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Ying Huang
University of Memphis

Susan Elkinawy
Loyola Marymount University, susan.elkinawy@lmu.edu

Pankaj K. Jain
University of Memphis

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Investor Protection and Cash Holdings: Evidence from U.S. Cross-Listing

Ying Huang^a, Susan Elkinawy^b, Pankaj K. Jain^c: *

^a *Fogelman College of Business & Economics, The University of Memphis, Memphis, TN, USA*

^b *College of Business Administration, Loyola Marymount University, Los Angeles, CA, USA*

^c *Fogelman College of Business & Economics, The University of Memphis, Memphis, TN, USA*

Abstract

This paper examines (i) whether firms' cash holdings differ depending on the strength of investor protection, (ii) whether cross-listed firms that provide better investor protection through "bonding" hold relatively more cash than non-cross-listed firms, and (iii) whether higher cash holdings of cross-listed firms increase their profitability. We analyze 1,405 ADR firms and their corresponding matched firms from 39 different countries and document that they have significantly higher cash holdings relative to their non-cross-listed peers. Higher cash holdings of cross-listed firms are associated with higher profitability and sales growth. The increases in cash holdings after cross-listing are much higher for emerging market firms that initially score very low on home country investor protection and accounting standards.

JEL classification: G15; G32; G34

Keywords: Cross-listing; Cash holdings; Bonding hypothesis; Investor protection

* Corresponding author. Tel: +1 901 678 3810; fax: +1 901 678 0839. Address: 425 Fogelman College of Business, University of Memphis, Memphis TN 38152.

Email addresses: yhuang2@memphis.edu (Y. Huang), Susan.Elkinawy@lmu.edu (S. Elkinawy), pjain@memphis.edu (P.K. Jain).

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1. Introduction

The proverb “*Cash is King*” has attained renewed clout as corporate America's cash pile has hit its highest level in half a century. The practical importance of the level of corporate cash holdings is highlighted by its frequent appearance in the popular business press. Lahart (2011) documents in a Wall Street Journal front page article that nonfinancial companies in the U.S. held a record \$2 trillion in cash and other liquid assets in 2011, which represents 7.1% of the companies' total assets. Our analysis suggests that the proportionate cash ratio is even higher for international firms. An advantage of holding ample amounts of cash is that it enables firms to securely wade through hard economic times. Monga et al. (2011) note that non-financial firms in the S&P 500 have increased their cash holdings by 59% since the third quarter of 2008, the onset of the recent financial crisis. Cash holdings also provide a quick way to fund profitable expansion opportunities in good times without resorting to costly external financing. Thus, cash can be a desirable asset. On the negative side, Jensen (1986) posits that the deployment of cash is central to the agency conflict between managers and shareholders. Managers have strong incentives to build large piles of cash due to the relative ease with which cash can be expropriated or used for non-value-maximizing corporate activities for their own private benefit. Cash is also viewed as an idle and unproductive asset, which loses value due to inflation. Indeed an important new finding from our analysis is that inflation is an important inverse determinant of corporate cash holdings. This school of thought places cash in the category of less desirable

assets. This trade-off between the positive and negative effects of cash has important implications for the level of cash reserves that firms actually maintain.

In this study, we show that investor protection plays a significant role in a firm's decision of how much cash to hold. Consistent with agency theory explanations of cash holdings, we show that better shareholder protection, better accounting standards, and transparent stock market trading are associated with higher levels of cash holdings. Moreover, as an extension to the transaction cost model of cash determinants, we show that inflation, a determinant that has not been investigated in prior literature, is inversely related to the level of firms' cash holdings.

Enhanced shareholder protection and lower information asymmetry can tilt the balance in favor of higher cash holdings by minimizing the negative effects of holding excess cash. In contrast, liquid assets are discounted more heavily when they are held by firms in poor investor protection environments, which offer poor shareholder protection, unreliable financial reporting standards, and lack secondary market transparency. How can managers reliably commit to subject themselves to increased investor protection? A popular answer to the question is in the "bonding hypothesis" proposed by Coffee (1999, 2002) and Stulz (1999) which predicts that firms cross-listed on the U.S. stock exchange have better investor protection, higher trading transparency, greater scrutiny by outside investors, and are subject to more stringent U.S. laws, law enforcement, and accounting rules than their domestic peers in their respective home markets.¹ This hypothesis posits that managers of foreign firms cross-listed in the U.S. markets

¹ Coffee (2002) defines "Bonding" as a term of art in modern institutional law and economics. It refers to the costs or liabilities that an agent or entrepreneur will incur to assure investors that it will perform as promised, thereby enabling it to market its securities at a higher price.

are effectively restrained from expropriating minority shareholders. Recent empirical research (Frésard and Salva, 2010 and Zerni et al., 2010) shows that indeed, firms enjoy higher *valuation* of cash and other liquid assets by shareholders when they have better governance. Although cross-listed firms have greater access to external finance which might reduce their need for cash relative to non-cross-listed firms, cash holdings enable firms to more quickly exploit profitable business opportunities. This position is further supported by the pecking order theory which suggests that internal financing through retained cash is preferable to costly external financing (Myers and Majluf, 1984).

Given the prediction about the effects of bonding on mitigating agency conflicts, we hypothesize that the improved governance associated with cross-listing more than offsets the relative ease of obtaining external finance. Firms that cross-list in the U.S. markets choose to do so because they foresee potentially lucrative investment opportunities. As such cash will be put to good use in positive NPV projects and investors will be less concerned about potential misuse of cash. This increased level of investor assurance reduces the likelihood that investors will discount the cash holdings of these firms. Thus, all else equal we expect that cross-listed firms will hold more cash to take advantage of these higher valuations than those that do not cross-list in the U.S.

We focus our analysis on the period from 1992 to 2009 during which 95% of the currently cross-listed firms entered the U.S. exchanges. We test the hypothesis about the relation between a firm's cash holdings and its improved investor protection by studying the cash holdings of 1,405 ADR firms from 39 countries in our final merged sample with varying levels of shareholder protection, accounting standards, and secondary market transparency. We also

form a matched control sample of non-cross-listed domestic firms that have similar firm characteristics as the cross-listed firms. We find that the average cash holding, which is defined as cash plus equivalents divided by firm's net assets, is higher for cross-listed firms than for their matched counterparts listed only in the domestic markets. For cross-listed firms themselves, the ratio is higher after cross-listing than before. In our robustness tests, following Harford, et al. (2008) we use the ratio of cash to sales as an alternative measure of liquidity, and find that this ratio also increases with the degree of shareholder protection and cross-listing.

In our multivariate regression analysis, where we control for several other determinants of cash holdings, we find that cross-listing is associated with higher cash holdings relative to the cash holdings of matched non-cross-listed firms. Furthermore, the bonding effect of cross-listing is more pronounced for firms from emerging markets which may suffer from inferior home-country investor protection compared to that in developed markets. We observe a substantially higher increase in cash holdings of emerging market firms relative to cross-listed firms from the developed markets or matched samples of non-cross-listed home market firms. We also interact home market investor protection variable with cross-listing in the U.S. market to understand these differential impacts on cash holdings. Whereas firms from home markets with poor investor protection initially hold a lower level of cash than firms from home markets with better investor protection, firms in the former category also experience a much higher increase in the level of their cash holdings after cross-listing. Moreover, cross-listed level III ADR firms hold more cash than level I, level II or restricted ADR firms. Because level III ADRs require the strictest compliance with U.S. laws and regulations and, therefore, represent the highest level of shareholder protection and information disclosure, shareholders discount the cash holdings of

these firms less than the lower level ADR listings. The effect of level III ADR cross-listing is robust to the removal of sample firm-years that may have higher cash holdings due to the effects of new financing.

The remainder of the paper is organized as follows. Section I presents a brief literature review focusing on theories of excess cash valuation and other potential determinants of a firms' cash holding. Then we describe our data and the variables of our final sample in Section II. We discuss our analyses and empirical results in section III, and section IV concludes the paper.

2. Literature

A. Agency Theory

As agents of shareholders, corporate managers have conflicting interests with shareholders (Jensen and Meckling, 1976). Corporate managers have a strong incentive to hoard cash, either to increase private benefits or to increase their power via greater control of resources. Large cash holdings enable managers to over-invest in projects, even if some of those projects have a negative NPV, because it is in the managers' best interest to let the firm grow into a corporate empire (Jung et al., 1996). Shareholders who are concerned about managers' inclination to extract excessive private benefits of control, on the other hand, aim at lower level of cash holdings (Stulz, 1990). They prefer a pay back of the return on their investment in the form of dividends or a stock repurchase instead of leaving the cash at the managers' discretion.

Thus, a testable implication of the agency cost model on the effect of information asymmetries between shareholders and managers is that the level of cash holdings should optimally be kept low if the conflicts of interest between these two parties are high. With more severe conflicts, cash holdings will be discounted more heavily. The relation between corporate

governance and the relative valuation of firm's cash holdings in the stock market is documented by Dittmar and Mahrt-Smith (2007) who provide empirical evidence that the value of a dollar of cash is substantially less if corporate governance is poor. Pinkowitz et al. (2006), Kalcheva and Lins (2007), and Frésard and Salva (2010) show that the stock market discounts the value of cash held by poorly governed firms by 10% to 60% compared to well governed matching firms in countries with better investor protection.

Agency problems can be mitigated by aligning the interest of the managers with those of the shareholders. For example, Lang et al. (2003, 2004), Hope et al. (2007), and Bailey et al. (2006) show that high quality accounting disclosures can increase firm valuation by limiting the flexibility that the managers have for potentially abusing corporate assets. Similarly, O'Hara (1997) and Jain (2005) propose that a transparent secondary market trading environment seamlessly transfers corporate information about cash flows and order flow information to investors. Higher investor protection resulting from transparent trading can mitigate agency problems by reducing information asymmetries and increase valuations. Better audit trail with electronic trading also results in better investor protection by punishing malpractices such as insider trading and front-running. Furthermore, electronic trading offers greater liquidity at lower transaction costs to investors (Pagano and Röell, 1996 and Hendershott et al., 2011). These traits of investor protection exert substantial influence on the valuation of the firm's cash holdings. As a result, we posit that shareholder protection, accounting standards, and transparent trading are significant predictive factors in determining the level of a firm's cash holding. None of the papers cited above examine the effects of a valuation premium due to better investor protection on the actual cash holdings of the firm.

