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Creditor Rights, Country Governance, and Corporate Cash Holdings

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Abstract

This study examines the impact of creditor rights and country governance on cash holdings using a sample of firms from 47 countries. We hypothesize that cash holdings are smaller when both creditor rights and country governance are high. In these circumstances firms will not need to hold as much cash for future investments needs (precautionary funds) because firms will expect that funds will be available in the future. Our findings support our hypothesis and hold for alternative definitions for cash holdings, different country samples, different definitions of governance and concerns about endogeneity.

1. Introduction

At the end of 2010, the 413 non-financial firms in the S&P 500 held $1.10 trillion in cash and cash equivalents, which amounted to 11 per cent of their combined total assets. This sizable level of cash holdings is hardly unique to American firms. In our sample of firms from 47 countries, cash holdings averaged 17 per cent of total assets. While substantial liquidity seems to be the universal norm, there are significant cross-country differences in corporate cash holdings. Our goal is to extend the literature that seeks to explain these differences by focusing on disparities in creditor rights and governance quality.

This paper focuses on the effects of creditors and country governance on corporate cash holdings. Creditors supply funds to firms on the expectation that those funds will be repaid with interest. In virtually all legal regimes, failure to meet this expectation typically results in the bankruptcy of the borrower. However, the ramifications of

bankruptcy as well as other consequences of defaulting vary from one country to another.

We test the hypothesis that firms will hold less cash when both creditor rights are high and country governance is strong. Firms will hold less funds now because they do not need to save as much now (precautionary funds) for future investment needs. Stronger creditor rights will lead to greater availability of funds due to lower interest rates and increased supply of funds and since creditor rights do not change much over time, this will result in greater amounts of funds now and also in the future. Stronger country governance, where laws are enforced and corruption is low, will make it easier and less risky for markets to supply funds. The combination of strong creditor rights and high country governance will allow firms to hold less cash now because if they need to obtain funds in the future they can expect to get it then.

Our sample includes over 15,000 unique firms from 47 countries over the period 1996–2006. As expected, we find a significant negative relation between corporate cash holdings and the interactive term of strong creditor rights and strong country governance. We demonstrate this relationship in a variety of ways (different samples, alternative definitions for cash and governance, and a variety of controls).

These results extend the literature on cash holdings by further illustrating the significance of country-level institutional differences in explaining corporate cash holdings, over and above the effects of firm-specific variables. Invariably, managers must consider the environments in which their firms operate when making policy choices. Our results suggest that the strength of creditor rights and country level governance constitute an important dimension of these considerations in corporate liquidity decisions.

The rest of the paper proceeds as follows. We give a brief review of the literature on creditor rights in Section 2, present our hypothesis in Section 3, and discuss our data and methodology in Section 4. Section 5 contains our tests and results, while Section 6 concludes with a brief summary.

2. A Brief Review of the Literature on Creditor Rights

Traditionally, the emphasis in finance has been on the powers of creditors during bankruptcy or during periods of financial distress. Recent evidence, however, shows that creditors do use their powers in many

instances where financial distress is not an immediate issue. Brockman and Unlu (2009) observe, for example, that creditor rights play an important role in dividend decisions. They show that when creditor rights are weak, creditors seek and managers agree to pay less dividends, consistent with a substitution model. In this case, less dividends substitute for weak creditor rights and the agency costs of debt are reduced.

Creditors may have significant influence on corporate policies especially for firms that have private credit agreements as opposed to firms that use the public bond markets. When a firm violates a private credit agreement (for example, acquires an adverse credit rating or the ratio of debt to cash flow increases too much), the agreement is generally renegotiated (as opposed to being called) but the terms of the agreement change as additional restrictions are imposed on the firm. It is important to note that the great majority of these violations do not lead to bankruptcy. As a result of these violations and the additional restrictions, a number of corporate policies are affected. Nini et al. (2009) find that firms with private credit agreements with banks reduce investments. Nini et al. also indicate that following violations there is an increase in CEO turnover, reduction in corporate payouts (repurchases and dividends), and an increase in cash balances. Acharya et al. (2011) observe that stronger creditor rights result in more diversifying acquisitions, and Acharya and Subramanian (2009) and Seifert and Gonenc (2012) show that strong creditor rights are associated with less innovation.

Roberts and Sufi (2009) find that firms that have high cash balances do not suffer as much as firms with low cash balances after a technical violation. In other words, high cash firms (as opposed to low cash firms) frequently escape additional penalties as a result of a technical violation. Furthermore, Roberts and Sufi observe that the ratio of cash to assets is often used to determine whether a technical violation has occurred. These results suggest that creditors think the ratio of cash to assets is important and they prefer firms to have high cash ratios and that there are perks to borrowers who have high cash ratios.

In a recent study, Kyrolainen et al. (2013) show that the marginal value of cash is worth more in countries with weak creditor rights than it is in countries with strong creditor rights. Also they find that the marginal value of investment is similarly higher in weak creditor countries. In contrast to their study we look at the level of cash as it relates to creditor rights and not the value of cash.

3. Hypothesis

Djankov et al. (2007) find that stronger creditor rights results in an increase in the supply of credit and the research by Qian and Strahan (2007) show that greater creditor rights reduces interest rates and increases loan maturities. These factors should increase the supply of funds available to firms now and in the future (creditor rights do not change often). Managers will thus have more confidence in their ability to obtain funds in the future and they will not have to hold as much cash now for future investments.

Another factor in explaining cash holdings should be country governance. Strong country governance implies that the rule of law is followed and corruption is minimal. Strong enforcement of creditor laws results in higher recovery rates and less time spent in repossessing collateral following defaults (Bae and Goyal, 2009) and thus should lead to more funds being available. Bae and Goyal further find that enforcement of creditor rights has more power in explaining loan amounts, maturities, and spreads than creditor rights. Strong country governance should therefore reduce agency issues and lead to a reduced need to hold cash. Lending in poorly-governed countries potentially exposes creditors to significant expropriation risk by corporate insiders. Thus, rational lenders would restrict the supply of credit in such jurisdictions. Consistent with this, Jappelli et al. (2005) show that credit availability is lower in jurisdictions with poorer judicial efficiency. Similarly, Fabbri (2002) shows that judicial efficiency is positively related with the flow and stock of corporate debt.

