

Financial Liberalization, Investor Protection and Corporate Cash

Yenn-Ru Chen*, Robin K. Chou, Johnny Chou,

College of Commerce
National Chengchi University
Taipei, Taiwan

August 2019

ABSTRACT

We examine the impact of financial liberalization on corporate cash holdings and the value of cash holdings. We find that corporate cash holdings decrease significantly with the level of liberalization, and the market value of cash holdings is lower for firms in countries with higher level of financial liberalization. These effects are more significant in countries with better investor protection legal system. The impact of financial liberalization on corporate cash policy is robust to alternative measures of financial liberalization, to alternative measure of investor protection and to firms' financial constraint. Using the level of financial liberalization as an exogenous macro shock, we examine the motives of cash holdings from the perspectives of both capital demands and supplies.

Keywords: Financial Liberalization; Cash Holdings; Value of Cash Holdings; Investor Protection; Financial Constraint

JEL: G15, G32, G38

* Corresponding author: yrchen@nccu.edu.tw

1. Introduction

Firms accumulate cash assets to avoid investment distortion due to financial insufficiency. Firms with large cash holdings tend to accumulate cash from their own internal operations for mainly transaction motives (Opler, Pinkowitz, Stulz, and Williamson (1999), Almeida, Campello, and Weisbach (2004)) and to save the net proceeds from equity issuances for mainly precautionary motives (Kim and Weisbach (2008), McLean (2011)). This behavior of accumulating cash from internal operations (cash flow sensitivity of cash) is consistently observed across countries (Khurana, Martin, and Pereira (2006), Kusunadi and Wei (2011)). However, there is relatively little evidence on whether the accumulation of cash from external markets is also observed. Given that equity financing plays an important role in corporate cash holdings and cash savings behavior in the United States, we argue that firms' capability to access external markets would affect their cash policies in an international market setting, based on the precautionary motive of cash holdings.

In this study, we utilize an exogenous macro shock, the level of financial liberalization, to examine the motives of corporate cash holdings for firms in different countries. Financial liberalization refers to the opening of the market to foreign capital and is usually proxied by events such as the relaxation of government decrees and the introduction of depositary receipts and country funds (Obstfeld (1994), Bekaert and Harvey (2000), Bae, Bailey, and Mao (2006), Christoffersen, Chung, and Errunza (2006)). Kaya, Lyubimov, and Miletkov (2012) show that countries in need of financial aid are more likely to liberalize their financial markets for international investors, highlighting the importance of market openness in countries with scarce capital. Financial liberalization could affect corporate cash holdings by altering firms' motives for holding cash assets.

Financial liberalization could improve the level of financial liberalization improves firms' access to external finance for investment opportunities, for three reasons. First, global participation in local financial markets not only brings in more capital but also improves market transactions and liquidity, which increases the supply of funds for firms seeking external financing (Bekaert, Harvey, and Lumsdaine (2002), Errunza (2001), Levine (2001)). Second, global participation enhances the diversification effect of global portfolios, lowering the systematic risk of local markets. Consequently, firms' cost of equity in local markets is lowered (Stulz (1999), Buch, Döpke, and Pierdzioch (2005)). Third, global participation decreases the information asymmetry

in local financial markets, enhancing liquidity and investor protection and thus also lowering the cost of equity financing for local firms (Stulz (1999), Henry (2000)). With greater financial feasibility, the transaction cost motive of cash holdings would thus be lowered. We therefore predict a negative impact of financial liberalization on corporate cash holdings.

Nevertheless, the level of financial liberalization normally increases when a country is experiencing strong economic growth and firms are in need of strong financial support. The effect of financial liberalization on the stability of local economic development is likely to be ambiguous, depending on the country's institutional quality (Stiglitz (2000), Andersen and Tarp (2003), Khurana et al. (2006)). Countries with poor legal systems to protect properties and investments may not benefit from financial liberalization. Great institutional uncertainty can lead to unstable market development following financial liberalization, leading to increases in the information asymmetry of the institutional environment faced by global investors. Such market uncertainty might not allow firms to raise sufficient funds for investment with time (Khurana et al. (2006)). Therefore, the negative effect of financial liberalization on corporate cash holdings should be more observable in countries with better investor protection.

To examine the impact of financial liberalization on corporate cash holdings policy, we adopt the comprehensive *de jure* measure for financial current account and capital account openness, KAOPEN, of Chinn and Ito (2006, 2008). This measure relates to changes in laws and regulations about a country's liberalization policy. Adapting the model of Bates, Kahle, and Stulz (2009) for our international sample over the period from 1987 to 2016, we find a negative impact of financial liberalization on corporate cash holdings, as predicted. This finding indicates that the benefits of financial liberalization in enhancing access to financing lower firms' motivation to maintain high levels of cash holdings. In addition, the negative effect of financial liberalization on corporate cash holdings is only observed in firms of countries with common law system, which is considered to provide stronger legal protection to outside investors than civil law. That is, the objective of a nation's financial liberalization policy in improving firms' accessibility to capital markets can be achieved when the nation possesses better legal protection to outside investors.

To the best of our knowledge, this study is the first to link financial liberalization directly to corporate cash holding policy. Given that most studies on cash holdings examine corporate cash balances from the perspective of corporate capital spending or investor protection (Dittmar, Mahrt-

Smith, and Servaes (2003), Kusnadi and Wei (2011)), we show that the capital supply in financial markets also significantly affects firms' motives for holding cash and cash saving behavior. Related studies, such as those of Kim and Weisbach (2008) and McLean (2011), emphasize only the cash accumulation trend of U.S. firms. The level of financial liberalization not only shows a country's need for international capital to support its economic growth (Kaya et al. (2012)), but also demonstrates whether international capital is likely to participate in the country's capital market (Errunza (2001), Levine (2001), Bekaert et al. (2002)). When the supply of capital can match the demand for capital for a country's economic growth, firms' motives for cash holdings would therefore be decreased.

As the purpose of financial liberalization is to attract foreigner investors participating in local capital markets and further to support industrial development, an issue in examining the effect of financial liberalization on cash holdings is why the liberalization would lower the cash holdings when firms in these countries are in high demand of cash to support their growth. The fact of the lower level cash holdings is in relative to the size of total assets. While the cash may be built up in these firms during their growing paths, the growth of their total assets exceeds the growth of their cash holdings. The reason of smaller growth rate of cash than the growth of total assets is because these firms have better access to external financing for their investments and the needs of building cash assets would certainly be lowered.

To comprehensively understand the effect of financial liberalization on cash holdings, we also examine the impact of financial liberalization on the value of cash holdings. Adopting the model of Pinkowitz et al. (2006), we find that the value of cash holdings is lower for a higher level of liberalization. This finding is consistent with the precautionary motive. Financial liberalization increases firms' financial accessibility to the external financing cost and then further reduces the motive of holding large cash. We further look into firms under different investor protection conditions to understand whether the effect of financial liberalization would alter the motive of cash holdings under different investor protection. The empirical results consistently show the value of cash holdings reduces with the level of financial liberalization in countries with better investor protection legal system.

To ensure the empirical findings is robust, we adopt another measurement of financial liberalization, a comprehensive *de facto* measure, *TOTAL*, from Lane and Milesi-Ferretti (2007).

This measure reflects changes in actual capital flows in a given country. The empirical findings on cash holdings and the value of cash holdings remain consistent.

This paper also expands the scope of the literature on the effect of financial liberalization on individual firms. For instance, Bekaert and Harvey (2000) and Henry (2000) suggest that market openness reduces the corporate cost of capital through risk reduction in more integrated global markets. Laeven (2003) argues that financial liberalization significantly reduces financial constraints for small firms. We examine whether financial liberalization has different impacts on corporate cash holdings between financially constrained and unconstrained firms. Prior studies have shown that constrained firms have stronger incentives to accumulate cash than unconstrained firms do (Faulkender and Wang (2006)). We use firm size as a proxy for financial constraint. Because large firms, on average, can more easily access external funds before financial liberalization, greater ease of access to external funding due to liberalization will have less impact on them. Our empirical results verify this prediction.

Overall, the levels of cash holdings and the value of cash holdings decrease with the level of financial liberalization, especially in countries with better investor protection legal system. These findings show that financial liberalization, through increasing liquidity and lowering information asymmetry in the local capital markets, provides firms with better access to external financing and at lower cost. Thus, firms in highly liberalized countries have lower motives of cash holdings.

This paper proceeds as follows. Section 2 reviews the literature and develops our empirical hypotheses. Section 3 describes the sample construction process and financial liberalization measures. Section 4 presents the empirical analyses of the effects of financial liberalization on corporate cash policy, including robustness tests. Section 5 concludes the study.

2. Literatures and Hypothesis

While a country's financial liberalization decision is mainly associated with macroeconomic factors, its effect on capital market and industry development has important impacts on microeconomic entities. The level of financial liberalization affects corporate financing policy in several ways. First, it increases the capital supply in local markets. Liberalization allows foreign investors to trade in local capital markets, which increases the markets' liquidity (Errunza (2001),

Levine (2001), Bekaert et al. (2002)) and provides local corporations with better access to financing. With higher levels of liberalization, firms are more capable of accessing the capital markets for their investment needs, which would otherwise have to be met mostly by the firms themselves when the capital supply is limited. That is, financial liberalization is expected to lower the motive for cash holdings.