B. Bonding Hypothesis

In order to fully benefit from listing in a better investor protection environment, managers must bond with or commit themselves to the best practices in shareholder protection, high quality accounting disclosures, and transparent trading practices (Doidge et al. 2009). Bonding, defined by Coffee (1999), is that firms, through their credible and binding commitment, voluntarily subject themselves to the better investor protection environment in the U.S. to overcome the concerns of the investors when the home country regulations are weak. Coffee (1999), Stulz (1999), Doidge (2004), Reese and Weisbach (2002), and Hope et al. (2007) propose cross-listing as an effective mechanism for managers to signal their commitment to best practices in shareholder protection, accounting and disclosure standards, and transparent trading, with adverse consequences for violating their commitment. They suggest that firms cross-listed on U.S. stock exchanges have unique governance benefits relative to firms cross-listed in London (Doidge et al., 2009) and are better governed than their domestic peers because they are subject to more stringent U.S. laws and regulations designed to protect the interests of minority shareholders. For example, firms are subject to the Foreign Corrupt Practices Act, the Sarbanes Oxley Act, Securities and Exchange Commission (SEC) reporting requirements, and stricter enforcement of investor protections laws. Each of these serve to effectively limit managers' ability to manipulate reported earnings or misappropriate corporate resources for their private benefits. Additionally, firms must adhere to the disclosure requirements set out in U.S. Generally Accepted Accounting Principles (GAAP) and International Financial Reporting Standards

(IFRS²), thereby largely reducing the information asymmetry between managers and investors. The specific predictions of the bonding hypothesis according to LeL and Miller (2008) are as follows: (1) cross-listed firms are expected to have better corporate governance than non-cross-listed, (2) the improvement in corporate governance of firms from weaker shareholder protection regimes is greater than those from stronger shareholder protection regimes, and (3) the improvement in corporate governance of firms that are subject to the most stringent U.S. rules through a level 3 ADR listing is greater than those with lower levels of listing. The enforcement mechanism driving these predictions are apparent in their empirical work, which shows that poorly performing CEOs of cross-listed firms are more likely to be terminated than poorly performing non-cross-listed firms. Similarly, Khanna et al. (2004) find that cross-listing is associated with a higher level of accounting disclosure and corporate transparency. Additionally, Fernandes et al. (2010) find that the requirement to adhere to U.S securities regulations has a positive impact on shareholder valuation, particularly for firms from a weak governance home country.

Cross-listing also exposes a firm to closer scrutiny by expert analysts who can more accurately forecast the firm's future prospects according to Lang et al. (2003) who find that cross-listed firms experience greater analyst coverage and higher valuation. Frésard and Salva (2010) show that the value investors attach to excess cash holdings is substantially larger for

² U.S. Securities and Exchange Commission (SEC) has been in the process of developing and executing a Work Plan to incorporate IFRS into the U.S. financial reporting system since early 2010.

firms cross-listed in the U.S. stock market relative to their domestic peers due to stronger enforcement of U.S. legal rules and stricter disclosure requirement in the U.S. stock market.

However, none of these papers cited above focus explicitly on the level of cash holdings and the impact of the enhanced investor protection on firms' cash holdings. Our analyses extend the literature on U.S. cross-listing's effect on firms' cash holdings. We also examine the implications of higher cash holdings on firm's profitability.

C. Determinants of Cash Holdings

Kim et al. (1998) posit that firms determine the optimal level of cash and liquid assets by evaluating a tradeoff between the low return earned on cash and liquid assets compared to the benefit of minimizing costly external financing. Our study is centered on the determinants of a firm's level of cash holdings in light of agency costs and the investor protection with which the managers bond. However, to truly understand the contribution of these factors, we must control for other known determinants of cash holdings. Opler, Pinkowitz, Stulz, and Williamson (hereafter OPSW, 1999) used their transaction cost model of cash holdings for the U.S. market to identify a number of firm-level functional characteristics as important determinants of cash holdings. Specifically, cash holdings increase with cash flow volatility, the market-to-book ratio, R&D expenditure, and operational expenditure and decrease with firm size. A major difference between OPSW (1999) and our study is that OPSW's U.S. sample excludes cross-listed firms. Thus, our research complements their work by assessing the importance of cross-country differences in the quality of investor protection.

Another important consideration that has not been examined in the corporate finance literature is the degree of inflation in the economy. Economists have demonstrated that there is a

negative relation between inflation and household wealth (Taylor and Threadgold, 1979 and Davey, 2001). In addition, during inflationary periods consumers adjust expenditures downward (Ungern-Sternberg, 1981). As such, we expect that similar behavior exists among firms. In addition to the determinants identified by OPSW (1999), in our regression analysis we also control for the effect of inflation on corporate cash holdings.

D. Effects of Cross-listing and Higher Cash Holdings on a Firm's Profitability

Mikkelson and Partch (2003) assert that firms persistently hold large amounts of cash in order to support future investments and maintain good profitability. They find that large cash holdings are associated with greater investment activity. Additionally, Opler and Titman (1994) document that increased cash holdings accompanied by cross-listing in the U.S. could be based on a higher expectation of profitability. We conjecture that greater investment activities would increase the profitability of the firm and, therefore, we expect a positive relationship between cash holdings and future profitability, particularly for cross-listed firms.

E. Hypotheses

The discussion presented above leads to the following hypotheses:

Hypothesis 1: The quality of investor protection, through its role in agency cost issues, significantly affects firms' cash holdings. Specifically, cash holdings are positively related to the strength of shareholder protection, the accounting standards, and the degree of transparency in secondary market trading.

Since a firm can improve its investor protection with its decision to cross-list in U.S. markets (Doidge et al., 2004, Doidge, 2004, Hope et al., 2007), we hypothesize that cross-listed

firms have a higher level of cash holdings because such bonding mitigates the adverse selection problem for investors.

Hypothesis II: Firms can subject themselves to improved investor protection by cross-listing in developed markets such as the U.S. Thus, this bonding hypothesis extends the predictions of the first hypothesis and states that cross-listing increases cash holdings as a result of improved shareholder protection, higher accounting standards, and less information asymmetry between managers and investors.

The magnitude of the benefits of cross-listing would depend on the difference between the ending level of the investor protection and the beginning level of the investor protection for the firm. Among the various types of ADRs, Level III ADRs have the most stringent rules and requirements that the listing firm needs to adhere to. Hence, a level III ADR listing would improve the ending level of investor perception more than a level II or level I ADR listing. Consequently, firms from home markets with very poor investor protection would benefit more from cross-listing than a firm from an already advanced home market (Foerster and Karolyi, 2000, Hail and Leuz, 2006, Hail and Leuz, 2009, and Doidge et al., 2004).

Hypothesis III: The magnitude of the impact of cross-listing on cash holdings depends on the difference between the ending value and the beginning value of investor protection: (a) Since Level III ADR cross-listing offers the highest degree of investor protection, firms listing as level III ADRs are expected to hold more cash relative to other types of ADR firms. (b) The impact of cross-listing on cash holdings is greater for firms from weaker investor protection environments such as those from emerging markets than for firms from countries where investor protection is already strong.

Whereas the first three hypotheses relate to the determinants of cash holdings, our final hypothesis relates to the profitability outcomes of higher cash holdings from section D above:

Hypothesis IV: Higher cash holdings increase the firms' EBIDTA profitability and sales growth in future periods more for cross-listed firms than for non-cross-listed firms.

3. Data Sources for the Main Sample and a Matched Control Sample

The data are obtained from the following major sources: DataStream, WorldBank, J.P. Morgan, and academic articles such as La Porta, Lopez-de-Silanes, Shleifer, and Vishny (LLSV thereafter, 1997, 1998), Jain (2005) and Kaufmann, Kraay, and Mastruzzi (KKM thereafter, 2010). For our primary dependent variable, we measure cash holdings as the ratio of cash and equivalents (DataStream item 02001 which by definition represents the sum of cash and short term investments) to net assets which are computed as total assets (DataStream item 02999) minus cash and equivalents. For an alternative measure of cash holdings we divide cash and equivalents (DataStream item 02001) by sales (DataStream item 01001).

Corporate governance studies (Doidge et al., 2007, Aggarwal et al., 2009) show that country characteristics are major forces in shaping corporate governance. Thus, we examine three country-level facets of the investor protection quality, which include the level of shareholder protection, the degree of accounting disclosure, and the transparency of stock market trading. KKM (2010) provide a time series of six governance indices relating to voice and accountability, political stability and absence of violence or terrorism, government effectiveness, regulatory quality, rule of law, and control of corruption for 213 countries from 1996-2010. We construct the *shareholder protection index* as the sum of each of these country level governance

indicators over our study period.³ Next, we obtain the accounting standard ratings from LLSV (1998) as our corporate disclosure and transparency measure where the United States has a score of 71 and Sweden the highest score of 83. Other important investor protection factors include informational transparency which can be captured with efficient trading systems. We obtain the number of years of electronic trading reported by Jain (2005) who documents that electronic trading represents a more informative trading environment that helps firms reduce their cost of capital. The number of years of electronic trading is computed as the difference between the observation year and the year in which electronic trading was introduced in the firm's home market.

