**Use It or Lose It: Fiscal Year End Corporate Investment around the World**

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**Abstract**

It is documented that companies and government agencies in the United States invest more in the fourth fiscal quarter without having higher investment opportunities. While previous studies focus on the agency conflicts and information asymmetry within organizations, we are motivated by Scharfstein and Stein’s (2000) two-tiered agency model, and examine how firms’ external business environment affects the “fourth quarter effect”. We implement our study in a sample of 41 countries, and observe similar seasonality in firm investment as documented in the U.S. market. More importantly, using country characteristics, we find that firms from countries with better investor rights and protection, and more developed financial markets show less severe over-investment in the fourth fiscal quarter.

Keywords: Internal capital market, Agency theory, International fourth quarter investment

JEL classification: G30, G31,G15

**1. Introduction**

Internal capital market has been a popular topic in corporate finance since studies such as Myers and Majluf (1984) and Fazzari et al. (1988) posited that firms rely on internal capital when they face financial constraint because external and internal financing are not perfect substitutes. Harris and Raviv (1996, 1998) are among the first to study internal capital market in the context of capital allocation among divisions. In their model, a firm’s headquarters has control over budget allocation, but divisional managers have better information about profitability and investment opportunities of their own divisions. In addition to information asymmetry, there are conflicts of interest between firm’s headquarters and divisions because their interests are not perfectly aligned. As a result, the headquarters may make suboptimal capital allocation decisions: some divisions with good projects may not receive the budget they deserve while those without good projects may end up with more than what they need to implement their positive NPV projects.

One particular manifestation of capital allocation inefficiency is documented in the finance and accounting literature. Shin and Kim (2002), Callen, Livnat, and Ryan (1996), and Kinney and Trezevant (1993) show that firms in the U.S. market tend to make fixed investments more aggressively in the fourth fiscal quarter than in the other three. In particular, Shin and Kim (2002) find that this fourth fiscal quarter over-investment (hereafter “fourth quarter effect”) is due to the “use it or lose it” budget rule, combined with conflicts of interest and information asymmetry between headquarters and divisions. They argue that divisional managers have incentives to increase, or at least maintain current budget allocations for the following fiscal year, and therefore tend to use up their remaining budget by the fiscal year-end even if they do not have good investment opportunities.

We investigate this “fourth quarter effect” in corporate investment, and attempt to address two questions. First, we examine whether the “fourth quarter effect” is present in other countries. A positive answer to this question would alleviate the concern that this effect documented in the U.S. is just a coincidence. Second, and more importantly, unlike earlier papers that concentrate only on the conflicts of interest between the headquarters and divisional managers, we examine the external agency conflicts and characteristics of business environments. Our study is motivated by the two-tiered agency model on internal capital market by Scharfstein and Stein (2000). In their internal capital allocation model, the firm has the headquarters, a high-productivity division, and a low-productivity division. There are two layers of agency conflicts: the inner-layer between headquarters and divisional managers, and the outer-layer between CEO (headquarters) and outside investors. The model shows that if there are only conflicts of interest between headquarters and divisional managers, the headquarters would compensate low-productivity divisional managers with extra salary but not excessive capital allocation. However, they argue that the presence of agency conflicts between the CEO and outside investors can lead to a distortion in capital allocation since it is now in the CEO’s (but not the firm’s) best interest to compensate divisional managers with excessive capital allocation rather than extra salary. Therefore, they conclude that “socialism” in internal capital allocation is more acute when top management has weak incentives to maximize value. More recently, Ozbas and Scharfstein (2010) and Graham, Harvey, and Puri (2015), among others, show empirical evidence consistent with the predictions by Scharfstein and Stein (2000).

In this paper, we argue that agency conflicts between CEO and outside investors are likely to lead to a more significant “fourth quarter effect”. We proxy the “external layer” agency conflicts with country characteristics, and seek to examine whether and how the differences in our country characteristics have impact on the variation in firms’ “fourth quarter effect.” Cumming et al. (2017) argue that “given the predominant focus in extant literature on internal, organizational aspects of corporate governance, there is limited prior work on potential roles of the firm’s institutional environments in terms of their impact on the link between governance factors, international business strategy and ultimately performance.” To our knowledge, there is no prior work in the literature on the effect of firm’s institutional environment on its investment seasonality. There are two advantages of studying this in the international setting. First, country characteristics can be used as more explicit proxies for external agency conflicts compared with firm-level variables, and the cross-country divergence offers a rich ground for this test. Second, compared to firm-level variables, country characteristics are less endogenous to firm’s decisions.

Using firm-level data from 41 countries, we find that similar to the results in earlier studies on the U.S. market, firms in the global market increase their capital expenditure (hereafter CapEx) towards the end of the fiscal year as well. Notably, their CapEx in the fourth quarter is roughly 15% higher than the average of the first three quarters even though the fourth quarter investment opportunities are not higher than those in the other quarters. In answering the second question, which is our main focus, we obtain multiple country characteristics, and categorize them into two groups: investor rights and protection, and financial markets development. Our results suggest that both categories of country characteristics show significant effects on firms’ investment seasonality. Specifically, firms that operate in countries with higher investor rights and protection, and more developed financial markets tend to show less severe “fourth quarter effect.”

To alleviate the concern that our results are subject to endogeneity issues, we use lagged variables at the firm level, and include a firm fixed effect to control for time-invariant firm-level CapEx and mitigate potential omitted variables bias. We also include industry-calendar-year-quarter interaction fixed effects to control for time-varying investment opportunities. To further support our argument that the “fourth quarter effect” is associated with the agency costs between firm management and outside investors, we divide our sample into two subsamples based on a firm’s dependence on the external financial market. We expect that effect of agency conflicts between CEO and outside investors plays a more significant role in affecting the “fourth quarter effect” among the firms from industries that are more dependent on external financial market because such firms interact more closely with outside investors. This is indeed what we find. To provide additional evidence to support our finding, we test the investment-q sensitivity across our country characteristics—as it measures how responsive firms’ quarterly spending is to investment opportunities—and find results consistent with our expectations. Our results hold in robustness tests where we use alternative constructions of key variables, industry-adjusted firm-level variables, and regressions at the aggregate level. We also address an alternative explanation that the “fourth quarter effect” is simply due to tax savings in section 5.

Our work is related and contributes to two broad strands of literature. In general, our study is related to the internal capital market efficiency literature. One common theme in the literature is that conflicts of interest and information asymmetry within the firm can lead to suboptimal capital allocation and investment decisions[[2]](#footnote-2). In the context of the two-tiered agency model by Scharfstein and Stein (2000), earlier studies focus on the inner-tier agency problems (headquarters vs. divisional managers) such as firm size, number of divisions, and cash holdings. However, we pay attention to the external agency conflicts and environmental characteristics at the country level, and how they can affect firms’ “use it or lose it” phenomenon. Ozbas and Scharfstein (2010) empirically test the model in Scharfstein and Stein (2000), and find that higher external agency conflicts (measured by CEO ownership) indeed exacerbates investment inefficiency in conglomerate firms. Hoechle et al. (2012) and Duchin and Sosyura (2013) find similar results.

Unlike earlier researches that focus on firm-level characteristics, our paper studies the characteristics of countries in which firms operate. An advantage of doing so is that country characteristics more explicitly capture the “outer-tier” agency problems (CEO vs. outside investors), while many firm-level variables such as firm size capture agency problems at both internal and external levels. Recent studies taking advantage of cross-country variation in legal, cultural, and financial institutions include Cumming and Walz (2010), Dai and Nahata (2015), and Ellis et al. (2016), among others.

One cross-country study on corporate investment is by McLean, Zhang, and Zhao (2012), who show that firms’ investment is more sensitive to Tobin’s q in countries with better investor protection. They use investment-q sensitivity to measure how responsive firms’ investment is to their investment opportunities, and interpret higher sensitivity as evidence of less financial constraint. More closely related to our study is Graham, Harvey, and Puri (2015), who study internal capital allocation in the global market and find results consistent with ours, but their research is survey-based. Specifically, they find that it is common practice that CEOs delegate corporate investment decisions to divisional managers, and that “socialism” in capital allocation is more frequent in Asian and European firms compared with those in the U.S., which they speculate is because firms in Asian and European countries receive less incentive pay than do U.S. executives. Nevertheless, based on our study, another explanation for their results is the differences in country-level institutions between countries in Asia and Europe and those in North America, which is missing in their investigation. In addition, Wurgler (2000) argues that strong minority investor rights are associated with more efficient capital allocation at the industry level: countries with more developed financial sectors invest more in their growing industries (less in their declining industries) than those with undeveloped financial sectors. Wurgler further shows that minority investor rights improve capital allocation by limiting the supply of finance to declining industries rather than improving investment in growing industries. However, the capital allocation literature is lacking more direct evidence on the specific channels through which firms improve allocation and investment efficiency. We seek to fill this gap by showing that the “fourth quarter effect” is one of such channels, and provide evidence on how external frictions lead to firms’ inefficient capital budgeting and allocation.

Second, in the accounting and finance literature, several studies document certain seasonal patterns in firms’ behaviors. For example, Oyer (1998) documents seasonality in firms’ sales and revenues, and show that this is due to non-linear incentive contracts between firms and agents. In addition, Das, Shroff, and Zhang (2009) point out that companies may choose to smooth earnings in the fourth fiscal quarter. Specifically, firms that are smaller (larger), more (less) levered, and with weaker (stronger) earnings performance during the year tend to manage earnings upward (downward). Moreover, Roychowdhury (2006) shows that managers may also manipulate real activities to avoid reporting annual losses. These activities could include boosting annual sales by offering substantial price discounts, or reduction of discretionary expenditures such as plant maintenance and R&D expenditures.

In the context of corporate investment, a recent study by Liebman and Mahoney (2013) shows that the abnormally high level of year-end investment is associated with projects with lower qualities in the U.S. public sector, indicating that much of the extra spending is inefficient. Earlier papers (e.g. Callen, et al., 1996, Shin and Kim, 2002) also find similar evidence in the U.S. private sector. Although authors of these studies all acknowledge that there are two necessary conditions to have the “use it or lose it” situation: (1) the inability to carry over unspent budget to the next fiscal year, and (2) divisional managers’ incentive to use up the budget in order to be allocated more budget in the future, the authors identify this problem in different yet non-mutually exclusive ways.

Liebman and Mahoney (2013)’s model shows that in addition to an inability to carry over unspent budget to the next year, a combination of uncertainty and decreasing returns on projects leads to less spending in early periods of the year. According to Callen, et al. (1996), this effect is more pronounced in firms that have higher growth in their spending, because as their budget grows, they tend to be inexperienced in allocating their new budget; thus, they are more likely to “be forced to” spend more before their allocated budget expires. Shin and Kim (2002), however, analyze the severity of the issue from the perspective of corporate governance. They argue that firms with larger internal agency conflicts and information asymmetry tend to have higher spending in the fourth fiscal quarter that cannot be explained by investment opportunities. To our best knowledge, our paper is the first to document cross-country evidence on the “fourth quarter effect”. By focusing on the “fourth quarter effect”, we extend this literature and show that external business environment can enhance firms’ investment efficiency.

The remainder of the paper is organized as follows. The next section develops the main hypotheses in this study. Section 3 describes the data, and the construction of our sample. In section 4, we provide evidence on the “fourth quarter effect” in a sample of 41 countries, and test our hypotheses in detail by analyzing the relation between the “fourth quarter effect” and country characteristics. Section 5 discusses robustness checks and alternative explanations. Section 6 concludes this study.

**2. Hypotheses Development**

In this section, we describe our two main hypotheses on how the “use it or lose it” phenomenon can be different across countries. This is one of the main extensions in our study using country characteristics since earlier researches on the “fourth quarter effect” focus on firm characteristics. First, shareholder rights and protection variables are common ones used in the corporate governance literature as proxies for corporate agency costs. In addition, it is documented that more developed financial markets are associated with more efficient allocations of external finance, which should further lead to more efficient budget allocations within the firm. We discuss it in more detail in section 2.2. We next outline testable hypotheses, which we formally test in section 4.

2.1. Shareholder Rights and Protection

Since the seminal paper by Jensen and Meckling (1976), agency problems between different stakeholders have been extensively studied in numerous topics in firms’ investment and financing. Because the interest of firms’ managers is not perfectly aligned with shareholders, they may have the incentive to engage in activities that are detrimental to shareholder value, such as seeking private perks (e.g. Bertrand and Mullainathan, 2003), or building their own empires (e.g. Jensen, 1986). The outside investors, on the other hand, rely on various mechanisms and institutions such as compensation schemes and potential takeover threats to align managers’ interests more with those of the investors’.

At the country level, previous studies have also documented how policies and institutions play important roles in protecting investors’ rights. One of the central themes in the law and finance literature is that certain countries do a better job of protecting investors’ rights, especially for the minority stakeholders, and such protection can in turn improve the efficiency in firms’ investing and financing activities. A vast majority of the research in this area points out that English common law system dominates civil law systems, especially French civil law, in terms of protecting small investors, allocating resources efficiently, and enhancing financial market development. Additionally, effective law enforcement (e.g. Bhattacharya and Daouk (2002) is shown to be an important addition and complement to the laws to make the legal system effective. For example, they are shown to have positive effect in general on different aspects of firm-level features and activities such as ownership dispersion (LLS, 1999), dividend payouts (LLSV, 2000 and Brockman and Unlu, 2009), valuation (LLSV, 2002), and debt enforcement (Djankov, McLiesh, and Shleifer, 2007, Djankov et al., 2008). Wurgler (2000) also argues that strong investor rights are associated with more efficient capital allocation across industries with different growth prospects. These authors argue that investigating country characteristics has econometric advantages because they are largely considered exogenous to firm activities. For instance, legal systems are typically introduced into various countries through a combination of conquest, imperialism, outright borrowing, and more subtle imitation.

We follow the spirit of the studies mentioned above, and posit that corporate governance and institutions at the country level can affect firms’ budgeting and investment efficiency in the context of a “use it or lose it” dilemma. Specifically, according to Scharfstein and Stein (2000)’s model and empirical findings such as Graham, Harvey, and Puri (2015), firms with their CEOs’ interest less closely aligned with that of outside investors are more likely to demonstrate “socialism” in capital allocation—reallocating budget from high-productivity divisions to low-productivity divisions. Shin and Kim (2002) argue that this would cause low productivity divisions to be allocated with excessive capital. That is, low productivity divisions do not invest immediately due to the absence of profitable opportunities, but they use up their budget towards the end of the fiscal year due to the “use it or lose it” dilemma. As a result, we expect to observe less “fourth quarter effect” in countries where CEO’s interest is better aligned with that of outside investors. This is expected because more “benevolent” CEOs should do a better job of overseeing and allocating the firms’ budgets.

Alternatively, however, another possible consequence of “socialism” in capital allocation is that divisional managers have lower incentives to exaggerate their investment opportunities, and bargain with the headquarters for higher budgets in countries with poor investor rights and protection since their budget will be more than what they need anyway. We therefore empirically test how the country-level investor rights and protection variables are related with the “fourth quarter effect”. Thus, we posit:

**H1**: *Firms in countries with stronger investor rights and protection, on average, demonstrate less “fourth quarter effect”, and therefore less overinvestment.*

2.2. Financial Market Development and Access to External Finance

Previously, we mentioned that researchers find that stronger minority investor rights help firms allocate capital more efficiently. Another dimension of cross-country characteristics is financial market development. In their seminal paper, Rajan and Zingales (1998) find that industries that are more dependent on external finance have developed faster in countries with more developed financial markets. It has since been documented that more developed financial markets are associated with enhanced real economy, such as more efficient asset allocations (Wurgler, 2000), corporate investments (Brown, Martinsson, and Petersen, 2013), higher levels of innovation (Hsu, Tian, and Xu, 2014), and stronger labor markets (Benmelech, Bergman, and Seru, 2011). In particular, although financially developed countries do not seem to invest at a higher level (e.g. Beck, Levine, and Loayza, 2000), Wurgler (2000) finds that more developed financial markets are associated with more efficient allocations of capital, indicating that it is easier (more difficult) for firms and industries with higher (lower) investment opportunities to access external finance.