Second, financial liberalization lowers the cost of capital in local markets. Portfolio theory suggests that the level of financial liberalization can lower the risk of the capital market due to the diversification effect (Stulz (1999), Henry (2000), Buch et al. (2005)). The correlation between a less liberalized market and international markets is usually low, due to the different industry mix between less liberalized and more developed economies (Harvey (1995), Bekaert and Harvey (2000)). The risk-sharing effect of integrating local markets with international markets is likely to lower the local market risk premium and thus decrease the cost of capital with increases in the level of liberalization (Bekaert and Harvey (2000)). Consequently, capital investments will increase because projects originally with negative net present values could start to create value with lower costs of capital (Henry (2000)). Therefore, when the capital markets can provide firms with less costly funding for investment with higher levels of financial liberalization, the motive for cash holdings is lowered because more investments can be undertaken at a lower cost of capital (Opler et al. (1999)).

Third, liberalization can also alleviate information asymmetry. Information asymmetry is likely to be lowered due to tightened requirements on information disclosure by law or regulations in domestic markets to attract more international participation (Stulz (1999)). Some firms even choose to enhance their information quality to be higher than required for better access to external capital after liberalization (Bae et al. (2006)). An increase in analyst coverage and the scrutiny of foreign investors effectively transmit higher disclosure quality and reductions in information asymmetry, enhancing investor protection and lowering firms' costs of capital. Similar to the previous discussions, we find lower costs of capital will lead to lower motives for cash holdings (Opler et al. (1999)). Overall, when firms are more capable of obtaining external capital for their investment projects, the need to build up large amounts of cash to meet payments and investment requirements will then be lowered.

***H1:** The level of financial liberalization lowers the precautionary motive of cash holdings and therefore the market value of cash holdings.*

Nevertheless, countries' intentions to liberalize their financial markets for global participation are often accompanied by economic developments. Capital to support corporate investments is essential to growing countries. The degree of capital market openness to international investors is essential to whether the liberalizing countries can actually experience growth from their investment opportunities (Bekaert, Harvey, Lundblad, and Siegel (2007)). For international investors to participate in local markets, countries need to improve their regulations to provide greater investor protection. The uncertainty of investor protection to international investors could make them very sensitive to changes in macro factors in local markets and thus make local capital market more volatile (Stiglitz (2000), Andersen and Tarp (2003), Khurana et al. (2006)). Stiglitz (2000) argues that, if an underdeveloped financial market liberalizes prematurely, its economy could become vulnerable instead of benefiting from financial liberalization. This market uncertainty could deter firms from raising sufficient funds for investment (Khurana et al. (2006)) and then prompt firms to trade off current investments for future investments.

The negative effect of financial liberalization on the precautionary motive of cash holdings is mainly associated with the reluctance of international investors to participate in local capital markets due to concerns of a less than satisfactory regulatory and investor protection environment. Thus, when the magnitude of financial liberalization is large enough to spur market participation, the precautionary motive should be decreased. This prediction is consistent with the literature. For instance, Klein and Olivei (2001) find that financial market liberalization deepens financial markets if and only the countries are financially well developed. Stulz (2005) argues that ownership concentration limits the effect of financial globalization on market development and growth. Bekaert, Harvey, and Lundblad (2005) find that equity market openness would induce economic growth, especially in countries with high-quality institutions. Similarly, Chinn and Ito (2006) find that market openness leads to equity market development if a certain quality level of institutional environment is achieved. Therefore, if the effect of liberalization on market uncertainty is attenuated by high-quality institutions, then liberalization will have a negative impact on corporate cash holdings.

H2: The negative effects of financial liberalization on the level of corporate cash holdings as well as the value of cash holdings are more profound in countries with better legal protection to outside investors.

3. Data and Financial Liberalization Measure

3.1 Data and Sample Selection

We adapt the determinants of the cash model of Bates et al. (2009) to examine the effects of financial liberalization on cash holdings and we adapt the value of cash model of Pinkowitz et al., (2006) to investigate how the value of cash is affected by financial liberalization. This study is a firm-level analysis and the data and sample are mainly at the firm level, with the proxies of financial liberalization and investor protection measured at the country level.

The major data sources are the Compustat Global and the Compustat North American databases. The latter is included because the global database does not contain Canadian samples. The financial liberalization measures are obtained from the authors of related literature, as discussed in detail below. To construct our samples, we set several criteria. Sample firms are required to have positive assets and positive sales. Financial firms (with Standard Industrial Classification (SIC) codes 6000–6999) and utility firms (SIC codes 4900–4999) are excluded, because the investment and financing activities (which further affect cash holdings) of these firms are highly regulated. We exclude countries with fewer than five firms or fewer than 10 firm–year observations. The sample period ranges from 1988 to 2016. The full sample of the cash model includes 81,454 firm–year observations and the number of observations for the cash value model is 32,293. The distributions of the financial variables in this study are similar to those of prior studies (Dittmar et al. (2003), Huang, Elkinawy, and Jain (2013)).

3.2 Measures of Key Variables

Financial Liberalization

We measure the level of financial liberalization by a *de jure* financial liberalization index, KAOPEN, developed by Chinn and Ito (2006, 2008),² The *de jure* measure relates to change in laws and regulations in a given country. The index is available from the authors' webpages. KAOPEN is a comprehensive measure for financial current account and capital account openness. Chinn and Ito (2006, 2008) constructed the index by using the binary dummy variables that codify the tabulation of restrictions on cross-border financial transactions reported in the Annual Report on Exchange Arrangement and Exchange Restrictions (AERAER) of the IMF. Chinn and Ito (2006, 2008) reverse these binary variables that indicate the presence of multiple exchange rates (k1), restrictions of current account transactions (k2), restrictions of capital account transactions (k3), and the requirement of the surrender of export proceeds (k4). To control for capital transitions, Chinn and Ito (2006, 2008) use the share of five-year rolling average (from t-4 to t for k3) that capital controls were not in effect to construct SHAREk3. KAOPEN is the first principal component of the k1, k2, k3 and k4. The KAOPEN data is available for 52 countries up to 2015.

Investor Protection

La Porta et al. (1997, 1998) stand that legal protection of investors in a country is an important determinant of the development of its financial markets. Where laws are protective of outside investors and well enforced, investors are willing to finance firms, and financial markets are both broader and more valuable. In contrast, where laws are unprotective of investors, the development of financial markets is stunted. Moreover, systematic differences among countries in the structure of laws and their enforcement, such as the historical origin of their laws, account for the differences in financial development. Legal scholars such as David and Brierley (1985) show that commercial legal systems of most countries derive from relatively few legal families. Therefore, we separate countries into two groups, common law and civil law, as a measurement of country level investor protection.

² For details of the measurement procedure, see Chinn and Ito (2006, 2008).

4. Empirical Results

4.1 Direct impact of financial liberalization on corporate cash holdings

We adapt the cash determinant models of Bates et al. (2009) and Opler et al. (1999) to test the impact of financial liberalization on corporate cash holdings policy, as follows:

$$\begin{aligned} Cash_{i,t} = & \alpha + \beta_1 MB_{i,t} + \beta_2 Cash\ flow_{i,t} + \beta_3 NWC_{i,t} + \beta_4 Size_{i,t} + \beta_5 CapEx_{i,t} \\ & + \beta_6 Leverage_{i,t} + \beta_7 IndustrySigma_{i,t} + \beta_8 Div_{i,t+1} + \beta_9 RD_{i,t} \\ & + \beta_{10} Acquisition_{i,t} + \beta_{11} Liber_{i,t} + fixed\ effects + \varepsilon_{it} \end{aligned} \quad (1)$$

Following Bates et al. (2009), we use the cash-to-assets ratio rather than the cash-to-net assets ratio as the dependent variable to avoid extreme outliers, which mainly arise for firms with large portions of assets in cash. *Liber* is financial liberalization index and is used to examine the effect of financial liberalization on corporate cash holdings. To control the unobservable effects, we also include the country, industry and year fixed effects to the regression.

MB is the book value of assets minus the book value of equity plus the market value of equity, divided by assets; *Cash flows* is operating cash flows, estimated by earnings after interest, taxes, and dividends but before depreciation; *NWC* is working capital without cash; *Size* is the logarithm of book assets in 2011 dollars, in millions of units; *Leverage* is long-term debt plus debt in current liabilities to book assets; *Industry Sigma* is the mean standard deviation of cash flow over assets over 10 years for firms in the same two-digit SIC code industry; *Div* is the total payout to shareholders is the sum of common dividends and stock repurchases over assets; *CapEx* is the capital expenditures scaled by assets; *RD* is the R&D expenses scaled by assets; *Acquisition* is the acquisition expenditure scaled by assets. Detailed definitions of all the explanatory variables are given in the Appendix. We winsorize the market-to-book ratio of assets at the 99% level and the cash flow-to-assets and net working capital-to-assets ratios at the 1% level. The variable *Leverage* is restricted to between zero and one. All the other variables are winsorized at the 1% and 99% levels. Table 1 shows the summary statistics for the key variables. The distributions are similar to those in the international studies of Dittmar et al. (2003) and Huang et al. (2013), indicating that our samples share similar characteristics with those in prior studies.