From DataStream, we also collect accounting and financial ratios and other control variables that explain the level of firms' cash holdings according to the transaction cost model of OPSW (1999). For example, we measure firm size as the natural log of the total assets in 2009 dollars based on CPI. Leverage is computed as a ratio of the total debt to net assets. To a certain degree leverage reflects the level of internal funds which accumulate when debt falls given the notion of the pecking order model (OPSW, 1999). Next, we create an indicator variable which is set to 1 if the firm paid out dividends in the given year. Another important determinant of observed cash holdings is the firms' operating cash flow. We follow OPSW (1999) and begin with earnings before interest and taxes, depreciation, and amortization. From this, we deduct only the cash outflows, i.e., interest, taxes, and common dividends, to arrive at firms' operating

³ In our robustness tests we use another shareholder protection index based on LLSV. Following Berkman and Nguyen (2010), we construct the *shareholder protection index* as the product of LLSV's (1997, 1998) anti-director rights index and their rule-of-law index divided by 10.

cash flow. Also following OPSW (1999) and Dittmar et al., (2003), we include R&D expenditure as a proxy for information asymmetry, which can be a measure of agency costs. It is computed as a ratio of R&D expense to sales and set to 0 in the years when the firm does not incur any R&D expenses. We control for growth prospects of the firm by including M/B ratio (market value of equity divided by book value of equity). Lastly, we measure volatility or riskiness of cash flow by computing the industry sigma defined as the average of the standard deviation of the cash flow of all firms in the given industry sector.

We obtain the types of ADR (Level 1, Level 2, Level 3, 144A, or restricted program) from the JP Morgan website (www.adr.com) on April 5, 2010. We begin constructing our sample with ADRs from countries that have LLSV's accounting standard rating available. Thus, we start with an initial sample of 1,849 ADR firms from 41 countries for our sample period of 1992 to 2009.⁴ For each of these ADR-issuing firms, we find a matching non-ADR-issuing domestic firm from the same country of origin without replacement based on three additional stock attributes: industry sector, market value, and market-to-book ratio. Following Huang and Stoll (1996), we first require the industry code to be the same for cross-listed and non-cross-listed firms and then minimize the composite matching score (CMS) as shown in equation (1):

$$CMS = \sum_{i=1}^2 [(X_i^C - X_i^D) / (X_i^C + X_i^D) / 2]^2 \quad (1)$$

⁴ In 1973, a total of 27 foreign firms were cross-listed as American Depositary Receipts (ADR) in the U.S. markets. In 1992, which is the starting point of our sample, there were 99 cross-listed ADRs and at the end of our sample period in 2009 there are 2,187 active ADRs.

where X_i represents one of the remaining two stock attributes of market value, and market-to-book ratio; the superscripts of C and D, represent the cross-listed firm and the domestic firm respectively. A total of 1,429 control firms are matched with ADR firms. We then merge the matched sample with the data from J.P Morgan and the World Bank. We winsorize the net cash ratio at its 1st and 99th percentile to mitigate the effect of any outliers. Finally, firms operating in the financial services industry such as banks, insurance and real estate firms, and utility firms are removed according to the common practice in corporate finance research. In our final sample, we are left with 1,405 ADR firms and their corresponding matched firms from 39 countries for a total of 39,766 firm-year observations.

4. Empirical Results

A. Univariate Analysis

Table 1 depicts mean, median and percentiles of key firm specific variables for our final sample. The average net cash ratio across all firms is 23%. This number is close to the range reported in the previous literature for the U.S. firms, e.g., 17% in OPSW (1999) and 22% in Dittmar and Mahrt-Smith (2007).⁵

[Insert Table 1 here]

In Figure 1, we plot the cash/net asset ratio five years prior to the year of cross-listing (gray bar) and five years after cross listing firms (black bar) for all cross-listed firms in Panel A. For comparison we also plot the ratio for matched non-cross-listed control firms. Those firms do

⁵ Larger firms hold less cash. Firms in the largest quartile of total assets hold an average of 10% of their net assets in cash in our sample.

not actually cross-list but we create hypothetical before and after periods using the cross-listing date of the corresponding ADR sample firms. As shown in the figure, cross-listed firms have substantially larger increases in cash holdings after cross-listing in the U.S. compared to the non-cross-listed firms.

[Insert Figure 1 here]

In Panels B and C of figure 1, we divide the sample into developed markets and emerging markets respectively. The cross-listed firms from the developed markets experience a similarly higher incremental change in cash holdings than that for the non-cross-listed peers. Lastly, firms from the emerging markets have higher cash holdings after cross-listing, while their non-cross-listed counterparts do not experience any change in their cash holdings.

Table 2 shows the distribution of firms by country of origin. The United Kingdom has a total of 364 firms, among which 182 are cross-listed firms included in the final sample. That is 5,120 firm-year observations. United Kingdom is followed by Japan, which has 362 total firms and 182 cross-listed firms. At the lower end of the range is Jordan with 6 firms or 57 firm-year observations. Firms from Switzerland have the highest cash holdings, while those from Portugal and Columbia have some of the lowest cash holdings. Finland scores the highest in the shareholder protection index with a score of 11.35 and is followed by the Denmark with a score of 11.04. Venezuela has the lowest shareholder protection index with a value of -5.27. In terms of accounting standards ranking, Sweden ranks at the top with a score of 83, while Indonesia ranks at the bottom with a score of 4.2.

[Insert Table 2 here]

B. Multivariate Regression Analysis

B.1 Investor Protection Variables as Determinants of Cash Holdings

We use three measures to evaluate each country's investor protection quality and its relation to the cash holdings. The first measure is the *shareholder protection index*, which is created as the summation of six country-wise governance indicators constructed by KKM (2010). Shareholder protection has a statistically significant positive coefficient of 0.035 in the first column of Table 3 where the logged net cash ratio is the dependent variable. Thus, firms operating in countries with stronger shareholder protection appear to hold more cash, consistent with the prevailing U.S evidence (Harford et al., 2008). The second measure of investor protection in our study is the quality of accounting standards in the firms' home country, as reported by LLSV (1998). The statistically significant and positive coefficient of 0.022 in column (2) suggests that the higher accounting standards, the greater the cash holding. Doidge, Karolyi and Stulz (2004) reveal that the quality of investor protection is positively associated with stock market development. Thus, we examine the effect of reduced information asymmetry due to increased disclosure and transparency achieved through fully automated stock exchange trading and electronically archived records in the firms' home market. The secondary market transparency score is based on the number of years of electronic trading computed from automation dates provided in Jain (2005). The statistically significant coefficient of 0.023 in the third column indicates that firms from countries with a longer history of automated trading and associated real time transparency and disclosures have higher cash holdings. In Column (4), we regress cash holdings on the three investor protection variables simultaneously. Accounting standards and disclosures as well as automated trading and transparency variables continue to have positive and statistically significant coefficients, consistent with empirical results of

Drobetz et al. (2010). The findings suggest that various aspects of investor protection appear to play a significant role in alleviating agency problems. With improved investor protection, firms are able to hold more cash, in line with our first alternative hypothesis.

[Insert Table 3 here]

In all of the regression results reported in Table 3, we control for firm specific determinants that are identified by OPSW (1999). Many firm-level characteristics are statistically significant and are in expected directions, consistent with prior literature. Larger firms, as well as firms with greater levels of net working capital and debt hold less cash, while firms operating in industries with more volatile cash flows and greater R&D expense hold more cash.

B.2 Cross-listing and Cash Holdings

To test our second hypothesis, we need to measure the impact of improved investor protection on cash holdings. The improvements in investor protection upon U.S. cross-listing include stronger shareholder protection, more stringent disclosure requirements, and a lower degree of information asymmetry between investors and firms' managers. We define *Cross Listing* as an indicator variable which is assigned the value of 1 for firm years after the cross-listing date and 0 before the cross-listing date. The variable is also set to zero for the matched control sample firm-years for the entire sample period. Furthermore, we use *Level III ADR* indicator to examine whether cash holdings increase more for level III ADRs relative to other types of ADRs. Our main regression analysis has the log of the net cash ratio as the dependent variable, Cross Listing and *Level III ADR* as key explanatory variables, inflation and firm level

characteristics that are identified by OPSW (1999) as control variables, and year (η) and country (ω) fixed effects as equation (2) shown below:

$$\text{LogNetCashRatio}_{i,t} = \alpha + \beta_1 \text{CrossListing}_{i,t} + \beta_2 \text{LevelIIIADR}_{i,t} + \beta_3 \text{Inflation}_t + \sum_{k=4}^{13} (\beta_k \text{ContrlVar}^k_{i,t}) + \eta + \omega + \varepsilon_{i,t} \quad (2)$$

The results of this regression are presented in Table 4. As we hypothesized, cross-listing is a significant predictor of cash holdings. For the overall sample, it is associated with 17.8% to 22.3% increase in cash holdings in different model specifications. With logged cash/net assets ratio as the dependent variable, the coefficient for the cross-listing variable is 0.178 in the single variable regression in the first column and 0.219 in OLS regressions in the second column with several control variables including firm level characteristics such as firm size, growth prospects, and industrial volatility among others. Following previous studies, we re-estimate the model using the Fama and Macbeth (1973) cross-sectional model in the third column, which yields a similar coefficient of 0.199. The Fama-MacBeth model is estimated annually to utilize all the information in the regression for each year (OPSW, 1999). In the fourth column we add year fixed effects and country fixed effects and the coefficient for cross-listing is 0.223. Thus, the results are robust to alternative model specifications and lend support to our second hypothesis where we state that by bonding with more stringent rules and laws in the U.S. market, firms are able to increase their cash holdings as their cash assets are likely to receive a higher valuation.⁶

The benefits of bonding can vary significantly across firms because the net improvement in investor protection depends on both the level of ADR listing targeted in the U.S. and the

⁶ In unreported tests we confirm this valuation rationale that the market value of our sample firms increases after cross-listing, consistent with Frésard and Salva (2010).

quality of shareholder protection available in the home markets. We first analyze these effects separately in Table 4 and then assess their joint effects in the next table. The higher the level of ADR listing, the more stringent are the listing requirements and the higher should be the gains from cross-listing. The level III ADR indicator is positive for all the regression specifications in Table 4. The magnitude of the coefficient on level III ADR is also economically and statistically significant in five out of the six models with the exception of the regression in column (2).