Intuitively, *ceteris paribus*, more efficient allocations of external finance should also lead to more efficient budget allocations within the firm. With more efficient capital allocations, firms that have less investment opportunities are less likely to have capital to spend on wasteful projects. Some empirical evidence is consistent with this conjecture. For example, Laeven (2003), Love (2003), and Khurana, Martin, and Pereira (2006) show that in countries with less developed financial markets, larger firms are less constrained financially and thus have more slack to engage in inefficient investments. Therefore, since financial market development promotes efficient budget allocations across firms and thus mitigates agency conflicts between firm CEOs and outside investors, we expect to find a negative relation between efficiency of capital allocation at the country level (or financial market development) and severity of the “fourth quarter effect”.

However, there may be another channel through which access to external finance could have an impact in the opposite direction on capital budget allocations. Since some firms may have to rely more on internal finance[[3]](#footnote-3), they might have incentives to pay more attention to their internal allocation efficiency and thus reduce the distortions. Therefore, whether a more developed financial market augments, or mitigates the “fourth quarter effect” is an empirical question, and we test the following hypothesis.

**H2**: *Firms in countries with more developed financial markets on average demonstrate less (more) salient “fourth quarter effect”, and therefore less (more) overinvestment.*

**3. Data and Summary Statistics**

3.1. Data

Our primary data source for firm-level data is Standard and Poor’s Compustat. According to Standard & Poor’s Compustat Xpressfeed Manual, Compustat data “is unique in that it is normalized to provide comparability across a wide variety of global accounting standards and practices.” This should alleviate the concern that our analysis is contaminated by the cross-country variation in the quality of our data. We obtain quarterly and annual financial statement variables, security price, and exchange rates data from the Compustat Global and North America (NA) database.[[4]](#footnote-4) We collect country-level variables through various sources. The details of these variables are provided in Appendix A. To measure investor rights and protection, we use general proxies such as legal system and more specific indices for investor rights. We obtain anti-director index (AD), anti-self-dealing index (AS), accounting strength (ACCT), and Common law dummy (UK) data from Professor La Porta’s website, country-level earnings management index (EM) from Leuz, Nanda, and Wysocki (2003), and the extent of disclosure index (DISC) from World Bank’s Doing Business database. We obtain Rule of law (RULE) from World Bank’s Worldwide Governance Indicators (WGI) as a measure for law enforcement. To measure a countriy’s financial market development, we collect data from World Bank’s World Development Indicators (WDI), including the ratio of stock market capitalization over GDP (EQUITY), the ratio of domestic credit to private sector over GDP (CREDIT), and the combination of the two as a general measure of financial market development (FD). In addition, we download the number of IPOs per capita (IPO) from La Porta’s website. Finally, we acquire GDP per capita and annual GDP growth rate from World Bank’s World Development Indicators (WDI), and U.S. Consumer Price Index for All Urban Consumers at Bureau of Labor Statistics.

Due to possible accounting reporting delay, we use data through fiscal year 2014. Since 2005 is the first fiscal year in which we have more observations from Compustat Global than from Compustat NA, our sample ranges from fiscal year 2005 to 2014 to avoid data being dominated by a single country. In section 4, we also exclude U.S. firms in our main tests to make sure our results are not driven by the United States alone. Following the literature (e.g. Ozbas and Scharfstein, 2010), we cross-validate observations in the annual files with those in the quarterly files, and drop observations for which the total assets or capital expenditure in the annual files do not fall within 5% of their counterparts in the quarterly files at year-end. In calculating firm’s market capitalization, if a firm has multiple issues of common stock at multiple exchanges, we combine issues of common stock at the primary exchange and exclude issues at other exchanges.

After removing observations with missing security price information and non-quarterly reporting periodicity[[5]](#footnote-5), we merge the dataset of company fundamentals with the Compustat North America and Global Security Daily File so that we could calculate Tobin’s q, our main proxy for investment opportunities. Since quarterly capital expenditure is only available in year-to-date form in Compustat, we “quarterize” it by converting year-to-date cumulative data into non-cumulative quarterly data. We follow Chen and Chen (2012) and define quarterly cash flow as the sum of quarterly income before extraordinary items and depreciation and amortization, divided by firm’s assets at the beginning of each quarter. As in Dittmar and Mahrt-Smith (2007), we define free cash flow (FCF) as operating income minus interest expense minus income taxes, scaled by the book value of assets. We use various versions of firm size (SIZE), including total assets, market capitalization, sales, and number of employees. We take natural logarithm of all the SIZE variables. Following the literature, we measure beginning-of-quarter Tobin’s q at firm-level as the ratio of the sum of book value of debt and market value of equity over book value of total assets. Alternatively, we follow Ozbas and Scharfstein (2010) and use median industry-year q (bounded above at 10) for investment opportunities. Following Ozbas and Selvili (2009), we use median country-calendar-year-industry median sales-normalized CapEx as another alternative proxy for investment opportunities. The results are similar to those using firm-level q as a proxy for investment opportunity. We exclude companies from financial services (4900–4949), utilities (6000–6999), and public administration (≥9000)[[6]](#footnote-6). In addition, we use foreign exchange rate data to convert foreign currencies into U.S. dollars and then normalize dollar-value variables to beginning of year 2000 dollars.

Next, we drop firm-year observations with: (i) change in fiscal year end, (ii) missing or extreme values on important variables[[7]](#footnote-7), (iii) firm data for fewer than two years, (iv) data for a certain firm in a certain year that are missing either in the fourth fiscal quarter, or in all of the first three fiscal quarters[[8]](#footnote-8), and countries that: (a) are tax havens such as Bermuda and Cayman Islands, and (b) have fewer than 50 firms in the Compustat database[[9]](#footnote-9). We winsorize all key variables at the top and bottom one percentiles of their distributions within each fiscal quarter. And finally, following Duchin, Ozbas, and Sensoy (2010), we bound q at 10 because winsorized q may still exceed 10 in our sample.

3.2. Summary Statistics

After this data cleaning process, we end up with an unbalanced panel of roughly 232,000 firm-year-quarter observations that contain about 10,000 firms during our 10-year sample period across 41 countries. Table 1 provides descriptive statistics on various firm and country variables. We scale quarterly capital expenditure by total assets at the beginning of quarter to construct the first version (CapEx), and by property, plant and equipment at the beginning of quarter for the second version (CapEx\_PPE). We then multiply the two ratios by 100 to create the percentage versions so that we can observe and interpret the results more easily, but we do not do the same for other scaled variables. Following the corporate investment literature, we control for quarterly cash flow, and include Tobin’s q at the beginning of each quarter as a proxy for firms’ investment opportunities. Following Shin and Kim (2002), we also include quarter-to-quarter annual sales growth, and change in cash holdings from the previous fiscal quarter in our regression analyses to control for firms’ change in working capital, which could be a substitute for firms’ investment in fixed assets. Firms’ leverage, annual free cash flow, total assets, market capitalization, and number of employees are summarized in Table 1. Finally, we add the implicit tax rate, defined as annual total income taxes divided by taxable income as a control variable in our regression analyses.

Panel A summarizes firm variables in our sample that are also used in regressions in section 4. The average (median) quarterly capital expenditure is 1.30% (0.78%) of firm assets. Quarterly cash flow has a mean (median) of 1.7% (1.95%) of assets. The average (median) Tobin’s q at the beginning of the quarter is 1.75 (1.35). Annul sales growth rate has a mean of 13.4% and median of 6.94%. Leverage in the previous fiscal year has a mean of 18.5% and median of 15.9%. In our sample, firms on average have total assets of $1.85 billion, and their equity has an average market capitalization of $1.76 billion.

In Panel B, the country characteristics are investor rights and protection, development of financial market, and GDP per capita in constant 2005 US$ (GDP) and annual GDP growth (GDP\_GRO). The details of these variables are provided in Appendix A. As in Panel A, we provide information on summary statistics such as number of observations, mean, standard deviations, and the 25th percentile, median, and 75th percentiles.

[Insert Table 1 here]

To show cross-country variations in the country-level variables, we report the country characteristics by individual countries for the 41 countries in our sample in Table 2 Panel A. Corresponding with our hypotheses in section 2, we categorize the country-level variables into two different groups: investor rights and protection, and development of financial markets. Due to data availability, not all countries have all the variables. The third and fourth to last rows show the countries with the minimum and maximum values for each country-level variable, respectively. The United States represents the largest part of the sample, accounting for approximately 40% of the total observations, while Egypt represents the least. One interesting observation from Table 2 is that the data show a high level of diversity in many dimensions. For example, Switzerland is one of the developed countries with high GDP per capita, but has the least extent of disclosure. The last two rows report the means and standard deviations of these characteristics across all countries.

Pairwise Pearson correlations among these country variables are presented in Table 2 Panel B. In the parentheses below the correlation coefficients are p-values, and those with p-values below 0.05 are in boldface. Ideally, we would like to have high pairwise correlations among the variables within each category, and low correlations between variables from different categories. The former seems to be the case, and although the latter is not entirely true, the earnings management index (EM) and number of IPOs per capita (IPO) are, in general, highly correlated with variables in their own category but not with those in the other categories.

[Insert Table 2 here]

**4. Regression Specification and Results**

4.1. Is the “Fourth Quarter Effect” a Global Phenomenon?

We next examine how widespread the “fourth quarter effect” is in the world. A positive answer to this question would alleviate the concern that this effect documented in the U.S. is merely a coincidence. Figure 1 shows some preliminary results in regards to this question. In our pooled sample, both the equal-weighted and value-weighted average proportion of firms’ investment in the fourth fiscal quarter are higher than 25%. For detailed seasonal patterns, Table 3 Panel A presents the means and medians of both versions of capital expenditures sorted by fiscal quarter in Columns 1 and 2, and other variables in Columns 3 through 8. It shows that we have around 58,000 observations for each fiscal quarter in our full sample. The most notable phenomenon in Table 3 is that the mean and median of the two measures of capital expenditure, CapEx and CapEx\_PPE, are roughly 15% greater in the fourth fiscal quarter than the average of the first three quarters. Regarding the other variables, there is a similar seasonal pattern across fiscal quarters for cash flow, but not for any of the rest including Tobin’s q, our main measure for investment opportunities. In Column 8, we show that the same seasonal pattern in CapEx still holds when we exclude U.S. firms from our sample.

In order to show that the fourth-quarter capital expenditure effect only occurs in the fiscal quarters context and not in calendar quarters, we present the results from the firms that have a fiscal year end different from December, and repeat the means and medians for our variables. Table 3 Panel B and C show that the “fourth quarter effect” disappears when we sort data by calendar year in the subsample that only includes firms whose fiscal year-ends do not coincide with calendar year-ends; however, it still persists when we sort by fiscal quarter in the same subsample. Not surprisingly, we only have around 17,350 observations in each quarter because the majority of the observations in our full sample are from firms whose fiscal year-end coincides with calendar year-end. This separation of calendar and fiscal seasonality demonstrates that the “fourth quarter effect” is only due to fiscal year seasonality.

[Insert Figure 1 here]

[Insert Table 3 here]

4.2. Regression Specification

Now that we confirm the “fourth quarter effect” of capital expenditure around the world, the next question is in what environments are firms more likely to manifest this effect. In this section, we test the hypotheses we laid out in section 2.

We use panel regression analysis to explore the relationship between firms’ seasonal spending pattern, and variables measuring country characteristics. We then address possible concerns with our analysis in section 5. Using firm-level data, we establish the following specification:

 (1)
where *i* denotes a firm, *t* denotes a fiscal quarter, *j* is an industry, and *k* is a country. The dependent variable yi,t is our measure of investment CapEx; D4 is the dummy variable for fourth fiscal quarter; Xi,t-1 is a lagged firm-level characteristic that is of interest to us, and *ϕk,t* is a country-level characteristic. λi is firm fixed effect;  is Fama-French-48 industry (Fama and French, 1997) times calendar-year-quarter fixed effects to control for time-varying investment opportunities. χi,t includes firm-level controls such as cash flow, q, leverage, change in cash holdings, tax rate, and the interaction term between tax rate and fourth quarter dummy. In cross-country analysis, we also include natural logarithm of GDP per capita and annual GDP growth rate in our equation.

Note that regression equation (1) is the comprehensive version of our regression specifications, and we use variations of equation (1) depending on what we investigate. For example, in the next section, we study firm-level variations in a pooled sample and therefore skip the country-level variables. In later sections, we may focus on country-level variables and drop some firm-level ones, or use the full version of (1) when we combine both firm-level and country-level variables.

4.3. Cross-firm Analysis in Pooled Sample

In this section, we take a brief digression and verify the relationship between the “fourth quarter effect” and firm-level variables posited by Shin and Kim (2002), because an affirmative answer would alleviate the concern that the empirical pattern documented in the earlier studies is due to a single country phenomenon or even coincidence. Specifically, we look at firms’ annual FCF and firm size to measure firm-level agency problems and asymmetric information. As Jensen (1986) points out, “Conflicts of interest between shareholders and managers over payout policies are especially severe when the organization generates substantial free cash flow.” In other words, excess cash tends to reduce the pressures on management to enhance shareholder value. Therefore, FCF is often used to measure firms’ agency problems in the finance literature. Also, other things equal, larger firms tend to have more information asymmetry due to more a complex organizational structure and larger costs of information transmission. For example, Gabaix and Landier (2008) find that CEO compensation is closely related with firm size, implying that bigger firms are harder to manage and therefore requires more CEO ability. Also, larger size is typically associated with higher levels of diversification, which exacerbates the asymmetric information problem between headquarters and its divisions.

Since the results are very similar, we only present our results using total assets and number of employees[[10]](#footnote-10) in Table 4. To mitigate the endogeneity concerns, we use FCF and firm size from the previous year. We divide our sample firms into quintiles using each of the above-mentioned variables and produce ranking dummies.

Table 4 Panel A presents the results of regressions of capital expenditures on the firm-level variables such as FCF and size and their interactions with fiscal-fourth-quarter dummy, controlling for firm fixed effects, time-varying industry investment opportunities, and other firm-level observable measures that can affect capital expenditures. Standard errors are clustered at the country level. In Columns 1 through 4, we define capital expenditure as quarterly capital expenditures over total assets, and in Columns 5 through 8, we define capital expenditures as quarterly capital expenditures over property, plant, and equipment. In Column 1, we can observe that coefficient on the fourth quarter dummy is positive and statistically significant. The coefficient of Q4 Dummy is about 0.15, indicating that capital expenditure is on average higher in the fourth quarter by 0.15% of total assets. Given that the mean (median) of CapEx is 1.30 (0.78), this increase represents an 11.5% (19%) jump in spending during the fourth quarter relative to the other three quarters. In Columns 2 through 4, the interaction terms of FCF and SIZE rankings with fourth quarter dummy are all positive and statistically significant, implying that *ceteris paribus*, firms with higher agency problems and asymmetric information spend relatively more in the fourth quarter. In terms of economic significance, the results in Column 2 suggest that even for firms in the lowest FCF quintile, on average, they spend 14.6% (0.114/0.78) higher than the CapEx median, and when FCF increases by each quintile rank, the “overspending” increases on average by another three percentage points (0.0208/0.78). In Column 3 and 4, we observe similar patterns: CapEx is higher in the fourth fiscal quarter in the smallest quintile, and the fourth-quarter effect is stronger in larger quintiles. Columns 5 through 8 essentially repeat the results in Columns 1 to 4. Finally, the interaction of implicit tax rate and fourth quarter dummy is positive and statistically significant at least 5% significance level except for Column 4; the discussion on tax-related issue is in section 5.6.

In sum, in a sample of 41 countries, it appears that firms with bigger size and higher FCFs tend to have higher unexplained fourth quarter spending, consistent with Shin and Kim's (2002) results using U.S. data. Admittedly, variables such as firm size are broad and sometimes vague proxies. In section 4.4, which is the focus of this paper, we address this problem by taking advantage of country-level variables and their wide cross-country divergences that can provide a richer ground for testing our hypotheses.

[Insert Table 4 here]

4.4. Cross-country Analysis

As mentioned in section 2, we investigate two country-level channels by which companies’ seasonal investment behaviors can be affected. In this section, we use cross-country analysis to evaluate and compare various explanations for the “fourth quarter effect”. Thus, we investigate how country characteristics influence seasonal investment behaviors of firms that are located in different countries but are otherwise similar. We have provided a brief rationale for the selection of the variables of country characteristics in section 2 and 3; see Appendix A for detailed variable definitions. Our preliminary results are presented in Figure 2. We divide our full sample into two subsamples based on whether a country’s legal origin is English Common law, and three subsamples based on tertiles of other country characteristics that are used to measure investor rights and protection as well as financial market development. These characteristics are described in section 3.1. For all the characteristics except for earnings management, a higher number is associated with stronger investor rights and protection, or more developed financial markets. For example, in the first graph in Figure 2, group 1 (3) represents firms in countries with the lowest (highest) anti-director index. In the next graph, group 1 (3) represents firms in countries with the lowest (highest) overall financial market development. For earnings management, it is the opposite—group 1 (3) represents firms in countries with the highest (lowest) earnings quality and thus highest (lowest) investor protection. All the graphs depicted in Figure 2 show that firms in countries with better investor rights and protection, and more developed financial markets, demonstrate less severe “fourth quarter effect”. The patterns are mostly monotonic, and for the two that are not (IPO and earnings management), the trend is consistent with our expectations. We next present more rigorous regression results.

