

Labor Unions and Corporate Cash Holdings: Evidence from International Data

Zhenxu Tong *

University of Exeter

Hui Huang **

University of Exeter

First Draft: May 2016

This Draft: November 2016

Abstract

We examine how the presence of labor unions affects corporate cash holdings in the international setting. We find that firms in countries with higher union membership have less corporate cash holdings. We divide the firms into sub-groups and find that this negative relationship is stronger for firms in the countries with weaker employment protection legislation, for firms in the countries with a higher degree of labor bargaining centralization, and for financially constrained firms. Moreover, we find that the market value of corporate cash holdings is lower for firms in countries with higher union membership. We also find that the positive relation between corporate cash holdings and operating profitability is stronger for firms in countries with lower union membership, and that the positive relation between corporate cash holdings and labor costs is weaker for firms in countries with lower union membership. In addition, we find that the number of strikes & lockouts is higher in countries with more corporate cash holdings. Our findings are consistent with the bargaining hypothesis, and we conclude that firms strategically choose corporate cash holdings to gain the bargaining position with labor in the international setting.

JEL classifications: G32; J51

Keywords: Corporate cash holdings; Labor unions

* Corresponding author. Address: Xfi Centre for Finance & Investment, School of Business, University of Exeter, Rennes Drive, Exeter EX4 4ST, United Kingdom. Telephone: +44 1392 723155. E-mail address: z.tong@exeter.ac.uk.

** Address: Xfi Centre for Finance & Investment, School of Business, University of Exeter, Rennes Drive, Exeter EX4 4ST, United Kingdom. Telephone: +44 7709 699392. E-mail address: hh337@exeter.ac.uk.

1. Introduction

Corporate cash holdings occupy an important role in the collective bargaining with labor unions around the world. For example, in the US in 2006, the workers in General Motors observed that the firm had a cash balance of 20 billion dollars, and claimed that “they hope the threat of a strike will prompt GM’s management to dip into its cash reserves to compensate them for accepting lower pay and benefits”.¹ For another example, in South Africa in 2016, the labor unions in wage negotiations with South African Airlines (SAA) said that they “had revised upwards their wage demands from single digits to 11%, after the airline's board chair Dudu Myeni said on Friday SAA was financially sound and ‘had money’”. After that, the South African Airlines “moved to distance itself from perceptions it had sufficient cash to meet high wage demands”.²

In this paper, we examine how the presence of labor unions affects corporate cash holdings in the international setting. Our motivation is based on the following three perspectives. First, corporate cash holdings have an important role in a firm’s balance sheet around the world. For example, Pinkowitz, Stulz and Williamson (2013) find that in 2010 the mean of the ratio of cash to assets is 13.49% for the firms in Compustat in 45 countries, and that the corresponding mean is 21.48% for US firms. Given such a large magnitude of corporate cash holdings, we believe that it is a promising area to examine the impact of labor unions on corporate financial policy in the international setting.

Second, while labor union is a prevalent phenomenon around the world, there is substantial difference between US and other countries in the world. For example, Visser (2006) examines the data of labor unions in the international setting. He finds that in 2001 the union density

¹ Last tango in Detroit? General Motors, Delphi and the unions. *The Economist*, April 2006, page 70.

² SAA denies wage deadlock during negotiations. *Times LIVE*, 12 May 2016. The article is available at the following website. A PDF copy of the article is also available from the authors upon request. <http://www.timeslive.co.za/local/2016/05/12/SAA-denies-wage-deadlock-during-negotiations>

ranges from 8.1% to 78.0% in 24 countries. Among them, the union density in the US is 12.8%, ranking at the 22nd place. It implies that there is a significant difference between the US data and the international data in terms of unionization rates. This motivates us to conduct the research in the international setting.

Third, the findings in the existing literature reveal that sometimes there is a different pattern in the impact of labor unions on corporate financial policy between US data and international data. For example, Matsa (2010) finds that a firm with the external finance constraints has an incentive to use the cash flow demands of debt service to improve its bargaining position with workers. However, Simintzi, Vig and Volpin (2012) find that there is a negative relation between union density and leverage, and argue that this is not consistent with the theory of debt as a bargaining tool. Instead, they argue that the employment protection increases operating leverage, crowding out financial leverage. Nevertheless, the situation may be different in the setting of corporate cash holdings. For instance, the two examples we mentioned in the beginning of the paper imply that corporate cash holdings affect the collective bargaining both in the US and in South Africa. Therefore, we conjecture that corporate cash holdings may have a bargaining role both in the US and in other countries in the world. This motivates us to examine the impact of labor unions on corporate cash holdings in the international setting.