[Insert Table 4 here]

In the last two columns of Table 4, we divide the sample into two groups based on whether the country of origin for a given ADR is an emerging market or a developed market as the countries in these groups can represent very different home country investor protection quality. Indeed, the average shareholder protection score of emerging markets is 0.1, much below the average of 8.9 for the developed markets. Likewise, the average accounting standards rating of emerging markets is 53.5 respectively, also below the average rating of 66.3 for the developed markets. Thus, firms from emerging markets may have more to gain from a U.S. listing than firms from developed markets where investor protection is already good. The statistically significant positive coefficients for the cross-listing variable in columns (5) and (6) of Table 4 imply that firms from both emerging markets and developed markets experience an increase in cash holdings after cross-listing. The increase in cash holdings of 29.7% for emerging market firms is, however, more than 10 percentage points higher than the increase in cash holdings of 15.6% for the developed market firms. This result represents a preliminary piece of evidence supporting our third hypothesis which states that the effect of cross-listing in the U.S. on cash holdings is greater for firms from countries with poor investor protection compared to

that for firms from countries with relatively better investor protection. The signs on the coefficients for firm level characteristics are similar to those reported in the previous section. We present another test of the third hypothesis in the next section.

B.3 Interplay of Cross-listing and Home-Market Investor protection on Firms' Cash Holdings

So far we have shown that firms hold more cash when shareholders are better protected. Since firms commit themselves to a higher degree of shareholder protection by cross-listing in the U.S., their cash holdings increase after cross-listing. Emerging market firms benefit more from cross-listing relative to developed market firms. Since firms in our sample are from home markets with varying degrees of investor protection, we calibrate the degree of improvement due to cross-listing more accurately in this section.

To assess the joint effect of cross-listing and the home markets' investor protection quality, we classify the ADR issuing firms into two groups representing lower home country investor protection standards versus higher home country standards. The cutoff point for the classification is the median value of the respective investor protection variable. In other words, we form the low and high groups separately for the three investor protection variables, yielding six groups in all. Therefore, firms from countries with values less than the median values of the level of shareholder protection score, quality in accounting standards, and market transparency quality are placed in the low investor protection group and flagged with a 1 for the corresponding indicator variable. The same indicator variable is set to 0 for firms from countries with scores above the median values of the investor protection measure. Then, we interact the low investment quality indicator variable with the cross-listing variable.

In Table 5, we present the results of this analysis. The effects of low shareholder protection, low accounting standards, and low trading transparency are analyzed in three separate columns. In column (1) low shareholder protection has a statistically significant negative coefficient of -0.426, which again confirms that cash holdings are lower for firms operating in countries with a poor home market investor protection. Likewise, the statistically significant positive coefficient on level III ADRs implies that the cash holdings ratio is 23.1% higher for level III cross-listing firms. The statistically significant positive coefficient on the interactive variable implies that the increase in cash ratio upon cross-listing is 38.7% higher for cross-listed firms from low shareholder protection countries than for all other firms in the sample.⁷ Similarly, as shown in column (2), low level of accounting standards decreases the cash holdings by almost 47.9% while cross-listing increases the cash holdings ratio by 14.2% for level III listing. Here too, the coefficient on the interaction term suggests the biggest increase in cash holdings of an additional 29.9% is experienced by cross-listed firms originating in countries with low accounting standards. For the trade disclosure and transparency measure, the interactive effects are insignificant although the basic result of an increase in cash holdings ratio by 24.3% upon cross-listing can be observed in the last column.

[Insert Table 5 here]

This result that the increase in cash holdings ratio upon cross-listing is of a higher magnitude for firms originating from countries with lower shareholder protection and lower

⁷ These other firms include non-cross listed firms from all countries as well as cross-listed firms from countries where the shareholder protection score is already high.

accounting standards is in line with our third hypothesis that firms from countries with poor investor protection have more to gain from cross-listing compared to firms from home countries with relatively better investor protection.

B.4 Removing the temporary effect of new equity financing on cash holdings

So far we have shown a positive association between the magnitude of increase in the cash holdings ratio and the difference between the ending value of shareholder protection (which could be higher with level III ADRs than others) and the beginning value of shareholder protection (which could be lower for ADRs from countries with poorer scores than others). Admittedly, apart from bonding with better investor protection, some firms cross list in the U.S. market to tap the global capital markets for new financing. Intuitively, some of the increase in cash holdings following level III ADRs might be attributable to the cash generating effect of new equity offerings (IPO effect). We remove the firm-year observations of two years prior to and two years after the base year which is the year firms start their cross-listing in the U.S. market and report the results in Panel A of Table 6. The coefficient on the cross-listing variable remains significantly positive at 25.3% for the overall sample and remains significantly positive at 29.6% and 16.4% for emerging and developed markets, respectively. In particular, the incremental effect of level III ADRs on the level of cash holdings remains significant and positive after removing the five year period surrounding the IPO, during which any excess cash is likely to be utilized for capital purchases stated in the prospectus. The statistical significance level, the direction and the magnitude of the coefficients for the other variables are consistent with our previous tables.

[Insert Table 6 here]

Further, we conjecture that the IPO effect would exist only for level III ADRs and privately placed ADRs (SEC rule 144A) that actually raise cash by issuing new shares. As a result, we investigate whether there is a cross-listing effect on cash holdings for level I and level II ADRs and present the results in Panel B of Table 6. We obtain similar results as in Panel A. For results in both panel A and panel B, the cross-listing effect on emerging market firms is stronger than that of the developed markets. Thus, the conclusion that cash holdings increase with cross-listing due to the bonding effects is robust to the exclusion of IPO effects.

B. 5 Role of Inflation

We believe that the rate of inflation, although not included in previous studies of cash holdings, can be an important factor that firms might consider when deciding on the amount of cash and other equivalent idle assets they want to hold. Across all the regressions examined thus far, we explicitly include the rate of inflation and find it has a negative and statistically significant coefficient, suggesting an inverse relationship between the level of cash holdings and the rate of inflation. Nonetheless, cross-listing has an incremental impact on cash holdings over and above the effects of inflation and other control variables.

C. Cross-listing, Increased Cash holdings, and Firms' Profitability

Previous sections analyzed the determinants of cash holdings. In this section, we change the focus on to the impact of cash holdings on firm's profitability measures. Joh (2003) shows in his study of Korean firms that profitability is closely related to corporate governance. Are the increased cash holdings the channel through which better governance transforms into better profitability measures? We calibrate the joint impact of increased cash holdings and the cross-listing on firms' profitability. That is, we investigate whether firms' profits differ with the dual

effect of the level of cash that firms hold and better corporate governance that comes with cross-listing in the U.S. market. We hypothesized that higher cash holdings enable firms to readily capture rewarding business projects and increase future profitability. One important issue that applies to this analysis is the impact of profits on cash holdings in the reverse direction. When a firm retains its profits its cash holdings increase. To control for the endogenous increase in cash holdings we estimate the effect of cash holdings on the firms' performance and profitability using a two-stage least squares regression (2SLS) equation system (3) as shown below and use the fitted values cash holdings in the second stage:

Stage 1:

$$\text{LogNetCashRatio}_{i,t} = \alpha + \beta_1 \text{Inflation} + \sum_{k=2}^{10} (\beta_k \text{ContrlVar}_{i,t}^k) + \varepsilon_{i,t}$$

Stage 2:

$$\text{ProfitRatio}_{i,t} = \alpha + \beta_1 \text{CrossListed} + \beta_2 \text{PredCash} + \beta_3 \text{CL} * \text{PredCash} + \sum_{k=2}^9 (\beta_k \text{ContrlVar}_{i,t}^k) + \varepsilon_{i,t} \quad (3)$$

where $\text{CrossListed}_{i,t}$ is the indicator variable with 1 meaning cross-listed firm; $\text{PredCash}_{i,t}$ is predicted cash from stage 1 regression; $\text{CL} * \text{PredCash}_{i,t}$ is the interaction term of the cross-listing and the predicted cash holdings from first stage; Control variables as defined earlier are also included and $\varepsilon_{i,t}$ is the innovation term.

[Insert Table 7 here]

Following Joh (2003), we measure profitability using (1) the ratio of earnings before interest, taxes, and depreciation (EBITDA) to total assets and (2) the ratio of sales growth to total assets. The sales growth is defined as the change in the total sales and revenue from year t to year t-1. The results are presented in Table 7. Our key explanatory variables are the predicted cash

holdings and the interaction term of the predicted cash holdings and cross-listing indicator.

Several control variables that affect firm's profitability and performance are also included.

The coefficient on the interaction variable capturing the cash holdings held by cross-listed firms is positive suggesting that higher cash is associated with better profitability, leading to more than 10.3% increase in EBITDA and 14.0% increase in sales growth. The effect of cash holdings of non-cross-listed firms' on profitability is negative in the regression of profitability measure of EBITDA and sales growth/net assets, indicating that cash held by non-cross-listed firms does not help with growth in earnings. Hence, the evidence shows that excess cash works well only in combination with good governance resulting from cross-listing. Excess cash plays an important role in cross-listed firms' profitability after controlling for past profits, firm size, cash flow/net assets and leverage, supporting our fourth alternative hypothesis. Our profitability finding provides a direct explanation for the empirical results of Roosenboom and Dijk (2009) who document higher valuations for cross-listed firms, and we show that higher cash holdings are the conduits for generating higher profitability.

The F-test is used to examine whether the difference in the effect of cash holdings on firms' profitability between the cross-listed and non-cross-listed firms is material. The F-values of 20.99 in regression of EBITDA and 19.01 in regression of sales growth indicate that cash holdings have a favorable impact on cross-listed firms' profitability and an adverse impact on non-cross-listed firms' profitability.

D. Robustness

Since country level governance measure reported by LLSV (1997, 1998) are widely used in the literature, we use their measure as an alternative to the KKM's governance measure to

gauge the effect of shareholder protection on cash holdings. With this alternative measure, we continue to find that shareholder protection positively affects the level of cash holdings as shown in column (1) of Table 8, the same effect as KKM's governance protection index reported in Table 3 and Table 5.

