification elicits a larger increase in $RM_{PROD}$ (about 3.5%) than in $RM_{DISX}$ (only about 1.0%). However, the SG variable has a more pronounced negative impact on $RM_{DISX}$ (about −8.2%) than its corresponding impact on $RM_{PROD}$ (only about −5.6%).

Overall, our findings are in conflict with those reported by Jiraporn et al. (2008) and El Mehdi and Seboui (2011); they suggest that industrial (global) diversification decreases (increases) earnings management. One explanation for the observed difference is that prior studies use discretionary accruals to proxy earnings management, whereas we use real activities manipulation. Dechow et al. (2011) recently show that traditional methods of estimating discretionary accruals suffer from significant measurement errors, and that financial statement information beyond accruals is important for identifying earnings manipulation. McNichols (2000) underscores that by focusing on accruals, the accuracy of detecting earnings management is reduced because the manipulation on other items is overlook. Furthermore, given that real earnings management is harder to detect and must occur during the fiscal year (Graham et al., 2005), managers adjust their accruals at year-end based on the realized level of real activities manipulation (Zang, 2012).

Several of our control variables are also significant. The coefficients on *MKTSHARE* and the *ZSCORE* variables are positive and significant, confirming that firms with larger market shares and stronger financial health engage in higher levels of real activities manipulation. Zang (2012) suggests that these results are consistent with these managers perceiving themselves as having more flexibility to deviate from optimal business decisions due to their competitive advantage in the industry or their healthy financial condition. The significantly negative coefficient for the *MTR* variable implies that firms with higher marginal tax rates find real activities manipulation more costly.

The coefficients for the *BIG8* and the *ATENURE* variables are negative and significant, indicating that managers who are subject to more reputable audit firms and auditors with longer tenure engage in lower levels of real activities manipulation. Consistent with Cohen et al. (2008), the coefficient on the SOX variable is positive and highly significant, emphasizing the prevalence of real activities manipulation in the post-SOX period due to heightened scrutiny of financial reports. Real activities manipulation is more pronounced among firms with less accounting flexibility due to accrual manipulation in prior years or shorter operating cycles. This is evident by the positive coefficient for the *NOA* variable and the negative coefficient for the *CYCLE* variable (Zang, 2012).

The coefficients for the *FSIZE* and *RNDR* variables are negative and highly significant, suggesting that more informational asymmetries are not associated with higher levels of earnings management (Jiraporn et al., 2008; Chin et al., 2009). The coefficient for the *ROA* variable is also negative and significant, implying that more profitable firms engage in less real activities manipulation. This is consistent with the view that earnings manipulation is motivated by waning performance (McNichols, 2000; Dechow et al., 2011).

Considering that firms choose to diversify, a potential concern is selection bias (Campa and Kedia, 2002). To address the self-selection of diversified firms, we employ the Heckman (1979) two-step self-selectivity approach. These results are reported in Table 5. In the first stage, we assess a firm's choice to diversify (see Panel A) based on the model suggested by Campa and Kedia (2002). In the second stage, we then compute the inverse Mills ratio (*INVMILLS*) and include it as an explanatory variable in our real earnings management regression (see Panel B).

Overall, the results in Table 5 indicate that our findings are not biased by self-selection. The inclusion of the inverse Mills ratio does not change any of the relationships between real earnings management and corporate diversification variables. Thus, our results are robust even after controlling for a firm's endogenous choice to diversify its operations. Furthermore, the coefficient of the *INVMILLS* variable is statistically insignificant, implying that self-selection is not a problem in our analysis.

Since our analysis may be sensitive to how corporate diversification is measured, we consider alternative measures of diversification. In Table 6, we check the robustness of the results using the sales-based industrial Herfindahl Index (*IHERF*) and the sales-based geographic Herfindahl Index (*GHERF*). As anticipated, the variable *IHERF* is negative and highly significant. Since a lower index value implies a higher level of industrial diversification, the estimated coefficient of −0.070 in Model

