The Determinants of Corporate Cash Management Policy: Evidence from around the World

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Abstract

We examine the determinants of corporate cash management policy across a broad sample of international firms. We find that firms in countries with strong legal protection of minority investors are more likely to decrease (increase) their cash holdings in response to an increase in cash flow (stock price) than are firms in countries with weak legal protection. In addition, financially constrained firms display higher sensitivities of cash to both cash flow and stock prices than do financially unconstrained firms. The results are robust to alternative specifications. Our findings highlight the importance of both country-level institutional factors and firm-level financial constraints in managers' corporate cash management policies.

***JEL classifications*:** G32; G34

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1. Introduction

The stream of research on corporate cash management policies has received increasing attention. Early studies by Keynes (1936), Jensen and Meckling (1976), Myers (1984), Jensen (1986) and Myers and Majluf (1986) have debated the potential costs and benefits of holding cash. Related studies by Kim et al. (1998) and Opler et al. (1999) have examined the effects of various financial variables on the *level* of cash reserves for U.S. firms. More recently, a number of papers have documented evidence that corporate governance at both country and firm levels could potentially influence corporate cash holdings in both U.S. and international firms.[1] However, the conclusions from this strand of research are mixed.[2]

Almeida et al. (2004) argue that examining *changes* in cash holdings is perhaps a more viable means to determine a firm's demand for liquidity from a theoretical perspective. The imperfection in capital markets gives rise to a deviation between the costs of internal and external financing. Firms anticipating a higher cost of external financing are thereby constrained in their investments and financial policies. A survey by Graham and Harvey (2001) reveals that top managers value financial flexibility when making important corporate decisions. One way for constrained firms to achieve this flexibility is to alter their *current* financial policies to meet *future* investment needs. To be more specific, Almedia et al. (2004) propose that corporate demand for liquidity can be empirically tested by measuring the marginal propensity to save cash

[1] See Dittmar et al. (2003), Pinkowitz et al. (2006), Dittmar and Mahrt-Smith (2007), Harford et al. (2007), and Kalcheva and Lins (2007) for a sample of recent representative work on the relationship between corporate governance mechanisms and cash holdings.

[2] While Dittmar et al. (2003) document a significantly negative relationship between country-level legal protection and cash holdings in their sample of international firms, Harford et al. (2006) find an opposite relationship between firm-level shareholder rights and cash holdings in their U.S. sample. Combining both firm-level and country-level measures of corporate governance, Kalcheva and Lins (2007) confirm the evidence of a negative relationship between firm-level governance mechanisms (the degree of managerial control) and cash holdings in an international setting. Moreover, the negative effect of firm-level corporate governance on cash holdings is more pronounced for firms in countries with weak legal protection of investors.

out of current cash flows in order to fund more profitable future investments, i.e., the *cash flow sensitivity of cash*.

Almeida et al. (2004) further argue that the cash flow sensitivity of cash is better at capturing the role of financial constraints than is the investment-cash flow sensitivity, a measure that has generated numerous critiques in the empirical corporate finance literature. They develop a model which predicts that the cash flow sensitivity of cash should be positive and significant only for financially constrained firms. Their empirical results strongly support their prediction, which attests to the importance of cash management for financially constrained firms as opposed to unconstrained firms.

The objective of this study is to test the effects of legal protection and financial constraints on cash management policies by firms around the world. We use five indices from La Porta et al. (1998) and La Porta et al. (2006) as our measures of country-level legal protection of investors. In addition, we use firm size and the equally weighted *KZ* index suggested by Kaplan and Zingales (1997) as our two alternative measures of firm-level financial constraints. Using financial data from more 104,000 firm-year observations from 43 countries over the period 1985-2004, we find that legal protection of investors is negatively related to the cash flow sensitivity of cash. Furthermore, the stock price sensitivity of cash is higher for firms in countries with strong legal protection than for firms in countries with weak legal protection. Finally, financially constrained firms (i.e., small firms) exhibit higher cash-cash flow and cash-stock price sensitivities than do financially unconstrained firms.[3]

These findings are consistent with the notion that effective legal systems ease firms' access to the external capital markets. As a result, firms in countries with strong legal protection of

[3] Riddick and Whited (2006) also find in their OLS regressions that constrained firms display higher cash-cash flow sensitivities than do unconstrained firms in the U.S. and Japan.

investors face fewer restrictions in raising external capital and thus are less likely to save cash from current cash flows to fund their future investments than are their counterparts in countries with weak legal protection. On the other hand, the stock prices of firms in countries with strong legal protection reflect a more accurate proxy for their future growth options. This suggests that firms with higher stock prices should increase their cash holdings in anticipation of more value-added investments in the future. Likewise, since financially constrained firms have limited access to external financial markets, they need to rely more on internal funds to finance their more profitable future investments. As a result, financially constrained firms exhibit a higher propensity to increase their cash holdings in response to both cash flows and stock prices innovations to support their future investment needs. Our results are also robust to a series of alternative specifications.

Our paper contributes to the growing literature on corporate cash management policies. The study that is closest to ours is Khurana et al. (2006). They examine the effect of financial development on the cash-cash flow sensitivity in an international setting and document evidence that is consistent with the hypothesis that the cash-cash flow sensitivity is negatively related to the degree of financial development. Their argument is based on the premise that the presence of financial constraints deters economic growth and that economic development helps to mitigate this problem (Love (2003)). However, previous literature has suggested that cross-country variation in stock market development is itself a function of country-level legal protection of minority investors (La Porta et al. (1997, 1998) and Beck and Levine (2005)). Moreover, Pinkowitz et al. (2006) stress the relevance of country-level legal protection in cross-country corporate governance studies. Therefore, we assert that legal protection should provide a first-order effect in influencing the cash-cash flow sensitivity. More importantly, what distinguishes

our paper from Khurana et al. (2006) is that we extend the empirical analysis proposed by Almeida et al. (2004) to an international setting and that we document the first evidence of the impact of legal protection and financial constraints on the cash-stock price sensitivity.

In summary, we uncover evidence that supports our main hypotheses. Our findings provide valuable contributions to the current literature by emphasizing the important roles of both legal protection and financial constraints in corporate cash management policies around the world. Managers should recognize the roles of both factors in attaining optimal cash management policies for their firms.

The remainder of the paper is organized as follows. Section 2 develops our main hypotheses. Section 3 describes the data we use in our sample. Section 4 provides the empirical analysis and discusses our regression results. Finally, Section 5 concludes the paper.

2. Hypothesis Development

Keynes (1936) suggests that a firm's cash management policy should depend upon its access to external financing. A firm is considered to be financially unconstrained if it is able to obtain free and unlimited access to the external capital market. Consequently, it would not need to manage its cash holdings in terms of saving cash out of its internal cash flow. On the other hand, a firm is deemed to be financially constrained if it encounters higher costs in raising external capital. Such a firm would require active management of its cash reserves by stockpiling cash balances as a precautionary motive.

Beginning with the seminal paper by Fazzari et al. (1988), a large number of studies have examined the relationship between corporate investment and cash flow to test for the role of financial constraints. Most of these studies provide strong support for the existence of financial

constraints.[4] In essence, they find that cash flow is a more important determinant of corporate investments for firms that are a priori identified as the most likely to be financially constrained. However, later studies by Kaplan and Zingales (1997) and Cleary (1999) provide conflicting results. They find that investment is the most sensitive to cash flow for firms that are the least likely to be financially constrained. Bushman et al. (2006) demonstrate that the existing results on the investment-cash flow sensitivity are not driven by financial constraints. Instead, the investment-cash flow sensitivity simply captures the role of firm growth in capital investments.

Almeida et al. (2004) develop a simple model of corporate cash management policies and propose a new measure that they think would be better to reflect the role of financial constraints than the investment-cash flow sensitivity: namely, the marginal propensity to save cash out of *current* cash flows to finance *future* investment needs or *the cash flow sensitivity of cash*. Since firms have to forego current investments if they are to hold large amounts of cash balances, managers have to trade-off the costs and benefits of holding cash to decide their optimal cash management policies that will maximize their firm values. Almeida et al. (2004) further contend that moving the center of attention from corporate investments to financial policies would help to circumvent the problems associated with the investment-cash flow sensitivity and offer a more theoretically sound implication about the role of financial constraints.[5]

2.1 Legal protection, the cash-cash flow sensitivity, and the cash-stock price sensitivity

La Porta et al. (1997, 1998) develop a series of country-level indices to measure the degree of legal protection of minority investors from possible expropriation by insiders across 49 countries

[4] Hubbard (1998) provides an extensive summary of this literature. A recent paper by Stein (2003) also discusses the role of agency costs and information asymmetry on the efficiency of corporate investments.

[5] Recent work by Acharya et al. (2006) and Almeida et al. (2006) extends the theoretical framework set up in Almeida et al. (2004) to examine the implications of financial constraints on both corporate financial and investment policies.

around the world. They find that countries with strong legal protection and more effective enforcement of laws and regulations have more developed financial markets, which allow firms in those countries to have better access to external financing. La Porta et al. (2006) further emphasize on the different aspects of enforcement of the securities laws (private and public enforcement) related to the issuance of new public offerings for the same set of 49 countries. One key finding is that securities laws matter to capital market development. In particular, private enforcement of laws in the form of disclosure requirements and liability rules is deemed to be more effective than is public enforcement in deterring corporate insiders from engaging in activities that are detrimental to minority investors. More importantly, Bushman and Piotroski (2006) contend that systematic differences in the legal environments and institutions across countries influence corporate decisions made by managers of firms in different countries.[6]

One of the main benefits of holding a large cash balance is that it helps to fund capital investments in the future, especially when there is a deviation between the internal and external costs of financing. This wedge is driven by agency conflicts (Jensen and Meckling (1976)), information asymmetry (Myers and Majluf (1984)), and potential financial distress if the firm is unable to repay its debt. Hence, the presence of cash reserves in the balance sheet allows firms to depend more on internal funds in making their investments.