Higher cash holdings are potentially more valuable for these financially constrained firms than for firms without financial constraints (Faulkender and Wang, 2006, Gamba and Triantis, 2008, and Denis and Sibilkov, 2010). Cross-listing enables foreign firms to tap the U.S. capital market and thus lowers financial constraints. Thus, we verify the robustness of our findings in sub-samples of firms from financially unconstrained countries with high sovereign credit ratings (from AAA+ to A-) and those from constrained countries with lower sovereign credit ratings (i.e., BBB+ and below) by Standard & Poor's. We report the fixed-effect multivariate regression results for these two sub-groups of firms in column (2) and column (3) of Table 8. The findings support our hypothesis that firms hold more cash after cross-listing in the U.S market irrespective of the financial constraint status in their home market. Further, in unreported regressions for a subsample of financially constrained and unconstrained firms, we repeat the same analysis as in Table 3 and 4 and the coefficients of cross-listing and type III ADR remain positive and statistically significant. Thus, financial constraints are not driving our main result of higher cash holdings for cross-listed firms.

[Insert Table 8 here]

As a further robustness check, we use the cash over total sales as an alternative cash holdings measure and repeat the regression analyses with cash/total sales ratio as the new dependent variable. We obtain similar results, although the adjusted R-Square of the regression

models predicting the cash/total sales ratio are generally lower than the corresponding regression models predicting the cash/net assets ratio. In Panel B of Table 8, we report regression results of using cash/total sales as dependent variable. We find that the coefficient on cross-listing ranges from 0.164 to 0.296 and is always statistically significant, analogous to the models presented in Table 4 which have cash/net assets as the dependent variable. These additional regression results are further evidence favoring our second and third alternative hypotheses. Likewise, in unreported regressions of cash/total sales available upon request, we also repeat the equity-raising effects analysis of Table 6. We obtain similar effects to those shown in Table 6 in that cross listing and level III ADRs coefficients are positive and statistically significant.

Given the conflicting findings in the literature about the impact of shareholder protection on the level and the valuation of cash holdings, we also test for the applicability of our finding during different time periods. Our finding related to the positive impact of shareholder protection on cash holdings applies to most of the sample period with the exception of the very early periods prior to 1998. Dittmar et al. (2003) investigated cash holdings for international firms in 1998 and found that firms from low shareholder protection countries actually held more cash than those from better shareholder protection countries. But our analysis suggests that investor sophistication has improved over the years and for all of the recent years we find that better shareholder protection positively affects cash holdings⁸. We conjecture that it could be due to the fact that investors became increasingly aware of the importance of better protection on cash

⁸ For brevity, we do not present the year by year regression results with Shareholder Protection Index used by Dittmar et al. (2003), but these results are provided upon request.

holdings after the Asian financial crisis of 1997-1998. The evidence in our study shows that investors discount a firm's excess cash holdings without the assurance that cash will be put to good use. Cross listing is one mechanism providing this assurance.

Finally, we use all the non-cross-listed firms from our sample countries, without matching them with ADRs this time, and treat them as comparison group relative to the cross-listed firms. We apply the same multivariate analyses and find similar results. Thus, the key results are robust to alternative sample formation methods and variable definitions.

5. Conclusion

Our study extends the transaction cost model of cash holdings by showing that the quality of investor protection is a statistically significant determinant of a firm's cash holdings. While larger cash holdings can also be subject to expropriation, the relatively stronger governance of cross-listed firms suggests that such negative effects are minimized. Instead, the cash is used to create shareholder value by quickly exploiting favorable investment opportunities or effectively dealing with economic downturns. Investor protection features such as strong shareholder protection, reliable accounting and corporate information disclosure standards, and transparency in stock market trading help reduce the agency cost by improving corporate governance. Lower agency costs reduce the valuation discount applicable to a firm's cash holdings. In turn, higher valuation can create incentives for a corporation to hold more cash. Our findings support this notion as cross-listed firms have statistically significant higher cash holdings than their domestic non-cross-listed peers.

Cross-listed level III ADR firms, which are required to adhere to the strictest shareholder protection regulations, hold more cash compared to level I, level II, or restricted ADRs. Our

results are consistent with a bonding hypothesis which states that by committing themselves to more stringent U.S. laws and enforcements, corporate managers can enhance shareholders' wealth. Conversely, the beginning value of investor protection varies based on the ADR's country of origin and some firms have more to gain from cross-listing than others. We observe that the impact of cross-listing on cash holdings is more pronounced for firms whose home markets have weaker shareholder protection, less stringent corporate disclosure and a more opaque stock market - further evidence supporting the bonding hypothesis. Our analysis links agency theory and the bonding hypothesis by showing that bonding with the U.S. market helps reduce agency problems.

Apart from the determinants of cash holdings, we also examine its impact on performance. We find that higher cash holdings are associated with an increase in revenues and profitability of cross-listed firms. But cross-listing related to good governance appears to be essential for higher cash holdings to work because it is advantageous only for cross-listed firms but disadvantageous for non-cross-listed firms. These conclusions apply to accounting profits measured by EBITDA as well as sales growth and are robust to different measures of cash holdings.

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Table 1
Summary Statistics of Key Variables for the 1992-2009

| Variable | Mean | 25th Percentile | Median | 75th Percentile | Firm-year Observations |
|--------------------------------|-------|--------------------|--------|--------------------|---------------------------|
| Cash/ net assets | 0.23 | 0.00 | 0.07 | 0.19 | 39,766 |
| Cash/ sales | 0.34 | 0.00 | 0.08 | 0.21 | 39,766 |
| Mark-to-book ratio | 2.32 | 0.00 | 1.00 | 2.24 | 24,888 |
| Net working capital/net assets | -0.23 | -0.86 | -0.08 | 0.04 | 39,766 |
| Log of real total asset | 14.23 | 12.46 | 14.49 | 16.11 | 30,766 |
| Total leverage | 0.20 | 0.00 | 0.15 | 0.34 | 39,766 |
| R&D/sales | 0.02 | 0.00 | 0.00 | 0.00 | 39,766 |
| Cash flow/net assets | -0.63 | -2.44 | 0.07 | 0.13 | 39,766 |
| Industry sigma | 36.61 | 0.08 | 0.16 | 0.46 | 39,766 |
| Expenditure | 0.06 | 0.05 | 0.05 | 0.05 | 39,766 |

Descriptive statistics on key firm specific variables are shown for our sample of firm years from the 1992 to 2009. Net cash ratio is the ratio of cash/net assets. Net assets are total assets minus cash holdings. We measure firm size by its natural log of assets, adjusted using the CPI to 2009 dollars. The market-to-book ratio is computed as the ratio of the market value to common equity recorded in the books, which represents common shareholders' investment in a company. Following OPSW (1999), cash flow is calculated as earnings before interest and taxes, depreciation, and amortization, less interest, taxes, and common dividends. Total leverage is the ratio of total debt to total assets. Industry sigma is the industrial average of standard deviations of cash flow over assets.

Table 2
Descriptive Statistics

| Country | No of Sample and matched firms | No of firms cross listed as ADRs | No of firm-year observati ons | Cash/Net Assets | Cash/Sale s | Shareholder protection index | Accounti ng Standards Score |
|------------------|--|--|--|--------------------|----------------|------------------------------------|--------------------------------------|
| Developed Market | | | | | | | |
| Australia | 220 | 110 | 2,843 | 0.45 | 0.21 | 9.51 | 75 |
| Austria | 30 | 15 | 444 | 0.17 | 0.25 | 9.85 | 54 |
| Belgium | 24 | 12 | 358 | 0.20 | 0.25 | 8.02 | 61 |
| Denmark | 28 | 14 | 369 | 0.31 | 0.61 | 11.04 | 62 |
| Finland | 26 | 13 | 389 | 0.14 | 0.10 | 11.35 | 77 |
| France | 138 | 69 | 1,915 | 0.27 | 0.33 | 7.27 | 69 |
| Germany | 124 | 65 | 1,782 | 0.21 | 0.23 | 9.23 | 62 |
| Greece | 20 | 7 | 321 | 0.10 | 0.13 | 4.35 | 55 |
| Hong Kong | 216 | 108 | 2,929 | 0.28 | 0.47 | 7.57 | 69 |
| Ireland | 32 | 18 | 485 | 0.54 | 0.62 | 9.24 | Na |
| Italy | 62 | 31 | 818 | 0.13 | 0.27 | 4.32 | 62 |
| Japan | 362 | 182 | 4,512 | 0.21 | 0.17 | 6.58 | 65 |
| Netherlands | 70 | 35 | 1,143 | 0.16 | 0.18 | 10.48 | 64 |
| New Zealand | 8 | 4 | 131 | 0.07 | 0.29 | 10.57 | 70 |
| Norway | 40 | 20 | 586 | 0.13 | 0.16 | 10.21 | 74 |