We develop two hypotheses. First, the bargaining hypothesis argues that with the presence of stronger labor unions, a firm will strategically hold lower level of corporate cash holdings to increase a firm's bargaining position with labor unions, because this can make a more credible case that the risk of liquidity shortages would be exacerbated by granting additional concessions to the labor unions. Second, the operating leverage hypothesis argues that since stronger labor unions increase the rigidity of labor costs, the trade-off theory predicts that a firm will hold a higher level of corporate cash holdings with the presence of a higher level of fixed costs.

We use a sample of 355715 firm-year observations from 66 countries in our empirical analysis. We use the country-level union membership, defined as total number of trade union members to the total number of paid employees in a country, as our primary measure of the bargaining power of labor unions across countries. Since endogeneity problem can be a potential concern in studying the relation between union membership and corporate cash holdings, we use the instrumental variables approach accompanied with the tests on the validity of the instruments and the specification.

We find that firms in countries with higher union membership have less corporate cash holdings. The data shows that a one standard deviation increase in the country-level union membership leads to a 0.317 decrease in corporate cash holdings which are defined as the ratio of cash and marketable securities to non-cash assets. This corresponds to a decrease in corporate cash holdings with a dollar value of 55.40 million dollars. We divide the firms into sub-groups based on the characteristics that can affect the bargaining power of labor unions. We find that this negative relation between country-level union membership and corporate cash holdings is stronger for firms in the countries with weaker employment protection legislation, for firms in the countries with a higher degree of labor bargaining centralization, and for financially constrained firms.

To better understand the negative relation between country-level union membership and corporate cash holdings, we proceed to examine how labor unions affect the market value of corporate cash holdings. We find that the market value of corporate cash holdings is lower for firms in countries with higher union membership. Moreover, we examine how labor unions affect the relation between corporate cash holdings and profitability as well as labor costs. We find that the positive relation between corporate cash holdings and operating profitability is stronger for firms in countries with lower union membership, and that the positive relation between corporate cash holdings and labor costs is weaker for firms in countries with lower

union membership.

Our findings are consistent with the bargaining hypothesis, and we conclude that firms strategically choose corporate cash holdings to gain the bargaining position with labor in the international setting.

Our paper makes several contributions. First, we contribute to the literature by finding out the difference in the role of bargaining between cash and leverage in terms of the comparison between US and international data. Both cash (e.g. Klasa, Maxwell and Ortiz-Molina, 2009) and leverage (Matsa, 2010) have been found as an effective bargaining tool in the studies that use US data. However, Simintzi, Vig and Volpin (2012) argue that leverage is not regarded as a bargaining tool in the international data. Nevertheless, the situation is different in the setting of corporate cash holdings because we find that corporate cash holdings have an important role for bargaining in the international data. Therefore, if we take our paper and Klasa, Maxwell and Ortiz-Molina (2009) as a pair, and take Simintzi, Vig and Volpin (2012) and Matsa (2010) as another pair, the comparison between the two pairs reveal that cash and leverage play different roles in the collective bargaining between US data and international data. This has not been documented in the literature.

Broadly speaking, our findings are also consistent with the argument proposed by Opler et al. (1999) that cash is not negative debt. Opler et al. (1999) argues that cash is not negative debt from the perspective of trade-off theory.³ However, our paper reveals a new channel, namely collective bargaining, through which cash is not simply regarded as negative debt based on the study of international data. Therefore, our paper extends Opler et al. (1999) by pointing out a new difference between cash and leverage from the bargaining perspective.

Second, our research extends the literature on corporate cash holdings in the international

³ Opler et al. (1999) state that “..... for a given amount of net debt, there is an optimal amount of cash, and cash is not simply negative debt”. (see Opler et al., 1999, page 8)

setting. There is a large literature on corporate cash holdings using both US data⁴ and international data. Among the previous papers that use international data, Dittmar, Marhr-Smith and Servaes (2003) find that the level of corporate cash holdings is determined by the degree of shareholder protection from law in different countries, and argue that firms with low shareholder protection cannot make managers to disgorge cash. Kalcheva and Lins (2007) find that when external country-level shareholder protection is weak, firm values are lower when controlling managers hold more cash. Lins, Servaes and Tufano (2010) conduct an international survey and find that lines of credit are strongly related to a firm's need for external financing to fund future investment opportunities, and that cash is primarily held as a general buffer against future cash flow shortfalls. To our knowledge, no previous paper has examined the relation between labor unions and corporate cash holdings in the international setting.