It seems evident that both creditor rights and country governance can influence corporate cash holdings and our hypothesis follows: *Corporate cash holdings will be lower when both creditor rights are high and country governance is strong.*

4. Data Sources and Methodology

4.1. Data Sources

We obtain data on creditor rights from Djankov et al. (2007). They rate the powers of secured lenders during bankruptcy, scoring countries on four attributes: "(1) whether there are restrictions, such as creditor consent, when a debtor files for reorganization; (2) whether secured creditors are able to seize their collateral after the petition for

reorganization is approved, that is, whether there is no automatic stay or asset freeze imposed by the court; (3) whether secured creditors are paid first out of the proceeds of the liquidating bankrupt firm; and (4) whether an administrator, and not management, is responsible for running the business during reorganization" (Djankov et al., 2007:302). These data are available for 1996–2003. For years subsequent to 2003, we assume that the level of creditor rights remains unchanged from 2003. This allows us to extend our analysis beyond 2003 without compromising the integrity of our results since the index of creditor rights exhibits very little time series variation. In fact, only four of the 47 countries in our sample (Indonesia, Japan, Russia and Thailand) experienced any movement in the index of creditor rights between 1996 and 2003 and the change is a one-unit change in each case. As a robustness check, we also estimate (unreported) regressions where our sample is restricted to years with actual observations for creditor rights and obtain virtually identical results. (For more on the definitions of our variables please refer to Table 1.)

We use a broad definition of country governance based on data from the World Bank (Kaufmann et al., 2009). They define governance as "the traditions and institutions by which authority in a country is exercised. This includes the process by which governments are selected, monitored, and replaced; the capacity of the government to effectively formulate and implement sound policies; and the respect of citizens and the state for the institutions that govern economic and social interactions among them" (Kaufmann et al., 2009:5). Six dimensions are used to measure this definition: (1) voice and accountability, (2) political stability and absence of violence, (3) government effectiveness, (4) regulatory quality, (5) rule of law, and (6) control of corruption (Kaufmann et al., 2009:6). With the exception of 1997, 1999, and 2001, we define each country's governance score for each year as the average of its scores on these six dimensions. The World Bank does not have data for the aforementioned years. As a result, we use scores for the immediately preceding year for each of these years in order to prevent a significant data loss.

In addition to using a broad definition for governance, we also employ two narrower ones. These are based on two of the six dimensions for the World Bank definition of governance, namely the rule of law and corruption.

We include a variable for shareholder rights in our models since Dittmar et al. (2003) show that shareholder rights significantly impact

Table 1. *Definitions of Variables*

Dependent variable	
CASH=	Cash ratio, with two different definitions
	(Cash and Short-term Investments/Total Assets)
	Alternative measure of Cash: [Ln (Cash and Short-term Investments/Net Assets)]
Net Assets=	(Total Assets—Cash and Short-term Investments)
Independent variables	
1. Country level variables	
CR=	Creditor Rights for the period 1996–2006
	(Djankov et al. 2007), 2003 CR data is used for years after 2003
SR=	Shareholder Rights
	[La Porta et al. (1997) for the period 1996–2002, and Djankov et al. (2008) for 2003–2006]
GOV=	World Governance Index, World Bank (Kaufmann et al. 2009)
	Annual average score of the mean of six governance indicators (voice and accountability, political stability, government effectiveness, regulatory quality, rule of law, control of corruption) for the period 1996–2006 (For years 1997, 1999, and 2001, when data index is not available, we take the index in the previous year.)
RULE OF LAW=	One of six governance indicators and captures perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence
CORRUPTION=	Control of corruption index from governance indicators capturing perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests
STOCKCAP=	Annual Stock Market Capitalization (Beck and Demirgüç-Kunt 2009)
	Value of listed shares to GDP, deflated by CPI (Consumer Price Index)
PRVCREDIT=	Private Credit (Beck and Demirgüç-Kunt 2009)
	Private credit by deposit money banks and other financial institutions to GDP, deflated by CPI
EXPANSION=	Economic expansion years, World Development Indicators
	(Dummy variable being 1 for years when growth in GDP is positive, otherwise 0)
2. Firm level variables	
MB=	Market to Book Ratio
	[(Total Debt + Market Value of Equity)/Total Assets]
RSIZE=	Ln of Real Total Assets in U.S. $

Table 1 (*Continued*)

NWC= Net Working Capital
[(Current Assets–Cash and Short-term Investments–Current Liabilities)/Total Assets]
When alternative measure of CASH is used, this variable is scaled by Net Assets

CFLOW= Cash Flow
[(Operating Income+Depreciation and amortization–Interest–Taxes–Cash Dividends)/Total Assets]
When alternative measure of CASH is used, this variable is scaled by Net Assets

R&D= Research and Development Expenses
(Research and Development Expenses/Sales)

AI= Asymmetric Information
(The standard deviation of the firm's daily price returns minus the local market returns)

LEV= Leverage
[(Short-term Debt + Long-term Debt)/Total Assets]
Alternative Leverage definitions
  Industry adjusted: Firm leverage—mean of leverage by 2-digit SIC # by country and year
  Mean adjusted: Firm leverage—mean of firm leverage in the sample period

CAPEXP= Capital Expenditures
(Capital Expenditures/Total Assets)

corporate cash holdings. This variable measures the legal protection afforded to minority shareholders against expropriation by corporate insiders and comes from La Porta et al. (1997) for 1996–2002 and Djankov et al. (2008) for 2003–2006.

Our firm-level accounting and stock return data come from *Worldscope* and *Datastream*, respectively. We exclude utilities and financial firms due to possible regulatory influences. Finally, we obtain stock market capitalization data from a World Bank study by Beck and Demirgüç-Kunt (2009). Based on the intersection of these various datasets, our full sample consists of 95,537 firm-year observations for 15,449 unique firms in 47 countries over 1996–2006. We winsorize all financial data at the 1st and 99th percentiles to reduce the influence of potential outliers.