| | | | | | | | |
|------------------------------|-------|-------|--------|------|------|-------|------|
| Portugal | 18 | 9 | 266 | 0.06 | 0.11 | 7.00 | 36 |
| Singapore | 54 | 27 | 647 | 0.17 | 0.24 | 8.84 | 78 |
| Spain | 34 | 17 | 486 | 0.07 | 0.17 | 6.60 | 64 |
| Sweden | 47 | 24 | 840 | 0.21 | 0.43 | 10.51 | 83 |
| Switzerland | 55 | 28 | 794 | 0.58 | 0.69 | 10.49 | 68 |
| United Kingdom | 364 | 182 | 5,120 | 0.36 | 0.63 | 9.17 | 78 |
| Developed Total / Average | 1,972 | 990 | 27,178 | 0.41 | 0.28 | 8.90 | 66.3 |
| Emerging Market | | | | | | | |
| Argentina | 31 | 17 | 462 | 0.07 | 0.21 | -1.01 | 45 |
| Brazil | 201 | 100 | 3,071 | 0.10 | 0.16 | -0.01 | 54 |
| Chile | 46 | 23 | 765 | 0.07 | 0.10 | 6.75 | 52 |
| Colombia | 6 | 3 | 76 | 0.06 | 0.16 | -3.29 | Na |
| India | 60 | 30 | 1,034 | 0.23 | 0.30 | -1.34 | 57 |
| Indonesia | 26 | 13 | 342 | 0.15 | 0.30 | -4.26 | 4.2 |
| Israel | 34 | 18 | 451 | 0.30 | 0.39 | 3.52 | Na |
| Jordan | 6 | 3 | 57 | 0.10 | 0.15 | 0.03 | Na |
| Malaysia | 10 | 5 | 148 | 0.14 | 0.22 | 2.16 | 76 |
| Mexico | 125 | 63 | 1,903 | 0.10 | 0.23 | -0.58 | 60 |
| Peru | 18 | 9 | 288 | 0.09 | 0.19 | -1.97 | 38 |
| Philippines | 14 | 7 | 226 | 0.14 | 0.24 | -2.06 | 65 |
| South Africa | 116 | 58 | 1,595 | 0.12 | 0.17 | 2.18 | 70 |
| South Korea | 47 | 25 | 714 | 0.22 | 0.24 | 3.1 | 62 |
| Taiwan | 38 | 20 | 835 | 0.15 | 0.18 | 5.01 | 65 |
| Thailand | 18 | 9 | 288 | 0.12 | 0.34 | 0.31 | 64 |
| Turkey | 11 | 6 | 177 | 0.13 | 0.12 | -1.06 | 51 |
| Venezuela | 10 | 6 | 156 | 0.07 | 0.27 | -5.27 | 40 |
| Emerging Total / Average | 817 | 415 | 12,588 | 0.13 | 0.21 | 0.10 | 53.5 |
| Overall Total / Average | 2,789 | 1,405 | 39,766 | 0.23 | 0.30 | 5.98 | 62 |

This table presents the distribution of the sample used in the regression analysis by country. It describes the number of firm-year observations, number of firms, number of ADR firms, the average cash/net assets, cash/sales, the shareholder protection index, and accounting standards scores across countries. Na: not available.

Table 3. The Effect of Investor Protection on Cash Holdings in the Home Markets

| | (1) | (2) | (3) | (4) |
|-------------------------------|----------------------|----------------------|----------------------|----------------------|
| Intercept | -1.044*** (-5.53) | -2.453*** (-6.74) | -1.353*** (-6.72) | -2.096*** (-5.07) |
| Shareholder protection | 0.035*** (4.14) | | | 0.017 (1.58) |
| Accounting standards | | 0.022*** (5.70) | | 0.011** (2.38) |
| Stock market disclosure | | | 0.023*** (6.01) | 0.017*** (4.20) |
| Inflation | -0.021*** (-3.50) | -0.001*** (-6.70) | -0.001*** (-7.19) | -0.018** (-2.96) |
| Market-to-book ratio | 0.000 (0.69) | 0.001 (0.96) | 0.001 (0.94) | 0.000 (0.72) |
| Real size | -0.098*** (-7.59) | -0.100*** (-7.88) | -0.093*** (-7.49) | -0.086*** (-6.75) |
| Cash flow/net assets | -0.139* (-1.86) | -0.079 (-1.22) | -0.078 (-1.19) | -0.1462* (-1.98) |
| Networking Capital/net assets | -0.839*** (-4.67) | -0.475** (-2.38) | -0.628*** (-3.36) | -0.743*** (-3.93) |
| Total leverage | -1.06*** (-6.33) | -0.767*** (-3.86) | -0.830*** (-4.22) | -1.045*** (-6.47) |
| Industry sigma | 0.001*** (3.12) | 0.001** (2.55) | 0.001*** (3.00) | 0.001*** (3.33) |
| R&D/sales | 3.923*** (7.29) | 4.514*** (7.68) | 4.839*** (7.94) | 3.904*** (7.16) |
| Dividend dummy | 0.181** (2.93) | 0.258*** (4.01) | 0.206*** (3.03) | 0.17** (2.70) |
| Expenditure | 0.502 (1.20) | 0.686 (1.48) | 0.468 (1.08) | 0.321 (0.77) |
| Firm-year observations | 10,287 | 10,051 | 10,287 | 10,051 |
| Adjusted R-square | 0.16 | 0.15 | 0.15 | 0.16 |

Sample period is 1992-2009 and the firms included in this analysis are non-cross-listed. The dependent variable in all regressions is the natural log of ratio of cash/net assets, which is calculated as cash divided by net assets. In column (1), (2) and (3), we report the results of OLS regressions of cash holdings on the investor protection (IP) variables and the control variables.

$$\text{LogNetCashRatio}_{i,t} = a + \beta_1 IP_i + \beta_2 \text{Inflation}_i + \sum_{k=3}^{12} (\beta_k \text{ContrIVar}_{i,t}^k) + \varepsilon_{i,t}$$

The IP includes three alternative measures: (1) the shareholder protection index, (2) the accounting ratings, and (3) Secondary market transparency. The *shareholder protection index* is constructed by summing over six governance indicators reported by KKM (2010) starting from year 1996. The accounting rating on accounting standards are created based on the report of international accounting and auditing trends LLSV (1998). Secondary market transparency is measured by years of electronic trading which are updated annually and are based on start dates reported in Jain (2005). Inflation rate is obtained from World Bank. Firm size, market-to-book ratio, cash flow/net assets, and total leverage, and industry sigma are defined in Table 1. Dividend dummy is an indicator variable and set to one if firm paid a dividend in the year. For the analysis in column (4), all IP measures are included simultaneously. The t-statistics are bracketed and are computed using two-way clustered

robust standard errors computed from the variance-covariance matrix: $V_{\text{Firm\&Year}} = V_{\text{Firm}} + V_{\text{Year}} - V_{\text{White}}$ (Petersen, 2009). The ***, **, * indicate statistical significance at the 0.01, 0.05 and 0.10 level, respectively.

Table 4. Impact of Cross-listing on Firms' Cash Holding

| | (1) All | (2) All | (3) All | (4) All | (5) Emerging | (6) Developed |
|----------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Intercept | -2.283*** (-44.80) | -0.777*** (-4.30) | 0.289*** (2.90) | -1.561*** (-13.07) | -2.742*** (-15.72) | -0.340*** (-3.83) |
| Cross-listed | 0.178*** (3.55) | 0.219*** (4.96) | 0.199*** (12.76) | 0.223*** (12.28) | 0.297*** (8.64) | 0.156*** (7.31) |
| Level III ADR | | 0.111 (1.58) | 0.231*** (5.33) | 0.216*** (8.48) | 0.248*** (6.39) | 0.178*** (5.46) |
| Inflation | | -0.001*** (-6.85) | -0.034*** (-5.21) | -0.001*** (-9.47) | -0.001*** (-7.93) | -0.001 (-0.16) |
| Market-to-book ratio | | 0.001 (1.29) | 0.006 (1.61) | 0.001 (1.05) | 0.019*** (3.06) | 0.000 (0.50) |
| Firm size | | -0.115*** (-10.77) | -0.101*** (-16.38) | -0.115*** (-23.25) | -0.035*** (-3.12) | -0.120*** (-21.65) |
| Cash flow/net assets | | -0.041 (-0.71) | 0.029 (0.69) | -0.075*** (-3.36) | 0.106*** (2.92) | -0.156*** (-5.82) |
| Networking Capital/net assets | | -0.633*** (-3.68) | -0.734*** (-11.69) | -0.737*** (-12.81) | -0.042 (-0.39) | -0.911*** (-13.94) |
| Total leverage | | -0.745*** (-4.43) | -0.823*** (-5.28) | -0.772*** (-13.94) | -0.350*** (-3.42) | -0.940*** (-14.75) |
| Industry sigma | | 0.001*** (3.03) | 0.001*** (5.96) | 0.001*** (7.27) | -0.002*** (-5.56) | 0.001*** (7.86) |
| R&D/sales | | 5.005*** (9.93) | 3.496*** (4.61) | 4.457*** (22.49) | 7.858*** (11.77) | 3.677*** (17.65) |
| Dividend dummy | | 0.149** (2.65) | 0.154*** (4.26) | 0.075*** (2.98) | 0.521*** (11.72) | -0.207*** (-6.92) |
| Expenditure | | 0.902** (2.40) | 2.212*** (7.92) | 0.121 (0.73) | 1.117*** (4.44) | -0.181 (-0.91) |
| Year fixed effect | No | No | No | Yes | Yes | Yes |
| Country fixed effect | No | No | No | Yes | Yes | Yes |
| Firm-year observations | 38,149 | 26,633 | 18 | 23,777 | 7,087 | 16,646 |
| Adjusted R-square | 0.002 | 0.16 | 0.18 | 0.23 | 0.18 | 0.27 |

This table presents results of cross-sectional regression for the impact of cross-listing on firms' cash holdings using a matched control sample from 1992-2009. The dependent variable in all regressions is the natural log of ratio of cash/net assets, which is calculated as cash divided by net assets. Column (3) reports predicted values from the Fama-MacBeth regressions (1973). Column (4), (5) and (6) are fixed-effects regressions. Cross-listed is an indicator variable and set to one if firm crossly listed in U.S. Level III is an indicator variable is 1 for level III ADR and 0 for level I, level II, and restricted ADRs. Inflation rate is obtained from World Bank. Firm size, market-to-book ratio, cash flow/net assets, and total leverage, and industry sigma are defined in Table 1. Dividend dummy is an indicator variable and set to one if firm paid a dividend in the year. The t-statistics are bracketed. For non-fixed effect regressions it is computed using two-way cluster robust standard errors computed from the variance-covariance matrix: $V_{Firm\&Year} = V_{Firm} + V_{Year} - V_{White}$ (Petersen, 2009). The t-statistics for regressions are computed using heteroscedasticity consistent standard errors and fixed-effects calculations are based on White (1980) and MacKinnon and White (1985). The ***, **, * indicate statistical significance at the 0.01, 0.05 and 0.10 level, respectively.