As mentioned earlier, the cost of external financing provides an indication of the extent of shareholder protection afforded by the legal institutions. Recent studies by Chen et al. (2006) and Hail and Leuz (2006) have further documented that firms in countries with strong legal protection of investors tend to enjoy a lower cost of equity than do firms in countries with weak

[6] Specifically, firms in countries with strong legal protection in the form of securities laws and more effective legal systems are more likely to engage in conservative accounting (timely recognition of bad news in accounting numbers) than are firms in countries with weak legal protection and less effective legal systems. In addition, public enforcement is more effective than private enforcement in creating incentives for conservative accounting.

legal protection of investors. Consequently, strong legal protection helps to reduce the constraints that firms face in gaining access to the external capital markets. This implies that firms in these countries should face relatively lower costs of external financing and thereby have fewer incentives to increase their current cash holdings out of cash flows to fund their future investments. In other words, we postulate that there exists a negative relationship between legal protection and the cash-cash flow sensitivity:

Hypothesis 1: *Changes in cash holdings are less sensitive to cash flows (i.e., the cash-cash flow sensitivity) for firms in countries with strong legal protection of investors than for firms in countries with weak legal protection of investors.*

Recently, Morck et al. (2000) find that stock prices are more synchronous with each other and therefore contain less information about their investment opportunities for firms in countries with weak legal protection than for firms in countries with strong legal protection. A related paper by Gelb and Zarowin (2002) also document that stock prices are more informative about future earnings for firms that provide more voluntary disclosure.[7] Fox et al. (2003) further report that mandatory securities disclosure improves the accuracy of stock prices and, in turn, the efficiency of capital allocation. In addition, Kusnadi and Wei (2007) find that legal protection of investors is positively associated with the investment-stock price sensitivity. These studies imply that the stock prices of firms in countries with low legal protection are less likely to affect their investment and cash management policies. Correspondingly, as the level of legal protection increases, the stock prices of firms in these countries will be more reflective of their

[7] Fan and Wong (2002) use the ownership structure of East-Asian firms as a proxy for the effectiveness of corporate governance and find that firms with concentrated ownership are associated with more agency conflicts and tend to have lower quality of accounting numbers.

fundamentals and future investment opportunities. As a result, an increase in stock prices would be regarded as a signal of a more favorable future investment environment. Managers of these firms would increase their current cash holdings, expecting that they will have more profitable investments in the future. This suggests that the cash-stock price sensitivity should increase with the level of legal protection:

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Hypothesis 2: *Changes in cash holdings are more sensitive to stock prices (i.e., the cash-stock price sensitivity) for firms in countries with strong legal protection of investors than for firms in countries with weak legal protection of investors.*

2.2 Financial constraints, the cash-cash flow sensitivity and the cash-stock price sensitivity

Almeida et al. (2004) predict that cash management policies should be different between financially constrained firms and financially unconstrained firms. Specifically, since constrained firms would face greater restrictions in terms of raising funds required to finance future investments, these firms would be better off by sacrificing marginal current investments in favor of hoarding cash and saving it for potentially more profitable future investments. On the contrary, unconstrained firms have no problems in financing their current and future investments. Thus, these firms are less likely to hoard cash in anticipation of using it to fund investments in the future. Their empirical findings are consistent with the predictions of their model. Khurana et al. (2006) also document similar findings in their sample of international firms.

Even though we argued earlier that firms in countries with strong legal protection of investors should in general face lower costs of external financing and thereby should be considered as financially unconstrained, it is always possible that the impact of firm-level

measures of financial constraints such as firm size remain relevant. In this manner, small firms will still find themselves constrained in terms of their access to external capital markets. Our prediction of the effect of firm-level financial constraints on changes in cash holdings in response to cash flow innovations follows that of Almeida et al. (2004). We conjecture that there exists a positive relationship between financial constraints and the cash-cash flow sensitivity:

Hypothesis 3: *Changes in cash holdings are more sensitive to cash flows (i.e., the cash-cash flow sensitivity) for financially constrained firms than for financially unconstrained firms*.

Since stock prices reflect a firm's future investment opportunities, firms with higher stock prices should save more cash out of current cash flows to fund their potentially more profitable future investments. This implies that firms' changes in cash holdings are positively associated with their stock prices. In addition, financially constrained firms face difficulty in accessing the external markets than do financially unconstrained firms, which implies that constrained firms have to depend more on internal funds for their investments than do unconstrained firms. Consequently, constrained firms should exhibit a greater tendency to increase their current cash holdings to safeguard against potentially more profitable investments in the future. The above arguments suggest that financial constraints should have a positive effect on the cash-stock price sensitivity:

Hypothesis 4: *Changes in cash holdings are more sensitive to stock prices (i.e., the cash-stock price sensitivity) for financially constrained firms than for financially unconstrained firms*.

3. Data and Sample Statistics

Our sample comprises both country-level institutional variables and firm-level financial variables. The country-level legal protection variables are obtained from La Porta et al. (1998) and La Porta et al. (2006). They include (1) anti-director rights, (2) liability standards, (3) disclosure requirements, (4) private enforcement, (5) public enforcement, and (6) investor protection. We retrieve the firm-level financial data from Worldscope and Datastream, provided by Thomson Financial. The financial variables include cash holdings, changes in cash holdings, short-term debt, total debt, cash flow, capital expenditures, cash dividends, dividend payouts, total assets, book value of equity, and market capitalization. We require our sample to have non-missing firm-year observations. In addition, we also follow previous studies by excluding firms operating in the financial industry (SIC codes between 6000 and 6999) and firms with book values of total assets of less than US$10 million. Our final sample consists of an unbalanced panel data of 104,283 firm-year observations from 43 countries covering the period from 1985 to 2004.

Table 1 presents the summary statistics of both the institutional and financial variables for each country in our sample. From the second and third columns of Table 1, we observe that Japan and the United Kingdom have the largest total firm-year observations and the largest number of firms, while Egypt and Zimbabwe have the smallest. The average firm-year observations and the number of firms in our final sample are 2,425 and 386, respectively.

[Insert Table 1 here]

3.1 Country-level legal protection variables

As mentioned above, we obtain the legal protection variables from La Porta et al. (1998,

2006). In this subsection, we briefly describe the six indices we use in this study. Many studies have employed the anti-director rights index (*ANTIDIR*) as a measure of corporate governance. It ranges from 0 to 5. Since the anti-director rights index is an "aggregated" index of shareholder rights, a higher anti-director rights score indicates that minority shareholders are legally protected from expropriation by the managers or controlling shareholders in corporate decisions (La Porta et al. (1998)). These rights include voting by mail, shares not blocked before shareholder meetings, cumulative voting of directors or proportional representation on the board, legal mechanisms to protect against possible oppression by managers or directors, preemptive rights, and a minimum share ownership requirement to call an extraordinary general meeting.

The other indices are taken from a recent paper by La Porta et al. (2006). The disclosure requirements index (*DISC*) ranges from 0 to 1. It is calculated by taking an arithmetic average of six sub-indices: prospectus, compensation, shareholders, inside ownership, irregular contracts and transactions. It captures regulations on the information that must be disclosed in an IPO transaction. The liability standards index (*LIAB*) also ranges from 0 to 1. Similarly, it is an arithmetic average of three sub-indices: liability standards for the issuer of securities and its directors, liability standards for distributors of securities and liability standards for accountants. It measures the procedural difficulty in recovering losses from directors, distributors and accountants. The fourth index is the private enforcement index (*PRIVENF*). It ranges from 0 to 1 and is calculated as the average of the disclosure requirements and liability standards indices. Essentially, it measures the costs that investors need to incur to recoup damage from corporate insiders, distributors of securities and accountants, when the information disclosed during the IPO is deemed to be erroneous or insufficient. A higher value of *PRIVENF* suggests more effective private enforcement of securities laws.

The fifth index is the public enforcement index (*PUBENF*). It ranges from 0 to 1 and is calculated as the arithmetic average of six sub-indices: the supervisor's characteristics, rule-making power, investigative power, orders and criminal indices. It measures the power of the capital market supervisory agency in regulating and enforcing the securities laws. Thus, a higher value of *PUBENF* indicates a more effective regulation and enforcement of the securities laws. The last index is the investor protection index (*INVPRT*). It ranges from 0 to 1 and is calculated as the principal component of the disclosure requirements, liability standards and anti-directors rights indices. A higher value of *INVPRT* signals a more effective protection afforded by the legal systems.

We present the summary statistics on the legal protection indices in the last six columns of Table 1. We find that six countries (Hong Kong, India, Pakistan, Canada, Chile and South Africa) have the highest scores (5) on the anti-director rights index. Meanwhile, only Belgium has the lowest score (0) on the anti-directors rights index. The scores on the disclosure requirement index ranges from 0.17 (Venezuela) to 1.00 (Singapore). Germany has the lowest score of 0 and Canada and the Philippines both have the highest score of 1 on the liability standards index. Combining the two indices, we observe that Austria (0.18) has the lowest score on the private enforcement index and the Philippines (0.92) has the highest. For the public enforcement index, the score ranges from 0 (Japan) to 0.90 (Australia). Finally, Germany has the lowest score on the investor protection index (0) and Canada has the highest score (0.96).

3.2 Firm-level financial variables

We define cash holdings (*Cash Holdings*) as cash and equivalents divided by total assets (both at the end of year *t*). The change in cash holdings (Δ*CashHoldings*) is computed as the

change in cash and cash equivalents divided by total asset between year *t* and *t*-1. *Q* is Tobin's *Q* and is calculated as the market value of equity plus total assets minus total book value of equity divided by total assets. *CF* is cash flow and is calculated as income before extraordinary items plus depreciation and amortization divided by total assets. *SIZE* is the natural logarithm of total assets (in millions of US dollars). *CAPX* is capital expenditures divided by total assets. ΔSTD is the change in the short-term debt divided by total assets between year *t* and *t*-1. To alleviate the problems of outliers, we winsorize all financial variables at the 1st and the 99th percentile levels.