4.2. Determinants of the Level of Cash

The tradeoff model provides a useful starting point to discuss the determinants of corporate cash holdings. (See Opler et al. (1999) and Dittmar et al. (2003) for additional details.) In this model, the optimal level of cash holdings occurs at the point when the marginal cost of holding the next dollar of cash equals its marginal benefit. The tradeoff model suggests a number of factors as potential determinants of corporate cash holdings. Firms that are subject to a higher degree of information asymmetry would be expected to have higher cash holdings because it is more costly for them to raise funds externally.[1] As a result, firms that invest more in research and development (R&D) or whose activities are not very transparent to investors would hold more cash (Dittmar et al., 2003). Firms with more volatile cash flows should hold more cash since these firms are more likely to have shortfalls in cash and holding more cash would reduce the probability of going to the markets to acquire it (Opler et al., 1999 and Dittmar et al., 2003). Larger firms should hold relatively less cash since they have better access to the capital markets and on average are able to obtain funds more cheaply than smaller firms due to the economies of scale in raising funds (Opler et al., 1999 and Dittmar et al., 2003). Firms with more investment opportunities should hold more cash because the loss to them of not being able to take advantage of these opportunities is greater than for firms with fewer investment opportunities (Opler et al., 1999 and Dittmar et al., 2003). Firms with close substitutes for cash should be able to have lower levels of cash. If necessary, these

firms could sell these substitutes without incurring a substantial penalty (Opler et al., 1999; Dittmar et al., 2003 and Kalcheva and Lins, 2007). Firms with higher cash flow are in a position to have lower cash holdings. All things being equal, these firms are less likely to need to raise cash to pay for future expenses because of their higher cash flow. On the other hand, if increased cash flow is not spent or paid out, then higher cash flows would be associated with increased cash holdings. Opler et al. (1999), Kalcheva and Lins (2007), and Dittmar et al. (2003) find evidence consistent with the idea that higher cash flows are associated with greater cash holdings.[2]

Current literature has also shown that agency issues are likely a determinant of cash holdings for firms and that governance quality is important both for the level of cash holdings and for cash valuation. Managers who are not guided by shareholder maximization are inclined to waste company resources on perks and projects with negative net present values and to divert company resources to themselves. As Pinkowitz et al. (2006) point out, it would be expected that these managers would maintain above average cash levels. Having high cash levels makes it easier and provides greater flexibility for managers to spend unwisely or divert funds. Dittmar et al. (2003) find that companies in countries with poor shareholder protection and hence substantial agency issues do, in fact, hold almost twice as much cash as firms operating in countries with strong shareholder protection.[3] Harford et al. (2008) find evidence to the contrary, namely that firms with weak corporate governance hold smaller amounts of cash.[4]

4.3. Basic Model

The following regression equation is our basic model to examine the impact of creditor rights on cash levels. The precise definitions for all the variables are given in Table 1.

$$
\begin{aligned}
\mathrm{CASH}_{it} = {} & b_0 + b_1\mathrm{PRVCREDIT}_{jt} + b_2\mathrm{SR}_{jt} + b_3\mathrm{STOCKCAP}_{jt} \\
& + b_4\mathrm{MB}_{it} + b_5\mathrm{RSIZE}_{it} + b_6\mathrm{NWC}_{it} + b_7\mathrm{CFLOW}_{it} + b_8\mathrm{R\&D}_{it} \\
& + b_9\mathrm{LEV}_{it} + b_{10}\mathrm{AI}_{it} + b_{11}\mathrm{EXPANSION}_{it} + b_{12}\mathrm{CAPEXP}_{it} \\
& + b_{13}\mathrm{CR}_{jt} + b_{14}\mathrm{GOV}_{jt} + b_{15}\mathrm{CR}_{jt} * \mathrm{GOV}_{jt} + \sum b\,\mathrm{FIRM} \\
& + \sum c\,\mathrm{YEAR} + \mathrm{e}_{it}
\end{aligned}
\tag{1}
$$

In this model, country level variables for country j in year t are creditor rights (CR_{jt}) from Djankov et al. (2007), shareholder rights (SR_{jt}) from Djankov et al. (2008), and governance scores (GOV_{jt}) from Kaufmann et al. (2009). Stock market capitalization (STOCK-CAP$_{jt}$), private credit (PRVCREDIT$_{jt}$), and a dummy variable that equals one if the country's GNP increased in year t (EXPANSION$_{jt}$) are also annual country level variables. Firm-level variables (denoted by the subscript i and t for firm and time, respectively) are cash holdings as a percentage of total assets (CASH$_{it}$), market-to-book ratio (MB$_{it}$), real size (RSIZE$_{it}$), net working capital (NWC$_{it}$), cash flow (CFLOW$_{it}$), research and development expenditures (R&D$_{it}$), leverage (LEV$_{it}$), asymmetric information (AI$_{it}$), and capital expenditures (CapExp$_{it}$). YEAR indicates a set of year dummies and FIRM fixed effects captures unobservable firms' characteristics.

Our basic model makes an important distinction between rights (creditor rights and shareholder rights) and the size (success) of the resulting debt (PRVCREDIT) and equity markets (STOCKCAP). While one can argue that strong rights lead to bigger markets (see La Porta et al., 2008 for evidence for the debt market), conceptually cash holdings can be influenced both by the rights of creditors and stockholders as well as the size (availability of funds) of these markets. Thus we include both concepts in our basic model.

We also include two additional controls. The first is whether a country is experiencing an increase in GNP during the year (EXPANSION). Dittmar and Dittmar (2008) document the importance of GNP growth in many financing decisions (for example, equity issues, cash flows, and equity repurchases). The second is the dollar value of capital expenditures of the firm (CAPEXP).

We mainly focus on the interaction variable between creditor rights and country governance ($CR_{jt}*GOV_{jt}$). We estimate all our models using firm and year fixed effects regressions with standard errors clustered at the country level. Fixed effects allows us to control for time invariant omitted variables. We repeat our analysis based on an alternative definition of cash (as well as some of the explanatory variables) to see if our main findings are robust to different definitions of cash holdings. We follow the same approach for governance. We also use an instrumental variable approach to control for potential endogeneity.

5. Results

5.1. Descriptive Statistics

Table 2 provides descriptive statistics for cash, governance index, rule of law, corruption, creditor rights, and shareholder rights by country. The mean and median values of the ratio of cash and short-term investments to total assets are 16.9 and 9.5 per cent for our sample countries. Thus, on average, one-sixth of total assets are held in cash and short-term investments. In unreported results, we find that cash holdings have increased steadily over time, results similar to Bates et al. (2009).

Mean scores for creditor rights range from zero (weakest) to four (strongest). Colombia, France, Mexico and Peru have the lowest score (0) while Hong Kong, New Zealand and the U.K. have the highest score (4). The U.S. has a score of one. Mean scores for shareholder rights range from one to five, with higher scores indicating better rights for minority shareholders.

Mean governance scores in our sample range from −.884 (Pakistan) to 1.848 (Finland) and a mean of .76. Indonesia and Russia also have very low scores while Switzerland and New Zealand have particularly high scores. The score for the U.S. is 1.44.

Table 3 provides descriptive statistics for key variables in our model for three different samples: (1) all countries, (2) low creditor rights countries, and (3) high creditor rights countries. We define low creditor rights countries as those with creditor rights scores of 2 or lower and high creditor rights countries as those that score above 2. We also provide statistical comparisons of the variables for low versus high creditor rights countries. Panel A gives statistics for country level variables while Panel B presents information on firm level variables.