[Insert Figure 2 here]

4.4.1. Baseline Empirical Results Based on Country Characteristics

Table 4 Panel B reports the baseline results for regressions that include all the country-level variables, controlling for quarterly cash flow, Tobin’s q, fourth quarter dummy, natural logarithm of GDP per capita, and annual GDP growth rate. The results that we are most interested in are coefficients of the interaction terms between country-level variables and fourth quarter dummy. All the coefficients are consistent with our main predictions in our hypotheses in section 2, and statistically significant. For example, a firm from a country with stronger investor rights and protection (Column 1–7) and more developed financial market (Column 8–11) spends less in the fourth fiscal quarter than does a firm from a country with weaker investor rights and protection and less developed financial markets. However, there is no significant difference shown between their investments in a non-fourth quarter. The coefficients on firm-level variables are as expected, and that on GDP growth and GDP per capita is positive and negative, respectively. However, we shall see in Table 5 that once we control for firm-level variables, the coefficients on these two variables are largely positive but statistically insignificant.

Next, we attempt to study how country characteristics affect firms’ investment patterns in more detail. We investigate each category, and include the firm-level characteristics and controls. In addition to the variables widely considered attributable to CapEx in the literature, we include change in cash holdings from the previous quarter, annual sales growth, lagged leverage, implicit tax rate and its interaction with fourth quarter dummy, size rank in the previous fiscal year, and its interaction with fourth quarter dummy. To avoid our results being driven by only one country, we also run the same regression excluding all U.S. firms since U.S. firms account for almost half of our sample. We do not report the coefficients of controls such as calendar quarters because they are not our focus in this study, and they are not statistically or economically significant. In Table 5, one interesting change can be seen in the results: once we control for firm-level variables, GDP per capita and GDP growth are not statistically significant anymore; perhaps indicating that country-level economic growth is fully picked up by firm-level growth opportunities and other variables, which remain statistically and economically significant.

[Insert Table 5 here]

4.4.2. Investor Rights and Protection

Table 5 Panel A presents the results for cross-country analysis using investor rights and protection, again controlling for firm-level variables, and GDP level and growth rate. The coefficients of all interaction terms have the signs that we expect. Among the seven proxies for investor rights and protection, five are statistically significant at the 5% level or higher in both the full sample and non-U.S. subsample. For example, results in Column 2 indicate that firms in countries with the lowest ranked anti-self-dealing index on average invest more in the fourth fiscal quarter by 23% (0.307/1.30) to 39% (0.307/0.78) relative to the unconditional mean and median of CapEx, respectively;[[11]](#footnote-11) however, one standard deviation of increase in the anti-self-dealing index reverses this effect by 18% (-0.265\*0.203/0.307) [[12]](#footnote-12). Similarly, firms from countries with a non-English legal origin on average invest more in the fourth quarter by 18% (0.237/1.30) and 30% (0.237/0.78) relative to the unconditional mean and median of CapEx, respectively. However, firms from countries with an English legal origin on average reversed 57% of that (-0.136/0.237). It is also worth mentioning that since we include firm fixed effect, some country variables such as anti-director rights index are subsumed as they are time-invariant, but not for time-varying variables such as the rule-of-law index. Overall, these results are consistent with the evidence in the law and finance literature in that investor protection, in general, reduces manager’s wasteful spending or empire-building desire. Our results imply that higher levels of investor rights and protection seem to benefit investors in a specific way: it reduces the “fourth quarter effect” in firms’ investment, which is considered a manifestation of inefficient capital allocation and spending.

4.4.3. Financial Markets Development

We report cross-country results on the influence of financial market development on the “fourth quarter effect” in Table 5 Panel B. For all of the four measures of financial markets development, the coefficients on their interaction with the fourth quarter dummy are negative and statistically significant. This is an indication that a more developed financial market, and thus more efficient capital allocation, can alleviate the “fourth quarter effect” and reduce potentially wasteful over-spending in the fourth fiscal quarter. For example, Column 3 suggests that firms from countries with the least financial markets development on average outspend in the fourth quarter by around 20% (0.268/1.30), and one standard deviation of increase in financial markets development reverses 26% (-0.0006\*117.1/0.268) of the extra investment. It is also worth noting that in the financial markets development literature, some researchers document that the equity market matters more for firms’ R&D investment and innovation outcomes but credit market development is more important for investment in fixed assets (see Brown, Martinsson, and Petersen, 2013 and Hsu, Tian, and Xu, 2014). They argue that this is because the natures of R&D such as large upside returns and lack of collateral value limit firms’ ability to use debt finance. Consistent with the evidence documented in the literature, our results in Columns 2 and 6 show that when it comes to investment in fixed assets, credit market matters more, at least in reducing potentially wasteful fourth quarter spending.

In summary, the results above show that firms’ external business environment, specifically country characteristics, does indeed matter for firms’ investment activities. Firms in countries with higher investor rights and protection, English legal origin, stronger law enforcement, and more developed financial markets tend to have a less salient “fourth quarter effect”, implying that the “use it or lose it” dilemma is generally less severe or more effectively reduced in firms in these countries.

**5. Robustness Checks and Alternative Explanations of “Fourth Quarter Effect”**

5.1. Lagged q and Cash Flow as Instruments

When researchers study corporate investment and use Tobin’s q as one of the proxies for firms’ investment opportunities, one common caveat in their studies is that the average q is subject to measurement error mentioned in, for example, Erickson and Whited (2000). The measurement error problem is especially contaminating when researchers attempt to interpret the coefficient on a firm’s cash flow when they study, for example, how firms’ investments are impacted by financial constraints, because cash flow and the measurement error is significantly correlated. This issue is not particularly critical in this current study since we focus on the coefficient on country characteristics instead of firm’s cash flow. Still, following Almeida, Campello, and Galvao (2010), we take into account the measurement error problem, and implement the 2SLS approach.

Panel A of Table 6 reports the key results of 2SLS regressions for the full sample, where the regression specification in the second stage is the same as that in Table 5, and Tobin’s q is estimated in the first stage using instrumental variables as 1-year and 2-year lagged Tobin’s q, as well as 1-year and 2-year lagged cash flows. The results are qualitatively similar to those in Table 4 and 5, and are robust to variations of instrumental variable sets as well as removing U.S. companies from the full sample.

5.2. Cross-country Analysis at the Aggregate Level

To address the possibility that our cross-country results in section 4 are dominated by countries with the largest number of observations, we re-run our panel regressions at the country-year level instead of firm-year level so that each country is weighted equally. We calculate the average of each of the variables in our regressions at the country level in each year to come up with a panel of country-year-quarter observations. As in section 4, we lump observations in the first three fiscal quarters in a certain year and compare them with those in the fourth fiscal quarter, and regress aggregate capital expenditures on the fourth quarter dummy, country characteristics, and the interaction of the two, controlling for other variables as in Table 5, also aggregated at the country level. Our main results are shown in Table 6 Panel B. To save space, we place all the interaction variables between country-level characteristics and fourth-quarter dummy in the third to last row.

[Insert Table 6 here]

As can be seen in Table 6, the interaction terms between fourth-quarter dummy and the three legal environment variables have the expected signs and are statistically significant. Similar to our results in section 4, the variables in the investor rights and protection category generally have coefficients that are statistically significant. For anti-director, anti-self-dealing, accounting quality, and the earnings management index, the results are statistically significant at the 5% level or higher, but for disclosure index and Common Law dummy variable, the results are significant only at the 10% level. Nevertheless, all items have signs as expected. As for the financial markets development measures, the results are similar to those in section 4. Again, credit market development appears to be the dominating factor in the financial market development when it comes to affecting firms’ CapEx, whereas equity market development and even financial market development overall are not as significant. This, again, confirms the evidence in the corporate investment literature that credit market is more important for firms’ fixed investment compared with equity market. It is also consistent with our earlier evidence in Table 5 Panel B.

5.3. Industry Adjustment

In our previous regressions, we control for industry-time fixed effects to control for time-varying investment opportunities. However, one could still argue that the results we obtain so far are due to some confounding industry effects. For example, it is plausible that certain industries are more prevalent in certain countries, and the results we find earlier are because the “fourth quarter effect” is more salient in certain industries rather than countries. To address this issue, we also adjust all firm-specific variables following the method in LLSV (2000) and Brockman and Unlu (2009). First, we compute the industry median for each variable at the country level. We then compute the median value of these first-stage medians across all countries. Finally, we subtract the global industry median from each firm-level variable used in our regressions. The regression results using industry-adjusted variables are presented in Table 7 Panel A (full sample) and B (non-U.S. subsample), and are consistent with those reported in Table 4 and 5. These results reassure us that our earlier findings are due to variations in country characteristics rather than industry variations across countries.

[Insert Table 7 here]

5.4. Investment-q Sensitivity

The main results we have shown so far is that firms in certain countries spend significantly more in their last fiscal quarter than those in other countries. In other words, such investment is inefficient, or is wasteful overspending.

In this section, we extend our evidence of inefficient investment across countries by investigating the sensitivity of investment to Tobin’s q at the quarterly level. An earlier study that investigates investment-q sensitivity across countries is McLean, Zhang, and Zhao (2012), who use annual data and find that the sensitivity is higher in countries with better investor rights and protection. However, what distinguishes our test from theirs is that we investigate the sensitivity using quarterly data rather than annual data. This is because in their research, their focus is on firm’s financial constraint, and they use investment-q sensitivity to measure how responsive firms’ investment is to their investment opportunities, and how it is affected by their financial constraints. In contrast, the inefficiency in our framework is derived from cross-fiscal-quarter and cross-division capital allocation, not from firm-wide capital allocation at the beginning of the year. The annual total investment inefficiency is not our focus here. Rather, our focus is to investigate whether firms overspend in the fourth fiscal quarter and underspend in earlier quarters. Since the quarterly investment-q sensitivity measures how responsive firms’ quarterly spending is to investment opportunities, we expect to see higher sensitivity in countries with better investor rights and protection as well as more developed financial markets.

We present our results in Table 8. The coefficients of our main interest are those on the interaction between Tobin’s q and country characteristics. Consistent with our conjecture, investment-q sensitivity is higher in countries with higher investor rights and protection, and more developed financial markets. The results hold in our full sample in Panel A and in the non-U.S. subsample in Panel B. Furthermore, in order to avoid our results being influenced mainly by large countries, we first regress quarterly investment on Tobin’s q within each country and obtain the coefficients on q. We control for firm-level variables and firm and industry-time fixed effects. We then run an OLS regression of the investment-q sensitivities on our country characteristics. The results of the second regression are shown in Panel C of Table 8. Due to the low number of observations, the power of this test is low. Still, 6 out of 11 of the coefficients are statistically significant at the 10% or higher level, and the rest have signs that are consistent with our conjecture. In sum, Table 8 provides supporting evidence that firms in countries with stronger investor rights and protection, and more developed financial markets allocate their capital more efficiently across fiscal quarters.

[Insert Table 8 here]

5.5. External Finance Dependence across Industries

Since the agency conflicts we focus on in this study are between CEO and outside investors, or “external”, we expect to see a larger effect of agency problems on investment efficiency when firms interact more with outside investors, or depend more on external finance.

Following Rajan and Zingales (1998) and Duchin, Ozbas, and Sensoy (2010), we first construct dependence on external finance for each firm as the ratio of external financing to capital expenditures[[13]](#footnote-13). To do this, we first collect the year-end data of cash flows from operations, capital expenditures, and other expenses of all public firms in North America from the Compustat database. We then aggregate firms’ external finance dependence in each year at the industry level, which is identified as a three-digit SIC code, and then compute dependence as the time-series average of an industry’s dependence on external finance during our sample period. Finally, we construct a dummy variable “EXTERNAL FINANCE” based on whether each industry’s dependence on external finance is above, or below the median of all industries’ dependence on external finance. As in Rajan and Zingales (1998), we assume that industry characteristics based on U.S. data can carry over to other countries.

We then re-run the tests in our full sample, and add a new three-term interaction—the interaction of fourth-quarter dummy, country characteristics, and the external finance dummy. Our results are presented in Table 9. Consistent with our conjecture, the coefficients on the interaction terms between country-level variables and fourth quarter dummy are qualitatively similar with those in Table 4 and 5, indicating that our earlier results hold among firms that are less dependent on external finance. What is new here is that the coefficient on the three-term interaction is mostly significant as well. The directions suggest that the country effects are more significant among firms that are more dependent on external financing. For example, the coefficient on EXTERNAL FINANCE × AD × Q4 Dummy (-0.0115) is negative and statistically significant, indicating that among firms that are more dependent on external financing, the anti-director index plays a more important role in reducing firms’ investments in the fourth fiscal quarter.

[Insert Table 9 here]

5.6. Tax Rate

In Kinney and Trezevant (1993), the authors argue that firms make higher capital expenditures during the fourth fiscal quarter in the current year rather than the following year to increase the present value of the tax shields provided by depreciation and investment tax credit. Although tax-related concerns are plausible, the results in Liebman and Mahoney (2013) imply that they are not the only reason for the “use it or lose it” dilemma because the results are based on data from the public sector, which does not have incentives to manipulate the timing of their spending to reduce tax liabilities. Still, we attempt to address this concern from two aspects. First, we construct an implicit tax rate variable to measure firms’ tax rate, and the hypothesis is that there is a positive relation between tax rate and the “fourth quarter effect”. In our tests, implicit tax rate for a company in a certain year is defined as annual total income taxes divided by taxable income. We include implicit tax rate, and the interaction of tax rate and fourth quarter dummy in most of the regressions. As is shown in Table 4 Panel A and Table 5, the interaction term is positive and statistically significant, but as we suspect, it does not drive away the results for other variables that we are more interested in and thus cannot explain the whole phenomenon. Second, we obtain country-level flat or top marginal corporate income tax rate from the OECD database, and interact the variable with the fourth quarter dummy and include them in our regressions as we do for other country-level variables. As Table 10 shows, tax rate at the country level does not appear to affect firms’ investment pattern in the fourth quarter, whether or not firm-level tax rate is controlled for.

This alleviates the concern that fourth-quarter-effect is mainly driven by tax incentives. Although there are tax-motivated quarterly manipulations documented in the earnings management literature in accounting (e.g. Das, Shroff, and Zhang, 2009), it does not seem to have a direct impact on firms’ quarterly investment patterns. In addition, there is no reason to expect that earnings management typically leads to the pattern of quarterly investment documented in this and the earlier studies.

Insert Table 10 here

**6. Conclusions**

We investigate patterns of firms’ quarterly spending in a sample of 41 countries. Our research resonates with earlier studies, which document that organizations in the U.S. tend to spend more towards the end of fiscal year even though the fourth quarter investment opportunities are not necessarily better.

More importantly, taking advantage of cross-country variation in investor rights and protection, and financial market development, this study sheds further light on the importance of business environment in which the firms operate. We show that firms from countries with better investor protection and more developed financial markets tend to show less severe “fourth quarter effect” compared with others. Our results indicate that a full understanding of firms’ investment activity in general, and of their internal capital budgeting and allocation in particular, demands careful analysis of not only the firm-level factors studied in the existing literature but also of the economy-wide institutions. Earlier international studies identify several country characteristics that promote efficiency in corporate investing and financing. By examining the “fourth quarter effect”, we identify a specific channel through which these country characteristics can enhance firms’ investment efficiency. Finally, of course, since investor rights and protection and financial markets serve as an important external “force” to keep firms’ managers in check and allocate resources more efficiently, countries should continue to improve their legal system and institutions to promote sufficient power for minority investors, and enhance financial market development.