Third, we add to the literature on the impact of labor unions on corporate finance in the international setting. There is growing literature that examines the impact of labor unions on corporate finance. Many papers in this literature use the US data. For example, previous papers have focuses on the impact of labor unions on leverage (e.g., Bronars and Deere, 1991; Hanka, 1998; Matsa, 2010), earnings management (e.g., DeAngelo and DeAngelo, 1991; D'Souza, Jacob, and Ramesh, 2001), and the cost of equity (e.g., Chen, Kacperczyk, and Ortiz-Molina, 2011). Moreover, Agrawal (2012) finds that labor union pension funds have preferences that partly reflect union worker interests rather than equity value maximization alone. Lee and Mas (2012) find a negative impact of union elections on firm performance. Among the papers that use international data, Atanassov and Kim (2009) documents the importance of interaction

⁴ Among the previous papers that use the US data, for example, Opler, Pinkowitz, Stulz and Williamson (1999) argue that corporate cash holdings can be explained by the tradeoff theory, the financing hierarchy theory and the agency theory. Harford (1999) finds that cash-rich firms are more likely to make value-decreasing acquisitions. Mikkelson and Partch (2003) find that firms with persistent high cash holdings do not have lower operating performances, and argue that the findings do not support the free cash flow hypothesis. Dittmar and Mahrt-Smith (2007) find that corporate charters of takeover defenses and institutional ownership affect the value of corporate cash holdings.

among management, labor, and investors in shaping corporate governance. They find that strong union laws protect not only workers but also underperforming managers. Therefore, our research extends the literature by studying the impact of labor unions on corporate cash holdings in the international setting.

The paper is organized as follows. Section 2 develops the hypotheses. Section 3 describes the data and the variables. Section 4 discusses the methodology. Section 5 presents the results. Section 6 shows the robustness checks. Section 7 concludes the paper.

2. Hypotheses

We develop the hypotheses in this section.

2.1. Bargaining

There is an extensive literature on the impact of debt on the bargaining between the firm and the labor (e.g., Baldwin, 1983; Bronars and Deere, 1991; Dasgupta and Sengupta, 1993; Perotti and Spier, 1993; Hanka, 1998; Matsa, 2010). This literature is built upon the essential rationale that employees will accept a lower wage with the presence of a substantial amount of debt, provided that the bankruptcy will be costly for employees. Consequently, a firm can gain the bargaining position with labor by taking on more debts.⁵

Klasa et al. (2009) apply this reasoning to the area of corporate cash holdings. They argue that firms hold less cash holdings to improve their bargaining positions against labor unions, because firms can make it a more credible case that the risk of liquidity shortages would even be exacerbated by granting additional concessions to the labor unions. As a result, a firm will strategically hold a lower level of corporate cash holdings to increase its bargaining position

⁵ For example, Bronars and Deere (1991) develop a model in which firms use debt to protect the wealth of shareholders from the threat of unionization. By issuing debt, firms can credibly reduce the funds that are available to a potential union when bankruptcy is costly. Bronars and Deere show that there is a cooperative Nash solution where the union will moderate its demand in the face of outstanding debt, and that there is a negative relation between the union wage and debt.

with labor. We expect that this mechanism is more likely to occur with the presence of stronger labor unions, because it will be more beneficial for a firm to engage in this kind of strategic choice of corporate cash holdings. Therefore, we have the following hypothesis.

Hypothesis 1: The bargaining hypothesis predicts that there is a negative relation between the strength of labor unions and the level of corporate cash holdings.

2.2. Operating leverage

Labor unions make wages more sticky and layoffs more costly. This increases the fixed labor costs, which results in an increase in a firm's operating leverage. For example, Chen, Kacperczyk, and Ortiz-Molina (2011) find that unionization is positively related to various measures of operating leverage. Danthine and Donaldson (2002) argue that fixed labor costs are an important source of operating leverage.