Model (1) of Table 2 reports a similar cash determinant model as that of Bates et al. (2009). The positive coefficients of the market-to-book ratio, R&D expenditures and *Industry sigma* verify the precautionary motive for cash holdings. Net working capital, capital expenditures, leverage, dividend payouts, and acquisition expenses are significant and negatively related to cash holdings, as expected, because these items imply reductions in the corporate cash balance.

Results in models (2) to (4) support the first hypothesis. In model (2), we use the liberalization index to investigate the impact of financial liberalization on corporate cash holdings. The coefficient of *KAOPEN* is negative and significant (-0.018), indicating a negative impact of financial liberalization on corporate cash holdings. Given the mean value of *KAOPEN* is 0.6455, firms in country with average level of liberalization will experience a decrease of cash holdings to total assets by 0.012 ($= -0.018 \times 0.6455$), approximately. More than half of the sample firms will experience a decrease of cash holdings to total assets by 0.018 ($= -0.018 \times 1$). This finding is consistent with our prediction that a higher level of financial liberalization enhances firms' access to international capital markets that, in turn, lowers their incentive to hold large amounts of cash. The results in models (3) and (4) are similar, while both models control different fixed effects.

As we discussed in the hypothesis development, liberalization often adds uncertainty to the domestic capital market. Whether external financing is actually feasible for firms still depends on the quality of the institutional environment. The literature shows that the benefits of financial liberalization arise when a country has a high-quality institutional environment (Demirgüç-Kunt and Detragiache (1998), Bekaert et al. (2005), Chinn and Ito (2006)). We measure the quality of the institutional environment with the indicator of legal system. Countries with common law countries generally have stronger legal protections for investors than civil law (La Porta et.al, 1998), so we divide the sample into two groups: countries with common law and civil law. Table 3 presents the results. The coefficient of *KAOPEN* in model (1-1) is negative and significant (-0.019), and is significantly higher than the coefficient in model (1-2) (-0.010). This finding consistently support our prediction in the first hypothesis. Liberalization enhances firms' financial accessibility to external financing and therefore mitigates the precautionary motive of holding large cash. Nevertheless, when the agency concern is relatively higher under the weaker legal protection, foreigner investors may hesitate to participate in local capital markets making the financial accessibility unlikely. That is, a potentially higher agency problem due to lower legal

protection to investors would not be able to mitigate firms' precautionary motive of holdings large cash assets.

The results in model (2-1) and (2-2) are similar, while the industry fixed effects are dropped from the regression estimation. Interestingly, when we remove the country fixed effects from models (1-1) and (1-2), keeping only the industry and year fixed effects, the results are somehow different. The effects of country-level financial liberalization (KAOPEN) on corporate cash holdings remain negative in both of common law and civil law countries, but the coefficient of KAOPEN is more negative in civil law countries than in common law countries, in models (3-1) and (3-2). However, country-specific issues other than liberalization could also affect firms' incentive of cash holdings. For instance, international investors would hesitate to invest in these countries' capital markets or the countries could suffer from the instability in their economic development (Stiglitz, 2000; Eichengreen, Gullapalli, and Panizza, 2011). As the equation (1) does not include sufficient country-level variables, including the country fixed effects would be better to control for unspecified country issues other than financial liberalization. Therefore, we would emphasize on the results controlling with control fixed effects in making conclusion.

4.2 Direct impact of financial liberalization on the market value of corporate cash holdings

We adapt the cash determinates models of Pinkowitz et al., (2006) to examine how financial liberalization impact the market value of cash. Pinkowitz et al., (2006) construct this model to estimate the market value of cash,

$$\begin{aligned}
 V_{i,t} = & \alpha + \beta_1 E_{i,t} + \beta_2 dE_{i,t} + \beta_3 dE_{i,t+1} + \beta_4 dNA_{i,t} + \beta_5 dNA_{i,t+1} + \beta_6 RD_{i,t} + \beta_7 dRD_{i,t} \\
 & + \beta_8 dRD_{i,t+1} + \beta_9 I_{i,t} + \beta_{10} dI_{i,t} + \beta_{11} dI_{i,t+1} + \beta_{12} D_{i,t} + \beta_{13} dD_{i,t} \\
 & + \beta_{14} dD_{i,t+1} + \beta_{15} dV_{i,t+1} + \beta_{16} Cash_{i,t} + \beta_{17} Liber_{it} \\
 & + \beta_{18} Cash_{i,t} * Liber_{i,t} + fixed\ effects + \varepsilon_{it}
 \end{aligned}$$

where V denotes the total market value of the firm calculated at fiscal year-end as the sum of the market value of equity and the book values of short-term debt and long-term debt. The denominator of all variables are book value of total assets, E is earnings before extraordinary items plus interest,

deferred tax credits, and investment tax credits (after depreciation and taxes); NA is net assets (defined as total assets minus liquid assets); RD is research and development expense; I is interest expense; D is common dividends paid; $Cash$ is liquid asset holdings (cash plus marketable securities), β_{16} in this equation can be viewed as a measure of the market value shareholders place on a marginal dollar of cash. For any variable, we used X_t to represent the level of variable X in year t divided by the level of book value of total assets in year t . We use dX_t to indicate the change in the level of X from year $t-1$ to year t , divided by the book value of total assets in year t $((X_t - X_{t-1})/Assets_t)$. Similarly, dX_{t+1} indicates the change in the level of X from year t to year $t+1$, divided by the book value of assets in year t $((X_{t+1} - X_t)/Assets_t)$. We also control for year and country/industry fixed effects. Outliers in firm-year explanatory variables are all winsorized at 1% level and 99% level.

The descriptive statistics of variables are reported in Table 4. The mean value of the market-to-book ratio is 1.3736 while the median is 0.6242. Firms hold about 16% of their assets in the form of cash and marketable securities on average, with the median value to be 13%. Comparing our results with Opler et.al (1999), the mean of cash assets ratio is similar in this study; however, our median of cash assets ratio is higher. Table 4 also shows that firm's profitability has been increasing over time as the changes in earnings are slightly positive both at the mean and median. Additionally, the mean value of firms' net assets grows over time, and the standard deviation of net assets is also quite high. As earnings, firms' research and development expenditures and interest expenses increase through time. Last, dividends change relatively little through time.

The empirical results of equation (1) are reported in Table 5. Model (1) reports the market value of cash holdings, the coefficient of cash holdings ($Cash_t$) is 1.191. This indicates that, on average, the market values cash at a significant premium to its book value. The results in models (2) and (3) are the second part of findings to support our first hypothesis, in addition to the findings of Table 2. In model (2), the coefficient of $Cash$ is significant and positive (2.423) and the coefficient of $Cash*KAOPEN$ is significant and negative (-1.668), indicating that the value of cash holdings significantly decreases with the level of financial liberalization. This finding is consistent with our prediction based on the trade-off theory that higher levels of financial liberalization increases capital market integration with international capital and thus enhances firms' access to capital markets in those countries. The results in model (3), in which industry fixed effects rather than country fixed effects are controlled, remain consistent as in model (2).

Table 6 reports the effects of financial liberalization on market value of cash holdings under different legal systems. The effect of financial liberalization index between common law countries and civil law countries are significantly different. In model (1-1), the coefficient of *Cash* is positive and significant (4.653) and the coefficient of *Cash* interacted with financial liberalization (*KAOPEN*) in common law countries is negative and significant (-4.043). That is, given the mean value of *KAOPEN* to be 0.595, the average level of financial liberalization will lower the market value of cash holdings by 2.620 times cash level ($= -4.043 \times 0.595$) compared to the case of zero level of financial liberalization in common law countries, for any given level of cash holdings. In contrast, the model (1-2) shows that the market value of cash holdings is insignificantly negative (-1.444) in civil-law countries, and the average level of financial liberalization would increase the market value of cash holdings by 1.156% ($= 1.946 \times 0.595$), for a given level of cash holdings. The findings indicate that the precautionary motive of cash holdings could be reduced by the level of financial liberalization in good investor protection conditions. That is, the lower the agency problem exhibits, the lower the precautionary cash holdings are needed. The second part of Hypotheses 2 is hereby supported.

4.3 Robustness: an alternative measure of financial liberalization

The *de jure* indexes have a disadvantage: they implicitly assume that all categories of indicators are equally important and that regulations cannot be reversed once released, which is not always true. To reflect actual capital flows, we also include a *de facto* measure. Lane and Milesi-Ferretti (2007) structure a *de facto* measure, *TOTAL*, which is calculated as the sum of a country's aggregate assets and liabilities over its gross domestic product. The assets and liabilities include foreign direct investments (FDIs), equity investments, external debt, and financial derivatives. A larger score for *TOTAL* indicates a more liberalized market with a larger amount of capital with greater liquidity. We update the index using the same method of Lane and Milesi-Ferretti (2007) with IMF data. The data is available for 53 countries up to 2016. The *Liber* variable in equations (1) and (2) are replaced with *TOTAL* and empirical analyses as in Tables 2, 3, 5, and 6 are then performed and reported in panels A to D of Table 7.

Panels A and B are the results of equation (1) with different liberalization measurement *TOTAL*. The coefficients of *TOTAL* in Panel A are positive and significant in models with country fixed

effects, but negative and significant in model without country fixed effects. This finding is not consistent with the prediction based on the precautionary motive. When we further look into Panel B, we realize that effects of financial liberalization in providing financing accessibility via lower financing cost and thus lowering the incentive of holding large assets are only observable in common law countries that are more likely to provide legal protection to outside investors. This finding is consistent with the results in Tables 2 and 3 that financial liberalization can lower the precautionary motive of cash holdings, mainly when the quality of institution environment is high because foreign investors would be cautious in participating international capital markets.