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**Appendix A: Definitions of the Country-level Variables**

|  |  |
| --- | --- |
| **AD** | Anti-director rights index is the sum of six components: (1) the country allows shareholders to mail their proxy vote to the firm, (2) shareholders are not required to deposit their shares prior to the general shareholders’ meeting, (3) cumulative voting or proportional representation of minorities in the board of directors is allowed, (4) an oppressed minorities mechanism is in place, (5) the minimum percentage of share capital that entitles a shareholder to call for an extraordinary shareholders’ meeting is less than or equal to 10 percent (the sample median), or (6) shareholders have preemptive rights that can be waived only by a shareholders’ vote. The index is obtained from LLSV (1998) and ranges from 0 to 6. |
| **AS** | Anti-self-dealing index. This is a survey-based measure of restrictions on controlling shareholders’ self-dealing, from Djankov et al. (2008), and this index ranges from 0 (weak control of self-dealing) to 1 (strong). |
| **DISC** | Extent of disclosure index from World Bank’s Doing Business database. This index is the average of the extent of disclosure index, the extent of director liability index and the ease of shareholder suits index. The index ranges from 0 to 10, with higher values indicating stronger regulation of conflicts of interest. |
| **ACCT** | Accounting standards based on the reporting or omission of 90 items from firms’ annual reports. This index is obtained from LLSV (1998). Higher values of ACCT indicate higher accounting standards.  |
| **EM** | The aggregate earnings management index from Leuz, Nanda, and Wysocki (2003). Higher EM is associated with higher earnings management and thus lower earnings quality. |
| **EQUITY** | Equity market development, defined as a country’s stock market capitalization divided by its GDP. This item is from the World Bank’s World Development Indicators database. |
| **CREDIT** | Credit market development is defined as a country’s ratio of domestic credit to private sector over GDP. This item is from the World Bank’s World Development Indicators database. |
| **FD** | Overall financial market development, which is the combination of EQUITY and CREDIT. |
| **IPO** | 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. Source of this item is La Porta, Lopez-De-Silanes, and Shleifer (2006). |
| **UK** | English Common Law indicator—equal to one if a country has English Common Law legal origin and zero otherwise. We do not further classify non-Common-Law origins into French, German, and Scandinavian. This item is obtained from LLSV (1998). |
| **RULE** | Rule of law index. This is a survey-based index that reflects perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence. Source: World Bank’s Worldwide Governance Indicators (WGI) database. |
| **TAX\_C** | Tax rate at the country level. It measures the basic central government statutory (flat or top marginal) corporate income tax rate. Source: OECD. |

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**Figure 1: “Fourth Quarter Effect” across Countries.**

This figure presents the equal- and value-weighted average of proportion of firms’ annual investment in their fourth fiscal quarters in our pooled sample.

Value-weighted

**Figure 2: “Fourth Quarter Effect” across Different Country Characteristics.**

This figure presents the value-weighted average of proportion of firms’ annual investment in their fourth fiscal quarters across different country characteristics. Results based on equal-weighted averages are qualitatively similar. We divide our full sample into two subsamples based on whether a country’s legal origin is English Common law, and three subsamples based on tertiles of other country characteristics that are used to measure investor rights and protection as well as financial market development. These characteristics are described in section 3.1. In the third graph in the first row, group 0 and 1 represent Civil Law and Common Law system, respectively. For the other characteristics except for earnings management, a higher number is associated with stronger investor rights and protection or more developed financial market. For example, in the first graph in the first row, group 1 (3) represents firms in countries with the lowest (highest) anti-director index. In the next graph, group 1 (3) represents firms in countries with the lowest (highest) overall financial market development. For earnings management, it is the opposite – group 1 (3) represents firms in countries with the highest (lowest) earnings quality and thus highest (lowest) investor protection.

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**Table 1 – Summary Statistics for Firm-level Variables**

This table provides summary statistics for firm- and country-level variables at firm-fiscal-year-quarter level from 2005 to 2014. CapEx is defined as quarterly capital expenditures over total assets at the beginning of the quarter and CapEx\_PPE as quarterly capital expenditures over property, plant, & equipment at the beginning of the quarter. Cash Flow is constructed as the sum of quarterly income before extraordinary items and depreciation and amortization, divided by firm’s assets at the beginning of each quarter. Tobin’s q is measured as the ratio of market value of assets over book value of assets at the beginning of the quarter, and is bounded above at 10. Change in Cash Holdings is the difference of cash holding from that in the previous fiscal quarter, and cash holding is defined as cash and short-term Investments over total assets. Leverage is total debt over total assets. Sales Growth is the growth rate of sales from the same fiscal quarter in the previous fiscal year. Free Cash Flow is annual operating income minus interest expense minus income taxes, scaled by the book value of assets. The Implicit Tax Rate is defined as annual total income taxes divided by taxable income. Total Assets and Market Cap are book value of total assets and stock market capitalization, respectively, in $millions. Number of employees is in thousands.

In Panel B, the country characteristics are investor rights and protection, development of financial market, and GDP per capita in constant 2005 US$ (GDP), annual GDP growth (GDP\_GRO), and country-level tax rate (TAX\_C). The proxies for investor rights and protection include the anti-director rights index (AD), the anti-self-dealing index (AS), the extent of disclosure index (DISC), accounting quality (ACCT), earnings management index (EM), an indicator of whether the country has English Common Law legal origin (UK) and the rule of law index (RULE). The development of financial market proxies include the ratio of stock market capitalization over GDP (EQUITY), the ratio of domestic credit to private sector over GDP (CREDIT), the combination of the two as a general measure of financial market development (FD), and the number of IPOs per capita (IPO). The details of these variables are provided in Appendix A.Our sample includes 41 countries and covers the period 2005-2014 in fiscal years.

|  |
| --- |
| Panel A: Firm Variable Summary Statistics |
|  | (1) | (2) | (3) | (4) | (5) | (6) |
| Variables | N | Mean | Std. Dev. | 25th Percentile | Median | 75th Percentile |
|  |  |  |  |  |  |  |
| CapEx | 232,192 | 1.344 | 1.527 | 0.355 | 0.810 | 1.714 |
| CapEx\_PPE | 231,770 | 6.947 | 8.275 | 2.357 | 4.572 | 8.329 |
| Cash Flow | 232,192 | 0.0158 | 0.0411 | 0.00831 | 0.0206 | 0.0335 |
| Tobin’s q | 232,192 | 1.750 | 1.266 | 1.013 | 1.356 | 1.991 |
| Change in Cash Holdings | 231,267 | -0.000877 | 0.0425 | -0.0139 | 0 | 0.0121 |
| Leverage | 232,168 | 0.186 | 0.168 | 0.0214 | 0.159 | 0.298 |
| Sales Growth | 223,396 | 0.133 | 0.430 | -0.0348 | 0.0701 | 0.203 |
| Free Cash Flow | 232,176 | 0.0637 | 0.135 | 0.0384 | 0.0805 | 0.124 |
| Implicit Tax Rate | 232,180 | 0.194 | 0.408 | 0.0524 | 0.246 | 0.339 |
| Total Assets | 232,192 | 1,916 | 5,210 | 72.41 | 261.1 | 1,107 |
| Market Cap | 232,180 | 1,834 | 5,252 | 56.32 | 225.1 | 1,025 |
| Num. of Employees | 173,683 | 9.422 | 22.58 | 0.394 | 1.660 | 6.803 |

|  |
| --- |
| Panel B: Country Variable Summary Statistics |
|  | (1) | (2) | (3) | (4) | (5) | (6) |
| Variables | N | Mean | Std. Dev. | 25th Percentile | Median | 75th Percentile |
|  |  |  |  |  |  |  |
| AD | 224,368 | 4.097 | 1.298 | 3 | 5 | 5 |
| AS | 229,228 | 0.630 | 0.203 | 0.540 | 0.651 | 0.683 |
| DISC | 217,001 | 7.465 | 1.845 | 7 | 7 | 8 |
| ACCT | 216,852 | 70.41 | 6.473 | 69 | 71 | 74 |
| EM | 209,844 | 8.113 | 7.643 | 2 | 5.300 | 13.50 |
| UK | 232,192 | 0.727 | 0.445 | 0 | 1 | 1 |
| RULE | 232,192 | 1.360 | 0.653 | 1.478 | 1.605 | 1.726 |
| EQUITY | 212,427 | 112.4 | 83.90 | 72.45 | 112.4 | 137.6 |
| CREDIT | 209,317 | 140.8 | 54.19 | 96.64 | 150.5 | 189.4 |
| FD | 189,751 | 252.0 | 117.1 | 167.9 | 274.4 | 317.7 |
| IPO | 224,368 | 5.491 | 2.859 | 3.778 | 5.472 | 6.332 |
| TAX\_C | 194,996 | 29.32 | 7.124 | 25 | 34.43 | 35 |
| GDP | 232,192 | 35,373 | 14,004 | 35,214 | 39,764 | 44,861 |
| GDP\_GRO | 232,192 | 2.057 | 2.623 | 1.380 | 2.321 | 3.059 |

**Table 2 – Summary Statistics for Country-level Variables**

**Panel A: Country Characteristics**

This table provides the number of firms and observations and magnitude or averages (if time-varying) for country characteristics of the 41 countries in our sample. The country characteristics are investor rights and protection, development of financial market, and GDP per capita in constant 2005 US$ (GDP), annual GDP growth (GDP\_GRO), and country-level tax rate (TAX\_C). The proxies for investor rights and protection include the anti-director rights index (AD), the anti-self-dealing index (AS), the extent of disclosure index (DISC), accounting quality (ACCT), earnings management index (EM), an indicator of whether the country has English Common Law legal origin (UK), and the rule of law index (RULE). The development of financial market proxies include the ratio of stock market capitalization over GDP (EQUITY), the ratio of domestic credit to private sector over GDP (CREDIT), the combination of the two as a general measure of financial market development (FD), and the number of IPOs per capita (IPO). The details of the country-level variables are provided in Appendix A.Our sample includes 41 countries and covers the period 2005-2014 in fiscal years.

|  |  |  |  | **Investor Rights and Protection** | **Financial Market Development** | **GDP & Tax Rate** |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Country** | **Number of firms** | **Number of observations** | **AD** | **AS** | **DIS** | **ACCT** | **EM** | **UK** | **RULE** | **EQUITY** | **CREDIT** | **FD** | **IPO** | **GDP** | **GDP\_GRO** | **TAX\_C** |
| **1** | Australia | 575 | 12140 | 4 | 0.790 | 8.000 | 75 | 4.8 | 1 | 1.757 | 109.150 | 121.632 | 230.780 | 8.714 | 36206.300 | 2.839 | 30.000 |
| **2** | Austria | 39 | 972 | 2 | 0.209 | 5.000 | 54 | 28.3 | 0 | 1.861 | 30.680 | 95.227 | 125.910 | 1.156 | 40499.270 | 1.007 | 25.009 |
| **3** | Belgium | 60 | 1512 | 0 | 0.540 | 8.000 | 61 | 19.5 | 0 | 1.375 | 60.080 | 58.522 | 118.600 | 2.348 | 38053.550 | 0.979 | 33.000 |
| **4** | Brazil | 125 | 2792 | 3 | 0.291 | 5.000 | 54 | . | 0 | -0.147 | 54.120 | 55.995 | 110.110 | 0.050 | 5609.400 | 3.220 | . |
| **5** | Canada | 894 | 21740 | 5 | 0.651 | 8.000 | 74 | 5.3 | 1 | 1.780 | 117.800 | 149.488 | 266.650 | 8.568 | 36961.270 | 1.836 | 18.400 |
| **6** | Chile | 81 | 2228 | 5 | 0.625 | 7.522 | 52 | . | 0 | 1.315 | 113.080 | 97.495 | 210.570 | 0.510 | 8879.650 | 4.176 | 18.526 |
| **7** | Denmark | 57 | 1388 | 2 | 0.466 | 7.000 | 62 | 16.0 | 0 | 1.936 | 60.240 | 185.793 | 205.960 | 1.196 | 48202.480 | 0.064 | 25.239 |
| **8** | Egypt | 17 | 388 | 2 | 0.491 | 4.820 | 24 | . | 0 | -0.336 | 36.860 | 32.936 | 69.300 | 2.218 | 1437.290 | 3.724 | . |
| **9** | Finland | 93 | 2768 | 3 | 0.460 | 6.000 | 77 | 12.0 | 0 | 1.960 | . | 85.299 | . | 3.778 | 40130.210 | 0.506 | 25.077 |
| **10** | France | 416 | 11612 | 3 | 0.382 | 9.000 | 69 | 13.5 | 0 | 1.445 | 75.190 | 92.629 | 167.820 | 2.310 | 35534.340 | 0.818 | 34.462 |
| **11** | Germany | 347 | 9204 | 1 | 0.279 | 5.000 | 62 | 21.5 | 0 | 1.682 | 43.350 | 91.033 | 134.380 | 2.784 | 37599.290 | 1.279 | 18.399 |
| **12** | Greece | 124 | 3000 | 2 | 0.225 | 1.936 | 55 | 28.3 | 0 | 0.641 | 38.970 | 98.293 | 137.260 | 8.782 | 21775.880 | -1.873 | 25.017 |
| **13** | Hong Kong | 50 | 1164 | 5 | 0.964 | 9.000 | 69 | 19.5 | 1 | 1.563 | 1029.260 | 186.163 | 1215.420 | 9.118 | 31811.840 | 3.168 | . |
| **14** | Indonesia | 181 | 3972 | 2 | 0.683 | 9.733 | . | 18.3 | 0 | -0.578 | 41.650 | 31.130 | 72.780 | 1.674 | 1634.430 | 5.708 | . |
| **15** | Ireland | 46 | 1156 | 4 | 0.787 | 10.000 | . | 5.1 | 1 | 1.728 | 45.190 | 132.737 | 177.930 | 6.090 | 50515.710 | 1.465 | 12.500 |
| **16** | Israel | 130 | 2808 | 3 | 0.714 | 7.000 | 64 | . | 1 | 0.922 | 77.890 | 68.640 | 146.530 | 0.394 | 23299.800 | 3.755 | 26.544 |
| **17** | Italy | 118 | 2964 | 1 | 0.385 | 7.000 | 62 | 24.8 | 0 | 0.382 | 29.720 | 88.273 | 117.990 | 5.938 | 30757.600 | -0.759 | 28.515 |
| **18** | Kuwait | 72 | 1392 | . | . | 4.000 | . | . | 0 | 0.423 | 112.310 | 63.756 | 162.560 | . | 28979.720 | 2.402 | . |
| **19** | Mexico | 64 | 1700 | 1 | 0.178 | 7.919 | 60 | . | 0 | -0.561 | 37.790 | 25.581 | 63.370 | 0.220 | 8252.830 | 2.319 | 29.363\ |
| **20** | Malaysia | 337 | 6624 | 4 | 0.948 | 10.000 | 76 | 14.8 | 1 | 0.516 | 142.530 | 111.880 | 254.410 | 6.182 | 6656.610 | 5.010 | . |
| **21** | Netherlands | 99 | 2568 | 2 | 0.209 | 3.205 | 64 | 16.5 | 0 | 1.810 | 80.960 | 115.825 | 196.780 | 2.630 | 43570.730 | 0.819 | 25.915 |
| **22** | New Zealand | 66 | 1576 | 4 | 0.950 | 10.000 | 70 | . | 1 | 1.878 | 32.090 | 138.107 | 167.470 | 0.060 | 28440.320 | 1.745 | 29.822 |
| **23** | Norway | 79 | 1688 | 4 | 0.435 | 7.000 | 74 | 5.8 | 0 | 1.943 | 55.130 | 82.789 | 156.420 | 2.202 | 66957.100 | 1.257 | 27.710 |
| **24** | Pakistan | 91 | 1964 | 5 | 0.408 | 6.000 | . | 17.8 | 1 | -0.861 | 24.630 | 20.801 | 48.460 | 0.398 | 772.220 | 3.649 | . |
| **25** | Peru | 37 | 948 | 3 | 0.408 | 8.143 | 38 | . | 0 | -0.652 | 50.430 | 26.399 | 76.830 | 0.038 | 3563.750 | 6.122 | . |
| **26** | Philippines | 70 | 1600 | 3 | 0.237 | 2.000 | 65 | 8.8 | 0 | -0.495 | 72.400 | 32.364 | 104.770 | 2.224 | 1450.470 | 5.523 | . |
| **27** | Poland | 199 | 4716 | . | 0.300 | 7.000 | . | . | 0 | 0.641 | 34.220 | 46.866 | 81.090 | . | 10090.230 | 3.583 | 19.000 |
| **28** | Russia | 35 | 572 | . | 0.476 | 6.000 | . | . | 0 | -0.774 | 36.670 | 50.458 | 87.730 | . | 6762.210 | 2.211 | . |
| **29** | Saudi Arabia | 79 | 1704 | . | . | 7.846 | . | . | 0 | 0.214 | 60.450 | 39.284 | 100.380 | . | 15932.370 | 5.085 | . |
| **30** | Singapore | 401 | 9372 | 4 | 1.000 | 10.000 | 78 | 21.6 | 1 | 1.712 | 242.130 | 106.150 | 348.280 | 5.940 | 34679.990 | 5.743 | . |
| **31** | South Africa | 100 | 2420 | 5 | 0.814 | 8.000 | 70 | 5.6 | 1 | 0.107 | 236.240 | 147.287 | 383.530 | 0.652 | 5936.160 | 2.694 | . |
| **32** | South Korea | 139 | 1764 | 2 | 0.461 | 7.000 | 62 | 26.8 | 0 | 0.966 | 91.720 | 136.776 | 228.500 | 5.322 | 23850.580 | 2.888 | 22.000 |
| **33** | Spain | 31 | 664 | 4 | 0.370 | 5.000 | 64 | 18.6 | 0 | 1.099 | 78.950 | 160.373 | 239.320 | 2.412 | 25977.990 | -0.729 | 32.219 |
| **34** | Sri Lanka | 63 | 1260 | 3 | 0.408 | 4.886 | . | . | 1 | -0.099 | 26.590 | 26.794 | 53.380 | 0.500 | 1749.660 | 6.535 | . |
| **35** | Sweden | 146 | 3700 | 3 | 0.340 | 6.707 | 83 | 6.8 | 0 | 1.930 | . | 122.959 | . | 6.332 | 45059.260 | 1.533 | 25.892 |
| **36** | Switzerland | 104 | 2740 | 2 | 0.267 | 0.000 | 68 | 22.0 | 0 | 1.812 | 207.300 | 160.924 | 368.230 | 7.108 | 58256.550 | 1.878 | 8.500 |
| **37** | Thailand | 188 | 4748 | 2 | 0.849 | 10.000 | 64 | 18.3 | 1 | -0.149 | 78.020 | 123.151 | 201.170 | 0.822 | 3435.990 | 3.420 | . |
| **38** | Turkey | 85 | 1724 | 2 | 0.426 | 8.744 | 51 | . | 0 | 0.070 | 30.920 | 50.851 | 81.770 | 1.482 | 8122.750 | 3.685 | 20.415 |
| **39** | United Kingdom | 693 | 16656 | 5 | 0.927 | 10.000 | 78 | 7.0 | 1 | 1.708 | 112.210 | 174.822 | 291.020 | 11.266 | 40314.140 | 1.090 | 26.635 |
| **40** | United States | 3381 | 92852 | 5 | 0.651 | 7.000 | 71 | 2.0 | 1 | 1.585 | 120.840 | 191.955 | 310.470 | 5.472 | 44767.780 | 1.535 | 35.000 |
| **41** | Vietnam | 46 | 728 | . | . | 6.213 | . | . | 0 | -0.456 | 22.630 | 100.765 | 124.710 | . | 987.620 | 5.782 | . |
|  | **Min.** | **Egypt** | **Egypt** | **Multi.** | **Mexico** | **Switzerland** | **Egypt** | **U.S.** | **Multi.** | **Pakistan** | **Vietnam** | **Pakistan** | **Pakistan** | **Peru** | **Pakistan** | **Greece** | **U.S.** |
|  | **Max.** | **U.S.** | **U.S.** | **Multi.** | **Singapore** | **Multi.** | **Sweden** | **Greece** | **Multi.** | **Finland** | **Hong Kong** | **U.S.** | **Hong Kong** | **U.K.** | **Norway** | **Sri Lanka** | **Switzerland** |
|  | **Mean** | **242.88** | **6036.29** | **3.056** | **0.526** | **6.846** | **64.063** | **15.159** | **0.341** | **0.821** | **101.292** | **95.810** | **195.863** | **3.525** | **24475.008** | **2.627** | **24.727** |
|  | **Standard Deviation** |  |  | **1.372** | **0.247** | **2.401** | **12.029** | **7.915** | **0.480** | **0.963** | **161.987** | **50.137** | **189.639** | **3.181** | **18462.171** | **2.025** | **6.749** |