**Table 5**
Heckman (1976) two-step regression for selection bias.

| Panel A: Ordered probit regression | | | Panel B: Heckman correction: $RM_{TOTAL}$ | | |
|---|---|---|---|---|---|
| | Coef. | Wald $X^2$ stat | | Coef. | *t*-Stat |
| *INTERCEPT* | 1.831 | 7.396*** | *INTERCEPT* | 0.128 | 5.277*** |
| *LNASSET* | 0.019 | 0.210 | $MD_t$ | 0.040 | 7.267*** |
| *EBIT/SALE* | −0.039 | −1.470 | $SG_t$ | −0.074 | −10.080*** |
| CAPX/SALE | −0.224 | −4.916*** | $MG_t$ | 0.025 | 4.550*** |
| *LNASSET* (1 lag) | 0.546 | 6.234*** | $MKTSHARE_{t-1}$ | 0.029 | 4.743*** |
| *EBIT/SALE* (1 lag) | 0.333 | 1.635 | $ZSCORE_{t-1}$ | 0.015 | 3.285*** |
| *CAPX/SALE* (1 lag) | 0.099 | 1.334 | $INST_t$ | −0.001 | −0.301 |
| *SNP* | 0.047 | 2.459** | $MTR_t$ | −0.018 | −1.576 |
| *PNDIV2* | 0.396 | 8.558*** | $BIG8_t$ | −0.027 | −4.446*** |
| *PSDIV2* | −0.053 | −1.229 | $ATENURE_t$ | −0.012 | −1.814* |
| *LOGMVOL* | 0.176 | 4.377*** | $SOX_t$ | 0.086 | 5.337*** |
| *MNUM* | −0.259 | −6.197*** | $NOA_{t-1}$ | 0.026 | 1.806* |
| *REAL_GDPG* | 0.112 | 7.179*** | $CYCLE_{t-1}$ | −0.032 | −5.247*** |
| *REAL_GDPG* (1 lag) | 0.054 | 3.910*** | $FSIZE_t$ | −0.122 | −13.663*** |
| *MAJOREX* | 0.102 | 3.208*** | $RNDR_t$ | −0.189 | −6.140*** |
| *FOREIGN* | 0.052 | 1.419 | $DEBT_t$ | −0.009 | −0.686 |
| | | | $MTB_{t-1}$ | −0.005 | −0.802 |
| | | | $ROA_t$ | −0.064 | −3.429*** |
| | | | $INVMILLS_t$ | −0.006 | −0.983 |
| Pseudo $R^2$ | 6.53% | | *F*-statistic | 53.08 | |
| Wald $X^2$ | 773.7*** | | Adjusted $R^2$ | 7.6% | |
| Number of Obs. | 44,772 | | # of Obs. | 38,526 | |
| | | | Year effects | YES | |

In Panel A, we estimate an ordinal probit regression based on the diversification decision model suggested by Campa and Kedia (2002). *LNASSET* is the log of total assets, *EBIT/SALES* is the ratio of *EBIT* to sales, and *CAPX/SALES* is the ratio of capital expenditures to sales. *SNP* = 1 when the firm is part of the S&P index; 0 otherwise. *PNDIV* is the fraction of all firms in the industry that are conglomerates and *PSDIV* is the fraction of industry sales accounted for by conglomerates. *MNUM* is the number of merger and acquisition announcements in a given year and *MVOL* is log of their annual value in billions of U.S. dollars. *REAL_GDPG* is the real growth rate of gross domestic product. *MAJOREX* = 1 if the firm is listed on a major exchange. *FOREIGN* = 1 if the firm is incorporated outside the U.S. As shown in Panel B, we compute the inverse Mills ratio (*INVMILLS*) and include it as an explanatory variable in the total real activities manipulation model. $MD_t$ = 1 if the firm is only industrially diversified; zero otherwise. $SG_t$ = 1 if the firm is only geographically; zero otherwise. $MG_t$ = 1 if the firm is both industrially and geographically diversified; zero otherwise. $MKTSHARE_{t-1}$ is market share at the beginning of the year, $ZSCORE_{t-1}$ is the Altman's Z-score at the beginning of the year, $INST_{t-1}$ is the percent of institutional ownership at the beginning of the year, and $MTR_t$ is the marginal tax rate for the year. $BIG8_t$ equals 1 if the firm's auditor is one of the Big 8; zero otherwise. $ATENURE_t$ is the log of the number of years the auditor has been with the firm. $SOX_t$ = 1 if the fiscal year is after 2003; zero otherwise. $NOA_{t-1}$ is net operating assets at the beginning of the year, which is computed as shareholders' equity less cash and marketable securities plus total debt. $CYCLE_{t-1}$ is the length of the operating cycles at the beginning of the year. *FSIZE* is the natural logarithm of total assets. *RNDR* is the ratio of R&D to total sales. $DEBTR_t$ is the total debt to total assets ratio. $MTB_{t-1}$ is the market-to-book ratio at the beginning of the year. $ROA_t$ is the return on assets. ***, **, and * indicate statistically significance at the 1%, 5%, and 10% level, respectively.