Results in Panels C and D also verify the findings in Tables 5 and 6. The coefficients of Cash interacted with TOTAL in Panel C are negative and significant, showing a negative impact of financial liberalization on the value of cash holdings. This finding is consistent with our prediction based on the trade-off theory (in particular precautionary motive) that higher levels of financial liberalization increases capital market integration with international capital and thus enhances firms' access to capital markets in those countries. The results in Panel D show that the negative coefficients of Cash interacted with TOTAL are significantly higher in common law countries than in civil law countries. This finding verifies that better investor protection lowers the precautionary motive and transaction motive due to lower cost of equity. When the precautionary motive decreases more in better investor protection countries, the market value of cash holdings would decrease more.

4.4 Robustness: the influence of financial constraints

The cash holdings literature often considers the impacts of financial constraints and growth opportunities when examining corporate cash holdings policy (Almeida et al. (2004), Faulkender and Wang (2006), Khurana et al. (2006), Denis and Sibilkov (2010), Kusnadi and Wei (2011)), because the trade-off theory emphasizes whether firms are able to generate sufficient funds for their investments. Firms must trade off between the cost of holding idle cash assets and the cost of losing investment opportunities, or the underinvestment problem (Opler et al. (1999)). It is more difficult for financially constrained firms to raise funds from external markets than it is for unconstrained firms and, thus, financially constrained firms have stronger incentives to maintain higher levels of cash holdings to avoid underinvestment problems.

We conjecture that these problems are going to be more significant before financial liberalization or at low levels of financial liberalization, when the supply of capital is relatively limited. Financial liberalization decreases the cost of external financing for constrained firms, enhances their financing capability for future growth, and thus lowers their incentives for excess cash holdings. On the contrary, unconstrained firms have better access to external financing, so the effect of an increased capital supply and decreased cost of capital due to financial liberalization will have a smaller impact on them. Overall, the degree of financial liberalization will have a more significant impact on the cash policy of constrained firms than on that of unconstrained firms.

After showing how financial liberalization affects cash holdings, we further test whether liberalization has different impacts on cash holdings for financially constrained and unconstrained firms. Financially constrained firms tend to hold large amounts of cash to avoid the underinvestment problem, but unconstrained firms do not. Better access to external financing with a higher level of financial liberalization is expected to benefit constrained firms more than unconstrained firms. Following the literature, we use firm size (Faulkender and Wang (2006)) as a proxy for financial constraints. Larger firms usually have better access to the capital markets than small firms do. We rank firms by sales each year from 1988 to 2015. Firms with sales in the lowest (highest) 30% of the annual sales distribution are classified as small (large) firms in a given year.

Table 8 reports the results. The negative effect of financial liberalization on cash holdings is stronger for small firms than for large firms for all liberalization measures. This finding is consistent with our prediction that smaller firms with greater financial constraints tend to decrease more of their cash holdings. Take the results in columns (1) and (2), with the *de facto* liberalization index, as examples. The coefficients of *TOTAL* liberalization are significantly negative, indicating that both small and large firms tend to hold less cash after financial liberalization. The negative coefficient is greater for small firms (-0.056) than for large firms (-0.0280). Large firms have better access to financing for their investments, either internally or externally, even when the level of financial liberalization is low. Small firms have stronger incentives to build up cash holdings when the level of financial liberalization is low because, otherwise, they might have to give up growth if investment opportunities arise. That is, the cost of holding idle cash assets is lower than the cost of losing investment opportunities for financially constrained firms. When capital control is relaxed due to increased financial liberalization, the improved capital supply and lowered

financing costs have a greater impact on the cash holding policies of small firms, because the cost of losing investment opportunities (underinvestment) would be greatly lowered, rendering large cash holdings unnecessary. The results are consistent across different *de jure* liberalization measures, as seen in columns (3) to (8). These findings are similar to those of Laeven (2003), in that financial liberalization relaxes the financial constraints of small firms more significantly than those of large firms.

Although small firms will benefit more from financial liberalization than large firms, small firms normally have greater information asymmetry and risk and are less capable of protecting themselves against adverse shocks than large firms are. Thus, generally, small firms have a higher precautionary motive for cash holdings in addition to the transaction motive than large firms do. Although large firms, with lower information asymmetry, could be more attractive to international investors, small firms with strong financial needs are still able to attract international investors by improving their information disclosure (Stulz (1999)) or through private external financing channels. That is, as the level of financial liberalization increases, firms with greater capital demand are more likely to obtain the capital than those with a lower external capital demand.

4.5 Robustness: the alternative measure of investor protection, corporate governance score

Investors have long recognized that environmental, social and governance (ESG) factors are important measures of a company's valuation, risk management and even regulatory compliance. Thomson Reuters Datastream constructed a new database related to ESG and scores were designed to transparently and objectively measure a company's relative ESG performance across ten themes (emissions, environmental product innovation, human rights, shareholders, etc.) based on company reported data. The ESG Score can be divided to environmental, social and corporate governance score.

The corporate governance score has five categories: board structure, board function, compensation policy, shareholder rights, vision and strategy, each category has 8, 9, 6, 5, 5 indicators in scoring respectively. The corporate governance score range from 0 to 1, available for 42 countries and 1307 companies and contains 3,862 firm-level sample from 2002 to 2016.

Table 9 reports the impact of firm-level investor protection on value of cash holdings. We define that an investor protection is considered as poor (good) investor protection if its corporate governance score is in the lowest (highest) 30% of annual corporate governance score distribution. We interact the financial liberalization index with corporate governance score to examine whether firm-level investor protection can still decrease the precautionary motive. The coefficients of the interactive term are only significant and negative for the firms with higher corporate governance score. That is, in firms with better corporate governance, it is less likely to expropriate investors' interests. Foreign investors are more willing to participate in local capital market on the better-governed firms. The results of Table 9 are consistent with our hypothesis.

4.6 Additional robustness tests

We now perform a few additional robustness tests, including different identifications of equity issuances and debt issuances, a different identification for liberalization, and an additional control for country effects. Because the results are similar, they are not tabulated here to save space.

Different identification of cash policy

Because the effect of financial liberalization on cash holdings is developed based on the equity market's integration with international equity markets, we distinguish the impact of financial liberalization on cash accumulations from equity and from other sources as robustness checks. We adapt McLean's (2011) cash accumulation model to test how the level of financial liberalization affects firms' cash accumulation behaviors.

Funds from external financing (equity issuances and debt issuances) are greater than those from internal financing (cash flows), consistent with McLean (2011). The results show that the coefficient (saving rate) of equity issuances is larger than for other sources, verifying the importance of equity issuance in cash accumulation. We find that the level of financial liberalization lowers annual cash accumulations, a result that is robust for all liberalization measures. The results show that financial liberalization lowers firms' motive of building up cash assets, because the level of financial liberalization decreases the cost of capital through the market's integration with international investors. The negative effects of liberalization on cash holdings and on annual cash accumulations suggest that capital spending also increases with

financial liberalization. This implication is consistent with the fact that financial liberalization generally occurs in growing economies with greater capital spending.

Different sample set

This new sample excludes U.S. firms due to the dominating U.S. sample size. Canada is hence the country with the largest number of firm–year observations. When we drop Canadian firms from the analyses, our empirical results remain consistent.

Different identification of liberalization

We exclude observations in countries liberalized before 1987 and then group the sample based on before and after market openness. We then rerun the empirical analyses. The findings are mainly consistent for the group of countries that had already opened their equity markets to international investors.

5. Conclusions

Based on the precautionary motive of cash holdings, we examine whether financial liberalization has a significant impact on corporate cash holdings. Opler et al. (1999) argues that the transaction and precautionary motives dominate the pecking order and agency theories in explaining corporate cash holdings. Bates et al. (2008) and McLean (2011) also verify the important effects of the precautionary motives beyond those of the agency motive for corporate cash holding decisions. We find that financial liberalization reduces firms' cash holdings, because it improves firms' access to external financing and thus reduces their concerns of underinvestment. This finding is especially true in common countries countries because they are in a better position to attract foreign investors via financial liberalization and thus lower firms' cost of external financing and thus their incentive of holding large cash. When the motivation of holding large cash is reduced, then the value of cash holdings would then be lowered as well.

Being the first study linking financial liberalization with corporate cash policy, this study not only contributes to the cash holding literature by using an exogenous shock to examine corporate cash policy, but also contributes to international studies with firm-level analyses to verify the implications of financial liberalization on capital markets. Countries open up their markets to international investors to support their economic growth (Kaya et al. (2012)). Financial

liberalization is therefore a good proxy for the potential capital supply to firms that need external financing to grow. When access to international capital increases, the cost of external financing decreases and the cost of underinvestment then decreases, which, in turn, decreases cash holdings. When the quality of country institutions is good enough to ensure the participation of international investors in domestic markets, the uncertainty of the capital supply in capital markets will be reduced, further lowering the precautionary motive for cash holdings.

Although the benefits of financial liberalization vary across countries (Andersen and Tarp (2003), Stulz (2005), Klein and Olivei (2008)), the overall empirical findings are consistent with the findings in the literature, in that market openness through financial liberalization is likely to enhance financial market development, which, in turn, supports the growth of firms in countries with a high level of financial liberalization.