Operating leverage can affect a firm's corporate cash holdings, because according to the tradeoff theory of corporate cash holdings, firms hold more cash when there are more expenditures due to the transaction motive. Kahl, Lunn and Nilsson (2014) find that firms with higher fixed costs hold more corporate cash holdings.

Linking the two streams of literature together, it implies that there is a positive relation between labor unions and corporate cash holdings through the impact of operating leverage. Similarly, this mechanism is more likely to occur with the presence of stronger labor unions, because the increase in operating leverage will be higher with the presence of stronger labor unions. Therefore, we have the following hypothesis.

Hypothesis 2: The operating leverage hypothesis predicts that there is a positive relation between the strength of labor unions and the level of corporate cash holdings.

3. Data and Variables

In this section, we describe the data and variables.

3.1. Data

This paper uses the international data obtained from the following sources. We get the financial data of U.S. firms and Canadian firms from Compustat North America database. We get the financial data of firms in other countries from Compustat Global database. We convert the data in foreign currencies to the corresponding data in U.S. dollars by using the monthly exchange rates from Compustat Global database. We get the country-level data of union membership from ILOStat database maintained by International Labor Organization. The sample period is from 1992 to 2013. The data starts from 1992 because we need to use the data in the prior five years to calculate the industry cash flow volatility, while the data in Compustat Global database starts from 1987. We follow the literature (e.g., Pinkowitz, Stulz and Williamson, 2013) and exclude firms with less than 5 million U.S. dollars in total assets or market capitalization. We also follow the literature and exclude financial firms (SIC codes between 6000 and 6999). We exclude the observations with incomplete data. Our final sample consists of 42777 firms with 355715 firm-year observations from 66 countries.

3.2. Variables

3.2.1. Union Membership

We use the variable Union Membership as a measure of the country-level bargaining power of labor unions. Union Membership is defined as the ratio of the total number of trade union members to the total number of paid employees in a country. A higher level of Union Membership indicates that the labor unions in a country have higher bargaining power.

3.2.2. Corporate Cash Holding

We follow the literature (e.g., Opler et al., 1999) and define the variable Corporate Cash Holdings as the ratio of cash and marketable securities to non-cash assets, where non-cash

assets is calculated as total assets minus cash and marketable securities.

3.2.3. Control Variables

We include the following control variables. Size is defined as natural logarithm of non-cash assets. M/B is defined as market value of equity plus non-cash assets minus book value of equity, divided by non-cash assets. Leverage is defined as the ratio of long-term debts to non-cash assets. Capital Expenditures are defined as the ratio of capital expenditures to non-cash assets. Dividends are defined as the ratio of dividends to non-cash assets. Cash Flow is defined as the ratio of income before extraordinary items to non-cash assets. R&D is defined as the ratio of research and development expenses to non-cash assets. Net Working Capital is defined as the ratio of working capital minus cash and marketable securities to non-cash assets. Industry Cash Flow Volatility is calculated as the standard deviation of the median of Cash Flow in an industry classified by two-digit SIC codes in the prior 5 years. We also include year dummy variables, industry dummy variables and country dummy variables in our regressions.

Among these dummy variables, we use country dummy variables to control the time-invariant characteristics in different countries. For example, Dittmar et al. (2003) include the variables such as shareholder rights as developed by La Porta et al. (1997), a dummy variable indicating whether the country has the tradition of common law or civil law, the level of external capital as documented in La Porta et al. (1997), and the level of private credit as documented in Levine, Loayza, and Beck (2000). However, these variables are all time-invariant in different countries.⁶ It means that we do not need to include these four variables as additional control variables in the regression because they have already been controlled by the country dummy variables.

⁶ For example, the data of shareholder rights in La Porta et al. (1997) for each country in his sample period has unique value. It means that this variable will be the same for each year in our sample period for a country. Since this is a time-invariant variable, our country dummy variables can control for the impact related with shareholder rights. This is the similar situation with other three variables.

4. Methodology

In this section, we discuss the methodologies to handle the potential endogeneity problem.

4.1. The potential endogeneity problem

One may propose an argument that the potential endogeneity problem exists due to the reverse causality exists. For example, suppose firms in a country generally hold a lower level of cash. The workers in the country may be concerned that generally the firms in the country are not in a financially stable situation, and that these firms may have a shortage of corporate liquidity in the future and will fire workers to reduce expenditures. Consequently, more workers will join the labor unions to protect themselves, resulting in a higher country-level union membership. In this argument, the causality is the other way around.