3 suggests that more industrial diversification is associated with about 7% more real earnings management. By the same token, the variable *GHERF* is significantly positive, indicating that more global diversification is associated with less real earnings management. Thus, very similar results to those we reported to this point are obtained for these alternative measures.

### 6.2. Excess value and corporate diversification

In this section, we examine whether excess value is correlated with the level of real earnings management, and how the relation between corporate diversification and real earnings management affects firm value. Table 7 presents regression results that accounts for the endogeneity of the diversification decision (Campa and Kedia, 2002). In Model 2, we report the results from the estimation of Eq. (5) (in Panel A); however, Model 1 does not include the any of the interaction terms between the real earnings management and diversification variables.

**Table 6**
Real activities manipulation and alternative measures of diversification.

| | Panel A | | Panel B | | | |
|---|---|---|---|---|---|---|
| | MODEL 1 | | MODEL 2 | | MODEL 3 | |
| | Coef. | t-stat | Coef. | t-stat | Coef. | t-stat |
| *INTERCEPT* | 0.270 | 10.55*** | 0.022 | 0.69 | 0.144 | 4.66*** |
| $IHERF_t$ | −0.065 | −13.04*** | – | – | −0.070 | −13.56*** |
| $GHERF_t$ | – | – | 0.055 | 7.31*** | 0.061 | 8.06*** |
| $MKTSHARE_{t-1}$ | 0.030 | 4.76*** | 0.035 | 5.61*** | 0.029 | 4.75*** |
| $ZSCORE_{t-1}$ | 0.015 | 3.47*** | 0.014 | 2.81*** | 0.015 | 3.28*** |
| $INST_t$ | −0.001 | −0.32 | −0.001 | −0.28 | −0.001 | −0.32 |
| $MTR_t$ | −0.017 | −1.43 | −0.017 | −1.42 | −0.019 | −1.62 |
| $BIG8_t$ | −0.030 | −4.74*** | −0.028 | −4.54*** | −0.028 | −4.49*** |
| $ATENURE_t$ | −0.012 | −1.87* | −0.011 | −1.72* | −0.012 | −1.83* |
| $SOX_t$ | 0.082 | 5.07*** | 0.089 | 5.44*** | 0.089 | 5.47*** |
| $NOA_{t-1}$ | 0.028 | 1.86* | 0.027 | 1.84* | 0.027 | 1.85* |
| $CYCLE_{t-1}$ | −0.019 | −2.91*** | −0.035 | −5.79*** | −0.030 | −4.97*** |
| $FSIZE_t$ | −0.138 | −14.02*** | −0.113 | −13.12*** | −0.120 | −13.88*** |
| $RNDR_t$ | −0.199 | −6.18*** | −0.196 | −6.13*** | −0.189 | −6.07*** |
| $DEBT_t$ | −0.010 | −0.77 | −0.002 | −0.12 | −0.007 | −0.57 |
| $MTB_{t-1}$ | −0.005 | −0.91 | −0.005 | −0.85 | −0.005 | −0.83 |
| $ROA_t$ | −0.063 | −3.42*** | −0.064 | −3.30*** | −0.064 | −3.41*** |
| $INVMILLS_t$ | −0.006 | −0.95 | −0.006 | −1.05 | −0.006 | −0.99 |
| *F*-statistic | 47.08*** | | 46.81*** | | 55.58*** | |
| Adjusted $R^2$ | 0.071 | | 0.069 | | 0.082 | |
| # of Obs. | 38,526 | | 38,526 | | 38,526 | |
| Year effects | YES | | YES | | YES | |