Table 5**Joint Impact of Cross-listing and Investor protection in Home Market on Firms' Cash Holding**

| | (1) | (2) | (3) |
|---|-----------------------|-----------------------|-----------------------|
| Intercept | -0.495*** (-3.06) | -0.199 (-1.33) | -0.142 (-0.93) |
| Low shareholder protection | -0.426*** (-5.41) | | |
| Low accounting standards | | -0.479*** (-6.50) | |
| Low secondary market transparency | | | -0.30*** (-4.64) |
| Cross-listed | 0.081 (1.57) | 0.042 (0.83) | 0.243*** (4.28) |
| Level III ADR | 0.231*** (3.57) | 0.142** (2.26) | 0.091 (1.45) |
| Cross-listing*low shareholder protection | 0.387*** (4.58) | | |
| Cross-listing*low accounting standards | | 0.299*** (3.73) | |
| Cross-listing*low secondary market transparency | | | -0.079 (-1.13) |
| Inflation | -0.016*** (-3.36) | -0.001*** (-6.73) | -0.001*** (-6.95) |
| Market-to-book ratio | 0.000 (1.00) | 0.001 (1.16) | 0.0006 (1.24) |
| Real size | -0.114*** (-10.59) | -0.101*** (-8.67) | -0.106*** (-9.36) |
| Cash flow/net assets | -0.088 (-1.47) | 1.182*** (6.17) | 1.081*** (5.86) |
| Networking Capital/net assets | -0.835*** (-5.26) | -0.99*** (-5.48) | -1.104*** (-6.39) |
| Total leverage | -0.93*** (-6.94) | -6.397*** (-10.83) | -6.446*** (-10.45) |
| Industry sigma | 0.001*** (3.42) | 0.001*** (3.31) | 0.001*** (3.51) |
| R&D/sales | 4.289*** (9.69) | 8.062*** (11.49) | 8.253*** (11.18) |
| Dividend dummy | 0.095* (1.86) | 0.068 (1.34) | 0.101* (1.83) |
| Expenditure | 0.675* (1.90) | 0.187 (0.57) | 0.151 (0.46) |
| Firm-year observations | 21,543 | 21,543 | 21,543 |
| Adjusted R-square | 0.18 | 0.18 | 0.18 |

This table presents results of cross-sectional regression for the impact of cross-listing on firms' cash holdings using a matched control sample from 1992-2009. The dependent variable in all regressions is the natural log of ratio of cash/net assets, which is calculated as cash divided by net assets. Net assets are total assets net of cash holdings. In columns (1), (2), and (3), we report the results of OLS regressions of cash holdings on the cross-listing dummy, the level III ADR dummy variable, the interaction terms, and control variables. The basic regression takes the form of:

$$\text{LogNetCashRatio}_{i,t} = \alpha + \beta_1 \text{CrossListing}_{i,t} + \beta_2 \text{LevelIIIADR}_{i,t} + \beta_3 \text{InterTerm}_t + \beta_4 \text{LowIP}_t + \beta_5 \text{Inflation}_t + \sum_{k=6}^{14} (\beta_k \text{ContrlVar}_{i,t}^k) + \varepsilon_{i,t}$$

Where cross-listed is an indicator variable and set to one if firm crossly listed in U.S. level III is an indicator of whether the firm is level III ADR with one meaning yes and zero otherwise. Cross-listing is interacted with the

investor protection quality in firms' origin market which is constructed as a dichotomous variable and set to 1 if the measure is below the median and 0 otherwise. Inflation rate is obtained from World Bank. Firm size, market-to-book ratio, cash flow/net assets, and total leverage, and industry sigma are defined in Table 1. Dividend dummy is an indicator variable and set to one if firm paid a dividend in the year. For the analysis in column (4), all IP measures are included simultaneously. The t-statistics are bracketed and are computed using two-way clustered robust standard errors computed from the variance-covariance matrix:

$V_{Firm\&Year} = V_{Firm} + V_{Year} - V_{White}$ (Petersen, 2009). The ***, **, * indicate statistical significance at the 0.01, 0.05 and 0.10 level, respectively.

Table 6

Impact of Cross-listing on Firms' Cash Holdings Excluding Capital-Raising Effects

| | Panel A | | | Panel B | | |
|----------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|----------------------|-----------------------|
| | (1) All | (2) Emerging | (3) Developed | (1) All | (2) Emerging | (3) Developed |
| Intercept | -1.877*** (-13.76) | -3.206*** (-16.94) | -0.408*** (-4.83) | -0.336** (-2.44) | -1.916*** (-7.48) | 0.323* (1.84) |
| Cross-listed | 0.253*** (11.31) | 0.296*** (6.76) | 0.164*** (6.49) | 0.195*** (6.40) | 0.216*** (3.53) | 0.131*** (3.79) |
| Level III ADR | 0.139*** (4.04) | 0.171*** (3.15) | 0.112** (2.52) | | | |
| Inflation | -0.001*** (-11.34) | -0.001*** (-8.74) | -0.021*** (-2.78) | -0.001*** (-9.48) | -0.001*** (-8.17) | -0.015 (-1.48) |
| Market-to-book ratio | 0.000 (0.87) | 0.022*** (5.28) | 0.000 (0.02) | 0.001 (0.73) | 0.034*** (6.71) | 0.000 (0.28) |
| Firm size | -0.104*** (-20.26) | -0.013 (-1.20) | -0.113*** (-19.99) | -0.148*** (-17.56) | -0.071*** (-3.97) | -0.176*** (-17.31) |
| Cash flow/net assets | 0.007 (0.40) | 0.157*** (4.85) | -0.068*** (-3.20) | 0.035 (0.99) | 0.081 (1.50) | 0.017 (0.41) |
| Networking Capital/net assets | -0.773*** (-16.40) | 0.081 (0.88) | -0.946*** (-17.69) | -0.860*** (-11.25) | -0.709*** (-5.08) | -0.920*** (-10.24) |
| Total leverage | -0.718*** (-13.96) | -0.100 (-0.97) | -0.899*** (-15.53) | -0.636*** (-8.26) | -0.394** (-2.54) | -0.641*** (-7.29) |
| Industry sigma | 0.001*** (8.27) | -0.002*** (-5.41) | 0.001*** (10.74) | 0.001*** (6.91) | 0.000 (0.51) | 0.001*** (4.66) |
| R&D/sales | 4.948*** (27.39) | 7.449*** (12.39) | 4.134*** (22.35) | 4.518*** (15.63) | 11.734*** (10.48) | 3.711*** (11.96) |
| Dividend dummy | 0.149*** (5.54) | 0.576*** (12.23) | -0.117*** (-3.65) | 0.021 (0.52) | 0.324*** (4.42) | -0.138*** (-2.97) |
| Expenditure | 0.101 (0.67) | 1.353*** (4.22) | -0.134 (-0.81) | 0.075 (0.22) | 0.520 (1.32) | -0.246 (-0.58) |
| Year fixed effect | Yes | Yes | Yes | Yes | Yes | Yes |
| Country fixed effect | Yes | Yes | Yes | Yes | Yes | Yes |
| Firm-year observations | 17,671 | 5,276 | 12,395 | 9,513 | 2,577 | 6,936 |
| Adjusted R-square | 0.24 | 0.19 | 0.26 | 0.30 | 0.24 | 0.35 |

This table presents results of cross-sectional regressions for the impact of cross-listing on firms' cash/net assets excluding the effect of equity-raising through cross-listing. Panel A shows the regression results by removing observations of base year and two years before and after the base year observations. Panel B presents the effects of cross-listing on level I and level II ADR firms' cash holdings. The dependent variable is the natural log of ratio of cash/net assets. Base year is the year that firm cross-listed in U.S. Cross-listed is an indicator variable and set to one if firm crossly listed in U.S. Level III is an indicator variable is 1 for level III ADR and 0 for level I, level II, and restricted ADRs. Inflation rate is obtained from World Bank. Firm size, market-to-book ratio, cash flow/net assets, and total leverage, and industry sigma are defined in Table 1. The t-statistics are bracketed and computed using heteroscedasticity consistent standard errors. The ***, **, * indicate statistical significance at the 0.01, 0.05 and 0.10 level, respectively.

Table 7

Two-Stage Least Squares (2SLS) Regression of Joint Impact of Cross-listing and Excess Cash on Firms' Revenues and Profits

| | (1) EBITDA/Total Assets | (2) Sales Growth/Total Assets |
|--|----------------------------|----------------------------------|
| Intercept | 20.876*** (5.27) | -68.808*** (-9.54) |
| CL*PredCash | 10.291*** (4.73) | 14.038*** (4.36) |
| PredCash (Non-cross listed) | -4.364** (-2.41) | -9.796*** (-3.18) |
| Cross-listed | 27.244*** (5.27) | 33.277*** (4.43) |
| MTBV | 0.006 (0.21) | 0.021 (0.87) |
| EBITDA (1)t-1 or Sales Growth (2)t-1 | 3.864*** (9.63) | -9.618*** (-16.27) |
| Net working capital | -18.149*** (-6.62) | 7.347 (1.45) |
| Dividend dummy | 3.803*** (2.96) | 0.785 (0.30) |
| Total leverage | -9.491*** (-3.17) | -5.442 (-0.95) |
| Firm size | -4.948*** (-10.52) | 11.346*** (15.13) |
| Industry sigma | 0.002 (0.32) | -0.017 (-1.61) |
| Cash flow/net assets | 60.999*** (24.65) | 0.15 (0.08) |
| Test for difference in predicted cash between cross-listed and non-cross-listed1 | 20.99*** | 19.01*** |
| Firm-year observations | 18,037 | 10,117 |
| Adjusted R-square | 0.04 | 0.04 |

This table presents cross-sectional regression for the impact of cross-listing and excess cash on firms' profits. We regress the profitability measure on the cash of previous period and the control variables. The dependent variable in column (1) is the ratio of earnings before interest, taxes and depreciation (EBITDA) to total assets, in column (2) is the ratio of sales growth to total assets. The sales growth is the difference between the total sales revenue in year t and sales revenue in year $t-1$. The cross-listed $_{i,t}$ is a dummy variable with 1 meaning cross-listed firm and 0 matched non-cross-listed firms. CL*PredCash $_{i,t}$ is the product term of cross-listing by predicted cash holding. PredCash $_t$ is the predicted cash holding from first stage regression. The control variables in the second stage regressions include lagged value of profit, which is lagged value of EBITDA/total assets (1) and lagged sales growth/total assets (2). The sales growth is defined as the change in the total sales and revenue from year t to year $t-1$. Firm size, market-to-book ratio, cash flow/net assets, and total leverage, and industry sigma are defined in Table 1. Dividend dummy is an indicator variable and set to one if firm paid a dividend in the year. ¹: the statistically test is based on F test. The ***, **, * indicate statistical significance at the 0.01, 0.05 and 0.10 level, respectively.