**Table 2**

**Panel B: Correlations of Country Characteristics**

This table reports the correlations among the country-level characteristics of the 41 countries from our sample. The country characteristics are investor rights and protection, development of financial market, and GDP per capita in constant 2005 US$ (GDP), annual GDP growth (GDP\_GRO), and country-level tax rate (TAX\_C). The proxies for investor rights and protection include the anti-director rights index (AD), the anti-self-dealing index (AS), the extent of disclosure index (DISC), accounting quality (ACCT), earnings management index (EM), an indicator of whether the country has English Common Law legal origin (UK), and the rule of law index (RULE). The development of financial market proxies include the ratio of stock market capitalization over GDP (EQUITY), the ratio of domestic credit to private sector over GDP (CREDIT), the combination of the two as a general measure of financial market development (FD), and the number of IPOs per capita (IPO). The details of these variables are provided in Appendix A.Our sample includes 41 countries and covers the period 2005-2014 in fiscal years. The numbers in the parentheses below the coefficients are p-values for the pairwise correlations. The coefficients with p-value below 0.05 are in boldface.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | AD | AS | DISC | ACCT | EM | EQUITY | CREDIT | FD | IPO | UK | RULE | GDP\_PERCAP | GDP\_GRO | TAX\_C |
| AD | 1.0000 |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| AS | **0.5553** | 1.0000 |  |  |  |  |  |  |  |  |  |  |  |  |
|  | **(0.0004)** |  |  |  |  |  |  |  |  |  |  |  |  |  |
| DISC | 0.3026 | **0.7450** | 1.0000 |  |  |  |  |  |  |  |  |  |  |  |
|  | (0.0729) | **(<.0001)** |  |  |  |  |  |  |  |  |  |  |  |  |
| ACCT | **0.4048** | **0.3782** | 0.2648 | 1.0000 |  |  |  |  |  |  |  |  |  |  |
|  | **(0.0216)** | **(0.0328)** | (0.1431) |  |  |  |  |  |  |  |  |  |  |  |
| EM | **-0.6233** | -0.3377 | -0.2972 | **-0.6992** | 1.0000 |  |  |  |  |  |  |  |  |  |
|  | **(0.0005)** | (0.0849) | (0.1322) | **(0.0001)** |  |  |  |  |  |  |  |  |  |  |
| EQUITY | **0.3616** | **0.4206** | 0.1504 | 0.2488 | 0.0243 | 1.0000 |  |  |  |  |  |  |  |  |
|  | **(0.0356)** | **(0.0106)** | (0.3609) | (0.1850) | (0.9083) |  |  |  |  |  |  |  |  |  |
| CREDIT | **0.3965** | **0.4146** | 0.1362 | **0.5332** | -0.2177 | **0.4251** | 1.0000 |  |  |  |  |  |  |  |
|  | **(0.0167)** | **(0.0096)** | (0.3957) | **(0.0017)** | (0.2753) | **(0.0070)** |  |  |  |  |  |  |  |  |
| FD | **0.4204** | **0.4733** | 0.1667 | 0.3584 | -0.0307 | **0.9722** | **0.6232** | 1.0000 |  |  |  |  |  |  |
|  | **(0.0133)** | **(0.0036)** | **(0.3103)** | (0.0518) | (0.8840) | **(<.0001)** | **(<.0001)** |  |  |  |  |  |  |  |
| IPO | 0.2567 | 0.3008 | **0.0452** | **0.4697** | -0.1355 | **0.4088** | **0.5645** | **0.5009** | 1.0000 |  |  |  |  |  |
|  | (0.1308) | (0.0747) | (0.7935) | **(0.0067)** | (0.5004) | **(0.0164)** | **(0.0003)** | **(0.0025)** |  |  |  |  |  |  |
| UK | **0.6411** | **0.7797** | **0.4844** | **0.4685** | **-0.4363** | **0.3247** | **0.3744** | **0.3843** | 0.2694 | 1.0000 |  |  |  |  |
|  | **(<.0001)** | **(<.0001)** | **(0.0013)** | **(0.0068)** | **(0.0229)** | **(0.0437)** | **(0.0159)** | **(0.0157)** | (0.1120) |  |  |  |  |  |
| RULE | 0.1712 | 0.1884 | 0.0708 | **0.5819** | -0.1681 | 0.2435 | **0.6909** | **0.3940** | **0.4603** | 0.1462 | 1.0000 |  |  |  |
|  | (0.3182) | (0.2572) | (0.6600) | **(0.0005)** | (0.4021) | (0.1353) | **(<.0001)** | **(0.0131)** | **(0.0047)** | (0.3616) |  |  |  |  |
| GDP\_PERCAP | 0.0187 | 0.0043 | -0.0638 | **0.5281** | -0.1810 | 0.1539 | **0.5924** | 0.2891 | **0.4572** | 0.0028 | **0.8835** | 1.0000 |  |  |
|  | (0.9140) | (0.9798) | (0.6919) | **(0.0019)** | (0.3662) | (0.3495) | **(<.0001)** | (0.0743) | **(0.0051)** | (0.9862) | **(<.0001)** |  |  |  |
| GDP\_GRO | 0.2253 | 0.2974 | 0.2176 | -0.1938 | -0.1416 | 0.0662 | **-0.4619** | -0.0649 | -0.3051 | 0.2076 | **-0.5458** | **-0.6356** | 1.0000 |  |
|  | (0.1864) | (0.0698) | (0.1717) | (0.2879) | (0.4810) | (0.6891) | **(0.0024)** | (0.6946) | (0.0704) | (0.1928) | **(0.0002)** | **(<.0001)** |  |  |
| TAX\_C | -0.0506 | 0.1245 | 0.3396 | 0.1929 | -0.1442 | -0.2971 | -0.0969 | -0.2286 | -0.1941 | 0.0968 | -0.0614 | -0.0275 | -0.2838 | 1.0000 |
|  | (0.8186) | (0.5622) | (0.1045) | (0.3899) | (0.5682) | (0.1794) | (0.6522) | (0.3061) | (0.3749) | (0.6525) | (0.7756) | (0.8983) | (0.1790) |  |

**Table 3 – Capital Expenditures by Fiscal and Calendar Quarter**

Panel A reports the basic statistics of firm-level variables by fiscal quarter. In Columns 1 and 2, CapEx is defined as quarterly capital expenditures over total assets at the beginning of the quarter and CapEx\_PPE as quarterly capital expenditures over property, plant, & equipment at the beginning of the quarter. Cash Flow in Column 3 is constructed as the sum of quarterly income before extraordinary items and depreciation and amortization, divided by firm’s assets at the beginning of each quarter. Tobin’s q in Column 4 is proxied as the ratio of market value of assets over book value of assets at the beginning of each quarter, and is bounded above at 10. In Column 5, Sales Growth is quarterly growth rate of sales. In Column 6, Change in Cash Holdings is the difference of cash holding from that in the previous fiscal quarter, and cash holding is defined as cash and short-term Investments over assets. Leverage in Column 7 stands for quarterly leverage, defined as total debt over total assets. Finally, Column 8 shows the similar pattern of quarterly capital expenditure in the subsample excluding US firms.

Panel B (C) reports the means and medians of the same variables as in Panel A but instead through each **calendar (fiscal)** quarter for a subsample in which firms have fiscal year-end different from December.

|  |
| --- |
| Panel A: Firm Variable Summary Statistics by Fiscal Quarter |
|  |  | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|  | Variables | CapEx | CapEx\_PPE | Cash Flow | Tobin’s q | Sales Growth | Change in Cash Holdings | Leverage | CapEx, Non-US |
| Fiscal Q1 | N | 58,048 | 58,016 | 58,048 | 58,048 | 56,016 | 57,777 | 54,057 | 35,637 |
|  | Mean | 1.241 | 6.542 | 0.0161 | 1.738 | -0.00955 | -0.0066 | 0.201 | 1.327 |
|  | Median | 0.726 | 4.124 | 0.0193 | 1.354 | -0.018 | -0.0032 | 0.18 | 0.776 |
| Fiscal Q2 | N | 58,048 | 57,896 | 58,048 | 58,048 | 56,843 | 57,801 | 54,131 | 35,637 |
|  | Mean | 1.309 | 6.75 | 0.0173 | 1.774 | 0.0721 | -0.0029 | 0.202 | 1.373 |
|  | Median | 0.79 | 4.455 | 0.0209 | 1.369 | 0.0185 | 0 | 0.182 | 0.834 |
| Fiscal Q3 | N | 58,048 | 57,922 | 58,048 | 58,048 | 56,863 | 57,789 | 54,240 | 35,637 |
|  | Mean | 1.352 | 6.973 | 0.0169 | 1.763 | 0.0498 | 0.0013 | 0.2 | 1.447 |
|  | Median | 0.816 | 4.586 | 0.0214 | 1.363 | 0.019 | 0.0006 | 0.179 | 0.885 |
| Fiscal Q4 | N | 58,048 | 57,936 | 58,048 | 58,048 | 56,964 | 57,900 | 54,552 | 35,637 |
|  | Mean | 1.473 | 7.525 | 0.0128 | 1.726 | 0.051 | 0.0048 | 0.199 | 1.584 |
|  | Median | 0.927 | 5.154 | 0.0206 | 1.338 | 0 | 0 | 0.177 | 1.001 |

|  |
| --- |
| Panel B: Firm Variable Summary Statistics by **Calendar** Quarter (Fiscal Year End ≠ Dec.) |
|  |  | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|  | Variables | CapEx | CapEx\_PPE | Cash Flow | Tobin’s q | Sales Growth | Change in Cash Holdings | Leverage |
| Calendar Q1 | N | 17,351 | 17,346 | 17,351 | 17,351 | 16,846 | 17,263 | 15,768 |
|  | Mean | 1.287 | 6.857 | 0.0139 | 1.8 | 0.0181 | -0.0003 | 0.173 |
|  | Median | 0.755 | 4.605 | 0.0207 | 1.39 | 0 | 0 | 0.147 |
| Calendar Q2 | N | 17,361 | 17,344 | 17,361 | 17,361 | 16,851 | 17,276 | 15,757 |
|  | Mean | 1.317 | 7.016 | 0.0147 | 1.793 | 0.0428 | -0.0005 | 0.172 |
|  | Median | 0.779 | 4.746 | 0.0214 | 1.402 | 0 | 0 | 0.147 |
| Calendar Q3 | N | 17,361 | 17,347 | 17,361 | 17,361 | 16,679 | 17,266 | 15,734 |
|  | Mean | 1.341 | 7.068 | 0.0161 | 1.784 | 0.0527 | -0.0038 | 0.174 |
|  | Median | 0.779 | 4.73 | 0.0217 | 1.404 | 0.00747 | 0 | 0.149 |
| Calendar Q4 | N | 17,360 | 17,348 | 17,360 | 17,360 | 16,800 | 17,270 | 15,715 |
|  | Mean | 1.298 | 6.749 | 0.0172 | 1.803 | 0.049 | 0.0009 | 0.174 |
|  | Median | 0.763 | 4.654 | 0.022 | 1.396 | 0 | 0 | 0.148 |

|  |
| --- |
| Panel C: Firm Variable Summary Statistics by **Fiscal** Quarter (Fiscal Year End ≠ Dec.) |
|  |  | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|  | Variables | CapEx | CapEx\_PPE | Cash Flow | Tobin’s q | Sales Growth | Change in Cash Holdings | Leverage |
| Fiscal Q1 | N | 17,361 | 17,349 | 17,361 | 17,361 | 16,545 | 17,254 | 15,695 |
|  | Mean | 1.276 | 6.84 | 0.0164 | 1.775 | 0.0173 | -0.0079 | 0.175 |
|  | Median | 0.722 | 4.379 | 0.0207 | 1.397 | -0.0033 | -0.0034 | 0.15 |
| Fiscal Q2 | N | 17,361 | 17,349 | 17,361 | 17,361 | 16,855 | 17,275 | 15,704 |
|  | Mean | 1.284 | 6.633 | 0.0165 | 1.817 | 0.0532 | -0.0022 | 0.176 |
|  | Median | 0.751 | 4.614 | 0.0215 | 1.405 | 0 | 0 | 0.152 |
| Fiscal Q3 | N | 17,361 | 17,350 | 17,361 | 17,361 | 16,857 | 17,258 | 15,765 |
|  | Mean | 1.316 | 6.996 | 0.0155 | 1.817 | 0.0506 | 0.0019 | 0.172 |
|  | Median | 0.765 | 4.674 | 0.0218 | 1.406 | 0.0236 | 0.0008 | 0.146 |
| Fiscal Q4 | N | 17,361 | 17,348 | 17,361 | 17,361 | 16,930 | 17,299 | 15,818 |
|  | Mean | 1.368 | 7.222 | 0.0136 | 1.772 | 0.0409 | 0.0044 | 0.17 |
|  | Median | 0.845 | 5.074 | 0.0219 | 1.382 | 0 | 0 | 0.142 |