The results in Table 3 indicate that firms in countries with fewer creditor rights hold significantly more cash than those in countries with more creditor rights. Specifically, the mean cash ratio of 17.6 per cent for firms in low creditor rights countries is significantly higher than the 15.7 per cent observed among firms in countries with more creditor rights. We obtain similar findings when we examine the medians using the Mann–Whitney U Test/Wilcoxon rank-sum test.

Our dataset contains four instances where countries enacted laws that changed their creditor rankings. In each case (Russia in 1998 from two to one, Indonesia in 1998 from three to two, Japan in 2000 from

Table 2. *Cash Holdings by Country*

Country		CASH RATIO		GOVERNANCE (GOV)			CR	SR
	N	Mean	Median	Index mean	Rule of law	Corruption	Creditor rights	Shareholder rights
Argentina	226	0.063	0.043	−0.069	−0.281	−0.304	1.00	3.27
Australia	4709	0.164	0.079	1.599	1.778	1.905	3.00	4.00
Austria	228	0.124	0.083	1.617	1.839	1.941	3.00	2.22
Belgium	251	0.115	0.061	1.395	1.429	1.454	2.00	1.33
Brazil	743	0.137	0.109	−0.008	−0.296	−0.013	1.00	3.73
Canada	4113	0.141	0.052	1.638	1.753	2.007	1.00	4.64
Chile	505	0.066	0.039	1.104	1.218	1.359	2.00	5.00
Colombia	28	0.077	0.063	−0.538	−0.759	−0.235	0.00	3.00
Czech Republic	14	0.139	0.057	0.840	0.765	0.419	3.00	4.00
Denmark	645	0.156	0.091	1.767	1.882	2.230	3.00	2.73
Egypt	53	0.156	0.110	−0.543	−0.018	−0.466	2.00	3.00
Finland	513	0.132	0.071	1.848	1.926	2.356	1.00	3.18
France	1866	0.140	0.105	1.237	1.403	1.408	0.00	3.22
Germany	1894	0.143	0.077	1.555	1.686	1.972	3.00	1.91
Greece	159	0.080	0.051	0.735	0.827	0.511	1.00	2.00
Hong Kong	1999	0.227	0.181	1.118	1.202	1.401	4.00	5.00
Hungary	41	0.121	0.078	0.927	0.822	0.682	1.00	2.00
India	2409	0.076	0.035	−0.182	0.197	−0.354	2.00	5.00
Indonesia	372	0.127	0.089	−0.698	−0.615	−0.884	2.33	2.00
Ireland	442	0.168	0.111	1.515	1.610	1.594	1.00	4.36
Israel	316	0.242	0.178	0.618	0.973	1.112	3.00	3.36
Italy	404	0.132	0.097	0.774	0.772	0.559	2.00	1.36
Japan	10,395	0.162	0.128	1.120	1.376	1.209	2.36	4.18
Jordan	20	0.191	0.108	0.039	0.382	0.182	1.00	1.00
Korea, South	3818	0.138	0.094	0.584	0.775	0.373	3.00	2.91
Malaysia	1990	0.123	0.073	0.403	0.530	0.443	3.00	4.36
Mexico	523	0.081	0.051	−0.070	−0.428	−0.340	0.00	1.73

Table 2 *(Continued)*

Country	CASH RATIO			GOVERNANCE (GOV)			CR	SR
	N	*Mean*	*Median*	*Index mean*	*Rule of law*	*Corruption*	*Creditor rights*	*Shareholder rights*
Morocco	15	0.148	0.091	−0.249	−0.041	−0.160	1.00	2.00
Netherlands	1200	0.107	0.053	1.757	1.752	2.142	3.00	2.18
New Zealand	246	0.078	0.028	1.778	1.853	2.263	4.00	4.00
Norway	696	0.183	0.115	1.715	1.936	2.102	2.00	3.82
Pakistan	368	0.141	0.092	−0.884	−0.765	−0.865	1.00	4.64
Peru	162	0.079	0.026	−0.318	−0.626	−0.208	0.00	3.18
Philippines	589	0.099	0.055	−0.246	−0.330	−0.503	1.00	3.36
Poland	188	0.112	0.077	0.541	0.409	0.261	1.00	2.00
Russia	75	0.089	0.064	−0.650	−0.889	−0.756	1.00	4.00
Singapore	1478	0.175	0.133	1.525	1.598	2.233	3.00	4.36
South Africa	953	0.131	0.100	0.339	0.126	0.499	3.00	5.00
Spain	397	0.089	0.050	1.168	1.264	1.297	2.00	4.36
Sri Lanka	78	0.088	0.068	−0.311	−0.024	−0.173	2.00	3.36
Sweden	869	0.161	0.097	1.737	1.826	2.205	1.00	3.18
Switzerland	905	0.152	0.112	1.799	1.960	2.138	1.00	2.36
Thailand	361	0.076	0.040	0.156	0.337	−0.200	2.27	2.73
Turkey	243	0.107	0.073	−0.195	−0.013	−0.147	2.00	2.36
United Kingdom	9694	0.162	0.087	1.590	1.715	2.066	4.00	5.00
United States	36,271	0.204	0.099	1.440	1.599	1.672	1.00	4.27
Venezuela	73	0.075	0.053	−0.719	−0.953	−0.910	3.00	1.00
Total	93,537	0.169	0.095	0.763	0.837	0.896	1.96	3.30

The data for sample countries is collected for 1996–2006 from Worldscope. The definitions of variables CASH, GOV, CR, and SR are given in Table 1.