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Appendix: Variable Definitions

Variable	Description	Definition
<i>MB</i>	Market-to-book ratio	The book value of assets minus the book value of equity plus the market value of equity, divided by the book value of total assets.
<i>Cashflows</i>	Operating cash flows	Earnings after interest, taxes, and dividends but before depreciation, divided by the book value of total assets.
<i>NWC</i>	Net working capital	The ratio of working capital net of cash to the book value of total assets.
<i>Size</i>	Firm size	The logarithm of book assets in 2011 dollars.
<i>CapEx</i>	Capital expenditure	The ratio of capital expenditures to the book value of total assets.
<i>Leverage</i>	Book leverage	Long-term debt plus debt in current liabilities, divided by the book value of total assets.
<i>IndustrySigma</i>	Industry cash flow risk	The mean standard deviation of the ratio of cash flow over total assets over 10 years for firms in the same two-digit SIC code industry.
<i>Div</i>	Dividend dummy	A dummy variable equal to 1 in the year when a firm pays a common dividend and 0 otherwise.
<i>RD</i>	R&D expenses	The ratio of R&D expenses to sales, a proxy for growth opportunities.
<i>Acquisition</i>	Acquisition expenses	Acquisition expenses scaled by the book value of total assets.

Table 1 Descriptive Statistics of Variables for the Cash Model

This table reports summary statistics of the key variables. The variable *Cash* is cash and marketable securities; *MB* is the book value of assets minus the book value of equity plus the market value of equity, divided by assets; *Cash flows* is earnings after interest, taxes, and dividends but before depreciation; *NWC* is working capital without cash; *Real size* is the logarithm of book assets in 2011 dollars, in millions of units; *Leverage* is long-term debt plus debt in current liabilities to book assets; *Industry sigma* is the mean standard deviation of cash flow over assets over 10 years for firms in the same two-digit SIC code industry; *Div* is the sum of common dividends and stock repurchases over assets; net equity issuance is equity sales minus equity purchases; and net debt issuance is debt issuance minus debt retirement. The other variables displayed include measures of capital expenditures, R&D, and acquisitions. The variable *KAOPEN* is a component score of current account restrictions, export proceed surrender requirements, the presence of multiple exchange rates, and *SHARE*, which is the rolling average of scores of AREAER table indicators converted to zero to one over windows from year t to year $t - 4$.

	N	Mean	Std	P25	Median	P75
<i>Cash</i>	95023	0.1623	0.1408	0.0598	0.1240	0.2234
<i>MB</i>	95023	1.9466	3.2237	0.9061	1.1767	1.8086
<i>Cashflow</i>	95023	0.0554	0.0583	0.0272	0.0531	0.0831
<i>NWC</i>	95023	0.0284	0.1659	-0.0701	0.0292	0.1311
<i>Size</i>	95023	8.6526	2.5362	6.8777	8.5522	10.4160
<i>CapEx</i>	95023	0.0512	0.0507	0.0158	0.0357	0.0686
<i>Leverage</i>	95023	0.2064	0.1668	0.0580	0.1847	0.3200
<i>IndustrySigma</i>	95023	0.0348	0.0224	0.0224	0.0300	0.0409
<i>Div.</i>	95023	0.8657	0.3410	1.0000	1.0000	1.0000
<i>R&D</i>	95023	0.0104	0.0214	0.0000	0.0000	0.0089
<i>Acquisition</i>	95023	0.0048	0.0200	0.0000	0.0000	0.0000
<i>Liber-KAOPEN</i>	81454	0.6455	0.3849	0.2115	1.0000	1.0000

Table 2 Effect of Financial Liberalization on Corporate Cash Holdings

This table reports the effects of financial liberalization on corporate cash holdings. The dependent variable in all regressions is the ratio of cash to assets, which is calculated as cash and marketable securities divided by the book value of assets. The denominator of the following variables is the value of total assets, except for *RD*, which is scaled by sales. The variable *Cash* is cash and marketable securities, *MB* is the book value of debt plus the market value of equity over assets, *Cash flows* is operating cash flows, *NWC* is working capital without cash, *size* is the logarithm of book assets in 2011 dollars, *Leverage* is long-term debt plus debt in current liabilities over assets, *IndustrySigma* is the mean of the standard deviations of cash flows over assets over 10 years for firms in the same two-digit SIC code industry, *Div* is one if the firm paid dividends and zero otherwise, net equity issuance is equity sales minus equity purchases, and net debt issuance is debt issuance minus debt retirement. The other variables include measures of capital expenditures, R&D, and acquisitions. The liberalization variable *KAOPEN* is a component score of current account restrictions, export proceeds subject to surrender requirements, the presence of multiple exchange rates, and *SHARE*, which is the rolling average of the scores of AREAER table indicators converted to zero through one over windows from year *t* to year *t* - 4. All liberalization indexes range from zero to one. The standard errors are clustered at year, industry and firm levels.

	(1)	(2)	(3)	(4)
<i>Intercept</i>	0.261*** (16.01)	0.264*** (42.33)	0.280*** (54.09)	0.252*** (56.02)
<i>MB</i>	0.002*** (10.46)	0.002*** (10.87)	0.002*** (12.98)	0.003*** (15.82)
<i>Cashflow</i>	-0.030*** (-3.02)	-0.046*** (-4.25)	-0.021** (-1.97)	-0.090*** (-8.57)
<i>NWC</i>	-0.187*** (-61.18)	-0.175*** (-53.55)	-0.178*** (-57.62)	-0.185*** (-58.27)
<i>Size</i>	-0.009*** (-32.10)	-0.008*** (-28.11)	-0.011*** (-37.30)	-0.000 (-0.64)
<i>CapEx</i>	-0.243*** (-28.63)	-0.219*** (-24.64)	-0.254*** (-28.37)	-0.236*** (-26.35)
<i>Leverage</i>	-0.331*** (-113.95)	-0.326*** (-105.05)	-0.338*** (-110.43)	-0.344*** (-114.87)
<i>IndustrySigma</i>	0.430*** (15.95)	0.446*** (15.01)	0.581*** (20.41)	0.334*** (11.49)
<i>Div</i>	-0.004** (-2.41)	-0.006*** (-3.25)	-0.007*** (-3.65)	-0.026*** (-16.69)
<i>R&D</i>	0.681*** (25.28)	0.664*** (22.67)	0.755*** (29.34)	0.610*** (21.01)
<i>Acquisition</i>	-0.337*** (-18.58)	-0.318*** (-16.78)	-0.238*** (-13.02)	-0.543*** (-28.90)
<i>Liber-KAOPEN</i>		-0.018** (-2.46)	-0.018** (-2.55)	-0.008*** (-6.00)
Fixed Country	Yes	Yes	Yes	No
Fixed Industry	Yes	Yes	No	Yes
Fixed Year	Yes	Yes	Yes	Yes
N of observations	94969	81454	81454	81454
Adj. R-sq.	0.3476	0.3352	0.3086	0.3006
# of Countries	98	52	52	52

The superscripts ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 3 The Impact of Legal Protection on the Effect of Financial Liberalization

This table reports the impact of legal protection on the effects of financial liberalization on corporate cash holdings. The definitions of all the variables are the same as in Table 2. Standard errors are clustered by firm and year. The standard errors are clustered at year, industry and firm levels.

	(1-1) Common	(1-2) Civil	(2-1) Common	(2-2) Civil	(3-1) Common	(3-2) Civil
<i>Intercept</i>	0.235*** (24.92)	0.363*** (24.37)	0.229*** (31.52)	0.390*** (25.61)	0.257*** (31.45)	0.266*** (33.34)
<i>MB</i>	0.006*** (10.93)	0.000 (1.08)	0.006*** (11.59)	0.001*** (3.43)	0.006*** (11.43)	0.001*** (4.34)
<i>Cashflow</i>	-0.134*** (-8.60)	-0.018 (-0.96)	-0.120*** (-8.13)	0.037** (2.02)	-0.141*** (-9.14)	-0.072*** (-3.92)
<i>NWC</i>	-0.183*** (-34.37)	-0.219*** (-42.50)	-0.180*** (-36.69)	-0.233*** (-47.54)	-0.181*** (-34.37)	-0.222*** (-42.77)
<i>Size</i>	-0.005*** (-8.94)	-0.012*** (-29.31)	-0.005*** (-10.43)	-0.015*** (-39.00)	-0.003*** (-6.55)	-0.003*** (-11.81)
<i>CapEx</i>	-0.200*** (-15.54)	-0.380*** (-22.51)	-0.199*** (-15.61)	-0.480*** (-27.31)	-0.199*** (-15.53)	-0.416*** (-24.26)
<i>Leverage</i>	-0.287*** (-53.82)	-0.338*** (-77.87)	-0.290*** (-56.70)	-0.357*** (-82.57)	-0.292*** (-55.74)	-0.346*** (-78.78)
<i>IndustrySigma</i>	0.418*** (11.40)	0.609*** (9.64)	0.484*** (13.75)	1.025*** (16.14)	0.427*** (11.63)	0.578*** (9.24)
<i>Div</i>	-0.012*** (-3.18)	-0.013*** (-3.45)	-0.016*** (-4.07)	-0.015*** (-3.84)	-0.021*** (-5.48)	-0.002 (-0.50)
<i>R&D</i>	1.053*** (16.65)	0.632*** (17.75)	1.102*** (18.76)	0.675*** (23.20)	0.885*** (14.17)	0.538*** (14.94)
<i>Acquisition</i>	-0.299*** (-12.76)	-0.328*** (-9.15)	-0.265*** (-11.61)	-0.257*** (-7.42)	-0.395*** (-16.90)	-0.759*** (-21.10)
<i>Liber-KAOPEN</i>	-0.019** (-2.12)	-0.010 (-0.60)	-0.019** (-2.08)	-0.004 (-0.27)	-0.004* (-1.74)	-0.023*** (-7.43)
Fixed Country	Yes	Yes	Yes	Yes	No	No
Fixed Industry	Yes	Yes	No	No	Yes	Yes
Fixed Year	Yes	Yes	Yes	Yes	Yes	Yes
N	28950	36932	28950	36932	28950	36932
Adj. R-sq.	0.3329	0.3876	0.3183	0.3384	0.3016	0.3595