4.2. Instrumental Variables

We use the instrumental variables approach (e.g., Greene, 1997) with two-stage least squares estimation (2SLS) to address the potential endogeneity problem.⁷ In our research setting, instrumental variables are those variables that directly affect the country-level union membership but do not directly affect a firm's choice of corporate cash holdings.

The labor economics literature has shown that both the gender (e.g., Hirsch, 1980; Hirsch, 1982) and age (e.g., Scoville, 1971) of workers affect the demand for union services. We follow the literature (e.g., Chen, Kacperczyk and Ortiz-Molina, 2011) and use the country-level data of these two variables as instrumental variables.

4.2.1. The gender of the workers

This is a country-level variable. The workers' gender variable is called Fraction of Female Workers and is defined as as the fraction of female workers in the country a firm belongs to.

⁷ The instrumental variables approach can also address the potential endogeneity problem stemming from the omitted variables when one cannot exhaust all the control variables in a regression.

4.2.2. The age of the workers

This is also a country-level variable. The workers' age variable is called Average Age of the Workers and is defined as the average age of the workers in the country a firm belongs to.

We collect the data on gender and age from the ILOStat database maintained by International Labor Organization. To our knowledge, no theory has been proposed in the literature to directly link the gender or age of workers to a firm's choice of corporate cash holdings.

4.3. The Validity of the Instruments and the Specification

We use a series of tests to examine the validity of our instrumental variables and the specification. First, we conduct a first-stage F-test to examine the relevance of the instruments to determine whether they are weak (Stock, Wright and Yogo 2002). Then, we examine the first-stage partial R^2 , which measures the strength of the instrumental variables (e.g., Shea, 1997). Moreover, we conduct the over-identifying restrictions test to examine the exogeneity of the instruments. Finally, we conduct the Hausman (1978) test to examine the difference in the estimates between the OLS estimation and the 2SLS estimation.

5. Results

In this section, we describe our empirical results. We start with univariate statistics, and then we report OLS regressions on the determinants of corporate cash holdings. Next, we report the results by using two-stage least squares (2SLS) estimation. Furthermore, we report the results of sub-samples separated by Employment Protection Legislation, labor bargaining centralization and financial constraints. Finally, we report the results on how the union membership affects the market value of corporate cash holdings, and the relation between corporate cash holdings and operating profitability as well as labor costs.

5.1. Univariate Statistics

Table 1 shows the univariate statistics. Panel A reports the univariate statistics of the variables. The mean of the variable Corporate Cash Holdings is 0.3418, and the median is 0.1232. The mean of the variable Union Membership is 0.2548, and the median is 0.1860. Panel B describes corporate cash holdings and union membership by countries. The mean of corporate cash holdings and union membership in a country are reported in the panel. The mean of the variable Union Membership for the U.S. is 0.1289, which is significantly lower than the mean of the variable Union Membership in the whole sample as reported in the Panel A. Given such large difference in the magnitude of Union Membership between the U.S. data and international data, it is meaningful to examine the impact of union membership on corporate cash holdings in the international setting.

5.2. OLS regression

We first use an OLS regression to examine the relation between country-level union membership and corporate cash holdings. We follow the literature (Opler et al., 1999) and include various control variables. We also add year dummy variables, industry dummy variables and country dummy variables in the regression. We follow the literature (e.g., Fernandes and Gonenc, 2016) and cluster the standard errors at the firm level. We report the p-value in the parentheses in the tables.

Table 2 reports the results. We find that the coefficient of Union Membership is -0.187 (p-value = 0.01). It implies that firms in countries with higher union membership hold less corporate cash holdings. This is consistent with our Hypothesis 1 that there is a negative relation between the strength of labor unions and the level of corporate cash holdings because a firm strategically choose corporate cash holdings to gain bargaining position with the labor.

In terms of the economic magnitude, Table 1 reports that the standard deviation of Union Membership is 0.2503. It implies that a one standard deviation increase in Union Membership

leads to a 0.047 ($= (-0.187) * 0.2503$) decrease in the level of Corporate Cash Holdings. Since the median of non-cash assets is 159.65 million dollars in our sample, this corresponds to a decrease in corporate cash holdings with a dollar value of 7.50 million dollars ($= 0.047 * 159.65$). The economic magnitude based on the OLS regression is relatively modest.