The summary statistics for the financial variables are presented in Columns 4 to 10 of Table 1. We report the median *Cash Holdings*, $\Delta CashHoldings$, *Q*, *CF*, *SIZE*, *CAPX* and ΔSTD for each of the 43 countries in our sample. In addition, we also compute the overall mean and standard deviation for each of these variables. Firstly, we observe that there is a substantial variation in each of the financial variables across the countries in our sample. We find that Egypt and Japan have the highest median *Cash Holdings* of 23% and 13%, respectively, and Zimbabwe and New Zealand have the lowest ratios of 0.2% and 1.8%. The overall mean *Cash Holdings* is about 7%, with a standard deviation of 4%.

In general, the average $\Delta CashHoldings$ is zero in our overall sample, with a positive median value in all but eight of the countries. Egypt has the highest absolute $\Delta Cash\ Holdings$ of 3.3%. For the remaining firm-level financial variables, the mean and standard deviation of Tobin's *Q* across our international sample is 1.09 and 0.16, respectively. Greece (1.42) has the highest median Tobin's *Q* and Venezuela (0.69) has the lowest. The median ratio of *CF* is positive for all the countries in our sample, with an overall mean and standard deviation of 6.2% and 1.5%, respectively. Zimbabwe has the highest median *CF* of 10% and Hong Kong has the lowest median *CF* of 3.8%.

We use the natural logarithm of total assets (in millions of US dollars) as our measure of firm size (*SIZE*). Switzerland (6.4) has the highest median *SIZE* and Zimbabwe (3.4) has the lowest. The average *CAPX* across our sample is 4.6%, with a standard deviation of 1.0%. Norway (6.9%) has the highest median *CAPX*, while Hong Kong (2.9%) has the lowest value. The median ΔSTD is positive for all the countries but one (Zimbabwe), with an overall mean and standard deviation of 0.2% and 0.6%, respectively.

Next, we present the correlations among the firm-level financial variables and the country-level legal protection measures in Table 2.[8] *Cash Holdings* is negatively and significantly correlated with both $\Delta CashHoldings$ (-0.45) and *CF* (-0.37), and it is positively and significantly correlated with Tobin's *Q* (0.29). $\Delta CashHoldings$ has positive but insignificant correlations with both *CF* and *SIZE* and negative but insignificant with *Q* and *CAPX*. It is only significantly positively correlated with ΔSTD (0.40). The correlations between the financial and legal-protection variables are in general small and insignificant. Only four of the correlations are negative and significant at least at the ten percent level. Finally, the legal protection variables are positively and significantly correlated with each other as we expect. The magnitude of the correlations ranges from 0.29 to 0.88.

[Insert Table 2 here]

4. Empirical Analysis and Discussion of Results

In this section, we investigate whether international firms' corporate cash management policies are affected by the country-level legal protection variables and firm-level financial constraints. To be more specific, we explore how these two factors affect the relationship between the change in cash holdings with respect to the innovations in both cash flows (the cash-

[8] We first compute the country-mean value for each financial variable, before computing the correlations.

cash flow sensitivity) and stock prices (the cash-stock price sensitivity) for our international sample that covers a period of 20 years. Our empirical specifications build upon the earlier model developed by Almeida et al. (2004).

4.1 Legal protection of investors and the sensitivity of cash to cash flow

We first estimate the following baseline empirical model, which is adapted from Almeida et al. (2004), for our international sample:

$$\Delta CashHoldings_{it} = a_0 + \alpha_1 CF_{it} + \alpha_2 Q_{it} + \alpha_3 SIZE_{it} + \alpha_4 CAPX_{it} + \alpha_5 \Delta STD_{it} + \sum_{j=1}^{44} b_j Industry_i^j + \sum_{t=1}^{20} c_t Year_t + u_{it}, \quad (1)$$

where $\Delta CashHoldings_{it}$ is the change in cash holdings of firm *i* from year *t*-1 to year *t*. CF_{it} is firm *i*'s cash flow in year *t*; Q_{it} is its Tobin's *Q* in year *t*; $SIZE_{it}$ is its size in year *t*; $CAPX_{it}$ is its capital investment in year *t*, and ΔSTD_{it} is its change in short-term debt from year *t*-1 to year *t*. These variables are defined earlier. The sensitivity of cash to cash flow and the sensitivity of cash to stock prices are captured by the regression coefficients α_1 and α_2, respectively.

We estimate country random-effects generalized least squares (GLS) model for our panel data consisting of international firms. The regression specification also includes industry (b_j), and time (c_t) dummies.[9] The purpose is to control for industry and year fixed effects, since these factors have been known to affect a firm's cash holdings. u_{it} is an error term that is assumed to be independent of the explanatory variables. In addition, we estimate the standard errors that are adjusted for the error structure in heteroskedasticity and for within-period error correlation using the Huber-White estimators.

[9] The industry classification follows that of Fama and French (1997).

Our main interests in this study lie in the regression coefficients α_1 and α_2. The α_1 measures the sensitivity of a firm's changes in cash holdings to its cash flow innovations. Almedia et al. (2004) call this measure the marginal propensity to save cash from current cash flows or the cash-cash flow sensitivity. When firms have access to a large pool of internal funds (their operating cash flows), they can afford to transfer these resources to their cash holdings, thereby building up their cash reserves. As a result, we expect that the sign of α_1 should be positive. In addition, Almeida et al (2004) further argue that the sensitivity of cash to cash flows should be positive and significant only for financially constrained firms as opposed to unconstrained firms. We defer the discussion on the effect of financial constraints on the cash-cash flow sensitivity to a later sub-section.

Correspondingly, α_2 measures the cash-stock price sensitivity or the sensitivity of a firm's changes in cash holdings to its stock price innovation, which is proxied by Tobin's *Q*. When firms experience an increase in *Q* (i.e., higher stock prices), this signals that the firms will bring in more earnings and face better investment opportunities. This translates to an increase in their cash holdings, which suggests that α_2 should also be positive.

We further include *SIZE* and *CAPX* in equation (3) to control for firm size and a firm's need for capital investment. Almeida et al. (2004) argue that there are economies of scale associated with a firm's cash management policy. Further, firms usually rely on their internal funds to finance their capital investments. Hence, we expect that α_4 should be negative. The last control variable that we include in equation (1) is ΔSTD because Almedia et al. (2004) argue that changes in short-term debt can be considered as a substitute for cash and that it is also used by firms in their cash management policies. We do not make a priori prediction for α_5.

We present the results of our baseline regression in Column (1) of Table 3. For the sake of brevity, we do not report the coefficients on the industry and year dummies in all the tables. All the coefficients on the five control variables are significant at the one percent level with expected signs except for *SIZE*. The results suggest that large firms, firms with better investment opportunities, low capital investments needs, high cash flows, and those experiencing an increase in short-term debt have the tendency to increase their cash holdings.

We next examine the effect of the legal protection of minority investors on the cash-cash flow sensitivity. Essentially, this is a test of Hypothesis 1, which conjectures that the cash-cash flow sensitivity should decrease with the level of legal protection afforded to the investors. We expand the baseline model (equation (1)) by including an interaction term between cash flow and a measure of legal protection of investors. The regression specification to test Hypothesis 1 is as follows:

$$\begin{aligned}\Delta CashHoldings_{it} &= a_0 + \alpha_1 CF_{it} + \alpha_2 Q_{it} + \alpha_3 SIZE_{it} + \alpha_4 CAPX_{it} + \alpha_5 \Delta STD_{it} \\ &+ \alpha_6 LEGAL_i + \alpha_{11}(CF_{it} \times LEGAL_i) + \sum_{j=1}^{44} b_j Industry_i^j + \sum_{t=1}^{20} c_t Year_t + u_{it},\end{aligned} \tag{2}$$

where $LEGAL_i$ is one of the six country-level legal protection measures for firm i.[10] All the other variables are defined earlier. We are particularly interested in the coefficient on the interaction term between *CF* and *LEGAL*, α_{11}. The interaction term measures the effect of the legal protection of investors on the sensitivity of cash to cash flow. The prediction from our first hypothesis is that α_{11} should be negative. In particular, we wish to verify whether or not the presence of legal protection has a decreasing effect on the cash-cash flow sensitivity.

We report the results of the estimation of the country random-effects regressions in Columns (2) to (7) of Table 3. Despite the inclusion of the interaction term with the legal protection of

[10] We have normalized all the *LEGAL* variables (except for *ANTIDIR*) from 0 to 5 in all the regressions.

investors, the coefficients on *CF* (α_1) remain positive and significant at the one percent level in Columns (2) to (7). Their magnitudes increase as a result of the addition of the interaction term. Firms with higher cash flows display a propensity to save more cash out of their cash flows in order to fund future investment needs. As for the other control variables, the magnitudes of the coefficients (α_2 to α_5) are similar to those reported in Column (1) and they continue to show statistical significance with the same signs.

Our coefficient of interest (α_{11}) is negative and statistically significant at the one percent level for all the *LEGAL* measures, which suggests that the change in cash holdings is negatively associated with the interaction term between cash flow and different measures of legal protection. Therefore, our results are consistent with the prediction of Hypothesis 1 that changes in cash holdings are less sensitive to their cash flow innovations for firms in countries with strong legal protection of investors, as compared to firms in countries with weak legal protection of investors.