This table presents regression results on real activities manipulation ($RM_{TOTAL}$) and an alternative measure of diversification, the sales-based Herfindahl Index. $IHERF_t$ and $GHERF_t$ are the industrial and the geographic Herfindahl index, respectively. $MKTSHARE_{t-1}$ is market share at the beginning of the year, $ZSCORE_{t-1}$ is the Altman's *Z*-score at the beginning of the year, $INST_{t-1}$ is the percent of institutional ownership at the beginning of the year and $MTR_t$ is the marginal tax rate for the year. $BIG8_t$ equals 1 if the firm's auditor is one of the Big 8; zero otherwise. $ATENURE_t$ is the log of the number of years the auditor has been with the firm. $SOX_t$ equals 1 if the fiscal year is after 2003; zero otherwise. $NOA_{t-1}$ is net operating assets at the beginning of the year, which is computed as shareholders' equity less cash and marketable securities plus total debt. $CYCLE_{t-1}$ is the length of the operating cycles, which is computed as the days receivable plus the days inventory less the days payable at the beginning of the year. *FSIZE* is the natural logarithm of total assets. *RNDR* is the ratio of research and development expenses to total sales. $DEBTR_t$ is the total debt to total assets ratio. $MTB_{t-1}$ is the market-to-book ratio at the beginning of the year. $ROA_t$ is the return on assets. *INVMILLS* is the Heckman (1976) inverse Mills ratio. ***, **, and * indicate statistically significance at the 1%, 5%, and 10% level, respectively.

Notice that the coefficients on all the diversification dummy variables are negative and statistically significant. Consistent with Denis et al. (2002), these findings suggest that industrial as well as global diversification (and the combination of the two) have detrimental effect on firm value. Specifically, there is a 7.4% discount for industrial diversification, a 3.1% discount for global diversification, and an 11% discount for a mixture of industrial and global diversification. Our point estimates are lower than those reported by Denis et al. (2002); the differences maybe attributable to our inclusion of proxies for the level of real activities manipulation and the endogeneity of the diversification decision.

We posit that a departure from optimal operational decisions is likely to have an adverse effect on firm valuation. As expected, the results in Table 7 also indicate that excess value is significantly lower when firms engage in higher levels of real activities manipulation. The coefficient of the *URM* variable is significantly negative, implying that excess value is roughly 2% lower when real earnings management is abnormally highly. This translates to almost a $34 million loss to the shareholders of the average firm in our sample.[13] Hence, the economic impact of managers' endeavors to use real economic action to manipulate earnings is striking.

[13] The $34 million was estimated by multiplying the estimated coefficient of (−0.023) by the market capitalization of the median firm in the sample given in Table 2 ($1460 million).

**Table 7**
Valuation, real activities manipulation, and diversification.

| | Panel A: Excess value | | Panel B: Tobin's Q | | | |
|---|---|---|---|---|---|---|
| | MODEL 1 | | MODEL 2 | | MODEL 2 | |
| | Coef. | *t*-Stat | Coef. | *t*-Stat | Coef. | *t*-Stat |
| *INTERCEPT* | −0.701 | −4.09*** | −0.557 | −4.34*** | −0.147 | −2.96*** |
| *MD* | −0.074 | −10.31*** | −0.074 | −12.91*** | −0.172 | −7.07*** |
| *SG* | −0.031 | −4.15*** | −0.031 | −4.13*** | −0.041 | −2.48** |
| *MG* | −0.110 | −15.47*** | −0.110 | −18.85*** | −0.155 | −6.18*** |
| *URM* | −0.021 | −2.76*** | −0.023 | −2.96*** | −0.356 | −7.64*** |
| *URM* × *MD* | – | – | −0.007 | −2.14** | −0.078 | −2.59*** |
| *URM* × *SG* | – | – | 0.020 | 2.28** | 0.149 | 2.55** |
| *URM* × *MG* | – | – | −0.017 | −2.12** | −0.129 | −1.53 |
| *FSIZE* | 0.262 | 6.76*** | 0.262 | 8.28*** | 0.050 | 5.87*** |
| *ICAPXR* | 0.149 | 7.87*** | 0.149 | 7.31*** | 0.623 | 3.68*** |
| *IADR* | 0.005 | 0.60 | 0.004 | 0.49 | −0.413 | −0.78 |
| *IRNDR* | 0.289 | 16.32*** | 0.290 | 14.28*** | 0.889 | 4.85*** |
| *IDEBTR* | −0.101 | −2.55** | −0.101 | −3.13*** | −0.143 | −3.47*** |
| *IEBITR* | 0.161 | 4.18*** | 0.162 | 4.12*** | 0.651 | 3.64*** |
| *INVMILLS* | 0.016 | 0.07 | 0.016 | 0.08 | 0.203 | 1.21 |
| *F*-statistic | 273.9*** | | 250.6*** | | 19.48*** | |
| Adjusted $R^2$ | 0.184 | | 0.184 | | 0.105 | |
| # of Obs. | 30,279 | | 30,279 | | 30,279 | |
| Year effects | YES | | YES | | YES | |
| industry effects | YES | | YES | | YES | |