5.3. Country-level regression

Since we use country-level data of Union Membership, a country that has more firms takes more weight in the firm-level regression in Table 2. We therefore conduct a country-level analysis by giving each country an equal weight. We convert all firm-level variables into country-level variables each year by taking the average of the variables across the countries. This sample includes 974 country-year observations.

Table 3 reports the results. The coefficient of Union Membership is -0.125 (p-value=0.01). It implies that the country-level corporate cash holdings are lower with the presence of a higher country-level Union Membership. The results are consistent with the firm-level results in Table 2, and support the Hypothesis 1.

5.4. First-stage Regression

Table 4 shows the first-stage regression of the 2SLS estimation. The dependent variable is Union Membership. The independent variables are two instrumental variables and other control variables. We also include year dummy variables, industry dummy variables and country dummy variables in the regression. We find that the coefficient of the instrumental variable Fraction of Female Workers is 2.151 (p-value = 0.01) and the coefficient of Average Age of the Workers is -0.017 (p-value = 0.01).⁸ The partial F-statistic is 3795.91 (p-value = 0.01), indicating that the instruments are not weak. The partial R-square is 0.32, indicating that the

⁸ The positive coefficient of Fraction of Female Workers is consistent with the findings in Blanchflower (2006), who finds that male workers are less likely to join labor unions in public firms in a sample from 34 countries. The negative coefficient of Average Age of the Workers is consistent with the argument in Hirsch (1980) that older workers are less likely to join labor unions because they will receive a shorter time period of non-pension benefits than younger workers.

instruments have a reasonable strength.

5.5. Union Membership and the Corporate Cash Holdings

Table 5 shows the second stage of 2SLS estimation. The dependent variable is Corporate Cash Holdings. The coefficient of Union Membership is -1.265 (p -value = 0.01). We conduct the over-identifying restrictions test and find that the F-statistic is 1.55 (p -value = 0.21). This insignificant F-statistic indicates that these instrumental variables are exogenous and valid. We also conduct the Hausman test and find that the F-statistic is 114.47 (p -value = 0.01). This significant F-statistic implies that the 2SLS estimate reported in this table and the OLS estimate reported in Table 2 are significantly different. Therefore, it is more proper to draw implications based on the 2SLS estimates due to the existence of the endogeneity problem.

In terms of the economic magnitude, the 2SLS estimate is more economically significant than the OLS estimate. Using the 2SLS estimate reported in Table 5 and the standard deviation of Union Membership reported in Table 1, we find that the a one standard deviation increase in Union Membership leads to a 0.317 decrease ($= (-1.265) * 0.2503$) in the level of corporate cash holding. Since the median of non-cash assets is 159.65 million dollars in our sample, this corresponds to a decrease in corporate cash holdings with a dollar value of 55.40 million dollars ($= 0.317 * 159.65$)

Therefore, the results in Table 5 are consistent with the interpretation that firms hold less cash to gain bargaining position to the labor, and support the Hypothesis 1.

5.6. Employment Protection Legislation

Several recent papers on labor and finance have developed their research setting based on Employment Protection Legislation. For example, Simintzi, Vig and Volpin (2012) examine inter-temporal variation in employment protection legislation across 21 countries. They find that labor-friendly reforms are associated with a reduction in firm leverage. Bornhall, Daunfeldt and Rudholm (2015) examine the employment protection legislation in Sweden and

find that employment protection legislation seems to act as a growth barrier for small firms. Borisov, Gupta and Subramanian (2013) exploit within-country variation provided by changes in employment protection laws in OECD countries to examine the effect of stronger dismissal laws on M&A activity by U.S. firms in these countries.

We get the data of Employment Protection Legislation (EPL) indicator from OECD. It measures the procedures and relevant costs of hiring and dismissing employees, as well as working contracts. The indicators have been constructed by OECD based on statutory laws, collective bargaining agreements and case law as well as contributions from officials from OECD member countries and advice from country experts.⁹ A higher level of EPL indicates better employment protection.

A higher level of employment protection implies that it is more difficult to fire workers. Consequently, it increases the operating leverage. Therefore, we expect that the impact from the perspective of operating leverage as discussed in Hypothesis 2 will be stronger for firms in the countries with a higher level of employment protection. This can, at least, offset a certain degree of the impact from the bargaining perspective. Therefore, we expect that the negative relation between corporate cash holding and union membership is stronger (weaker) when a firm is in a country with a lower (higher) level of employment protection.