Previous studies have documented that countries with common-law legal traditions offer a stronger degree of legal protection to minority investors than do countries with civil-law traditions. Hence, we replace *LEGAL* with a legal origin dummy (*LO*) which equals zero in civil-law countries and one in common-law countries, and re-estimate equation (2). Our unreported results show that the interaction coefficient between *CF* and *LO*, α_{11}, is estimated at -0.035, with a *t*-statistic of -4.59, which is significant at the one percent level. The result complements the findings in Table 3.

[Insert Table 3 here]

Overall, our findings so far have conveyed an important message that the legal protection of minority investors matters to international firms' corporate cash management policies.

Specifically, we demonstrate that firms in countries with strong legal protection of investors have their changes in cash holdings that are less sensitive to cash flow innovations than do firms in countries with weak legal protection of investors.

4.2 Legal protection of investors and the sensitivity of cash to stock prices

Next, we turn our attention to the second coefficient of interest, α_2, which measures the sensitivity of cash to stock prices. Recall from the result of our baseline model (equation (1)) in Table 3 that α_2 is estimated at 0.005, with a *t*-statistic of 11.88. This indicates that firms will increase their cash holdings in response to increases in their stock prices.

We extend our analysis to test Hypothesis 2 on whether the legal protection of investors also has an impact on the cash-stock price sensitivity. We posit that there is a positive relationship between legal protection and the cash-stock price sensitivity. In other words, the cash holdings of firms in countries with strong legal protection of investors are more responsive to changes in stock prices than are the cash holdings of firms in countries with weak legal protection of investors.

We expand equation (2) to include an interaction term between Tobin's *Q* and a measure of legal protection as an additional regressor to test Hypothesis 2. The regression specification is as follows:

$$\Delta CashHoldings_{it} = a_0 + \alpha_1 CF_{it} + \alpha_2 Q_{it} + \alpha_3 SIZE_{it} + \alpha_4 CAPX_{it} + \alpha_5 \Delta STD_{it} + \alpha_6 LEGAL_i + \alpha_{11}(CF_{it} \times LEGAL_i) + \alpha_{22}(Q_{it} \times LEGAL_i) + \sum_{j=1}^{44} b_j Industry_i^j + \sum_{t=1}^{20} c_t Year_t + u_{it}, \quad (3)$$

where all the variables are defined earlier. We now have two interaction terms in the equation, which measure the effect of legal protection of investors on both the cash-cash flow and cash-stock price sensitivities. From Hypothesis 1, we predict that the first interaction term (α_{11})

between *CF* and *LEGAL* should be negative. In contrast, Hypothesis 2 predicts that the second interaction term (α_{22}) between *Q* and *LEGAL* should be positive. Specifically, we are interested in knowing if the cash-stock price sensitivity increases with the degree of legal protection of investors and if the result pertaining to the first hypothesis, which we have documented in Table 3, is robust to the inclusion of the additional interaction term.

We use the country random-effects model, which controls for industry and year variations, in the estimation of equation (3) and report the results in Columns (1) to (6) of Table 4. We first discuss the results with the control variables. Apart from the coefficient on *Q* (α_2), the magnitudes and significance of the other variables are stable and similar to those reported in Table 3.

Table 4 reveals that the results on the effect of legal protection on the cash-cash flow sensitivity, which we present in the previous table, are relatively robust to the inclusion of the additional interaction term between Tobin's *Q* and *LEGAL*. The interaction coefficient, α_{11}, remains negative and significant at least at the five percent level in all the specifications. Interestingly, we find that the coefficient on the interaction term between Tobin's *Q* and *LEGAL* (α_{22}) is positive and significant at least at the ten percent level in all six specifications.

In general, the results in Table 4 support Hypothesis 2 and demonstrate that the legal protection of investors has a positive effect on the cash-stock price sensitivity. Firms in countries with strong legal protection exhibit a higher propensity to increase their cash holdings when they experience increases in stock prices, which is driven by their potentially more profitable investment opportunities.

[Insert Table 4 here]

4.3 Robustness tests on the effect of legal protection of investors

In the previous sub-sections, we have established that the legal protection of investors plays an important role in international firms' corporate cash management policies, in terms of both the cash-cash flow and cash-stock price sensitivities. In this sub-section, we conduct a series of robustness checks to mitigate any concern that our results might be driven by omitted variables or measurement errors.

First, following Almeida et al. (2004) and Khurana et al. (2006), we include three additional explanatory variables into equation (3): the lagged cash-to-assets ratio (*LCASHR*) and the interaction term between *LCASHR* with both Tobin's *Q* and *CF*. We use *INVPRT* and country random-effects model to re-estimate the expanded model and present the results in Column (1) of Table 5.[11] We note that the adjusted R^2 increases from 0.09 in the previous tables to 0.19. We find that *LCASHR* is negatively and significantly related to the $\Delta CashHoldings$ (coefficient = -0.19). Conversely, the interaction term between *LCASHR* and *CF* has a positive and significant association (coefficient = 0.61) with $\Delta CashHoldings$. More importantly, we obtain qualitative unchanged results on the effect of legal protection on the cash-cash flow and cash-stock price sensitivities. While the cash-cash flow sensitivity decreases with legal protection, the cash-stock price sensitivity increases with legal protection.

Next, we use the ratio of external stock market capitalization from La Porta et al. (2006) as a measure of financial development (*DEV*). We include *DEV* as well as their interactions with both *CF* and *Q* as additional regressors and estimate the expanded model using country random-effects model. As shown in Column (2) of Table 5, we find that the level of capital market development does not alter the main effects of legal protection on firms' cash management

[11] We report the results for our subsequent tables only for *INVPRT*. The results are unchanged if we use the other *LEGAL* measures and they are available upon request,

policies. Firms in countries with strong legal protection of investors still display smaller cash-cash flow and higher cash-stock price sensitivities than do firms in countries with weak legal protection of investors.

Recent research has highlighted numerous problems associated with using Tobin's *Q*. For example, Baker et al. (2003) point out that Tobin's *Q* can be used to proxy for both stock price mispricing and investment opportunities. At the same time, *Q* might be estimated with measurement errors due to the difficulty in measuring the replacement cost of physical capital. Therefore, we follow Almeida et al. (2004) and Khurana et al. (2006) by replacing Tobin's *Q* with the ratio of future investment to current investment (*RATIO*) and re-estimate equation (3) using country random-effects model. We report the results in Column (3) of Table 5 and our main results remain unchanged.[12]

Another way to resolve the problem to use *Q* as a proxy for investment opportunities is to use an exogenous measure of investment opportunities that does not rely on local stock price information. In this case, we replace Tobin's *Q* with two measures of country-level growth opportunity from Bekaert et al. (2007): local growth opportunities (*LGO*) and global growth opportunities (*GGO*). We include their interactions with *INVPRT*, and re-estimate equation (3) using country random-effects model. Bekaert et al. (2007) further recommend that these measures will help to mitigate the endogeneity problem associated with Tobin's *Q*. The results are presented in Columns (4) and (5) of Table 5. We show that the coefficient of the interaction term between *INVPRT* and *CF* continues to be negative and significant and only the coefficient for the interaction term between *INVRT* and *LGO* is positive and significant.

[12] Specifically, *RATIO* is computed as the sum of one-year and two-year ahead capital investments (*CAPX*) divided by 2 times of current investment.

Finally, we drop two countries with the largest number of firm-year observations from our sample, namely Japan and the United Kingdom, to check if our results are driven by observations from these two countries. We re-estimate equation (3) and present the results in Column (6) of Table 5. Similar to the previous specifications, we continue to find that the interaction coefficients retain their signs and statistical significance levels in the regressions in this smaller sample. With the exception of the coefficient on *Q* in Column (6), all the other control variables remain significant with expected signs. Hence, we show that our main results are not caused by the observations from Japan and the United Kingdom.[13]

[Insert Table 5 here]

4.4 The role of financial constraints

We now explore the role of firm-level measures of financial constraints on international firms' corporate cash management policies, which is also a test of our Hypothesis 3. Following Almeida et al. (2004), we classify firms into two groups (financially constrained and financially unconstrained) based on two measures that have been used in the previous literature: firm size (*SIZE*) and the Kaplan-Zingales (*KZ*) index.

Many studies have used *SIZE* (the natural logarithm of total assets) as a measure of financial constraints. Large firms are usually considered to have better access to external financial markets than are small firms. Hence, we treat small firms as being financially constrained and large firms as being financially unconstrained.

[13] In our unreported results, we perform other robustness checks and find that our results are still valid at industry-level, for developed countries, EU countries, but not for emerging markets.

The original *KZ* index is first constructed by Kaplan and Zingales (1997) for a small sample of 49 low-dividend manufacturing firms in the U.S. as a proxy for the level of financial constraint. They estimate the following equation to construct the index:

$$KZ_{it} = -1.002CF_{it} - 39.368DIV_{it} - 1.315CASH_{it} + 3.139LEV_{it} + 0.283Q_{it}, \quad (4)$$

where KZ_{it} is the *KZ* score for firm *i* in year *t*. LEV_{it} is leverage and is calculated as the sum of long-term debt and debt in current liabilities divided by the sum of long-term debt, debt in current liabilities, and book value of equity. DIV_{it} is dividends and is calculated as cash dividends paid in year *t* divided by total assets at the end of year *t*-1. All other variables are defined earlier.