The superscripts ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 4 Descriptive Statistics of Variables for the Cash Value Model

V denotes the total market value of the firm calculated at fiscal year-end as the sum of the market value of equity and the book values of short-term debt and long-term debt. The denominator of all variables are book value of total assets, E is earnings before extraordinary items plus interest, deferred tax credits, and investment tax credits (after depreciation and taxes); NA is net assets (defined as total assets minus liquid assets); RD is research and development expense; I is interest expense; D is common dividends paid; Cash is liquid asset holdings (cash plus marketable securities), β_{16} in this equation can be viewed as a measure of the market value shareholders place on a marginal dollar of cash. For any variable, we used X_t to represent the level of variable X in year t divided by the level of book value of total assets in year t. We use dX_t to indicate the change in the level of X from year t-1 to year t, divided by the book value of total assets in year t $((X_t - X_{t-1})/Assets_t)$. Similarly, dX_{t+1} indicates the change in the level of X from year t to year t+1, divided by the book value of assets in year t $((X_{t+1} - X_t)/Assets_{t+1})$. The liberalization indexes KAOPEN is a component score of current account restrictions, export proceeds surrender requirements, presence of multiple exchange rates and SHARE which is rolling average of the scores of AREAER table indicators converted to 0/1 over windows t to t-4 year.

	N	Mean	Std	P25	Median	P75
<i>V</i>	35153	1.3736	3.4880	0.3390	0.6242	1.2039
<i>dV</i>	35153	0.2239	0.9713	-0.0627	0.0429	0.2508
<i>E</i>	35153	0.0650	0.0610	0.0286	0.0557	0.0953
<i>dE</i>	35153	0.0031	0.0442	-0.0112	0.0032	0.0186
<i>dE_{t+1}</i>	35153	0.0084	0.0475	-0.0088	0.0052	0.0229
<i>dNA</i>	35153	0.0459	0.1256	-0.0203	0.0341	0.1036
<i>dNA_{t+1}</i>	35153	0.0702	0.1662	-0.0176	0.0358	0.1154
<i>RD</i>	35153	0.0096	0.0202	0.0000	0.0000	0.0097
<i>dRD_t</i>	35153	0.0009	0.0052	0.0000	0.0000	0.0001
<i>dRD_{t+1}</i>	35153	0.0014	0.0067	0.0000	0.0000	0.0004
<i>I</i>	35153	0.0097	0.0107	0.0019	0.0060	0.0139
<i>dI</i>	35153	0.0000	0.0044	-0.0012	-0.0001	0.0009
<i>dI_{t+1}</i>	35153	0.0004	0.0047	-0.0010	-0.0001	0.0010
<i>D</i>	35153	0.0179	0.0241	0.0046	0.0094	0.0215
<i>dD_t</i>	35153	0.0015	0.0094	0.0000	0.0000	0.0025
<i>dD_{t+1}</i>	35153	0.0021	0.0105	0.0000	0.0001	0.0030
<i>Cash</i>	35153	0.1571	0.1245	0.0640	0.1258	0.2172
<i>Liber-KAOPEN</i>	32293	0.5950	0.3353	0.3636	0.4444	1.0000

Table 5 Effect of Financial Liberalization on Cash Value

This table shows the results of the base model regarding the effect of financial liberalization on the market value of cash holdings. The definitions of all variables are the same as in Table 4. The standard errors are clustered at year, industry and firm levels.

	(1)	(2)	(3)
<i>Intercept</i>	-1.061*	0.634**	0.504***
	(-1.79)	(2.52)	(4.98)
E_t	2.461***	2.514***	2.223***
	(4.30)	(4.41)	(4.12)
dE_t	-0.815	-1.067*	-1.155**
	(-1.47)	(-1.95)	(-2.12)
dE_{t+1}	-0.826	-0.684	-0.998*
	(-1.35)	(-1.11)	(-1.67)
dNA_t	0.533***	0.482***	0.329*
	(3.04)	(2.79)	(1.91)
dNA_{t+1}	0.402**	0.482***	0.478***
	(2.25)	(2.64)	(2.63)
RD_t	22.194***	22.689***	22.596***
	(13.02)	(12.81)	(12.34)
dRD_t	-16.507***	-19.026***	-17.365***
	(-3.09)	(-3.48)	(-3.19)
dRD_{t+1}	12.001***	11.536***	13.261***
	(3.35)	(3.21)	(3.70)
I_t	0.789	2.146	-5.267***
	(0.36)	(1.02)	(-2.69)
dI_t	-10.911**	-9.622**	-8.591**
	(-2.54)	(-2.33)	(-2.07)
dI_{t+1}	1.771	0.805	-0.103
	(0.38)	(0.18)	(-0.02)
D_t	21.337***	20.999***	13.545***
	(12.79)	(13.04)	(10.14)
dD_t	-10.372***	-8.366***	-5.007*
	(-3.45)	(-2.98)	(-1.82)
dD_{t+1}	4.736*	7.412***	4.473*
	(1.71)	(2.78)	(1.72)
dV_t	0.717***	0.623***	0.633***
	(8.77)	(7.34)	(7.53)
$Cash_t$	1.191***	2.423***	2.315***
	(6.94)	(5.83)	(5.88)
<i>Liber-KAOPEN</i>		-0.539**	-0.429***
		(-2.20)	(-5.79)
<i>Cash*Liber-KAOPEN</i>		-1.668***	-1.445***
		(-3.44)	(-3.10)
Fixed Country	Yes	Yes	
Fixed Industry			Yes
Fixed Year	Yes	Yes	Yes
N of Observations	35153	32293	32293
Adj. R-sq.	0.1404	0.1106	0.1106
N. of Countries	94	52	52

The superscripts ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 6 The Impact of Legal Protection on the Effect of Liberalization on Cash Value

This table reports the influence of different legal protection on the effects of financial liberalization on market value of cash holdings. The definitions of all variables are the same as in Table 4. The standard errors are clustered at year, industry and firm levels.

	(1-1) Common	(1-2) Civil	(2-1) Common	(2-2) Civil
<i>Intercept</i>	0.769*** (2.71)	-0.183 (-0.40)	0.121 (0.80)	1.306*** (4.44)
E_t	0.696 (0.85)	4.333*** (4.71)	1.558* (1.92)	5.071*** (5.40)
dE_t	-1.039 (-1.32)	-2.669*** (-2.96)	-1.570** (-2.08)	-3.074*** (-3.40)
dE_{t+1}	-1.203 (-1.45)	-1.770* (-1.68)	-1.239 (-1.56)	-1.858* (-1.74)
dNA_t	0.500** (2.17)	0.878** (2.55)	0.595** (2.56)	0.551 (1.58)
dNA_{t+1}	0.760*** (2.91)	1.122*** (3.31)	0.860*** (3.30)	1.071*** (3.14)
RD_t	14.909*** (6.64)	24.145*** (10.03)	16.257*** (6.93)	27.229*** (9.87)
dRD_t	11.396 (1.24)	-21.279** (-2.27)	10.994 (1.19)	-24.902*** (-2.62)
dRD_{t+1}	14.212* (1.86)	16.579** (2.38)	13.758* (1.80)	14.625** (2.10)
I_t	-2.112 (-0.98)	7.307 (1.46)	-2.538 (-1.11)	-5.552 (-1.29)
dI_t	-6.082 (-1.22)	14.570 (1.38)	-5.682 (-1.14)	15.421 (1.44)
dI_{t+1}	-7.354 (-1.39)	28.561* (1.95)	-7.952 (-1.52)	26.102* (1.92)
D_t	21.732*** (10.22)	21.497*** (7.95)	16.748*** (9.29)	12.478*** (4.76)
dD_t	-1.368 (-0.40)	-14.191* (-1.96)	-0.244 (-0.07)	-9.568 (-1.32)
dD_{t+1}	13.507*** (4.00)	19.692** (2.41)	10.318*** (3.19)	15.697* (1.93)
dV_t	0.273** (2.45)	1.236*** (7.46)	0.285*** (2.60)	1.227*** (7.48)
<i>Cash_t</i>	4.653*** (6.20)	-1.444 (-1.46)	4.300*** (5.90)	-3.469*** (-3.47)
<i>Liber-KAOPEN</i>	0.506* (1.82)	-1.177 (-1.29)	0.100 (0.90)	-1.473*** (-5.14)
<i>Cash*Liber-KAOPEN</i>	-4.043*** (-4.71)	1.946* (1.85)	-3.268*** (-3.97)	3.667*** (3.49)
Fixed Country	Yes	Yes		
Fixed Industry			Yes	Yes
Fixed Year	Yes	Yes	Yes	Yes
N. of observations	10882	16510	10882	16510
Adj. R-sq.	0.1610	0.1309	0.1610	0.1309

The superscripts ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 7 Robustness: Alternative Liberalization Measure, TOTAL

Panels A & B in this table repeated the analysis as in Tables 2 and 3 with the replacement of liberalization measure. Panels C & D in this table repeated the analysis as in Tables 5 and 6 with the replacement of liberalization measure. TOTAL is a de facto measure to reflect actual capital flows, and is calculated as the sum of a country's aggregate assets and liabilities over its gross domestic product. The assets and liabilities include foreign direct investments (FDIs), equity investments, external debt, and financial derivatives. A larger score for TOTAL indicates a more liberalized market with a larger amount of capital with greater liquidity. We update the index using the same method of Lane and Milesi-Ferretti (2007) with IMF data. The data is available for 53 countries up to 2016. The standard errors are clustered at year, industry and firm levels.