Panel data regression results of firm value on variables denoting industrial and global diversification, and a set of control variables. In Panel A, excess value is measured as the natural logarithm of the ratio of the firm's actual value (market value of equity plus book value of debt) relative to the sum of the imputed values of its segments as stand-alone domestic firms. Imputed segment values are computed by multiplying segment sales by the median market value to sales ratio of single-segment firms in the same industry. $MD_t = 1$ if the firm is only industrially diversified; zero otherwise. In Panel B, Tobin's *Q* is based on is Chung and Pruitt's (1994) approximation; it is measured as the sum of the market value, liquidating value of preferred stock, net short-term liabilities and the book value of long-term debt divided by total assets. $SG_t = 1$ if the firm is only geographically; zero otherwise. $MG_t = 1$ if the firm is both industrially and geographically diversified; zero otherwise. *URM* is the residuals from Eq. (4), representing the unexpected total real activities manipulation. *URM* × *MD*, *URM* × *SG*, and *URM* × *MG* are interaction terms. *FSIZE* is the natural logarithm of total assets. *ICAPXR* is the industry-adjusted ratio of ratio of capital expenditures and sales. *IADR* is the industry-adjusted ratio of ratio of advertisement expenses and sales. *IRNDR* is the industry-adjusted ratio of ratio of R&D expenses and sales. *IDEBTR* is the industry-adjusted ratio of long-term debt to total assets. *IEBITR* is the industry-adjusted ratio of earnings before interest and taxes and sales. *INVMILLS* is the Heckman (1976) inverse Mills ratio. ***, **, and * indicate statistically significance at the 1%, 5%, and 10% level, respectively.

This finding is also noteworthy because only sparse empirical evidence exists on the valuation effects of real activities manipulation (Gunny, 2010; Cohen and Zarowin, 2010). As such, our finding is consistent with the view that economic actions to meet earnings benchmarks reduce firm value because these activities deviate from optimal business practices (Graham et al., 2005; Roychowdhury, 2006). Graham et al. (2005) show that managers are willing to use operational activities to meet earnings targets even when the manipulation reduces firm value. Li et al. (2012) show that self-serving managers use real activities manipulation to distort valuation during management buyouts so as to acquire the firm from shareholders relatively cheap.

Our results also indicate that the adverse effect of real earnings management on excess firm value is sensitive to the firm's diversification profile. The coefficient of the interaction term, *URM* × *MD* is −0.007 and is significant at the 1% level, implying that the negative relation between real activities manipulation and excess value is more pronounced for industrially diversified firms (*t*-statistic = −2.14). Along the same vein, the interaction term *URM* × *MG* is also negative and highly significant. The point estimates indicate that the magnitude of the value loss from real activities manipulation is 1.7% higher among firms that are both industrially and globally diversified (*t*-statistic = −2.12).