Since there are problems associated with Tobin's *Q*, Baker et al. (2003) advocate the use of a four-variable *KZ* index that does not include *Q* in the estimation. Similar to Baker et al. (2003) and Almeida et al. (2004), we treat firms with higher *KZ* scores as being more financially constrained. The regression specification to estimate the modified *KZ* index is as follows:

$$KZ_{it} = -1.002CF_{it} - 39.368DIV_{it} - 1.315CASH_{it} + 3.139LEV_{it}, \quad (5)$$

However, there is one lingering concern about the *KZ* index. Since the coefficients in equation (4) or (5) are estimated using the U.S. sample firms, it might not be appropriate to use it as a measure of financial constraints in our sample of international firms. Therefore, we follow Baker et al. (2003) to construct an equally weighted *KZ* index based on equation (5) for each country in our sample. The weighting scheme allows each variable to contribute equally to the total variation of the index, such that we have different weights assigned to each variable in the estimation of the *KZ* index for each country.[14]

[14] Before we estimate the *KZ* index, we first winsorize the components of the *KZ* index at the 1st and 99th percentiles. We report the results based on the equally weighted *KZ* index. However, we still obtain similar results when we use the original and modified *KZ* indexes.

We include the interaction term between the measures of financial constraints and cash flow and estimate the following equation:

$$\Delta CashHoldings_{it} = a_0 + \alpha_1 CF_{it} + \alpha_2 Q_{it} + \alpha_3 SIZE_{it} + \alpha_4 CAPX_{it} + \alpha_5 \Delta STD_{it} + \alpha_6 (CF_{it} \times FC_{it}) + \sum_{j=1}^{44} b_j Industry_i^j + \sum_{t=1}^{20} c_t Year_t + u_{it}, \quad (6)$$

where FC_{it} is one of the two measures of financial constraints (*SIZE* and *KZ*) for firm *i* at time *t*. All the other variables are defined earlier. The coefficient of the interaction term between *CF* and *FC*, α_6, measures the effect of financial constraints on the cash-cash flow sensitivity. Hypothesis 3 predicts that α_6 should be negative for the specifications that use *SIZE* and positive for the specification that uses the *KZ* index. In other words, the cash-cash flow sensitivity is decreasing in the level of financial constraints. Financially constrained firms are more likely than their counterparts to save cash from their current cash flows to fund future investments.

Similar to the previous specifications, we estimate equation (6) using country random-effects model that controls for industry and year variations. Column (1) of Table 6 shows the results for the specification that uses *SIZE*. We find that the coefficient of interest (α_6) is negative and significant at least at the one percent level for both specifications. As a robustness check, we estimate equation (1) for each *SIZE* quintile portfolio. We report that the coefficient of *CF* (α_1) decreases from 0.202 (*t*-statistics = 31.4) for quintile 1 portfolio to 0.164 (*t*-statistics = 13.8) for quintile 5 portfolio. The result on *SIZE* in consistent with our hypothesis that the cash holdings of financially constrained firms are more sensitivity to changes in their cash flows, as compared to financially unconstrained firms.

However, the result for *KZ* as reported in Column (4) of Table 6 is puzzling and does not conform to our conjecture. In fact, the interaction coefficient between *CF* and *FC*, α_6, is

negative, which suggests that firms with higher *KZ* scores (financially constrained) show a lower propensity to save cash out of current cash flows. The results on the estimation of equation (1) using *KZ* quintile portfolios further confirm that α_1 decreases monotonically from 0.369 (t-statistics = 32.4) for quintile 1 portfolio to 0.112 (t-statistic = 18.2) for quintile 5 portfolio. Almeida et al. (2004) also find a similar result. They attribute the contradictory finding to the fact that the *KZ* index may not be a good measure of financial constraints. As for the other control variables, the signs and significant levels of the coefficients remain unchanged.

We further examine the implications of both legal protection and financial constraints on the cash-cash flow sensitivity. To do this, we modify equation (6) by introducing the interaction term between *INVPRT* and *CF* and estimate the following equation:

$$\begin{aligned}\Delta CashHoldings_{it} &= a_0 + \alpha_1 CF_{it} + \alpha_2 Q_{it} + \alpha_3 SIZE_{it} + \alpha_4 CAPX_{it} + \alpha_5 \Delta STD_{it} \\ &+ \alpha_6 (CF_{it} \times FC_{it}) + \alpha_7 INVPRT_i + \alpha_{11} (CF_{it} \times INVPRT_i) + \sum_{j=1}^{44} b_j Industry_i^j + \sum_{t=1}^{20} c_t Year_t + u_{it}, \end{aligned} \quad (7)$$

where all other variables are as defined earlier. Our predictions with regard to the interaction coefficients are the same as before. We expect that both α_6 and α_{11} should be negative for the specifications that use *SIZE*, while α_6 should be positive and α_{11} should be negative for the specification that uses *KZ*.

We use the country random-effects model to estimate equation (7) and present the results in Columns (2) and (5) of Table 6. We find that the main results obtained in the previous specifications are virtually unchanged. For *SIZE*, both interaction coefficients, α_{11} and α_6, display negative associations with the change in cash holdings as shown in Column (2). However, the result for *KZ* in Column (5) is contrary to our prediction.

Finally, to test Hypothesis 4, we add two additional interaction terms: one is between a measure of financial constraints and *Q* and the other is between *INVPRT* and *Q*. We estimate the following equation:

$$\begin{aligned}\Delta CashHoldings_{it} &= a_0 + \alpha_1 CF_{it} + \alpha_2 Q_{it} + \alpha_3 SIZE_{it} + \alpha_4 CAPX_{it} + \alpha_5 \Delta STD_{it} \\ &+ \alpha_6 (CF_{it} \times FC_{it}) + \alpha_7 INVPRT_i + \alpha_8 (Q_{it} \times FC_{it}) + \alpha_{11} (CF_{it} \times INVPRT_i) \\ &+ \alpha_{22} (Q_{it} \times INVPRT_i) + \sum_{j=1}^{44} b_j Industry_i^j + \sum_{t=1}^{20} c_t Year_t + u_{it},\end{aligned} \tag{8}$$

where all other variables are defined earlier. The coefficient of the interaction term between *Q* and a measure of financial constraints, α_8, measures how financial constraints affect the cash-stock price sensitivity. The prediction from Hypothesis 4 is that α_8 should be negative for the specifications that use *SIZE* and positive for the specification that uses *KZ*. The predictions with respect to other interaction terms are similar as before.

We report the results of the estimation of equation (8) using country random-effects model are reported in Columns (3) and (6) of Table 6. We find that the interaction coefficient between *Q* and *FC*, α_8, is negative and significant at the one percent level for the specification that uses *SIZE*, which is consistent with our prediction. Nevertheless, we continue to find a confounding result for the specification that uses *KZ*.

Finally, we perform similar robustness tests as those done in Table 5 and present the coefficients of the four relevant interaction terms in Table 7. Most of the interaction terms are significant with expected signs. Overall, the results in Table 6 and 7 lend further support to our conjectures that international firms' corporate cash management policies are influenced by country-level institutional factors as well as firm-level measures of financial constraints.

[Insert Table 6 and 7 here]

5. Conclusions

Using a large cross-country sample that covers a period of twenty years, we seek to examine the determinants of international firms' corporate cash management policies. We find that firms in countries with strong legal protection of minority investors exhibit lower cash-cash flow and higher cash-stock price sensitivities than do firms in countries with weak legal protection. The results on the impact of financial constraints indicate that when firms become more financially constrained, they are more likely to experience an increase in both their cash-cash flow and cash-stock price sensitivities, which is consistent with our predictions. Our study adds to the literature on corporate cash management policies and provides new insights on the roles of legal protection and financial constraints on the sensitivities of a firm's changes in cash holdings to its cash flow and stock price innovations.

Taken as a whole, our empirical findings are consistent with the notion that strong legal protection helps to ease the constraints encountered by firms in raising external financing. Hence, firms in countries with strong legal protection face less pressure to hoard cash from their internal funds in order to finance their future investments. On the other hand, the stock prices of these firms should provide a better signal of potential growth options available to the firms in the future, which increase their tendency to increase their cash holdings in response to increases in their stock prices. Moreover, the presence of financial constraints also makes it necessary for firms to stockpile cash reserve, in anticipation of future investment needs.

One practical implication of our research is that managers should acknowledge the importance of both the legal protection afforded to them by regulators and their own firms' level of financial constraints before they decide on the optimal corporate cash management policies that best suit their firms.

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Table 1
Summary statistics

This table presents the summary statistics of the financial and legal protection variables. *Cash Holdings* is cash and equivalents divided by total assets. Δ*Cash Holdings* and is calculated as the change in *Cash Holdings* between year *t* and *t*-1. *Q* is Tobin's *Q* and is calculated as the market value of equity plus total assets minus total equity divided by total assets. *CF* is cash flow and is calculated as income before extraordinary items plus depreciation and amortization divided by total assets. *SIZE* is the natural logarithm of total assets (in millions of US dollars). *CAPX* is the capital expenditures divided by total assets. Δ*STD* is the change in short-term debt divided by total assets between year *t* and *t*-1. *ANTIDIR* is the anti-director rights index, a measure of shareholder protection from La Porta et al. (1998). *PRIVENF* is the private enforcement index calculated as the average of the disclosure requirement (*DISC*) and liability standard (*LIAB*) indices from La Porta et al. (2006). *PUBENF* is the public enforcement index calculated as the average of the supervisor characteristics, rule-making power, investigative powers, orders and criminal indices also from La Porta et al. (2006). *INVPRT* is the investor protection index calculated as the principal component of the disclosure requirements, liability standard, and anti-directors rights indices from La Porta et al. (2006). The sample consists of 43 countries and covers the period from 1985 to 2004.