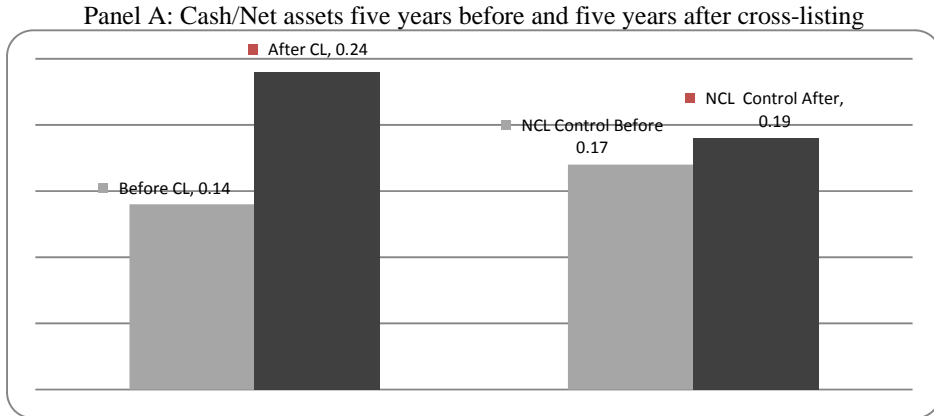
Table 8. Robustness tests

| Dependent Variable | Panel A: Cash/Net Assets | | | Panel B: Cash/Total Sales | | |
|-------------------------------|--------------------------|-----------------------------------|----------------------------------|---------------------------|-----------------------|-----------------------|
| | (1) All | (2) Financially Constrained | (3) Financial Unconstraint | (4) All | (5) Emerging | (6) Developed |
| Intercept | -1.562*** (-6.03) | -2.947*** (-16.19) | -0.325*** (-3.68) | -1.877*** (-13.76) | -3.206*** (-16.94) | -0.408*** (-4.83) |
| Shareholder protection | 0.147*** (4.69) | | | | | |
| Cross-listing | | 0.252*** (7.13) | 0.179*** (8.49) | 0.253*** (11.31) | 0.296*** (6.76) | 0.164*** (6.49) |
| Level-III ADR | | 0.268*** (6.62) | 0.179 (5.78) | 0.139*** (4.04) | 0.171*** (3.15) | 0.112** (2.52) |
| Inflation | -0.001*** (-4.52) | -0.001*** (-7.15) | 0.002*** (0.26) | -0.001*** (-11.34) | -0.001*** (-8.74) | -0.021*** (-2.78) |
| Market-to-book ratio | 0.001 (0.85) | 0.019*** (3.16) | 0.000*** (0.53) | 0.000 (0.87) | 0.022*** (5.28) | 0.000 (0.02) |
| Firm size | -0.084*** (-5.34) | -0.026** (-2.16) | -0.119 (-21.87) | -0.104*** (-20.26) | -0.013 (-1.20) | -0.113*** (-19.99) |
| Cash flow/net assets | -0.112 (-1.47) | 0.089** (2.42) | -0.155 (-5.81) | 0.007 (0.40) | 0.157*** (4.85) | -0.068*** (-3.20) |
| Networking Capital/net assets | -0.716*** (-3.19) | -0.24** (-2.20) | -0.847 (-13.07) | -0.773*** (-16.40) | 0.081 (0.88) | -0.946*** (-17.69) |
| Total leverage | -1.019*** (-4.98) | -0.069 (-0.68) | -1.078 (-16.53) | -0.718*** (-13.96) | -0.100 (-0.97) | -0.899*** (-15.53) |
| Industry sigma | 0.001** (2.58) | -0.001*** (-5.31) | 0.001 (7.41) | 0.001*** (8.27) | -0.002*** (-5.41) | 0.001*** (10.74) |
| R&D/sales | 4.516*** (6.03) | 5.269*** (8.87) | 3.933 (19.03) | 4.948*** (27.39) | 7.449*** (12.39) | 4.134*** (22.35) |
| Dividend dummy | 0.250*** (3.38) | 0.572*** (12.69) | -0.214 (-7.22) | 0.149*** (5.54) | 0.576*** (12.23) | -0.117*** (-3.65) |
| Expenditure | 0.498 (1.11) | 0.708*** (2.73) | 0.056*** (0.28) | 0.101 (0.67) | 1.353*** (4.22) | -0.134 (-0.81) |
| Year fixed effect | No | Yes | Yes | Yes | Yes | Yes |
| Country fixed effect | No | Yes | Yes | Yes | Yes | Yes |
| Firm-year observations | 10,287 | 6,866 | 7,736 | 17,671 | 5,276 | 12,395 |
| Adjusted R-square | 0.16 | 0.22 | 0.17 | 0.24 | 0.19 | 0.26 |

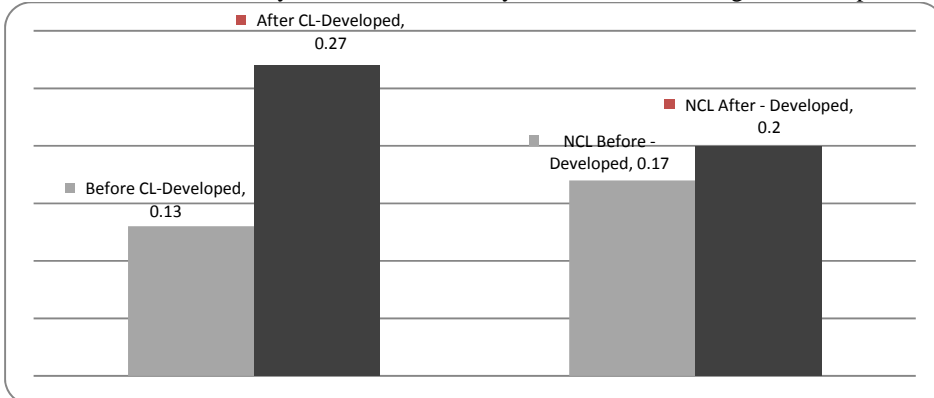
The sample period is 1992-2009. Firms included in column 1 are non-cross-listed and all sample firms are included in other columns. The dependent variable in Panel A regressions is the natural log of ratio of cash/net assets, which is calculated as cash divided by net assets. Net assets are total assets net of cash holdings. The dependent variable in Panel B regressions is the ratio of cash to total sales. Firms with (without) financial constraint in column 2 (3) are firms from countries rated in A- and above (BBB+ and below) by Standard & Poor's. The *shareholder protection index* reported in column 1 is the product of LLSV's (1997, 1998) anti-director rights index and their rule-of-law index divided by 10. Inflation rate is obtained from World Bank. Firm size, market-to-book ratio, cash flow/net assets, and total leverage, and industry sigma are defined in Table 1. Dividend dummy is an indicator variable and set to one if firm paid a dividend in the year. The t-statistics are in parenthesis. We two-way clustered robust standard errors (Petersen, 2009) in column 1. The t-statistics for regressions are computed using heteroscedasticity consistent standard errors and fixed-effects calculations are based on White (1980) and MacKinnon and White (1985). The ***, **, * indicate statistical significance at the 0.01, 0.05 and 0.10 level, respectively.

Figure 1

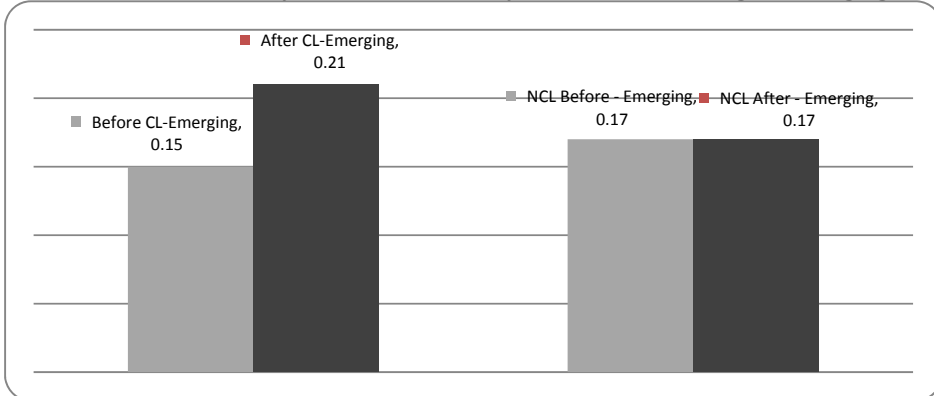
Cash/Net Assets 5 years before and 5 years after the base year for Cross-listed (CL) and Non-cross-listed (NCL) firms



Panel B: Cash/Net assets five years before and five years after cross-listing for developed markets



Panel C: Cash/Net assets five years before and five years after cross-listing for emerging markets



Cash/Net Assets is the ratio of cash and equivalents to the net assets computed as total assets less cash and equivalents. The base year is the year that the firm cross-listed. Average cash/net asset ratio in 5 years prior to cross-listing and 5 years after cross-listing are plotted. To be included in the sample a firms must have at least 7 years of non-missing cash/net assets data available.