**Table 8**
Valuation, real activities manipulation, and alternative measures of diversification.

| | Panel A: Excess value | | Panel B: Tobin's *Q* | | | |
|---|---|---|---|---|---|---|
| | MODEL 1 | | MODEL 2 | | MODEL 2 | |
| | Coef. | *t*-Stat | Coef. | *t*-Stat | Coef. | *t*-Stat |
| *INTERCEPT* | −1.062 | −8.11*** | −1.053 | −7.03*** | −0.513 | −6.06*** |
| *IHERF* | 0.348 | 20.30*** | 0.344 | 18.15*** | 0.240 | 6.42*** |
| *GHERF* | 0.133 | 7.34*** | 0.131 | 5.99*** | 0.092 | 2.04** |
| *URM* | −0.043 | −2.65*** | −0.081 | −2.03** | −0.670 | −4.57*** |
| *URM* × *IHERF* | – | – | 0.142 | 1.97** | 0.032 | 0.30 |
| *URM* × *GHERF* | – | – | −0.106 | −1.99** | −0.348 | −3.02*** |
| *FSIZE* | 0.118 | 9.35*** | 0.118 | 7.38*** | 0.053 | 6.18*** |
| *ICAPXR* | 1.038 | 7.22*** | 1.037 | 7.35*** | 0.615 | 3.65*** |
| *IADR* | 0.087 | 0.46 | 0.066 | 0.30 | −0.442 | −0.85 |
| *IRNDR* | 2.363 | 14.90*** | 2.371 | 16.94*** | 0.931 | 5.06*** |
| *IDEBTR* | −0.255 | −2.70*** | −0.256 | −2.57** | −0.143 | −3.46*** |
| *IEBITR* | 0.567 | 4.09*** | 0.571 | 4.23*** | 0.650 | 3.63*** |
| *INVMILLS* | 0.075 | 0.08 | 0.076 | 0.07 | 0.203 | 1.20 |
| *F*-statistic | 288.9*** | | 271.2*** | | 19.03*** | |
| Adjusted $R^2$ | 0.187 | | 0.187 | | 0.106 | |
| # of Obs. | 30,279 | | 30,279 | | 30,279 | |
| Year effects | YES | | YES | | YES | |
| Industry effects | YES | | YES | | YES | |

Panel data regression results of firm value on variables denoting industrial and global diversification, and a set of control variables. In Panel A, excess value is measured as the natural logarithm of the ratio of the firm's actual value (market value of equity plus book value of debt) relative to the sum of the imputed values of its segments as stand-alone domestic firms. Imputed segment values are computed by multiplying segment sales by the median market value to sales ratio of single-segment firms in the same industry. In Panel B, Tobin's *Q* is based on is Chung and Pruitt's (1994) approximation; it is measured as the sum of the market value, liquidating value of preferred stock, net short-term liabilities and the book value of long-term debt divided by total assets. $IHERF_t$ and $GHERF_t$ denote the industrial and the geographic sales-based Herfindahl index, respectively. *URM* is the residuals from Eq. (4), representing the unexpected total real activities manipulation. *URM* × *IHERF* and *URM* × *GHERF* are interaction terms. *FSIZE* is the natural logarithm of total assets. *ICAPXR* is the industry-adjusted ratio of ratio of capital expenditures and sales. *IADR* is the industry-adjusted ratio of ratio of advertisement expenses and sales. *IRNDR* is the industry-adjusted ratio of ratio of R&D expenses and sales. *IDEBTR* is the industry-adjusted ratio of long-term debt to total assets. *IEBITR* is the industry-adjusted ratio of earnings before interest and taxes and sales. *INVMILLS* is the Heckman (1976) inverse Mills ratio. ***, **, and * indicate statistically significance at the 1%, 5%, and 10% level, respectively.

However, real earnings management does not appear to destroy firm value in all diversification profile categories. We find a positive relation between real activities manipulation and excess value among firms that are globally but not industrially diversified. This result is consistent with our earlier findings that globally diversified firms exhibit less real activities manipulation than their counterparts. Our regression estimates indicate that there is about a 2% wealth gain from real earnings management to globally (but not industrially) diversified firms, as indicated by the positive and significant coefficient for the *URM* × *SG* interaction term.

Not only are our findings statistically significant, they are also robust after controlling for variables known to influence excess value. Generally speaking, our results lend credence to the argument that real earnings management is not value-maximizing and is an inconspicuous contributing factor to the excess value attributed to corporate diversification. This helps to explain why some diversified firms have lower valuations than others, not only across different diversification classifications, but also within the same diversification category.