Table 3. *Descriptive Statistics*

	All countries (N = 456)		Creditor rights ≤ 2 Low CR (N = 291)		Creditor rights > 2 High CR (N = 165)	
	Mean	Median	Mean	Median	Mean	Median
Panel A: Country level variables						
CR	1.958	2.000	1.254	1.000	3.200***	3.000***
PRVCREDIT	0.836	0.828	0.675	0.612	1.120***	1.146***
SR	3.298	3.500	3.223	3.000	3.430*	4.000**
STOCKCAP	0.792	0.567	0.665	0.510	1.017***	0.726***
GOV	0.763	0.900	0.593	0.664	1.063***	1.471***
RULE OF LAW	0.837	1.011	0.656	0.721	1.156***	1.500***
CORRUPTION	0.896	1.068	0.658	0.414	1.317***	1.846***
EXPANSION	0.932	1.000	0.952	1.000	0.897**	1.000**

	All Countries (N = 93,537)		Creditor rights ≤ 2 Low CR (N = 62,904)		Creditor rights > 2 High CR (N = 30,633)	
	Mean	Median	Mean	Median	Mean	Median
Panel B: Firm level variables						
CASH	0.169	0.095	0.176	0.095	0.157***	0.095**
MB	1.878	1.301	2.000	1.359	1.630***	1.200***
RSIZE	5.196	5.162	5.341	5.371	4.897***	4.754***
NWC	0.046	0.034	0.055	0.044	0.026***	0.014***
CFLOW	0.014	0.055	0.013	0.059	0.014	0.046***
R&D	0.083	0.000	0.098	0.000	0.051***	0.000***
LEV	0.212	0.184	0.216	0.188	0.203***	0.176***
AI	0.036	0.028	0.039	0.030	0.031***	0.026***
CAPEXP	0.060	0.039	0.060	0.039	0.060	0.040

This table reports the mean and median values of the country-level variables (Panel A), the firm-level variables (Panel B) and statistical comparisons of all variables between low versus high creditor rights countries. The sample period is from 1996 to 2006. Definitions of the variables are given in Table 1.
***, ** and * denote significance at 1%, 5% and 10% respectively.

three to two, and Thailand in 1999 from three to two) the creditor rankings dropped by one unit. We performed a natural experiment[5] with our panel data comparing the cash holdings the year prior to the change with the year after the change. We could not do the analysis for Russia due to a lack of data. In unreported results, our analysis failed to find evidence that a decrease in creditor rights increases average cash holdings.[6]

5.2. Basic Regression Results

Our initial regression findings are given in Table 4. We present three panels. Panel A uses the governance scores while Panels B and C use the rule of law and corruption indices respectively instead of the governance scores. Our results in Panels B and C are very similar to those in Panel A and hence we report only the key variables in Panels B and C. We initially focus on the first four columns of the table.

We first examine the effect of creditor rights and governance on cash holdings. The coefficient on creditor rights without including the variable governance in the equation (column 1) is negative and significant at the one percent level in all three panels. The findings are similar when the governance variable is included in the regression (column 3). The governance variable, on the other hand, is negative but not significant in all three panels (columns 2 and 3).

Our main hypothesis is tested in column 4. Here we include the interaction variable between creditor rights and governance. In all three panels the interaction variable has a negative sign and is significant at the one percent level. High levels of both creditor rights and governance result in lower cash holdings for firms.

We also use two alternative definitions for leverage (industry adjusted leverage and deviations from average leverage) to see if our result concerning the interaction variable between creditor rights and governance and cash holdings is sensitive to the definition of leverage. In unreported results we find that the interaction variable is still negative and significant when alternative definitions for leverage are employed.

In column 4 we include both creditor rights and governance variables in addition to the interaction variable between creditor rights and governance. In all three panels the signs and significance of these three variables are similar in that both creditor rights and governance have positive coefficients (governance has a significant positive coefficient) while the interaction term has a significantly negative coefficient.[7] We next address the total effect on cash holdings from these three variables for countries with both high creditor rights and high governance. It turns out that the total effect is negative for firms in countries with creditor rights scores of four and governance scores of 1.16 or more and if creditor rights equal 3 then the total effect is negative if governance is 1.59 or higher.[8]

Table 4. *The Effects of Creditor Rights and Country Governance on Cash Holdings*

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: Country governance							
Constant	0.267*** [0.018]	0.231*** [0.010]	0.267*** [0.018]	0.239*** [0.016]	0.246*** [0.014]	0.209*** [0.017]	0.215*** [0.016]
PRVCREDIT	0.029*** [0.008]	0.036*** [0.010]	0.030*** [0.008]	0.026*** [0.008]	0.026*** [0.008]	0.026*** [0.009]	0.026*** [0.008]
SR	−0.002 [0.002]	−0.002 [0.002]	−0.002 [0.001]	−0.003* [0.001]	−0.002* [0.001]	−0.002* [0.001]	−0.002 [0.001]
STOCKCAP	0.009* [0.006]	0.006 [0.005]	0.010* [0.005]	0.010* [0.005]	0.010* [0.005]	0.010* [0.005]	0.011** [0.005]
MB	0.017*** [0.001]	0.017*** [0.001]	0.017*** [0.001]	0.017*** [0.001]	0.017*** [0.001]	0.016*** [0.001]	0.016*** [0.001]
RSIZE	−0.008*** [0.000]	−0.006*** [0.001]	−0.008*** [0.000]	−0.008*** [0.000]	−0.008*** [0.001]	−0.008*** [0.001]	−0.008*** [0.001]
NWC	−0.234*** [0.014]	−0.227*** [0.013]	−0.234*** [0.014]	−0.235*** [0.014]	−0.234*** [0.014]	−0.233*** [0.014]	−0.232*** [0.014]
CFLOW	−0.045*** [0.015]	−0.046*** [0.015]	−0.046*** [0.016]	−0.046*** [0.016]	−0.046*** [0.016]	−0.045*** [0.015]	−0.045*** [0.015]
R&D	0.111*** [0.006]	0.112*** [0.006]	0.111*** [0.006]	0.111*** [0.006]	0.111*** [0.006]	0.110*** [0.006]	0.110*** [0.006]
AI	−0.209*** [0.103]	−0.112 [0.112]	−0.210** [0.102]	−0.226** [0.096]	−0.229** [0.096]	−0.234*** [0.094]	−0.237** [0.093]
EXPANSION	−0.013** [0.006]	−0.005 [0.004]	−0.012* [0.005]	−0.011* [0.005]	−0.010* [0.005]	−0.008 [0.006]	−0.008 [0.005]
LEV	−0.362*** [0.018]	−0.362*** [0.018]	−0.363*** [0.018]	−0.364*** [0.018]	−0.397*** [0.016]	−0.259*** [0.025]	−0.288*** [0.026]
CAPEXP	−0.329*** [0.039]	−0.324*** [0.038]	−0.329*** [0.039]	−0.330*** [0.039]	−0.330*** [0.039]	−0.330*** [0.039]	−0.330*** [0.039]
CR	−0.009*** [0.003]		−0.009*** [0.003]	0.009 [0.006]	0.005 [0.006]	0.009 [0.005]	0.005 [0.005]
GOV		−0.005 [0.005]	−0.004 [0.005]	0.025*** [0.008]	0.023*** [0.008]	0.046*** [0.009]	0.044*** [0.010]
CR*GOV				−0.014*** [0.004]	−0.013*** [0.004]	−0.014*** [0.004]	−0.013*** [0.003]
CR*LEV					0.018** [0.008]		0.015** [0.007]
GOV*LEV						−0.086*** [0.017]	−0.083*** [0.018]
Adjusted R^2	0.584	0.582	0.584	0.584	0.585	0.585	0.586
Observations	93,537	93,537	93,537	93,537	93,537	93,537	93,537
Panel B: Rule of law							
CR	−0.009*** [0.003]		−0.009*** [0.003]	0.008 [0.005]	0.004 [0.005]	0.004 [0.006]	0.001 [0.005]
GOV		−0.002 [0.006]	−0.001 [0.005]	0.024*** [0.007]	0.023*** [0.007]	0.038*** [0.007]	0.037*** [0.007]
CR*GOV				−0.013*** [0.003]	−0.013*** [0.003]	−0.011*** [0.003]	−0.010*** [0.003]
CR*LEV					0.018** [0.008]		0.015** [0.006]
GOV*LEV						−0.082*** [0.015]	−0.080*** [0.016]
Adjusted R^2	0.584	0.582	0.584	0.584	0.585	0.586	0.586
Observations	93,537	93,537	93,537	93,537	93,537	93,537	93,537