Country	*Number of firm-years*	*Number of firms*	*Cash Holdings*	Δ *Cash Holdings*	*Q*	*CF*	*SIZE*	*CAPX*	Δ *STD*	*ANTIDIR*	*DISC*	*LIAB*	*PRIVENF*	*PUBENF*	*INVPRT*
Argentina	326	69	0.0337	0.0030	0.9690	0.0538	6.3171	0.0375	0.0049	4	0.50	0.22	0.36	0.58	0.48
Australia	3867	757	0.0517	0.0014	1.2607	0.0595	4.9412	0.0491	0.0000	4	0.75	0.66	0.71	0.90	0.78
Austria	766	114	0.0630	-0.0001	1.1362	0.0660	5.3449	0.0567	0.0001	2	0.25	0.11	0.18	0.17	0.10
Belgium	1054	137	0.0815	0.0020	1.1551	0.0719	5.4346	0.0536	0.0010	0	0.42	0.44	0.43	0.15	0.07
Brazil	1344	286	0.0575	0.0037	0.9063	0.0466	6.2836	0.0498	0.0113	3	0.25	0.33	0.29	0.58	0.44
Canada	6430	1032	0.0339	0.0000	1.2241	0.0643	5.4061	0.0602	0.0000	5	0.92	1.00	0.96	0.80	0.96
Chile	930	132	0.0289	0.0009	1.0813	0.0544	5.5944	0.0513	0.0031	5	0.58	0.33	0.46	0.60	0.61
Colombia	167	27	0.0463	0.0047	0.7950	0.0479	5.8410	0.0304	0.0043	3	0.42	0.11	0.26	0.58	0.35
Denmark	1610	189	0.1029	-0.0006	1.1254	0.0770	4.7345	0.0540	0.0005	2	0.58	0.55	0.57	0.37	0.36
Egypt	19	9	0.2300	-0.0332	1.2711	0.0390	5.5325	0.0546	0.0031	2	0.50	0.22	0.36	0.30	0.20
Finland	1177	155	0.0775	0.0005	1.1529	0.0714	5.5422	0.0637	0.0002	3	0.50	0.66	0.58	0.32	0.47
France	6099	920	0.0891	0.0021	1.1515	0.0676	5.3973	0.0453	0.0022	3	0.75	0.22	0.49	0.77	0.47
Germany	5159	734	0.0595	-0.0005	1.2438	0.0669	5.4721	0.0573	0.0001	1	0.42	0.00	0.21	0.22	0.00
Greece	256	119	0.0642	-0.0037	1.4159	0.0618	5.1852	0.0547	0.0057	2	0.33	0.50	0.41	0.32	0.32
Hong Kong	3383	638	0.1282	0.0027	0.9549	0.0379	5.0600	0.0293	0.0000	5	0.92	0.66	0.79	0.87	0.85
India	2101	350	0.0276	0.0015	1.0447	0.0731	5.1066	0.0511	0.0004	5	0.92	0.66	0.79	0.67	0.77
Indonesia	1321	225	0.0805	0.0004	1.0725	0.0604	4.5359	0.0400	0.0021	2	0.50	0.66	0.58	0.62	0.51

Ireland	718	78	0.0894	0.0053	1.2518	0.0654	4.9085	0.0460	0.0010	4	0.67	0.44	0.55	0.37	0.48
Israel	282	74	0.0776	0.0021	1.1141	0.0430	6.0075	0.0470	0.0103	3	0.67	0.66	0.66	0.63	0.59
Italy	2195	296	0.0813	0.0011	1.0886	0.0518	6.0527	0.0397	0.0027	1	0.67	0.22	0.44	0.48	0.20
Japan	18649	3039	0.1356	-0.0024	1.0368	0.0396	6.1726	0.0301	0.0000	4	0.75	0.66	0.71	0.00	0.42
Korea	3751	767	0.0710	0.0018	0.8937	0.0443	5.4965	0.0343	0.0048	2	0.75	0.66	0.71	0.25	0.36
Malaysia	3990	682	0.0646	0.0024	1.1112	0.0462	4.7226	0.0314	0.0009	4	0.92	0.66	0.79	0.77	0.73
Mexico	880	126	0.0542	0.0047	1.0476	0.0647	6.8445	0.0455	0.0042	1	0.58	0.11	0.35	0.35	0.10
Netherlands	2026	245	0.0489	0.0003	1.2149	0.0877	5.5235	0.0605	0.0000	2	0.50	0.89	0.69	0.47	0.54
New Zealand	605	101	0.0181	0.0001	1.1828	0.0573	4.9781	0.0467	0.0000	4	0.67	0.44	0.55	0.33	0.46
Norway	1279	214	0.1097	0.0000	1.1567	0.0631	5.0087	0.0689	0.0000	4	0.58	0.39	0.48	0.32	0.44
Pakistan	538	74	0.0605	0.0040	1.0949	0.0773	4.2458	0.0417	0.0026	5	0.58	0.39	0.48	0.58	0.63
Peru	279	62	0.0190	0.0003	0.8781	0.0590	4.5498	0.0392	0.0000	3	0.33	0.66	0.50	0.78	0.66
Philippines	669	110	0.0511	-0.0002	0.9240	0.0514	4.8422	0.0422	0.0008	3	0.83	1.00	0.92	0.83	0.81
Portugal	533	84	0.0263	0.0010	1.0266	0.0601	5.1246	0.0409	0.0032	3	0.42	0.66	0.54	0.58	0.57
Singapore	2355	436	0.1154	0.0036	1.0979	0.0472	4.7243	0.0377	0.0000	4	1.00	0.66	0.83	0.87	0.77
South Africa	2391	398	0.0759	0.0035	1.1757	0.0828	5.4041	0.0574	0.0000	5	0.83	0.66	0.75	0.25	0.60
Spain	1415	177	0.0409	0.0010	1.1413	0.0618	6.0322	0.0407	0.0010	4	0.50	0.66	0.58	0.33	0.55
Sri Lanka	89	16	0.0660	0.0038	0.9574	0.0586	3.9767	0.0504	0.0163	3	0.75	0.39	0.57	0.43	0.40
Sweden	1900	324	0.0919	0.0009	1.2350	0.0659	5.4203	0.0476	0.0000	3	0.58	0.28	0.43	0.50	0.39
Switzerland	1967	238	0.1111	0.0026	1.1384	0.0706	6.4069	0.0472	0.0000	2	0.67	0.44	0.55	0.33	0.30
Taiwan	2664	583	0.0887	0.0053	1.1944	0.0544	5.6412	0.0331	0.0040	3	0.75	0.66	0.71	0.52	0.55
Thailand	2146	330	0.0404	0.0003	1.0251	0.0595	4.3734	0.0353	0.0016	2	0.92	0.22	0.57	0.72	0.37
Turkey	546	156	0.0549	0.0072	1.3279	0.0992	4.4908	0.0466	0.0108	2	0.50	0.22	0.36	0.63	0.34
United Kingdom	16316	2078	0.0625	0.0001	1.3244	0.0674	4.6600	0.0521	0.0000	5	0.83	0.66	0.75	0.68	0.78
Venezuela	88	16	0.0521	0.0116	0.6903	0.0586	5.8312	0.0319	0.0129	1	0.17	0.22	0.19	0.55	0.22
Zimbabwe	3	1	0.0017	-0.0136	0.7475	0.1032	3.3571	0.0231	-0.0220	3	0.50	0.44	0.47	0.42	0.42
Mean	2425	386	0.0689	0.0007	1.0939	0.0618	5.2680	0.0455	0.0022	3.05	0.61	0.48	0.55	0.51	0.47
Std Dev	2475	394	0.0392	0.0064	0.1551	0.0145	0.6990	0.0103	0.0055	1.31	0.20	0.24	0.19	0.22	0.22

Table 2
Cross-country correlation analysis

This table presents the cross-country correlations for the financial and legal protection variables. *Cash Holdings* is cash and equivalents divided by total assets. Δ *Cash Holdings* and is calculated as the change in cash and equivalents divided by total assets between year *t* and *t*-1. *Q* is Tobin's *Q* and is calculated as the market value of equity plus total assets minus total equity divided by total assets. *CF* is cash flow and is calculated as income before extraordinary items plus depreciation and amortization divided by total assets. *SIZE* is the natural logarithm of total assets (in millions of US dollars). *CAPX* is the capital expenditures divided by total assets. Δ *STD* is the change in short-term debt divided by total assets between year *t* and *t*-1. *ANTIDIR* is the anti-director rights index, a measure of shareholder protection from La Porta et al. (1998). *PRIVENF* is the private enforcement index calculated as the average of the disclosure requirement (*DISC*) and liability standard (*LIAB*) indices from La Porta et al. (2006). *PUBENF* is the public enforcement index calculated as the average of the supervisor characteristics, rule-making power, investigative powers, orders and criminal indices also from La Porta et al. (2006). *INVPRT* is the investor protection index calculated as the principal component of the disclosure requirements, liability standard, and anti-directors rights indices from La Porta et al. (2006). The sample consists of 43 countries and covers the period from 1985 to 2004. [a], [b], [c] denote statistical significance at the 10, 5, and 1 percent levels, respectively.