**Table 4 – Fourth-quarter Investment Patterns across Firms and Countries – Baseline Results**

Panel A of this table reports the results of regressions of capital expenditure on the firm-level variable quintiles and their interactions with fourth fiscal quarter dummy, controlling for firm fixed effects and other firm-level observable measures to account for any confounding effects attributable to capital expenditure. We also add Fama-French-48 industry × calendar quarter interaction fixed effects to control for time-varying investment opportunities. In Columns 1 through 4, we define capital expenditure as quarterly capital expenditures over total assets at the beginning of the quarter, and in Columns 5 through 8, we define capital expenditure as quarterly capital expenditures over property, plant, & equipment at the beginning of the quarter. Cash Flow is constructed as the sum of quarterly income before extraordinary items and depreciation and amortization, divided by firm’s assets at the beginning of each quarter. Tobin’s q is measured as the ratio of market value of assets over book value of assets at the beginning of each quarter, and is bounded above at 10. Change in Cash Holdings is the difference of cash holding from that in the previous fiscal quarter, and cash holding is defined as cash and short-term Investments over total assets. Leverage is total debt over total assets. Sales Growth is the growth rate of sales from the same fiscal quarter in the previous fiscal year, and the Implicit Tax Rate is defined as annual total income taxes divided by taxable income. FCF\_Rank, Assets\_Rank, Employee\_Rank are ranking dummies based on quintiles of annual FCF, total assets, and number of employees, respectively. Robust standard errors are reported in parentheses. \*, \*\*, and \*\*\* indicate significance at the 10%, 5%, and 1% level, respectively. Standard errors are clustered at the country level. Firm-level controls are winsorized at the 1% tails. Our sample includes 41 countries and covers the period 2005-2014 in fiscal years.

|  |
| --- |
| Panel A: Regressions of Capital Expenditure on the Interaction of Firm-level Variable and 4th Fiscal Quarter Dummy |
|  | Dependent Variable: CapEx |  | Dependent Variable: CapEx\_PPE |
|  | (1) | (2) | (3) | (4) |  | (5) | (6) | (7) | (8) |
|  |  |  |  |  |  |  |  |  |  |
| Cash Flow | 1.037\*\*\* | 0.593\*\*\* | 0.936\*\*\* | 0.900\*\*\* |  | 7.481\*\*\* | 4.519\*\*\* | 6.099\*\*\* | 5.325\*\*\* |
|  | (0.150) | (0.0985) | (0.107) | (0.0769) |  | (0.551) | (0.471) | (0.481) | (0.556) |
| Change in Cash Holdings |  | -1.646\*\*\* | -1.653\*\*\* | -1.614\*\*\* |  |  | -11.50\*\*\* | -11.51\*\*\* | -11.73\*\*\* |
|  |  | (0.0830) | (0.0830) | (0.0657) |  |  | (0.734) | (0.727) | (0.765) |
| Tobin’s q | 0.161\*\*\* | 0.139\*\*\* | 0.147\*\*\* | 0.149\*\*\* |  | 1.023\*\*\* | 0.891\*\*\* | 0.935\*\*\* | 1.026\*\*\* |
|  | (0.00956) | (0.00832) | (0.00788) | (0.00681) |  | (0.107) | (0.109) | (0.118) | (0.0923) |
| Sales Growth |  | 0.0942\*\*\* | 0.0710\*\*\* | 0.0687\*\*\* |  |  | 0.872\*\*\* | 0.766\*\*\* | 0.846\*\*\* |
|  |  | (0.00985) | (0.00993) | (0.0104) |  |  | (0.0923) | (0.0818) | (0.0800) |
| Leverage |  | -0.892\*\*\* | -1.024\*\*\* | -1.008\*\*\* |  |  | -4.805\*\*\* | -5.471\*\*\* | -4.852\*\*\* |
|  |  | (0.129) | (0.133) | (0.132) |  |  | (1.152) | (1.106) | (0.917) |
| Implicit Tax Rate |  | -0.00992 | -0.00679 | -0.00273 |  |  | -0.137\*\*\* | -0.115\*\*\* | -0.0577 |
|  |  | (0.0077) | (0.0081) | (0.0065) |  |  | (0.0370) | (0.0409) | (0.0411) |
| Q4 Dummy | 0.151\*\*\* | 0.114\*\*\* | 0.127\*\*\* | 0.0759\*\*\* |  | 0.787\*\*\* | 0.775\*\*\* | 0.661\*\*\* | 0.512\*\*\* |
|  | (0.0236) | (0.0161) | (0.0388) | (0.0192) |  | (0.102) | (0.126) | (0.168) | (0.117) |
| Implicit Tax Rate ×Q4 Dummy |  | 0.0261\*\* | 0.0294\*\* | 0.0155 |  |  | 0.185\*\*\* | 0.166\*\*\* | 0.125\*\*\* |
|  |  | (0.0119) | (0.0140) | (0.0114) |  |  | (0.0482) | (0.0457) | (0.0425) |
| FCF\_Rank |  | 0.0690\*\*\* |  |  |  |  | 0.338\*\*\* |  |  |
|  |  | (0.0041) |  |  |  |  | (0.0272) |  |  |
| FCF\_Rank ×Q4 Dummy |  | 0.0208\*\*\* |  |  |  |  | 0.0315\* |  |  |
|  |  | (0.0065) |  |  |  |  | (0.0182) |  |  |
| Assets\_Rank |  |  | -0.0652\*\*\* |  |  |  |  | -0.200\*\* |  |
|  |  |  | (0.0091) |  |  |  |  | (0.0944) |  |
| Assets\_Rank ×Q4 Dummy |  |  | 0.0166\* |  |  |  |  | 0.0987\*\* |  |
|  |  |  | (0.0093) |  |  |  |  | (0.0451) |  |
| Employee\_ Rank |  |  |  | 0.0490\*\*\* |  |  |  |  | 0.179\*\*\* |
|  |  |  |  | (0.0121) |  |  |  |  | (0.0485) |
| Employee\_ Rank ×Q4 Dummy |  |  |  | 0.0360\*\*\* |  |  |  |  | 0.167\*\*\* |
|  |  |  |  | (0.0039) |  |  |  |  | (0.0229) |
|  |  |  |  |  |  |  |  |  |  |
| Firm FE | Yes | Yes | Yes | Yes |  | Yes | Yes | Yes | Yes |
| Industry-Time FE | Yes | Yes | Yes | Yes |  | Yes | Yes | Yes | Yes |
| Observations | 214,339 | 206,600 | 206,601 | 153,688 |  | 213,956 | 206,331 | 206,332 | 153,457 |
| R-squared | 0.577 | 0.585 | 0.583 | 0.626 |  | 0.456 | 0.469 | 0.468 | 0.466 |

Panel B of this table reports the results of regressions of capital expenditure on the country-level variables and their interactions with 4th fiscal quarter dummy, controlling for GDP per capita and GDP growth and other firm-level observable measures to account for any confounding effects attributable to capital expenditure. We also add Fama-French-48 industry × calendar quarter interaction fixed effects to control for time-varying investment opportunities. The country characteristics are investor rights and protection, development of financial market, and GDP per capita in constant 2005 US$ (GDP), and annual GDP growth (GDP\_GRO). The proxies for investor rights and protection include the anti-director rights index (AD), the anti-self-dealing index (AS), the extent of disclosure index (DISC), accounting quality (ACCT), earnings management index (EM), an indicator of whether the country has English Common Law legal origin (UK), and the rule of law index (RULE). The development of financial market proxies include the ratio of stock market capitalization over GDP (EQUITY), the ratio of domestic credit to private sector over GDP (CREDIT), the combination of the two as a general measure of financial market development (FD), and the number of IPOs per capita (IPO). Robust standard errors are reported in parentheses. \*, \*\*, and \*\*\* indicate significance at the 10%, 5%, and 1% level, respectively. Standard errors are clustered at the country level. Firm-level controls are winsorized at the 1% tails. Our sample includes 41 countries and covers the period 2005-2014 in fiscal years. The details of the country-level variables are provided in Appendix A.

|  | Panel B: Regressions of Capital Expenditure on the Interaction of Country-level Variable and Fourth Fiscal Quarter Dummy |
| --- | --- |
|  | Investor Rights and Protection (INV\_RIGHTS) | Financial Market Development (FIN\_MKT) |
| Variables | AD | AS | DISC | ACCT | EM | UK | RULE | EQUITY | CREDIT | FD | IPO |
|  |  |  |  |  |  |  |  |  |  |  |  |
| Cash Flow | 4.197\*\*\* | 4.241\*\*\* | 4.286\*\*\* | 4.198\*\*\* | 4.197\*\*\* | 4.263\*\*\* | 4.286\*\*\* | 4.231\*\*\* | 4.192\*\*\* | 4.148\*\*\* | 4.197\*\*\* |
|  | (0.350) | (0.362) | (0.385) | (0.365) | (0.368) | (0.363) | (0.371) | (0.377) | (0.370) | (0.378) | (0.347) |
| Tobin’s q | 0.122\*\*\* | 0.125\*\*\* | 0.128\*\*\* | 0.122\*\*\* | 0.119\*\*\* | 0.126\*\*\* | 0.125\*\*\* | 0.125\*\*\* | 0.126\*\*\* | 0.125\*\*\* | 0.122\*\*\* |
|  | (0.0058) | (0.0071) | (0.0077) | (0.0062) | (0.0052) | (0.0072) | (0.0070) | (0.0082) | (0.0071) | (0.0081) | (0.0060) |
| Q4 Dummy | 0.340\*\*\* | 0.340\*\*\* | 0.296\*\*\* | 0.764\*\*\* | 0.0934\*\*\* | 0.267\*\*\* | 0.350\*\*\* | 0.210\*\*\* | 0.385\*\*\* | 0.308\*\*\* | 0.267\*\*\* |
|  | (0.0584) | (0.0777) | (0.0920) | (0.182) | (0.0207) | (0.0501) | (0.0409) | (0.0361) | (0.0641) | (0.0628) | (0.0493) |
| Log\_GDP | -0.0572\*\*\* | -0.0631\*\*\* | -0.0640\*\*\* | -0.0320 | -0.0555\*\* | -0.0616\*\*\* | -0.122\*\*\* | -0.0643\*\*\* | -0.0560\*\* | -0.0604\*\* | -0.0486\*\* |
|  | (0.0197) | (0.0186) | (0.0180) | (0.0267) | (0.0224) | (0.0176) | (0.0403) | (0.0192) | (0.0233) | (0.0226) | (0.0189) |
| GDP\_GRO | 0.0185\*\* | 0.0237\*\*\* | 0.0221\*\*\* | 0.0204\*\* | 0.0199\*\* | 0.0213\*\*\* | 0.0172\*\* | 0.0210\*\* | 0.0171\*\* | 0.0206\*\* | 0.0184\*\* |
|  | (0.0077) | (0.0082) | (0.0078) | (0.0080) | (0.0081) | (0.0076) | (0.0074) | (0.0089) | (0.0077) | (0.0085) | (0.0071) |
| INV\_RIGHTS | 0.00168 | -0.0437 | -0.0034 | -0.0017 | -0.0019 | -0.0108 | 0.110\* |  |  |  |  |
|  | (0.0135) | (0.0926) | (0.0096) | (0.0033) | (0.0024) | (0.0373) | (0.0578) |  |  |  |  |
| INV\_RIGHTS× Q4 Dummy | -0.0436\*\*\* | -0.272\*\* | -0.0183 | -0.0087\*\*\* | 0.0071\*\*\* | -0.134\*\* | -0.137\*\*\* |  |  |  |  |
|  | (0.0118) | (0.117) | (0.0118) | (0.0026) | (0.0021) | (0.0526) | (0.0273) |  |  |  |  |
| FIN\_MKT |  |  |  |  |  |  |  | -3.36e-05 | -0.000125 | -3.69e-05 | -0.00347 |
|  |  |  |  |  |  |  |  | (0.0001) | (0.0004) | (0.0001) | (0.0068) |
| FIN\_MKT × Q4 Dummy |  |  |  |  |  |  |  | -0.0004\* | -0.0015\*\*\* | -0.0005\*\* | -0.0194\*\*\* |
|  |  |  |  |  |  |  |  | (0.0002) | (0.0004) | (0.0002) | (0.0071) |
|  |  |  |  |  |  |  |  |  |  |  |  |
| Firm FE | No | No | No | No | No | No | No | No | No | No | No |
| Industry-Time FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 206,595 | 211,387 | 200,425 | 199,150 | 192,324 | 214,339 | 214,339 | 194,791 | 200,886 | 181,531 | 206,595 |
| R-squared | 0.217 | 0.215 | 0.211 | 0.223 | 0.223 | 0.212 | 0.212 | 0.213 | 0.207 | 0.207 | 0.217 |

**Table 5 – Country-level Analyses Controlling for More Firm-level Variables**

This table reports the results of regressions of capital expenditure on the interaction of country-level variables and 4th fiscal quarter dummy, controlling for a comprehensive set of firm-level variables and their interaction with the 4th fiscal quarter dummy. We define capital expenditure as quarterly capital expenditures over total assets. We control for firm characteristics such as quarterly cash flow, Tobin’s q, Change in Cash Holdings from the previous quarter, Leverage, and Sales Growth. We also control for firm fixed effects and country-level GDP per capita and GDP growth. We also add Fama-French-48 industry × calendar quarter interaction fixed effects to control for time-varying investment opportunities. We categorize country-level variables into two categories: investor rights and protection and level of financial market development. Robust standard errors are reported in parentheses. \*, \*\*, and \*\*\* indicate significance at the 10%, 5%, and 1% level, respectively. Standard errors are clustered at the country level. Firm-level controls are winsorized at the 1% tails. Our sample includes 41 countries and covers the period 2005-2014 in fiscal years. The details of the country-level variables are provided in Appendix A.