Panel A: Effect of Financial Liberalization on Corporate Cash Holdings

	(1)	(2)	(3)	(4)
<i>Intercept</i>	0.261*** (16.01)	0.238*** (34.22)	0.253*** (41.81)	0.271*** (57.52)
<i>MB</i>	0.002*** (10.46)	0.002*** (11.16)	0.002*** (13.42)	0.002*** (14.33)
<i>Cash flow</i>	-0.030*** (-3.02)	-0.047*** (-4.49)	-0.021** (-2.00)	-0.085*** (-8.22)
<i>NWC</i>	-0.187*** (-61.18)	-0.177*** (-55.49)	-0.181*** (-59.68)	-0.190*** (-61.18)
<i>Size</i>	-0.009*** (-32.10)	-0.008*** (-29.39)	-0.011*** (-38.92)	-0.001*** (-6.10)
<i>CapEx</i>	-0.243*** (-28.63)	-0.222*** (-25.42)	-0.260*** (-29.52)	-0.254*** (-29.05)
<i>Leverage</i>	-0.331*** (-113.95)	-0.326*** (-107.74)	-0.338*** (-113.38)	-0.346*** (-118.42)
<i>IndustrySigma</i>	0.430*** (15.95)	0.441*** (15.25)	0.586*** (21.13)	0.339*** (12.11)
<i>Div</i>	-0.004** (-2.41)	-0.004** (-2.45)	-0.005*** (-2.84)	-0.023*** (-14.58)
<i>R&D</i>	0.681*** (25.28)	0.673*** (23.65)	0.760*** (30.40)	0.654*** (23.41)
<i>Acquisition</i>	-0.337*** (-18.58)	-0.319*** (-17.26)	-0.237*** (-13.27)	-0.527*** (-28.53)
<i>Liber-TOTAL</i>		0.063*** (7.90)	0.063*** (7.68)	-0.034*** (-18.35)
Fixed Country	Yes	Yes	Yes	No
Fixed Industry	Yes	Yes	No	Yes
Fixed Year	Yes	Yes	Yes	Yes
N. of observations	94969	85464	85464	85464
Adj. R-sq.	0.3476	0.3396	0.3119	0.3062
N. of countries	98	53	53	53

The superscripts ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel B: The Impact of Leal Protection on Effect of Financial Liberalization

	(1-1)	(1-2)	(2-1)	(2-2)	(3-1)	(3-2)
	Common	Civil	Common	Civil	Common	Civil
<i>Intercept</i>	0.243*** (22.32)	0.285*** (18.98)	0.239*** (25.77)	0.336*** (23.41)	0.242*** (29.51)	0.361*** (42.90)
<i>MB</i>	0.006*** (11.30)	0.000 (1.12)	0.006*** (12.02)	0.001*** (3.52)	0.006*** (11.86)	0.000* (1.94)
<i>Cash flow</i>	-0.140*** (-9.13)	-0.009 (-0.48)	-0.126*** (-8.66)	0.050*** (2.79)	-0.148*** (-9.80)	-0.029 (-1.63)
<i>NWC</i>	-0.185*** (-35.62)	-0.223*** (-44.73)	-0.181*** (-37.92)	-0.237*** (-49.88)	-0.180*** (-34.57)	-0.224*** (-44.67)
<i>Size</i>	-0.004*** (-8.91)	-0.012*** (-31.07)	-0.005*** (-10.39)	-0.016*** (-41.25)	-0.002*** (-5.35)	-0.007*** (-21.24)
<i>CapEx</i>	-0.196*** (-15.72)	-0.396*** (-24.14)	-0.198*** (-16.02)	-0.501*** (-29.26)	-0.191*** (-15.23)	-0.412*** (-25.04)
<i>Leverage</i>	-0.290*** (-56.18)	-0.339*** (-80.37)	-0.293*** (-59.15)	-0.358*** (-85.27)	-0.296*** (-58.07)	-0.343*** (-80.91)
<i>IndustrySigma</i>	0.417*** (11.58)	0.596*** (9.57)	0.484*** (14.06)	1.044*** (16.70)	0.431*** (11.97)	0.559*** (9.19)
<i>Div</i>	-0.014*** (-3.56)	-0.010*** (-2.66)	-0.017*** (-4.44)	-0.012*** (-3.02)	-0.023*** (-5.98)	-0.008** (-2.16)
<i>R&D</i>	1.038*** (16.80)	0.638*** (18.55)	1.086*** (18.92)	0.683*** (24.25)	0.840*** (13.89)	0.595*** (17.38)
<i>Acquisition</i>	-0.298*** (-13.11)	-0.317*** (-8.96)	-0.262*** (-11.81)	-0.245*** (-7.14)	-0.403*** (-17.75)	-0.583*** (-16.47)
<i>Liber-TOTAL</i>	-0.046*** (-2.64)	0.121*** (7.77)	-0.052*** (-2.96)	0.130*** (8.20)	0.004 (1.35)	-0.116*** (-23.62)
Fixed Country	Yes	Yes	Yes	Yes	No	No
Fixed Industry	Yes	Yes	No	No	Yes	Yes
Fixed Year	Yes	Yes	Yes	Yes	Yes	Yes
N. of observations	30533	39318	30533	39318	30533	39318
Adj. R-sq.	0.3336	0.3938	0.3190	0.3438	0.3025	0.3744

The superscripts ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel C: Effect of Financial Liberalization on Cash Value

	(1)	(2)	(3)
<i>Intercept</i>	-1.061*	0.436	0.302***
	(-1.79)	(1.37)	(3.02)
E_t	2.461***	2.260***	2.393***
	(4.30)	(4.07)	(4.35)
dE_t	-0.815	-0.608	-0.793
	(-1.47)	(-1.14)	(-1.42)
dE_{t+1}	-0.826	-0.653	-0.803
	(-1.35)	(-1.08)	(-1.34)
dNA_t	0.533***	0.613***	0.596***
	(3.04)	(3.46)	(3.43)
dNA_{t+1}	0.402**	0.437**	0.483***
	(2.25)	(2.45)	(2.69)
RD_t	22.194***	22.879***	22.741***
	(13.02)	(13.25)	(12.73)
dRD_t	-16.507***	-18.249***	-18.074***
	(-3.09)	(-3.41)	(-3.37)
dRD_{t+1}	12.001***	11.800***	12.588***
	(3.35)	(3.31)	(3.52)
I_t	0.789	2.315	-1.722
	(0.36)	(1.10)	(-0.89)
dI_t	-10.911**	-12.534***	-14.220***
	(-2.54)	(-2.97)	(-3.35)
dI_{t+1}	1.771	0.461	-0.116
	(0.38)	(0.10)	(-0.03)
D_t	21.337***	22.375***	17.742***
	(12.79)	(13.97)	(12.08)
dD_t	-10.372***	-8.824***	-8.563***
	(-3.45)	(-3.12)	(-2.83)
dD_{t+1}	4.736*	6.683**	3.739
	(1.71)	(2.48)	(1.37)
dV_t	0.717***	0.634***	0.687***
	(8.77)	(7.69)	(8.33)
$Cash_t$	1.191***	3.013***	2.401***
	(6.94)	(8.44)	(7.09)
<i>Liber-TOTAL</i>		0.610	-0.635***
		(1.52)	(-7.12)
<i>Cash*Liber-TOTAL</i>		-3.985***	-2.743***
		(-6.67)	(-4.99)
Fixed Country	Yes	Yes	
Fixed Industry			Yes
Fixed Year	Yes	Yes	Yes
N. of observations	35153	34496	34496
Adj. R-sq.	0.1404	0.1488	0.1488
N. of Countries	94	53	53

The superscripts ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel D: The Impact of Legal Protection on the Effect of Financial Liberalization on Cash Value