Table 4 (*Continued*)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel C: Corruption							
CR	−0.009*** [0.003]		−0.009*** [0.003]		0.005		0.004 [0.005]
GOV		−0.006 [0.005]	−0.005 [0.004]	0.009* [0.005]	0.020*** [0.006]	0.009* [0.005]	0.036*** [0.007]
CR*GOV				0.021*** [0.006]		0.037*** [0.007]	−0.011*** [0.002]
CR*LEV				−0.011*** [0.003]	−0.011*** [0.003]	−0.011*** [0.002]	0.016** [0.006]
GOV*LEV					0.017** [0.008]	−0.063*** [0.012]	−0.063*** [0.013]
Adjusted R^2	0.584	0.583	0.584	0.584	0.585	0.586	0.586
Observations	93,537	93,537	93,537	93,537	93,537	93,537	93,537

The dependent variable is the ratio of cash and short term investments to total assets. All regressions include firm and year fixed effects. The definitions of all variables are given in Table 1. Standard errors corrected for heteroscedasticity and country-level clustering are in brackets. ***, ** and * denote significance at 1%, 5% and 10% respectively.

We examine next the other country variables in our regressions followed by the firm variables (we discuss the relationships for all three panels but for most of these variables we only report coefficients from Panel A). We control for PRVCREDIT, the ratio of private credit by deposit money banks and other institutions to GDP. This variable should reflect the supply of credit in each country and more credit availability should lower the need for precautionary cash holdings as firms can more likely obtain credit in the future. The coefficient on PRV-CREDIT is significantly positive, the opposite of what we expected. We find an insignificant negative relation between shareholder rights and cash holdings, contrary to Dittmar et al. (2003) which observed a significant negative relationship. The sign on stock market capitalization is positive but is only sometimes significant. Our results suggest that firms hold less cash during expansions. This probably results from greater spending during expansions than contractions.

Our results for firm-specific variables are in line with prior studies such as Opler et al. (1999) and Dittmar et al. (2003). A positive relation between market-to-book ratios and cash holdings suggest that firms with more investment opportunities generally hold more cash. Real firm size (RSIZE) has a negative and significant coefficient, which is consistent with the argument that larger firms can access capital markets more easily and thus do not need to hold as much cash. Net working capital has a negative sign indicating that these assets can act as substitutes for cash since they can be sold or liquidated rather easily. R&D has a positive relation with cash holdings. Firms that invest more in R&D may need to hold more cash because they are constrained in raising external funds due to a higher degree of information asymmetry. Like Opler et al. (1999), we find that leverage (LEV) has a significantly negative effect on cash holdings.[9] We also observe that cash flow (CFLOW) is negatively related with cash holdings. It could be that firms with high cash flows have less cash because they feel confident that their stockpile can be easily replenished. Capital expenditures has a negative coefficient which suggests that firms that have a high ratio of capital expenditures to total assets find that their cash holdings are smaller on average. Our findings concerning asymmetric information are the opposite of what we postulated.

We use subsets of our data to examine two additional questions. First we eliminate U.S. companies to see whether American companies are driving the results. In unreported results, we find that our most important finding that the interaction variable between creditor rights and gov-

ernance remains significantly negative when U.S. observations are removed. Second we eliminate countries with less than 100 observations on the grounds that firms in these countries may not be representative of firms in general in those countries. Our findings do not change. In the last three columns of Table 4 we investigate another possible channel on how creditor rights (country governance) could affect cash holdings. If stronger creditor rights (strong country governance) were to increase leverage and high leverage would lower the need for cash, then the interaction term between creditor rights (country governance) and leverage should be negative. It needs to be pointed out that the evidence that strong creditor rights results in greater leverage is far from conclusive.[10] Our findings show that the interaction term of creditor rights and leverage is positive, not negative in all three panels. The coefficient on the interaction term governance and leverage is however negative. Perhaps more importantly, the coefficient on the interaction term between creditor rights and governance remains significantly negative even after we account for possible interactions involving leverage with creditor rights and leverage with country governance.[11] Our findings, after considering another possible channel between creditor rights and cash holdings, reaffirm that strong creditor rights and high governance results in lower cash holdings.

5.2.1. Robustness results with alternative measure of cash. We repeat our regression analysis by employing an alternative measure of cash holdings used in the literature. In calculating this measure, we scale cash and short-term investments by net assets (i.e., total assets less cash and short-term investments) and do the same for NWC and cash flow. In Table 5 we report only the results from models 3 and 4 in Table 4. Our main finding (a significant negative relation between cash holdings and the interaction variable of creditor rights and governance) does not change when we employ an alternative definition of cash.