Panel A reports the results in the investor rights and protection category. These variables include anti-director rights index (AD), the anti-self-dealing index (AS), extent of disclosure index (DISC), accounting quality (ACCT), earnings management index (EM), an indicator of whether the country has English Common Law legal origin (UK), and rule of law index (RULE), a measure for law enforcement.

|  |
| --- |
| Panel A: Investor Rights and Protections (INV\_RIGHTS) – Full Sample |
| Variables | AD | AS | DISC | ACCT | EM | UK | RULE |
|  |  |  |  |  |  |  |  |
| Cash Flow | 0.923\*\*\* | 0.912\*\*\* | 0.891\*\*\* | 0.930\*\*\* | 0.929\*\*\* | 0.917\*\*\* | 0.916\*\*\* |
|  | (0.111) | (0.109) | (0.116) | (0.113) | (0.114) | (0.108) | (0.106) |
| Change in Cash Holdings | -1.640\*\*\* | -1.649\*\*\* | -1.658\*\*\* | -1.631\*\*\* | -1.626\*\*\* | -1.654\*\*\* | -1.659\*\*\* |
|  | (0.0859) | (0.0850) | (0.0865) | (0.0880) | (0.0854) | (0.0844) | (0.0842) |
| Tobin’s q | 0.144\*\*\* | 0.148\*\*\* | 0.151\*\*\* | 0.146\*\*\* | 0.146\*\*\* | 0.147\*\*\* | 0.146\*\*\* |
|  | (0.0069) | (0.0080) | (0.0077) | (0.0072) | (0.0071) | (0.0078) | (0.0075) |
| Sales Growth | 0.0692\*\*\* | 0.0688\*\*\* | 0.0723\*\*\* | 0.0677\*\*\* | 0.0705\*\*\* | 0.0704\*\*\* | 0.0703\*\*\* |
|  | (0.0103) | (0.0102) | (0.0113) | (0.0105) | (0.0101) | (0.0099) | (0.0099) |
| Leverage | -1.006\*\*\* | -1.029\*\*\* | -1.049\*\*\* | -0.992\*\*\* | -0.961\*\*\* | -1.020\*\*\* | -1.021\*\*\* |
|  | (0.128) | (0.136) | (0.130) | (0.121) | (0.112) | (0.131) | (0.131) |
| Implicit Tax Rate | -0.0053 | -0.0052 | -0.0092 | -0.0061 | -0.0058 | -0.0063 | -0.0062 |
|  | (0.0079) | (0.0077) | (0.0081) | (0.0078) | (0.0081) | (0.0080) | (0.0077) |
| Q4 Dummy | 0.303\*\*\* | 0.307\*\*\* | 0.259\*\* | 0.680\*\*\* | 0.0373\* | 0.237\*\*\* | 0.311\*\*\* |
|  | (0.0615) | (0.0847) | (0.106) | (0.183) | (0.0200) | (0.0541) | (0.0464) |
| Size\_Rank | -0.0725\*\*\* | -0.0664\*\*\* | -0.0642\*\*\* | -0.0690\*\*\* | -0.0696\*\*\* | -0.0686\*\*\* | -0.0706\*\*\* |
|  | (0.0097) | (0.0100) | (0.0114) | (0.0095) | (0.0093) | (0.0101) | (0.0101) |
| Implicit Tax Rate × Q4 Dummy | 0.0259\* | 0.0271\*\* | 0.0285\*\* | 0.0184\*\* | 0.0270\* | 0.0277\*\* | 0.0265\*\* |
|  | (0.0129) | (0.0132) | (0.0137) | (0.0089) | (0.0138) | (0.0134) | (0.0122) |
| Size\_Rank × Q4 Dummy | 0.0220\*\* | 0.0128 | 0.0108 | 0.0228\*\*\* | 0.0241\*\*\* | 0.0142 | 0.0227\*\* |
|  | (0.0096) | (0.0102) | (0.0101) | (0.0079) | (0.0083) | (0.0112) | (0.0087) |
| Log\_GDP | 0.539\*\* | 0.292 | 0.395 | 0.516\* | 0.577\*\* | 0.323 | 0.453 |
|  | (0.232) | (0.318) | (0.287) | (0.266) | (0.215) | (0.316) | (0.283) |
| GDP\_GRO | 0.0082 | 0.0110 | 0.0099 | 0.0083 | 0.00751 | 0.00930 | 0.00876 |
|  | (0.0062) | (0.0068) | (0.0069) | (0.0063) | (0.0055) | (0.0066) | (0.0062) |
| INV\_RIGHTS | - | - | 0.0003 | - | - | - | -0.196 |
|  |  |  | (0.0179) |  |  |  | (0.162) |
| INV\_RIGHTS× Q4 Dummy | -0.0458\*\*\* | -0.265\*\* | -0.0165 | -0.0082\*\*\* | 0.0078\*\*\* | -0.136\*\* | -0.142\*\*\* |
|  | (0.0116) | (0.122) | (0.0122) | (0.0028) | (0.0019) | (0.0526) | (0.0271) |
|  |  |  |  |  |  |  |  |
| Firm FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Industry-Time FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 199,113 | 203,804 | 193,659 | 191,863 | 185,327 | 206,601 | 206,601 |
| R-squared | 0.589 | 0.586 | 0.588 | 0.596 | 0.597 | 0.584 | 0.584 |

Panel B reports results from the same regression specifications as in Panel A but only in the non-US subsample.

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| --- |
| Panel B: Investor Rights and Protections and legal system (INV\_RIGHTS) – Non-US Subsample |
| Variables | AD | AS | DISC | ACCT | EM | UK | RULE |
|  |  |  |  |  |  |  |  |
| Q4 Dummy | 0.311\*\*\* | 0.343\*\*\* | 0.349\*\*\* | 0.653\*\*\* | 0.0125 | 0.259\*\*\* | 0.322\*\*\* |
|  | (0.0680) | (0.0866) | (0.103) | (0.176) | (0.0503) | (0.0564) | (0.0505) |
| INV\_RIGHTS | - | - | 0.0267\*\* | - | - | - | -0.149 |
|  |  |  | (0.0110) |  |  |  | (0.160) |
| INV\_RIGHTS×Q4 Dummy | -0.0415\*\* | -0.242\*\* | -0.0211\* | -0.0073\*\* | 0.0107\*\*\* | -0.118\* | -0.129\*\*\* |
|  | (0.0179) | (0.119) | (0.0124) | (0.0027) | (0.0031) | (0.0683) | (0.0294) |
|  |  |  |  |  |  |  |  |
| Firm FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Industry-Time FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 112,764 | 117,456 | 115,839 | 105,509 | 98,974 | 120,253 | 120,253 |
| R-squared | 0.569 | 0.565 | 0.564 | 0.579 | 0.580 | 0.562 | 0.562 |

In Panel C, we focus on the category of development of financial market, which is proxied by four variables, namely the ratio of stock market capitalization over GDP (EQUITY), the ratio of domestic credit to private sector over GDP (CREDIT), the combination of the two as a measure of overall financial market development (FD), and the number of IPOs per capita (IPO).

|  |
| --- |
| Panel C: Financial Market Development (FIN\_MKT) |
|  | Full Sample |  | Non-US Subsample |
| Variables | EQUITY | CREDIT | FD | IPO |  | EQUITY | CREDIT | FD | IPO |
|  |  |  |  |  |  |  |  |  |  |
| Q4 Dummy | 0.171\*\*\* | 0.354\*\*\* | 0.268\*\*\* | 0.232\*\*\* |  | 0.219\*\*\* | 0.453\*\*\* | 0.284\*\*\* | 0.266\*\*\* |
|  | (0.0487) | (0.0691) | (0.0694) | (0.0569) |  | (0.0531) | (0.0547) | (0.0671) | (0.0648) |
| log\_GDP | 0.0797 | 0.275 | 0.108 | 0.541\*\* |  | 0.463\* | 0.565\* | 0.457 | 0.858\*\*\* |
|  | (0.328) | (0.335) | (0.337) | (0.231) |  | (0.268) | (0.279) | (0.280) | (0.151) |
| GDP\_GRO | 0.0110\* | 0.0093 | 0.0098\* | 0.0082 |  | 0.0029 | 0.0020 | 0.0019 | -0.0012 |
|  | (0.0060) | (0.0061) | (0.0058) | (0.0061) |  | (0.0043) | (0.0044) | (0.0043) | (0.0032) |
| FIN\_MKT | 0.0010\* | 0.0017\*\*\* | 0.0008\*\* | - |  | 0.0005\*\* | 0.0021\*\*\* | 0.0006\*\* | - |
|  | (0.0005) | (0.0005) | (0.0003) |  |  | (0.0002) | (0.0006) | (0.0002) |  |
| FIN\_MKT×Q4 Dummy | -0.0004\* | -0.0017\*\*\* | -0.0006\*\* | -0.0207\*\*\* |  | -0.0004\*\* | -0.0025\*\*\* | -0.0005\*\* | -0.0184\*\* |
|  | (0.0002) | (0.0004) | (0.0002) | (0.0073) |  | (0.0001) | (0.0004) | (0.0002) | (0.0074) |
|  |  |  |  |  |  |  |  |  |  |
| Firm FE | Yes | Yes | Yes | Yes |  | Yes | Yes | Yes | Yes |
| Industry-Time FE | Yes | Yes | Yes | Yes |  | Yes | Yes | Yes | Yes |
| Observations | 187,771 | 193,881 | 175,234 | 199,113 |  | 101,422 | 115,700 | 97,052 | 112,764 |
| R-squared | 0.590 | 0.585 | 0.591 | 0.589 |  | 0.567 | 0.563 | 0.568 | 0.569 |

**Table 6 – Regressions Using Instrumental Variables for Tobin’s q and at Aggregate (Country) Level**

Panel A reports the results of 2SLS regressions for the full sample. The regression specification in the second stage is the same as that in Table 5, and Tobin’s q is estimated in the first stage using instrumental variables as 1-year and 2-year lagged Tobin’s q, as well as 1-year and 2-year lagged cash flows. The results are robust to variations of instrumental variable sets. We also add firm fixed effects and industry-year fixed effects. COUNTRY is used to represent country-level variables in each of the columns. The country characteristics are investor rights and protection and development of financial market as in Table 4 and 5. GDP per capita in constant 2005 US$ (GDP) and annual GDP growth (GDP\_GRO) are controlled for. Robust standard errors are reported in parentheses. \*, \*\*, and \*\*\* indicate significance at the 10%, 5%, and 1% level, respectively. Standard errors are clustered at the country level. Firm-level controls are winsorized at the 1% tails. Our sample includes 41 countries and covers the period 2005-2014 in fiscal years. The details of the country-level variables are provided in Appendix A.

Panel B reports the results of regressions of aggregated capital expenditures at country-level on aggregated firm-level variables and country-level variables and their interactions with 4th fiscal quarter dummy. We also add country and industry-year fixed effects. COUNTRY is used to represent country-level variables in each of the columns. The country characteristics are investor rights and protection and development of financial market. GDP per capita in constant 2005 US$ (GDP) and annual GDP growth (GDP\_GRO) are controlled for. Robust standard errors are reported in parentheses. \*, \*\*, and \*\*\* indicate significance at the 10%, 5%, and 1% level, respectively. Standard errors are clustered at the country level. Firm-level controls are winsorized at the 1% tails. Our sample includes 41 countries and covers the period 2005-2014 in fiscal years. The details of the country-level variables are provided in Appendix A.

|  |
| --- |
| Panel A: 2SLS Regressions in the Full Sample |
|  | Country Characteristics (COUNTRY) |
| Variables | AD | AS | DISC | ACCT | EM | UK | RULE | EQUITY | CREDIT | FD | IPO |
| COUNTRY | - | - | -0.0125 | - | - | - | -0.407\*\* | -0.0024\*\*\* | 0.0022 | -0.0015\*\*\* | - |
|  |  |  | (0.0176) |  |  |  | (0.182) | (0.0004) | (0.0017) | (0.0003) |  |
| COUNTRY×Q4 Dummy | -0.0299\*\*\* | -0.190\* | -0.0146 | -0.0055\*\* | 0.0077\*\*\* | -0.0798\* | -0.106\*\*\* | -0.0003 | -0.0018\*\*\* | -0.0005\*\* | -0.0130\* |
|  | (0.0113) | (0.114) | (0.0112) | (0.0022) | (0.0018) | (0.0478) | (0.0246) | (0.0002) | (0.0003) | (0.0002) | (0.0068) |
| Firm FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Industry-Time FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 181,039 | 184,837 | 179,898 | 175,307 | 170,307 | 186,984 | 186,984 | 169,986 | 167,256 | 150,421 | 181,039 |

|  |
| --- |
| Panel B: Regression at Aggregate (Country) Level |
| Country Characteristics (COUNTRY) |
| Variables | AD | AS | DISC | ACCT | EM | UK | RULE | EQUITY | CREDIT | FD | IPO |
| Log\_GDP | 0.517 | 0.470 | 0.856 | 1.032 | 0.471 | 0.374 | 0.118 | 0.539 | 0.222 | 0.401 | 0.495 |
|  | (0.661) | (0.613) | (0.613) | (0.786) | (0.612) | (0.561) | (0.596) | (0.577) | (0.605) | (0.592) | (0.666) |
| GDP\_GRO | -0.0024 | 0.0091 | 0.0083 | -0.0040 | 0.0057 | -0.0035 | -0.0039 | 0.0006 | 0.0030 | -0.0006 | -0.0010 |
|  | (0.0084) | (0.0107) | (0.0097) | (0.0104) | (0.0092) | (0.0126) | (0.0128) | (0.0115) | (0.0141) | (0.0117) | (0.0085) |
| COUNTRY | - | - | -0.0232 | - | - | - | 0.628 | -0.0003 | 0.0064\*\* | 0.0003 | - |
|  |  |  | (0.0419) |  |  |  | (0.395) | (0.0005) | (0.0026) | (0.0004) |  |
| COUNTRY×Q4 Dummy | -0.0717\*\* | -0.674\*\*\* | -0.0396\* | -0.0130\*\*\* | 0.0109\*\* | -0.188\* | -0.172\*\*\* | -0.0006\* | -0.0037\*\*\* | -0.0007\* | -0.0369\*\* |
|  | (0.0320) | (0.159) | (0.0207) | (0.0028) | (0.0051) | (0.101) | (0.0403) | (0.0003) | (0.0007) | (0.0003) | (0.0150) |
|  |  |  |  |  |  |  |  |  |  |  |  |
| Observations | 686 | 723 | 729 | 606 | 506 | 775 | 775 | 665 | 741 | 630 | 686 |
| R-squared | 0.691 | 0.700 | 0.714 | 0.697 | 0.745 | 0.661 | 0.673 | 0.664 | 0.673 | 0.664 | 0.692 |

**Table 7 – Regressions Using Industry-adjusted Variables**

This table reports the results of regressions of industry-adjusted capital expenditure on the interaction of country-level variables and 4th fiscal quarter dummy, controlling for a comprehensive set of industry-adjusted firm-level variables. Panel A is on the full sample and Panel B on the non-US subsample.

We adjust industry for each variable by subtracting global industry median from each variable. We control for firm characteristics such as quarterly cash flow, Tobin’s q, change in cash holding from the previous quarter, leverage, and sales growth. We also control for firm fixed effects and country-level GDP per capita and GDP growth, and add Fama-French-48 industry × calendar quarter interaction fixed effects to control for time-varying investment opportunities. We categorize country-level variables into two categories: investor rights and protection and level of financial market development. Robust standard errors are reported in parentheses. \*, \*\*, and \*\*\* indicate significance at the 10%, 5%, and 1% level, respectively. Standard errors are clustered at the country level. Firm-level controls are winsorized at the 1% tails. Our sample includes 41 countries and covers the period 2005-2014 in fiscal years. The details of these variables are provided in Appendix A.

|  |
| --- |
| Panel A: Dependent Variable: Industry-adjusted CapEx – Full Sample |
|  | Country Characteristics (COUNTRY) |
| Variables | AD | AS | DISC | ACCT | EM | UK | RULE | EQUITY | CREDIT | FD | IPO |
|  |  |  |  |  |  |  |  |  |  |  |  |
| COUNTRY | - | - | -0.0012 | - | - | - | -0.202 | 0.0009\*\* | 0.0018\*\*\* | 0.0007\*\* | - |
|  |  |  | (0.0180) |  |  |  | (0.160) | (0.0004) | (0.0005) | (0.0003) |  |
| COUNTRY×Q4 Dummy | -0.0458\*\*\* | -0.274\*\* | -0.0172 | -0.0084\*\*\* | 0.0078\*\*\* | -0.139\*\* | -0.144\*\*\* | -0.0004\* | -0.0017\*\*\* | -0.0005\*\* | -0.0211\*\*\* |
|  | (0.0116) | (0.121) | (0.0121) | (0.0028) | (0.0020) | (0.0526) | (0.0277) | (0.0002) | (0.0004) | (0.0002) | (0.0074) |
| Firm FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Industry-Time FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
|  |  |  |  |  |  |  |  |  |  |  |  |
| Observations | 199,113 | 203,804 | 193,659 | 191,863 | 185,327 | 206,601 | 206,601 | 187,771 | 193,881 | 175,234 | 199,113 |
| R-squared | 0.523 | 0.520 | 0.523 | 0.529 | 0.531 | 0.518 | 0.519 | 0.526 | 0.522 | 0.530 | 0.523 |

|  |
| --- |
| Panel B: Dependent Variable: Industry-adjusted CapEx – non-US Subsample |
|  | Country Characteristics (COUNTRY) |
| Variables | AD | AS | DISC | ACCT | EM | UK | RULE | EQUITY | CREDIT | FD | IPO |
|  |  |  |  |  |  |  |  |  |  |  |  |
| COUNTRY | - | - | 0.0256\*\* | - | - | - | -0.156 | 0.0004\*\* | 0.0021\*\*\* | 0.0006\*\*\* | - |
|  |  |  | (0.0110) |  |  |  | (0.158) | (0.0002) | (0.0006) | (0.0002) |  |
| COUNTRY×Q4 Dummy | -0.0426\*\* | -0.250\*\* | -0.0215\* | -0.0075\*\*\* | 0.0108\*\*\* | -0.121\* | -0.131\*\*\* | -0.0003\*\* | -0.0026\*\*\* | -0.0005\*\* | -0.0188\*\* |
|  | (0.0180) | (0.118) | (0.0124) | (0.0027) | (0.0032) | (0.0680) | (0.0298) | (0.0001) | (0.0004) | (0.0002) | (0.0075) |
| Firm FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Industry-Time FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
|  |  |  |  |  |  |  |  |  |  |  |  |
| Observations | 112,764 | 117,456 | 115,839 | 105,509 | 98,974 | 120,253 | 120,253 | 101,422 | 115,700 | 97,052 | 112,764 |
| R-squared | 0.499 | 0.495 | 0.497 | 0.506 | 0.510 | 0.493 | 0.494 | 0.502 | 0.500 | 0.509 | 0.499 |

**Table 8 – Investment-q Sensitivity across Countries**

This table reports the results of regressions of capital expenditure on Tobin’s q and their interaction with country-level variables, controlling for firm-level variables. Panel A reports the results using the full sample and Panel B the non-US subsample.