	Cash Holdings	Δ *in Cash Holdings*	*Q*	*CF*	*SIZE*	*CAPX*	Δ *STD*	*ANTIDIR*	*DISC*	*LIAB*	*PRIVENF*	*PUBENF*
Δ *Cash Holdings*	-0.45***	1.00										
Q	0.29*	-0.17	1.00									
CF	-0.37***	0.07	0.20	1.00								
SIZE	0.19	0.15	0.02	-0.38[c]	1.00							
CAPX	0.13	-0.12	0.61[c]	0.29[a]	0.10	1.00						
Δ *STD*	0.11	0.40[c]	0.01	-0.37[c]	0.33[a]	0.12	1.00					
ANTIDIR	-0.12	0.07	0.07	-0.10	-0.21	-0.02	-0.19	1.00				
DISC	0.15	0.06	0.16	-0.18	-0.22	-0.13	-0.17	0.52[c]	1.00			
LIAB	-0.07	0.03	0.07	-0.05	-0.19	0.03	-0.20	0.42[c]	0.45[c]	1.00		
PRIVENF	0.03	0.05	0.13	-0.13	-0.24	-0.05	-0.22	0.55[c]	0.82[c]	0.88[c]	1.00	
PUBENF	-0.25*	0.22	-0.15	-0.15	-0.30[b]	-0.27*	0.07	0.37[c]	0.39[c]	0.29[a]	0.40[c]	1.00
INVPRT	-0.19	0.13	0.00	-0.13	-0.30[c]	-0.11	-0.15	0.81[c]	0.60[c]	0.76[c]	0.80[c]	0.71[c]

Table 3
Legal protection and the cash flow sensitivity of cash

This table presents the coefficient estimates of random-effect regressions of the change in cash holdings on *Q*, cash flow, size, capital expenditures, the change in short-term debt, and the legal protection (*LEGAL*) variables. All the coefficients have been multiplied by 100. The dependent variable is Δ *Cash Holdings* and is calculated as the change in cash and equivalents divided by total assets between year *t* and *t*-1. *Q* is Tobin's *Q* and is calculated as the market value of equity plus total assets minus total equity divided by total assets. *CF* is cash flow and is calculated as income before extraordinary items plus depreciation and amortization divided by total assets. *SIZE* is the natural logarithm of total assets (in millions of US dollars). *CAPX* is the capital expenditures divided by total assets. Δ *STD* is the change in short-term debt divided by total assets between year *t* and *t*-1. *ANTIDIR* is the anti-director rights index, a measure of shareholder protection from La Porta et al. (1998). *PRIVENF* is the private enforcement index calculated as the average of the disclosure requirement (*DISC*) and liability standard (*LIAB*) indices from La Porta et al. (2006). *PUBENF* is the public enforcement index calculated as the average of the supervisor characteristics, rule-making power, investigative powers, orders and criminal indices also from La Porta et al. (2006). *INVPRT* is the investor protection index calculated as the principal component of the disclosure requirements, liability standard, and anti-directors rights indices from La Porta et al. (2006). The *t*-statistics are reported in parentheses. The estimated standard errors have been adjusted for the error structure in heteroskedasticity and for within-period error correlations using the Huber-White estimator. [a], [b], [c] denote statistical significance at the 10, 5, and 1 percent levels, respectively.

Variables	(1)	(2) *ANTIDIR*	(3) *DISC*	(4) *LIAB*	(5) *PRIVENF*	(6) *PUBENF*	(7) *INVPRT*
Q	0.0051[c]	0.0051[c]	0.0051[c]	0.0051[c]	0.0051[c]	0.0048[c]	0.0049[c]
	(11.88)	(11.74)	(11.75)	(11.73)	(11.71)	(11.19)	(11.38)
CF	0.1885[c]	0.2216[c]	0.2452[c]	0.2451[c]	0.2636[c]	0.2233[c]	0.2379[c]
	(46.85)	(20.74)	(14.94)	(24.95)	(18.84)	(24.91)	(24.89)
SIZE	0.0002	0.0002[a]	0.0002[a]	0.0002	0.0002[a]	0.0006[c]	0.0004[c]
	(1.34)	(1.73)	(1.89)	(1.44)	(1.70)	(4.88)	(3.36)
CAPX	-0.1809[c]	-0.1810[c]	-0.1805[c]	-0.1810[c]	-0.1808[c]	-0.1847[c]	-0.1827[c]
	(-36.79)	(-36.83)	(-36.70)	(-36.84)	(-36.80)	(-37.51)	(-37.20)
Δ *STD*	0.0685[c]	0.0691[c]	0.0691[c]	0.0692[c]	0.0693[c]	0.0681[c]	0.0691[c]
	(18.33)	(18.49)	(18.49)	(18.53)	(18.56)	(18.22)	(18.51)
LEGAL		0.0013[c]	0.0024[c]	0.0021[c]	0.0028[c]	0.0026[c]	0.0028[c]
		(5.19)	(6.43)	(7.48)	(7.73)	(12.40)	(10.60)
CF $\times$ *LEGAL*		-0.0087[c]	-0.0149[c]	-0.0189[c]	-0.0221[c]	-0.0116[c]	-0.0159[c]
		(-3.15)	(-3.48)	(-6.11)	(-5.45)	(-4.13)	(-5.34)
Industry and year dummies included	YES	YES	YES	YES	YES	YES	YES
Adjusted *R*-square	0.090	0.090	0.090	0.091	0.091	0.092	0.092
Number of observations	104,283	104,283	104,283	104,283	104,283	104,283	104,283

Table 4
Legal protection and the stock price sensitivity of cash

This table presents the coefficient estimates of regressions of the change in cash holdings on *Q*, cash flow, size, capital expenditures, the change in short-term debt, and the legal protection (*LEGAL*) variable, and the interaction terms between *CF* and *LEGAL* and between *Q* and *LEGAL*. All the coefficients have been multiplied by 100. The dependent variable is Δ*Cash Holdings* and is calculated as the change in cash and equivalents divided by total assets between year *t* and *t*-1. *LCASHR* is the lagged cash holdings. *Q* is Tobin's *Q* and is calculated as the market value of equity plus total assets minus total equity divided by total assets. *CF* is cash flow and is calculated as income before extraordinary items plus depreciation and amortization divided by total assets. *SIZE* is the natural logarithm of total assets (in millions of US dollars). *CAPX* is the capital expenditures divided by total assets. Δ*STD* is the change in short-term debt divided by total assets between year *t* and *t*-1. *ANTIDIR* is the anti-director rights index, a measure of shareholder protection from La Porta et al. (1998). *PRIVENF* is the private enforcement index calculated as the average of the disclosure requirement (*DISC*) and liability standard (*LIAB*) indices from La Porta et al. (2006). *PUBENF* is the public enforcement index calculated as the average of the supervisor characteristics, rule-making power, investigative powers, orders and criminal indices also from La Porta et al. (2006). *INVPRT* is the investor protection index calculated as the principal component of the disclosure requirements, liability standard, and anti-directors rights indices from La Porta et al. (2006). The *t*-statistics are reported in parentheses. The estimated standard errors have been adjusted for the error structure in heteroskedasticity and for within-period error correlations using the Huber-White estimator. [a], [b], [c] denote statistical significance at the 10, 5, and 1 percent levels, respectively.

Variables	(1) *ANTIDIR*	(2) *DISC*	(3) *LIAB*	(4) *PRIVENF*	(5) *PUBENF*	(6) *INVPRT*
Q	0.0001	-0.0039[b]	-0.0013	-0.0046[c]	0.0064[c]	0.0023[b]
	(0.04)	(-2.06)	(-1.17)	(-2.81)	(7.23)	(2.08)
CF	0.2261[c]	0.2512[c]	0.2487[c]	0.2689[c]	0.2213[c]	0.2400[c]
	(20.78)	(15.02)	(25.04)	(18.97)	(24.15)	(24.73)
SIZE	0.0002[a]	0.0002[a]	0.0002	0.0002[a]	0.0006[c]	0.0004[c]
	(1.81)	(1.89)	(1.42)	(1.67)	(4.83)	(3.34)
CAPX	-0.1815[c]	-0.1808[c]	-0.1816[c]	-0.1814[c]	-0.1844[c]	-0.1830[c]
	(-36.92)	(-36.76)	(-36.97)	(-36.92)	(-37.42)	(-37.24)
Δ *STD*	0.0694[c]	0.0693[c]	0.0696[c]	0.0697[c]	0.0681[c]	0.0693[c]
	(18.57)	(18.55)	(18.62)	(18.66)	(18.22)	(18.54)
LEGAL	-0.0005	-0.0007	-0.0009[a]	-0.0011[a]	0.0033[c]	0.0016[c]
	(-1.14)	(-1.03)	(-1.75)	(-1.66)	(8.81)	(3.33)
CF × *LEGAL*	-0.0099[c]	-0.0164[c]	-0.0200[c]	-0.0235[c]	-0.0110[c]	-0.0165[c]
	(-3.50)	(-3.76)	(-6.38)	(5.74)	(-3.82)	(-5.45)
Q × *LEGAL*	0.0013[c]	0.0024[c]	0.0021[c]	0.0029[c]	0.0006[a]	0.0009[c]
	(4.14)	(4.77)	(5.84)	(5.92)	(1.90)	(2.45)
Industry and year dummies included	YES	YES	YES	YES	YES	YES
Adjusted *R*-square	0.091	0.091	0.092	0.092	0.092	0.092
Number of observations	104,283	104,283	104,283	104,283	104,283	104,283

Table 5
Robustness checks on the effect of legal protection or corporate cash management policies

This table presents the coefficient estimates of regressions of the change in cash holdings on *Q*, cash flow, size, capital expenditures, the change in short-term debt, the investor protection (*INVPRT*) variable, and the interaction terms between *CF* and *INVPRT* and between *Q* and *INVPRT*. All the coefficients have been multiplied by 100. The dependent variable is Δ*Cash Holdings* and is calculated as the change in cash and equivalents divided by total assets between year *t* and *t*-1. *Q* is Tobin's *Q* and is calculated as the market value of equity plus total assets minus total equity divided by total assets. *CF* is cash flow and is calculated as income before extraordinary items plus depreciation and amortization divided by total assets. *SIZE* is the natural logarithm of total assets (in millions of US dollars). *CAPX* is the capital expenditures divided by total assets. Δ *STD* is the change in short-term debt divided by total assets between year *t* and *t*-1.). *INVPRT* is the investor protection index calculated as the principal component of the disclosure requirements, liability standard, and anti-directors rights indices from La Porta et al. (2006). *LCASHR* is the lagged cash holdings. *DEV* is a measure of financial development from La Porta et al. (2006). *RATIO* is the ratio of future investments to current investments. *LGO* (*GGO*) is the exogenous local (global) country growth opportunity measure from Bekaert et al. (2007). *INVPRT* is the investor protection index calculated as the principal component of the disclosure requirements, liability standard, and anti-directors rights indices from La Porta et al. (2006). The *t*-statistics are reported in parentheses. The estimated standard errors have been adjusted for the error structure in heteroskedasticity and for within-period error correlations using the Huber-White estimator. [a], [b], [c] denote statistical significance at the 10, 5, and 1 percent levels, respectively.