5.2.1. Equally weighed regression results. All of our tests so far have given equal weight to each firm in our data. As a result, countries like the U.S., U.K., and Japan have more influence on our results since these countries have more observations. In order to give equal weight to each country, we conduct a regression where each country per year has one observation. For firm variables, we use the mean of that variable each year as the value for that observation. As a result, the number of observations is reduced dramatically. Table 6 reports the

Table 5. *The Results with Alternative Measure of Cash Holdings*

	Panel A: Country governance		Panel B: Rule of law		Panel C: Corruption	
Constant	-1.394*** [0.217]	-1.819*** [0.151]	-1.394*** [0.222]	-1.840*** [0.173]	-1.406*** [0.210]	-1.811*** [0.156]
PRVCREDIT	0.149 [0.102]	0.078 [0.115]	0.131 [0.103]	0.041 [0.099]	0.157 [0.102]	0.074 [0.111]
SR	-0.065*** [0.022]	-0.078*** [0.019]	-0.067*** [0.022]	-0.074*** [0.019]	-0.065*** [0.022]	-0.075*** [0.019]
STOCKCAP	0.062 [0.090]	0.063 [0.092]	0.055 [0.094]	0.076 [0.088]	0.068 [0.088]	0.067 [0.087]
MB	0.119*** [0.009]	0.120*** [0.010]	0.118*** [0.009]	0.119*** [0.009]	0.119*** [0.009]	0.120*** [0.010]
RSIZE	0 [0.010]	-0.002 [0.009]	0 [0.010]	-0.001 [0.009]	0 [0.010]	-0.003 [0.009]
NWC	-1.212*** [0.069]	-1.226*** [0.072]	-1.213*** [0.070]	-1.226*** [0.073]	-1.212*** [0.070]	-1.227*** [0.073]
CFLOW	-0.417*** [0.032]	-0.416*** [0.032]	-0.415*** [0.032]	-0.416*** [0.032]	-0.417*** [0.032]	-0.416*** [0.032]
R&D	0.385*** [0.037]	0.386*** [0.036]	0.385*** [0.036]	0.386*** [0.036]	0.386*** [0.037]	0.386*** [0.036]
AI	-1.309* [0.670]	-1.556*** [0.572]	-1.296* [0.680]	-1.517** [0.567]	-1.327* [0.661]	-1.616*** [0.570]
EXPANSION	-0.170** [0.073]	-0.153** [0.066]	-0.180** [0.076]	-0.158** [0.071]	-0.165** [0.070]	-0.160** [0.064]
LEV	-3.439*** [0.166]	-3.463*** [0.163]	-3.432*** [0.170]	-3.470*** [0.160]	-3.444*** [0.165]	-3.468*** [0.163]
CAPEXP	-1.960*** [0.238]	-1.979*** [0.240]	-1.966*** [0.240]	-1.968*** [0.238]	-1.958*** [0.237]	-1.982*** [0.239]
CR	-0.004 [0.045]	0.281*** [0.064]	-0.004 [0.046]	0.261*** [0.070]	-0.002 [0.044]	0.274*** [0.056]
GOV	-0.048 [0.077]	0.400*** [0.112]	-0.001 [0.069]	0.386*** [0.082]	-0.055 [0.065]	0.333*** [0.081]
CR*GOV	-0.213*** [0.052]		-0.202*** [0.048]		-0.171*** [0.036]	
Adjusted R^2	0.53	0.531	0.53	0.532	0.53	0.532
Observations	92,204	92,204	92,204	92,204	92,204	92,204

The dependent variable is the natural logarithm of the ratio of cash and short term investments to net total assets. All regressions include firm and year fixed effects. The definitions of all variables are given in Table 1. Standard errors corrected for heteroscedasticity and country-level clustering are in brackets.
***, ** and * denote significance at 1%, 5% and 10% respectively.

Table 6. *Country Level Regressions*

	Panel A: Country governance		Panel B: Rule of law		Panel C: Corruption	
Constant	0.087*** [0.006]	0.077*** [0.006]	0.088*** [0.005]	0.080*** [0.006]	0.088*** [0.006]	0.079*** [0.006]
PRVCREDIT	0.024*** [0.008]	0.023*** [0.008]	0.021*** [0.008]	0.020*** [0.008]	0.022*** [0.008]	0.020*** [0.008]
SR	0.001 [0.002]	0.002 [0.002]	0.001 [0.002]	0.002 [0.002]	0.001 [0.002]	0.002 [0.002]
STOCKCAP	0.017*** [0.003]	0.016*** [0.003]	0.017*** [0.003]	0.016*** [0.003]	0.016*** [0.003]	0.015*** [0.003]
CR	0.001 [0.002]	0.007** [0.003]	0.000 [0.002]	0.006** [0.003]	0.000 [0.002]	0.007** [0.003]
GOV	0.007** [0.003]	0.020*** [0.005]	0.009*** [0.003]	0.019*** [0.004]	0.008*** [0.002]	0.020*** [0.004]
CR*GOV		−0.007*** [0.002]		−0.006*** [0.002]		−0.006*** [0.002]
Adjusted R^2	0.244	0.258	0.251	0.261	0.252	0.266
Observations	456	456	456	456	456	456

The dependent variable is mean of the ratio of cash and short term investments to total assets. All regressions are at the country level. The definitions of all variables are given in Table 1. Robust standard errors are in brackets. ***, ** and * denote significance at 1%, 5% and 10% respectively.

Table 7. *Instrumental Variable Regressions*

	Panel A: Country governance		Panel B: Rule of law		Panel C: Corruption	
Constant	0.345*** [0.014]	0.294*** [0.013]	0.341*** [0.014]	0.277*** [0.012]	0.338*** [0.014]	0.289*** [0.013]
PREDLEV	−0.986*** [0.078]	−0.976*** [0.077]	−0.970*** [0.076]	−0.963*** [0.075]	−0.983*** [0.077]	−0.968*** [0.076]
PRVCREDIT	0.026*** [0.002]	0.018*** [0.002]	0.023*** [0.002]	0.012*** [0.002]	0.026*** [0.002]	0.017*** [0.002]
SR	−0.008*** [0.001]	−0.008*** [0.001]	−0.008*** [0.001]	−0.008*** [0.001]	−0.007*** [0.001]	−0.007*** [0.001]
STOCKCAP	−0.001 [0.002]	−0.001 [0.002]	−0.003* [0.002]	0 [0.002]	0 [0.002]	0 [0.002]
MB	0.006*** [0.001]	0.006*** [0.001]	0.006*** [0.001]	0.006*** [0.001]	0.006*** [0.001]	0.006*** [0.001]
RSIZE	0.010*** [0.002]	0.010*** [0.002]	0.010*** [0.002]	0.009*** [0.002]	0.010*** [0.002]	0.009*** [0.002]
NWC	−0.366*** [0.020]	−0.366*** [0.020]	−0.363*** [0.019]	−0.364*** [0.019]	−0.365*** [0.019]	−0.364*** [0.019]
CFLOW	−0.109*** [0.008]	−0.107*** [0.008]	−0.105*** [0.008]	−0.105*** [0.008]	−0.108*** [0.008]	−0.105*** [0.008]
R&D	0.072*** [0.005]	0.073*** [0.005]	0.072*** [0.005]	0.073*** [0.004]	0.072*** [0.005]	0.073*** [0.004]
AI	0.559*** [0.075]	0.519*** [0.073]	0.562*** [0.074]	0.500*** [0.071]	0.556*** [0.074]	0.508*** [0.072]
EXPANSION	−0.016*** [0.004]	−0.015*** [0.004]	−0.018*** [0.004]	−0.014*** [0.004]	−0.016*** [0.004]	−0.016*** [0.004]
CAPEXP	−0.200*** [0.013]	−0.205*** [0.013]	−0.203*** [0.013]	−0.205*** [0.013]	−0.201*** [0.013]	−0.206*** [0.013]
CR	−0.002 [0.001]	0.027*** [0.003]	−0.002 [0.001]	0.033*** [0.003]	−0.001 [0.001]	0.026*** [0.003]
GOV	−0.026*** [0.003]	0.020*** [0.004]	−0.015*** [0.003]	0.035*** [0.003]	−0.020*** [0.003]	0.018*** [0.003]
CR*GOV		−0.021*** [0.002]		−0.026*** [0.002]		−0.017*** [0.001]
Adjusted R^2	0.2563	0.2601	0.2578	0.2627	0.2571	0.2618
Observations	50,573	50,573	50,573	50,573	50,573	50,573