We control for firm characteristics such as cash flow, Tobin’s q, change in cash holding from the previous quarter, leverage, and sales growth. We control for firm fixed effects and country-level GDP per capita and GDP growth. We also add Fama-French-48 industry × calendar quarter interaction fixed effects to control for time-varying investment opportunities. We categorize country-level variables into two categories: investor rights and protection and level of financial market development. Robust standard errors are reported in parentheses. \*, \*\*, and \*\*\* indicate significance at the 10%, 5%, and 1% level, respectively. Standard errors are clustered at the country level. Firm-level controls are winsorized at the 1% tails. Our sample includes 41 countries and covers the period 2005-2014 in fiscal years. The details of the country-level variables are provided in Appendix A.

|  |
| --- |
| Panel A: Full Sample |
|  | Country Characteristics (COUNTRY) |
| Variables | AD | AS | DISC | ACCT | EM | UK | RULE | EQUITY | CREDIT | FD | IPO |
|  |  |  |  |  |  |  |  |  |  |  |  |
| q | 0.0729\*\* | 0.0878\*\*\* | 0.0636\* | -0.0395 | 0.120\*\*\* | 0.0839\*\*\* | 0.0776\*\*\* | 0.116\*\*\* | 0.0870\*\*\* | 0.110\*\*\* | 0.0798\*\*\* |
|  | (0.0295) | (0.0289) | (0.0335) | (0.117) | (0.0122) | (0.0177) | (0.0203) | (0.0154) | (0.0230) | (0.0223) | (0.0189) |
| COUNTRY×q | 0.0082\*\*\* | 0.0354\*\* | 0.0065\* | 0.0021\*\* | -0.0019\*\*\* | 0.0295\* | 0.0217\* | -5.41e-05 | 0.0001\*\* | -2.09e-05\* | 0.0047\* |
|  | (0.0037) | (0.0173) | (0.0038) | (0.0010) | (0.0008) | (0.0168) | (0.0126) | (4.91e-05) | (5.59e-05) | (1.28e-05) | (0.0028) |
| Firm FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Industry-Time FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
|  |  |  |  |  |  |  |  |  |  |  |  |
| Observations | 199,121 | 203,816 | 193,671 | 191,871 | 185,335 | 206,613 | 206,613 | 187,783 | 193,893 | 175,246 | 199,121 |
| R-squared | 0.588 | 0.585 | 0.587 | 0.595 | 0.596 | 0.583 | 0.583 | 0.589 | 0.583 | 0.589 | 0.588 |

|  |
| --- |
| Panel B: non-US Subsample |
|  | Country Characteristics (COUNTRY) |
| Variables | AD | AS | DISC | ACCT | EM | UK | RULE | EQUITY | CREDIT | FD | IPO |
|  |  |  |  |  |  |  |  |  |  |  |  |
| q | 0.0680\*\* | 0.112\*\*\* | 0.0704\* | 0.0269 | 0.177\*\*\* | 0.0938\*\*\* | 0.0968\*\*\* | 0.131\*\*\* | 0.0693\*\* | 0.113\*\*\* | 0.102\*\*\* |
|  | (0.0336) | (0.0305) | (0.0363) | (0.119) | (0.0242) | (0.0196) | (0.0221) | (0.0191) | (0.0276) | (0.0241) | (0.0226) |
| COUNTRY×q | 0.0158\*\* | 0.0281 | 0.0065\*\*\* | 0.0014\*\* | -0.0049\*\*\* | 0.0455\*\* | 0.0220\*\* | 2.50e-06 | 0.0005\*\*\* | 5.95e-05\* | 0.0036 |
|  | (0.00747) | (0.0186) | (0.0029) | (0.0007) | (0.0017) | (0.0225) | (0.0110) | (5.21e-05) | (0.00022) | (3.59e-05) | (0.0028) |
| Firm FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Industry-Time FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
|  |  |  |  |  |  |  |  |  |  |  |  |
| Observations | 112,770 | 117,466 | 115,849 | 105,515 | 98,980 | 120,263 | 120,263 | 101,426 | 115,710 | 97,056 | 112,770 |
| R-squared | 0.567 | 0.563 | 0.562 | 0.577 | 0.579 | 0.560 | 0.560 | 0.565 | 0.561 | 0.566 | 0.567 |

Panel C presents the results of OLS regressions of country-level investment-q sensitivities on country characteristics, where country-level investment-q sensitivities are obtained from the regression of CapEx on Tobin’s q within each country subsample.

|  |
| --- |
| Panel C: Investment-q sensitivities on Country Characteristics |
|  | Country Characteristics (COUNTRY) |
| Variables | AD | AS | DISC | ACCT | EM | UK | RULE | EQUITY | CREDIT | FD | IPO |
|  |  |  |  |  |  |  |  |  |  |  |  |
| COUNTRY | 0.0696\*\*\* | 0.0996 | 0.0072 | 0.0091\*\*\* | -0.0045 | 0.0773\* | 0.0844 | 0.0005\*\*\* | 0.0020\*\*\* | 0.0005\*\*\* | 0.0134 |
|  | (0.0089) | (0.5107) | (0.6215) | (0.0171) | (0.3333) | (0.0956) | (0.2620) | (0.0214) | (0.0178) | (0.0093) | (0.2880) |
| Observations | 36 | 38 | 41 | 32 | 27 | 41 | 41 | 39 | 41 | 39 | 36 |
| R-squared | 0.2425 | 0.0508 | 0.0250 | 0.2288 | 0.0533 | 0.0350 | 0.0525 | 0.1619 | 0.1618 | 0.1976 | 0.0866 |

**Table 9 – External Finance Dependence**

This table reports the results in the full sample of regressing firm’s capital expenditures on country characteristics and their interactions with the fourth quarter dummy, as well as a three-term interaction of country characteristics, fourth quarter dummy, and an external finance dummy. We use the dummy variable “EXTERNAL FINANCE” to indicate whether a firm is from an industry that is dependent on external finance. We control for GDP per capita and GDP growth and other firm-level observable measures to account for any confounding effects attributable to capital expenditure. We also add Fama-French-48 industry × calendar quarter interaction fixed effects to control for time-varying investment opportunities. COUNTRY is used to represent country-level variables in each of the columns. The country characteristics are investor rights and protection, development of financial market, and GDP per capita in constant 2005 US$ (GDP) and annual GDP growth (GDP\_GRO). The proxies for investor rights and protection include the anti-director rights index (AD), the anti-self-dealing index (AS), the extent of disclosure index (DISC), accounting quality (ACCT), earnings management index (EM), an indicator of whether the country has English Common Law legal origin (UK) and the rule of law index (RULE). The development of financial market proxies include the ratio of stock market capitalization over GDP (EQUITY), the ratio of domestic credit to private sector over GDP (CREDIT), the combination of the two as a general measure of financial market development (FD), and the number of IPOs per capita (IPO). Robust standard errors are reported in parentheses. \*, \*\*, and \*\*\* indicate significance at the 10%, 5%, and 1% level, respectively. Standard errors are clustered at the country level. Firm-level controls are winsorized at the 1% tails. Our sample includes 41 countries and covers the period 2005-2014 in fiscal years. The details of the country-level variables are provided in Appendix A.

|  |
| --- |
| Country Characteristics (COUNTRY) |
| VARIABLES | AD | AS | DISC | ACCT | EM | UK | RULE | EQUITY | CREDIT | FD | IPO |
|  |  |  |  |  |  |  |  |  |  |  |  |
| COUNTRY | - | - | 0.0002 | - | - | - | -0.196 | 0.0009\* | 0.0017\*\*\* | 0.0008\*\* | - |
|  |  |  | (0.0179) |  |  |  | (0.162) | (0.0005) | (0.0005) | (0.0003) |  |
| COUNTRY×Q4 Dummy | -0.0377\*\*\* | -0.217\* | -0.0124 | -0.0077\*\*\* | 0.0086\*\*\* | -0.105\* | -0.127\*\*\* | -0.0003 | -0.0015\*\*\* | -0.0004\*\* | -0.0159\*\* |
|  | (0.0117) | (0.117) | (0.0122) | (0.0027) | (0.00214) | (0.0538) | (0.0278) | (0.0002) | (0.0004) | (0.0002) | (0.0077) |
| EXTERNAL FINANCE × COUNTRY × Q4 Dummy | -0.0115\*\*\* | -0.0838\*\*\* | -0.0076\*\*\* | -0.0007\*\*\* | -0.0013 | -0.0501\*\*\* | -0.0248\*\*\* | -0.0003\* | -0.0002\*\*\* | -0.0002\*\*\* | -0.0070\*\* |
|  | (0.0025) | (0.0209) | (0.0019) | (0.0002) | (0.0011) | (0.0144) | (0.0082) | (0.0002) | (6.00e-05) | (3.36e-05) | (0.0032) |
|  |  |  |  |  |  |  |  |  |  |  |  |
| Observations | 199,077 | 203,768 | 193,623 | 191,827 | 185,291 | 206,565 | 206,565 | 187,735 | 193,845 | 175,198 | 199,077 |
| R-squared | 0.589 | 0.586 | 0.588 | 0.596 | 0.597 | 0.584 | 0.584 | 0.590 | 0.585 | 0.591 | 0.589 |

**Table 10 – Country-level Tax Rate**

This table reports the results of regressions of capital expenditures on the country-level tax rate and its interaction with fourth fiscal quarter dummy. We also add Fama-French-48 industry × calendar quarter interaction fixed effects to control for time-varying investment opportunities. We obtain country-level flat or top marginal corporate income tax rate from OECD database. Robust standard errors are reported in parentheses. \*, \*\*, and \*\*\* indicate significance at the 10%, 5%, and 1% level, respectively. Standard errors are clustered at the country level. Firm-level controls are winsorized at the 1% tails. Our sample includes 41 countries and covers the period 2005-2014 in fiscal years. The details of the country-level variables are provided in Appendix A.

|  |
| --- |
| Country Characteristics (COUNTRY) |
| VARIABLES | AD | AS | DISC | ACCT | EM | UK | RULE | EQUITY | CREDIT | FD | IPO |
|  |  |  |  |  |  |  |  |  |  |  |  |
| GDP | 1.031\*\*\* | 0.197 | 0.254 | 1.021\*\*\* | 1.331\*\*\* | 0.198 | 0.617 | -0.0562 | 0.126 | -0.0793 | 1.037\*\*\* |
|  | (0.234) | (0.630) | (0.570) | (0.236) | (0.347) | (0.630) | (0.508) | (0.629) | (0.622) | (0.635) | (0.234) |
| GDP\_GRO | 0.0062 | 0.0166 | 0.0182\* | 0.0071 | 0.0036 | 0.0166 | 0.0137\* | 0.0183\* | 0.0151 | 0.0181\* | 0.0062 |
|  | (0.0066) | (0.0099) | (0.0103) | (0.0070) | (0.0060) | (0.0099) | (0.0076) | (0.0095) | (0.0091) | (0.0090) | (0.0066) |
| TAX\_C | 0.0105\*\* | 0.0091 | 0.0099 | 0.0109\*\* | 0.0121\*\* | 0.0091\* | 0.0122\*\*\* | 0.0031 | 0.0072\*\* | 0.0034 | 0.0115\*\* |
|  | (0.0042) | (0.0054) | (0.0063) | (0.0045) | (0.0046) | (0.0052) | (0.0036) | (0.0036) | (0.0033) | (0.0029) | (0.0044) |
| TAX\_C×Q4 Dummy | -0.0022 | -0.0039 | -0.0058\*\* | -0.0039\* | -0.0013 | -0.0032 | -0.0064\*\* | -0.0059\*\*\* | -0.0038 | -0.0045 | -0.0063\*\*\* |
|  | (0.0032) | (0.0027) | (0.0024) | (0.0021) | (0.0036) | (0.0040) | (0.0024) | (0.0018) | (0.0037) | (0.0028) | (0.0020) |
| COUNTRY | - | - | -0.0119 | - | - | - | -0.479\*\*\* | 0.0022\*\*\* | 0.0013\*\* | 0.0013\*\* | - |
|  |  |  | (0.0208) |  |  |  | (0.169) | (0.0007) | (0.0005) | (0.0005) |  |
| COUNTRY ×Q4 Dummy | -0.0519\*\*\* | -0.340\*\*\* | -0.0234\*\* | -0.0098\*\*\* | 0.0090\*\*\* | -0.1430\*\* | -0.144\*\*\* | -0.0010\*\* | -0.0007 | -0.0005\* | -0.0147\*\* |
|  | (0.0171) | (0.107) | (0.0126) | (0.0031) | (0.0036) | (0.0701) | (0.0388) | (0.0004) | (0.0006) | (0.0003) | (0.0067) |
|  |  |  |  |  |  |  |  |  |  |  |  |
| Observations | 166,347 | 170,485 | 158,252 | 165,299 | 157,621 | 170,485 | 170,485 | 153,666 | 157,765 | 141,125 | 166,347 |
| R-squared | 0.624 | 0.619 | 0.625 | 0.624 | 0.631 | 0.619 | 0.619 | 0.626 | 0.622 | 0.631 | 0.624 |

1. Corresponding author Tel: 1-513-288-2796 [↑](#footnote-ref-1)
2. See Lang and Stulz (1994), Lamont (1997), Shin and Stulz (1998), Rajan, Servaes, and Zingales (2000), Gertner, Powers, and Scharfstein (2002), Ozbas (2005), Xuan (2009), Ozbas and Selvili (2009), etcetera. [↑](#footnote-ref-2)
3. For example, Khurana, Martin, and Pereira (2006) show that poor financial market development encourages internal cash savings to avoid expensive external financing. [↑](#footnote-ref-3)
4. We remove the observations in Compustat NA that are also in Compustat Global to avoid double counting. One possible reason that some international companies are present in Compustat NA is perhaps that they adopt the U.S. dollar as their currency. [↑](#footnote-ref-4)
5. For example, Japan is not included in our sample because most of the Japanese firms report their accounting data semi-annually but not quarterly. [↑](#footnote-ref-5)
6. We also use the North American Industry Classification System (NAICS) as an additional filter, and exclude firms operating in industries with NAICS starting with 22, 52, or 92. [↑](#footnote-ref-6)
7. Observations are deleted if one or more of the common firm-level variables in later regressions are missing. Following the investment literature, e.g. Almeida, Campello, and Galvao (2010), we consider the following situations extreme or erroneous: market capitalization < $10 million in 2000 US Dollar, CapEx > 10 times assets or < -10 times assets, quarterly asset growth > 100%. [↑](#footnote-ref-7)
8. This is to ensure that for each firm in each fiscal year, there is at least one data point in the first three quarters and one in the fourth. [↑](#footnote-ref-8)
9. A few countries still end up with less than 50 firms (e.g., Egypt) in our final sample due to later data cleaning, but we keep those countries in our sample since removing them does not have qualitative impact to our results. [↑](#footnote-ref-9)
10. We use the number of employees to measure firm size, which is more comparable across countries and is a standard way to measure size in the literature. Unfortunately, as is shown in Table 4 Panel A, employee data is missing in some international firms from Compustat Global. [↑](#footnote-ref-10)
11. As is reported in Table 1 Panel A, CapEx has an unconditional mean of 1.30 and median of 0.78. [↑](#footnote-ref-11)
12. As is reported in Table 1 Panel B, AS has a standard deviation of 0.203. [↑](#footnote-ref-12)
13. External financing is measured as CapEx minus funds from operations (fopt). When fopt is missing, it is measured as the sum of the following variables: income before extraordinary items (ibc), depreciation and amortization (dpc), deferred taxes (txdc), equity in net loss/earnings (esubc), sale of PP&E (sppiv), and funds from operations – other (fopo). [↑](#footnote-ref-13)