Variables	(1)	(2)	(3)	(4)	(5)	(6)
Q	0.0002	0.0032[c]				-0.0011
	(0.20)	(2.86)	0.0000			(-0.65)
RATIO			(0.08)			
			0.2197[c]			
CF	0.1285[c]	0.2314[c]	(17.29)	0.2421[c]	0.2421[c]	0.2366[c]
	(15.13)	(23.85)	0.0002	(24.89)	(24.90)	(23.26)
SIZE	-0.0001	0.0005[c]	(1.52)	0.0004[c]	0.0003[b]	0.0011[c]
	(-0.92)	(3.58)	-0.1670[c]	(3.25)	(2.41)	(6.42)
CAPX	-0.1767[c]	-0.1833[c]	(-28.67)	-0.1757[c]	-0.1736[c]	-0.1747[c]
	(-39.07)	(-37.33)	0.0667[c]	(-34.91)	(-34.63)	(-30.91)
Δ *STD*	0.0662[c]	0.0683[c]	(15.05)	0.0649[c]	0.0650[c]	0.0685[c]
	(19.55)	(18.30)		(16.86)	(16.89)	(15.85)
LCASHR	-0.1886[c]					
	(-40.01)					
INVPRT	-0.0012[c]	0.0023[c]	0.0025[c]	-0.0046[b]	0.0044	-0.0000
	(-2.65)	(4.17)	(6.68)	(-2.16)	(1.09)	(-0.04)
DEV		-0.0027[a]				
		(-1.70)				
LGO				-0.0088[a]		
				(-5.27)		
GGO					-0.0149[a]	
					(-3.55)	
CF $\times$ *LCASHR*	0.6331[c]					
	(30.16)					
Q $\times$ *LCASHR*	0.0141[c]					
	(5.12)					
CF $\times$ *INVPRT*	-0.0188[c]	-0.0267[c]	-0.0114[c]	-0.0177[c]	-0.0175[c]	-0.0159[c]
	(-7.66)	(-7.04)	(-2.91)	(-5.69)	(-5.64)	(-4.88)
Q $\times$ *INVPRT*	0.0021[c]	0.0014[c]				0.0023[c]
	(6.03)	(3.37)				(5.64)
RATIO $\times$ *INVPRT*			0.0002[a]			
			(1.89)			

Variables	(1)	(2)	(3)	(4)	(5)	(6)
CF × *DEV*		0.0556[c]				
		(4.65)				
Q × *DEV*		-0.0034[c]				
		(-2.85)				
LGO × *INVPRT*				0.0026[c]		
				(3.53)		
GGO × *INVPRT*					-0.0005	
					(-0.38)	
Industry and year dummies included	YES	YES	YES	YES	YES	YES
Adjusted *R*-square	0.190	0.093	0.072	0.087	0.087	0.096
Number of observations	104,283	104,283	72,590	97,961	97,957	69,318

Table 6
Legal protection, financial constraints and corporate cash management policies

The table presents the coefficient estimates of regressions of the change in cash holdings on *Q*, cash flow, size, capital expenditures, the change in short-term debt, the measure of financial constraints (*FC*), the investor protection (*INVPRT*) variable, and the interaction terms between *CF* and *FC*, between *Q* and *CF*, between *CF* and *INVPRT* and between *Q* and *INVPRT*. All the coefficients have been multiplied by 100. The dependent variable is Δ *Cash Holdings* and is calculated as the change in cash and equivalents divided by total assets between year *t* and *t*-1. *Q* is Tobin's *Q* and is calculated as the market value of equity plus total assets minus total equity divided by total assets. *CF* is cash flow and is calculated as income before extraordinary items plus depreciation and amortization divided by total assets. *FC* is one of the measures of financial constraints. *SIZE* is the natural logarithm of total assets (in millions of US dollars). *CAPX* is the capital expenditures divided by total assets. Δ *STD* is the change in short-term debt divided by total assets between year *t* and *t*-1.). *INVPRT* is the investor protection index calculated as the principal component of the disclosure requirements, liability standard, and anti-directors rights indices from La Porta et al. (2006). The *KZ* Index is a measure of financial constraint and is the equally weighted *KZ* index suggested by Kaplan and Zingales (1997) without *Q*. The *t*-statistics are reported in parentheses. The estimated standard errors have been adjusted for the error structure in heteroskedasticity and for within-period error correlations using the Huber-White estimator. [a], [b], [c] denote statistical significance at the 10, 5, and 1 percent levels, respectively.

Independent variables	(1) *SIZE*	(2) *SIZE*	(3) *SIZE*	(4) *KZ*	(5) *KZ*	(6) *KZ*
Q	0.0054[c]	0.0052[c]	-0.0016	0.0011[b]	0.0008[a]	-0.0077[c]
	(12.36)	(11.96)	(-0.87)	(2.27)	(1.68)	(-7.20)
CF	0.2259[c]	0.2880[c]	0.2941[c]	0.2592[c]	0.3065[c]	0.2472[c]
	(19.32)	(11.96)	(18.87)	(51.83)	(32.68)	(23.85)
SIZE	0.0006[c]	0.0009[c]	-0.0004	0.0010[c]	0.0013[c]	0.0017[c]
	(3.31)	(5.22)	(0.92)	(7.58)	(9.84)	(13.28)
CAPX	-0.1786[c]	-0.1801[c]	-0.1821[c]	-0.1941[c]	-0.1961[c]	-0.1799[c]
	(-36.11)	(-36.44)	(-36.44)	(-39.03)	(-39.50)	(-35.58)
Δ *STD*	0.0679[c]	0.0684[c]	0.0685[c]	0.0752[c]	0.0759[c]	0.0800[c]
	(18.16)	(18.31)	(18.33)	(20.05)	(20.26)	(21.57)
INVPRT		0.0029[c]	0.0014[c]		0.0031[c]	0.0009[a]
		(10.83)	(2.86)		(11.95)	(1.80)
$CF \times FC$	-0.0087[c]	-0.0105[c]	-0.0114[c]	-0.0385[c]	-0.0387[c]	-0.0345[c]
	(-3.81)	(-4.61)	(-4.91)	(-31.15)	(-31.44)	(-26.67)
$Q \times FC$			-0.0074[c]			-0.0025[c]
			(2.96)			(-21.59)
$CF \times INVPRT$		-0.0175[c]	-0.0184[c]		-0.0150[c]	-0.0134[c]
		(-5.86)	(-6.08)		(-5.16)	(-4.49)
$Q \times INVPRT$			0.0011[c]			0.0017[c]
			(2.97)			(4.86)
Industry and year dummies included	YES	YES	YES	YES	YES	YES
Adjusted R-square	0.090	0.092	0.092	0.115	0.117	0.127
Number of observations	104,283	104,283	104,283	104,283	104,283	104,283

Table 7
Robustness checks on the role of legal protection and financial constraints on corporate cash management policies

This table presents the coefficients of the interaction terms between *CF* or *Q* and the investor protection index (*INVPRT*) and between *CF* or *Q* and *SIZE* from the change in cash holdings regressions using random-effects models. All the coefficients have been multiplied by 100. The dependent variable is Δ *Cash Holdings* and is calculated as the change in cash and equivalents divided by total assets between year *t* and *t*-1. *Q* is Tobin's *Q* and is calculated as the market value of equity plus total assets minus total equity divided by total assets. *CF* is cash flow and is calculated as income before extraordinary items plus depreciation and amortization divided by total assets. *SIZE* is the natural logarithm of total assets (in millions of US dollars). *INVPRT* is the investor protection index calculated as the principal component of the disclosure requirements, liability standard, and anti-directors rights indices from La Porta et al. (2006). *LCASHR* is the lagged cash holdings. *DEV* is a measure of financial development from La Porta et al. (2006). *RATIO* is the ratio of future investments to current investments. *LGO* (*GGO*) is the exogenous local (global) country growth opportunity measure from Bekaert et al. (2007). The *t*-statistics are reported in parentheses. The estimated standard errors have been adjusted for the error structure in heteroskedasticity and for within-period error correlations using the Huber-White estimator. [a], [b], [c] denote statistical significance at the 10, 5, and 1 percent levels, respectively.

	CF × *INVPRT*	*Q* × *INVPRT*	*CF*× *SIZE*	*Q* × *SIZE*
1. *Including LCASHR*				
	-0.0176[c]	0.0021[c]	-0.0085[c]	-0.0000
	(-7.10)	(5.96)	(-4.52)	(-0.17)
2. *Accounting for financial development (DEV)*				
	-0.0283[c]	0.0016[c]	-0.0109[c]	-0.0008[c]
	(-7.48)	(3.89)	(-4.70)	(-3.19)
3. *Replacing Q with RATIO*				
	-0.0111[c]	0.0017	-0.0001	-0.0002[c]
	(-2.78)	(0.57)	(-1.34)	(-3.52)
4. *Replacing Q* with *exogenous local growth opportunity (LGO)*				
	-0.0189[c]	0.0023[c]	-0.0094[c]	-0.0012[c]
	(-6.07)	(3.11)	(-4.00)	(-4.68)
5. *Replacing Q* with *exogenous global growth opportunity (GGO)*				
	-0.0188[c]	0.0006	-0.0085[c]	-0.0007
	(-6.03)	(0.46)	(-3.64)	(-0.89)
6. *Dropping Japan and UK*				
	-0.0199[c]	0.0019[c]	-0.0158[c]	-0.0000
	(-5.80)	(5.64)	(-5.58)	(-0.20)