	(1-1) Common	(1-2) Civil	(2-1) Common	(2-2) Civil
<i>Intercept</i>	0.429 (1.42)	20.740*** (9.56)	0.110 (0.57)	0.909*** (5.20)
E_t	0.752 (0.95)	4.302*** (4.82)	1.559* (1.96)	4.612*** (4.67)
dE_t	-1.067 (-1.39)	-2.002** (-2.34)	-1.573** (-2.13)	-1.908** (-2.02)
dE_{t+1}	-1.009 (-1.23)	-1.441 (-1.43)	-1.079 (-1.37)	-1.220 (-1.14)
dNA_t	0.610*** (2.67)	1.132*** (3.24)	0.668*** (2.92)	0.991*** (2.79)
dNA_{t+1}	0.761*** (2.97)	0.984*** (3.05)	0.841*** (3.31)	1.119*** (3.35)
RD_t	15.460*** (6.73)	23.877*** (10.33)	16.071*** (6.82)	26.584*** (9.84)
dRD_t	8.988 (0.99)	-18.202** (-2.00)	8.653 (0.96)	-23.065** (-2.50)
dRD_{t+1}	15.072** (2.04)	14.734** (2.17)	14.607** (1.99)	14.322** (2.06)
I_t	-0.468 (-0.22)	8.436* (1.68)	-2.815 (-1.22)	0.182 (0.04)
dI_t	-7.441 (-1.52)	13.927 (1.29)	-5.827 (-1.19)	8.573 (0.77)
dI_{t+1}	-8.073 (-1.56)	31.085** (2.14)	-9.225* (-1.80)	19.779 (1.45)
D_t	22.436*** (10.81)	23.674*** (8.48)	17.270*** (9.73)	21.670*** (6.54)
dD_t	-1.343 (-0.40)	-15.285** (-2.05)	-0.403 (-0.12)	-19.831** (-2.25)
dD_{t+1}	11.803*** (3.50)	21.689*** (2.67)	8.639*** (2.66)	18.508** (2.13)
dV_t	0.265** (2.43)	1.209*** (7.72)	0.276** (2.57)	1.295*** (8.36)
$Cash_t$	6.318*** (7.89)	1.590** (2.18)	6.045*** (7.82)	-0.636 (-0.85)
<i>Liber-KAOPEN</i>	2.396*** (3.03)	-0.532 (-0.44)	0.249* (1.95)	-2.430*** (-7.41)
<i>Cash*Liber-KAOPEN</i>	-7.401*** (-7.28)	-2.895* (-1.86)	-6.574*** (-6.93)	0.589 (0.37)
Fixed Country	Yes	Yes		
Fixed Industry			Yes	Yes
Fixed Year	Yes	Yes	Yes	Yes
N. of observations	11373	18238	11373	18238
Adj. R-sq.	0.1696	0.1792	0.1696	0.1792

The superscripts ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 8 Robustness: The Impact of Financial Constraint, Size

This table reports the impact of financial constraint (firm size) on the effects of financial liberalization on the market value of cash holdings. Constrained (Unconstrained) firm is considered with small (big) firm size is in the lowest (highest) 30% of annual firm size distribution. The definitions of all variables are the same as in Appendix as well as in Table 1. The standard errors are clustered at year, industry and firm levels.

	Liberalization-TOTAL		Liberalization-KAOPEN	
	Unconstrained	Constrained	Unconstrained	Constrained
<i>Intercept</i>	1.416*	0.534	1.618**	0.392
	(1.84)	(1.14)	(2.08)	(1.20)
E_t	5.309***	-0.165	5.241***	0.206
	(4.66)	(-0.17)	(4.19)	(0.21)
dE_t	-1.530**	-0.061	-2.050***	-0.398
	(-2.50)	(-0.07)	(-3.05)	(-0.46)
dE_{t+1}	0.949	-0.964	0.669	-1.029
	(1.00)	(-0.98)	(0.65)	(-1.02)
dNA_t	0.082	0.744**	0.070	0.586*
	(0.14)	(2.40)	(0.12)	(1.96)
dNA_{t+1}	-0.242	0.819***	-0.109	0.836***
	(-0.51)	(2.61)	(-0.22)	(2.61)
RD_t	9.779***	19.763***	10.233***	17.878***
	(5.10)	(7.68)	(4.93)	(7.46)
dRD_t	-17.802**	-1.189	-20.292**	1.714
	(-2.28)	(-0.14)	(-2.57)	(0.20)
dRD_{t+1}	1.712	11.024	0.502	13.796*
	(0.32)	(1.56)	(0.09)	(1.93)
I_t	-10.851***	1.109	-10.351**	0.271
	(-2.97)	(0.34)	(-2.77)	(0.08)
dI_t	-5.036	-6.243	-5.947	-2.070
	(-0.32)	(-1.00)	(-0.37)	(-0.34)
dI_{t+1}	1.046	-3.746	-0.599	-1.546
	(0.09)	(-0.51)	(-0.05)	(-0.21)
D_t	18.914***	20.626***	18.104***	19.161***
	(4.66)	(9.06)	(4.23)	(8.25)
dD_t	-2.634	-5.716	-0.347	-5.834*
	(-0.47)	(-1.61)	(-0.06)	(-1.66)
dD_{t+1}	11.644*	7.917**	10.336*	10.234***
	(1.79)	(2.09)	(1.81)	(2.74)
dV_t	0.478	0.451***	0.434	0.438***
	(1.55)	(4.12)	(1.32)	(4.03)
$Cash_t$	-0.076	4.558***	-0.142	3.666***
	(-0.14)	(5.48)	(-0.26)	(4.93)
<i>Liber-TOTAL</i>	-0.939	-1.793*		
	(-1.06)	(-1.66)		
<i>Liber-KAOPEN</i>			-1.078	-1.049*
			(-1.30)	(-1.79)
$Cash_t * Liber$	0.196	-5.700***	0.395	-3.483***
	(0.17)	(-5.08)	(0.33)	(-3.91)
Fixed Country	Yes	Yes	Yes	Yes
Fixed Year	Yes	Yes	Yes	Yes
N. of observations	10383	10307	9690	9678
Adj. R-sq.	0.1628	0.1629	0.06776	0.1820

The superscripts ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 9 Robustness: Alternative Measure of Investor Protection, Corporate Governance

This table reports the impact of corporate governance on the effects of financial liberalization on the market value of cash holdings. The definitions of all variables are the same as in Table 4. Corporate governance score (CGS) is as score constructed by Thomson Reuters Datastream. We rescaled this index to 0-1. A firm is considered with poor corporate governance if its corporate governance score is in the lowest 30% of annual ranking and good corporate governance if it's in the highest 30% of annual ranking. The standard errors are clustered at the year, industry and firm levels.

	TOTAL		KAOPEN	
	High_CGS	LOW_CGS	High_CGS	LOW_CGS
<i>Intercept</i>	8.063*	6.172	0.767	3.547
	(1.93)	(0.81)	(0.41)	(0.46)
E_t	-0.298	12.751***	3.669*	13.838***
	(-0.12)	(2.98)	(1.85)	(3.28)
dE_t	5.058*	-1.920	3.108	-3.062
	(1.74)	(-0.56)	(1.18)	(-0.89)
dE_{t+1}	6.747**	1.942	7.126**	-0.551
	(1.98)	(0.57)	(2.30)	(-0.16)
dNA_t	-0.700	-1.872	-1.416*	-2.659
	(-0.73)	(-1.03)	(-1.68)	(-1.46)
dNA_{t+1}	0.283	-2.886**	-0.291	-2.713*
	(0.42)	(-2.05)	(-0.46)	(-1.90)
RD_t	10.217	20.421**	1.610	20.164**
	(1.47)	(2.42)	(0.30)	(2.35)
dRD_t	20.068	-108.02*	17.831	-106.92*
	(0.63)	(-1.86)	(0.71)	(-1.80)
dRD_{t+1}	24.217	73.160**	20.451	69.387**
	(0.88)	(2.44)	(0.95)	(2.27)
I_t	-15.263	-15.055	-19.309**	-22.829
	(-1.53)	(-0.69)	(-2.58)	(-1.05)
dI_t	-31.086*	53.396	-23.716	53.392
	(-1.71)	(1.28)	(-1.43)	(1.28)
dI_{t+1}	-41.299**	30.822	-34.428**	34.357
	(-2.15)	(0.60)	(-2.09)	(0.67)
D_t	18.281***	18.822**	16.811***	13.072*
	(3.13)	(2.20)	(3.16)	(1.74)
dD_t	24.761*	-4.219	21.948*	-6.498
	(1.86)	(-0.16)	(1.67)	(-0.29)
dD_{t+1}	18.892	17.336	43.748***	34.302
	(1.20)	(0.66)	(2.98)	(1.41)
dV_t	0.183	1.951***	-0.062	1.918***
	(0.64)	(4.54)	(-0.25)	(4.40)
$Cash_t$	29.933***	0.236	20.126**	-3.439
	(3.31)	(0.09)	(2.46)	(-1.12)
<i>Liber-TOTAL</i>	-14.258	2.788		
	(-1.51)	(0.71)		
<i>Liber-KAOPEN</i>			-1.766	-5.052
			(-0.24)	(-0.67)
$Cash_t * Liber$	-37.843***	-2.156	-19.421**	2.851
	(-3.41)	(-0.48)	(-2.26)	(0.78)
Fixed Country	Yes	Yes	Yes	Yes
Fixed Year	Yes	Yes	Yes	Yes
N. of observations	1175	1185	1073	1078
Adj. R-sq.	0.3627	0.2676	0.4586	0.2570
N. of Countries	32	33	30	31

The superscripts ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.