The dependent variable is the ratio of cash and short term investments to total assets. PREDLEV is the predicted leverage from the first stage regression where U.S. leverage (by industry and by year) is used as the instrumental variable. The definitions of all variables are given in Table 1. Standard errors are reported in brackets below the estimated coefficients.
***, ** and * denote significance at 1%, 5% and 10% respectively.

results. We find that the interaction term between governance and creditor rights whether we use governance scores, the rule of law index, or the corruption index remains significantly negative. High levels of both creditor rights and country governance are associated with lower levels of cash holdings.

5.3. *Joint Determination of Cash Levels and Debt*

It is likely that a number of variables in the cash holdings equation are jointly determined, in which case we need to change our estimation procedure. We try in this paper to address the potential endogeneity issue between leverage and cash holdings, recognizing that there may well be other remaining endogeneity issues. To address the endogeneity issue between leverage and cash holdings, we employ an instrumental variable for leverage. A major difficulty in finding an appropriate instrument for leverage is that variables that affect leverage are also very likely to affect cash holdings. An instrument for leverage should be correlated with leverage and be uncorrelated with the error term in equation 1. We follow an approach from Rajan and Zingales (1998) and use the mean leverage by industry for U.S. firms as the instrument for leverage for foreign firms for that year. Hence the number of observations for the estimation for equation 1 is reduced to the number of non U.S. firms.

In Table 7, where we run firm fixed effect 2SLS regressions, we observe that our findings are similar to our previous results. The interaction term between governance and creditor rights is significantly negative for all three panels.

6. Conclusions

This paper seeks to explain differences in corporate cash holdings by investigating the role of creditor rights and corporate governance. We hypothesize that firms will hold lower amounts of cash when both creditor rights and country governance are very strong. Strong creditor rights should elicit a greater supply of funds due to lower interest rates and greater protection for creditors. High country governance means that laws affecting creditors will be enforced, corruption is minimal, and recovery times reduced. Managers will not need to hold as much cash now in order to fund future investment needs because they can expect that funds will be available in the future. Our results support

this hypothesis. These results are robust to alternative definitions of cash holdings and governance, different country samples, and concerns about endogeneity.

Our results illustrate the importance of country-level variables in explaining differences in corporate cash holdings. High levels of corporate liquidity have attracted significant academic and public policy attention in recent times. We contribute to these discussions by showing that firms respond to macro-level institutional factors in their liquidity decisions.

Notes

1. See Drobetz et al. (2010) for a discussion of information asymmetry and the value of cash.
2. We also control for leverage. Opler et al. (1999) point out, however, that there is no clear prediction on how firm-level leverage should affect cash holdings under the trade-off model. On one hand, it is possible to argue that more debt increases the odds of bankruptcy and therefore highly levered firms should hold more cash as a cushion. On the other hand, increased debt may result in less cash if debt acts to reduce agency issues. Moreover, debt and cash can be substitutes as firms can use lines of credits to substitute for costly cash holdings.
3. See also Kusnadi and Wei (2011) for a study of shareholder rights and changes in cash.
4. The literature has also compared the value of cash in well-governed companies with the value in companies with poor governance (Pinkowitz et al., 2006; Dittmar and Mahrt-Smith, 2007; Fresard and Salva, 2010).
5. A natural experiment occurs when an event like a change in creditor rights occurs that affects some countries/individuals/firms but not others. In a natural experiment there is a control group (cgroup) where the event does not affect this group and a treatment group (tgroup) where the event presumably affects this group. Let t_2 be a dummy variable that equals 1 for all observations in the second period (after the event has occurred) and zero otherwise. The regression equation for our natural experiment is cash = $b_0 + b_1 t_2 + b_2 \text{tgroup} + b_3 t_2 * \text{tgroup}$ + other variables. The coefficient of interest is b_3.
6. The coefficient b_3 discussed in endnote 5 is significantly negative for both Japan and Indonesia, contrary to expectations, but significantly positive for Thailand. Decreasing in cash holding after a decrease in creditor right index in Japan can be related to the explanation by Pinkowitz and Williamson (2001) who show that bank monopoly power influenced cash holdings of firms in Japan.
7. We find, in unreported results, that the same pattern (positive but insignificant coefficient for creditor rights, a positive and significant coefficient for governance, and a significantly negative interaction coefficient) occurs when alternative definitions for leverage are used.
8. Using the results from column 4 of Panel A in Table 4, the total effect of governance, creditor rights, and the interaction between the two variables on cash holdings should be negative if .009CR + .025GOV −.014CR*GOV is less than zero. This occurs when CR = 4 and GOV = 1.16. If CR equals 3 then GOV must be 1.59 or higher.
9. We observe this no matter what definition we use for leverage.

10. There are two opposing views on whether stronger creditor rights will induce more leverage. On one hand, the supply side proponents (see for example, La Porta et al., 1997 and Djankov et al., 2007) argue that suppliers of credit will be more willing to provide credit given greater protection. The demand side view (Vig, 2013 and Cho et al., 2014) believes that corporations will demand less debt because the consequences (loss of jobs and control of the firm) from financial distress are worse to the management of companies under strong creditor rights.

11. Our findings (unreported) are very similar when we employ our two alternative definitions for leverage with one exception. The coefficient on the interaction term between creditor rights and leverage remains positive but it is no longer significant.

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