In addition, our findings also help to explain why some empirical studies argue that global diversification increases firm value (e.g., Gande et al., 2009; Bodnar et al., 1999), while others contend that it does not (e.g., Denis et al., 2002). These assorted results may be the byproduct of managers' endeavors to use real economic actions to manipulate earnings. Similar to Denis et al. (2002), we find a diversification discount across all diversification profile. Yet, the interaction between global diversification and real activities manipulation has a strong positive effect of excess value.

We ascribe this finding to the ability of multinational firms to use intra-firm transactions to shift income to low-tax jurisdictions (Klassen et al., 1993) and to shift debt to high-tax jurisdictions (Huizinga et al., 2008). Therefore, transfer pricing may help to explain why real activities manipulation enhances value in globally diversified firms (relative to industrially diversified firms) since multinational firms typically engage in intra-firm transactions that exploit cross-country differences. Madura (2012, pp. 454) suggests that even if transfer prices are fair, intra-firm transactions may still allow one subsidiary to charge another for technology transfers, R&D expenses, or other forms of overheard expenses. Hence, multinational firms have more flexibility to profit sharing activities to achieve their objectives. To ensure that our results are not driven by the choice of the valuation measure used, we report regression results based on Tobin's *Q* as an alternative valuation measure. We show these results in Panel B of Table 7. Pursuant to Chung and Pruitt's (1994), we approximate Tobin's *Q* as the sum of the market value, liquidating value of preferred stock, net short-term liabilities and the book value of long-term debt divided by total assets. The results in Panel B suggest that our primary findings are generally robust. Thus, our findings are not sensitive to the choice of the valuation measure used.

We further check the robustness of our findings using the Herfindahl indices as alternative measures of diversification, and report the results in Table 8. As anticipated, the coefficient for the *IHERF* and *GHERF* variables are both positive and statistically significant, confirming that higher levels of both industrial diversification and global diversification are associated with reductions in firm value. In addition, the *URM* variable is negative and still highly significant, indicating that firm value is lower when real activities manipulation is higher.

Moreover, there is evidence that the interaction term $URM \times IHERF$ is positive and significantly related to excess value. Since a lower index value implies a higher level of industrial diversification, this result is consistent with our earlier findings that the diversification discount is larger when industrially diversified firms engage in real activities manipulation. In contrast, the results show that the interaction term $URM \times GHERF$ is significantly negative, which implies a valuation premium among globally diversified firms that engage in real activities manipulation. Thus, the results in Table 8 are qualitatively similar to those in Table 7.

## 7. Conclusion

There is a body of research that examines whether corporate diversification exacerbates or mitigates earnings management. However, the empirical evidence to date is limited. Earlier studies focus exclusively on relating diversification to accrual management, and the empirical results are mixed. While much research has been published on the prevalence of real activities manipulation as an earnings management tool, research on the relation between diversification and operational actions undertaken to manage earnings is sparse. We add to the literature by investigating the extent to which diversification facilitates earnings management through real operational activities, and whether the economic actions to meet earnings targets partially explain the diversification discount.

Our findings suggest that industrial diversification and the combination of industrial and global diversification exacerbates real activities manipulation, whereas global diversification mitigates it. These results are robust to alternative definitions for diversification and to the endogeneity of the diversification decision. They are also buttressed by empirical evidence indicating that industrially diversified firms suffer more agency problems than globally diversified firms.

In addition, we find that real earnings management is value-reducing. There is a strong negative relation between real activities manipulation and firm value, implying that shareholders suffer real economic losses from managers' endeavors to use operational activities to manipulate earnings. This finding is consistent with studies indicating that real earnings management involves activities that deviate from normal business practices. We also find that real activities manipulation influences the valuation discount attributed to diversification. Specifically, the reduction in value caused by real activities manipulation is more pronounced among industrially diversified firms and among firms that are both industrially and globally diversified, but not firms that are only globally diversified. This finding helps to explain why some empirical studies argue that global diversification increases firm value, while others contend that it does not.

Overall, our study offers new insights into the relation between diversification, corporate earnings management, and firm value, and reconcile past literature by helping to explain the discrepancy in previous findings. We provide a unifying view of how the diversification discount varies among firms and how it changes over time. In the cross-section of firms, our results explain why some diversified firms have lower valuations than others, not only across different diversification profiles, but also within the same diversification category.

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