We divide the sample into two sub-groups. A firm is in a country with higher (lower) level of employment protection if the EPL indicator of that country is above (below) the median. Table 6 reports the OLS regressions and the second stage of 2SLS estimations for these two sub-groups.

Table 6 shows the results. In Panel A, we report the OLS regressions in Column 1 and 2. The coefficient of Union Membership in Column 1 is -0.312 (p -value = 0.01) for the sub-group

⁹ See the OECD website for more details about the Employment Protection Legislation indicator. <http://www.oecd.org/els/emp/oecdindicatorsofemploymentprotection.htm>

of firms in a country with lower level of employment protection. The coefficient of Union Membership in Column 2 is -0.083 (p-value = 0.01) for the sub-group of firms in a country with higher employment protection. We conduct a t-test of the difference in the coefficients of Union Membership between the two sub-groups separated by the EPL indicator, and report the results in Panel B. We find that the difference is -0.229 (p-value = 0.01).

Panel A also shows the second stage of 2SLS estimations in Column 3 and 4. The coefficient of Union Membership in Column 3 is -1.001 (p-value = 0.01) for the sub-group of firms in a country with lower level of employment protection. The coefficient of Union Membership in Column 4 is -0.082 (p-value = 0.16) for the sub-group of firms in a country with higher employment protection. The over-identifying restrictions test and the Hausman test show that it is more proper to draw implications based on the 2SLS estimates. The results in Column 4 support the interpretation that the operating leverage effect is stronger in the sub-group with higher EPL, which offsets the bargaining effect. Consequently, this results in the insignificant coefficient of Union Membership in this column. We also conduct a t-test of the difference in the coefficients of Union Membership between the two sub-groups separated by the EPL indicator, and report the results in Panel B. We find that the difference is -0.920 (p-value = 0.01).

Therefore, the results in Table 6 imply that the negative relation between corporate cash holding and union membership is stronger (weaker) when a firm is in a country with a lower (higher) level of employment protection. This is consistent with both Hypothesis 1 and Hypothesis 2.

5.7. Labor Bargaining Centralization

The degree of labor bargaining centralization has also been used as a measure of the power of collective bargaining in the literature (Simintzi, Vig and Volpin, 2012). We get the data of labor bargaining centralization from the Institutional Characteristics of Trade Unions, Wage

Setting, State Intervention and Social Pacts (ICTWSS) database.¹⁰ In that database, the variable Centralization is an indicator of the degree of labor bargaining centralization in a country, which is a continuous variable ranging from 0 to 1.

A higher level of Centralization indicates higher power of collective bargaining in a country, because a collective bargaining will have a broader impact and will be more centrally coordinated in a country. Therefore, we expect that the negative relation between corporate cash holding and union membership is stronger (weaker) when a firm is in a country with a higher (lower) level of Centralization.

We divide the sample into two sub-groups. A firm is in a country with higher (lower) level of Centralization if the Centralization indicator of that country is above (below) the median. Table 7 reports the OLS regressions and the second stage of 2SLS estimations for these two sub-groups.

Table 7 shows the results. In Panel A, we report the OLS regressions in Column 1 and 2. The coefficient of Union Membership in Column 1 is significantly more negative for the sub-group of firms in a country with lower level of Centralization than the coefficient for the sub-group of firms in a country with higher centralization.

Panel A also shows the second stage of 2SLS estimations in Column 3 and 4. The coefficient of Union Membership in Column 3 is -0.741 ($p\text{-value} = 0.01$) for the sub-group of firms in a country with lower level of Centralization. The coefficient of Union Membership in Column 4 is -9.934 ($p\text{-value} = 0.01$) for the sub-group of firms in a country with higher Centralization. The over-identifying restrictions test and the Hausman test show that it is more proper to draw implications based on the 2SLS estimates. We also conduct a t-test of the difference in the coefficients of Union Membership between the two sub-groups separated by

¹⁰ The ICTWSS database is maintained by Professor Jelle Visser, and it is publicly available at the following website when we wrote the first draft of the paper. The database covers 51 countries with nearly 200 variables and 55 years (1960-2014). <http://www.uva-aias.net/208>

the Centralization indicator, and report the results in Panel B. We find that the difference is 9.193 (p-value = 0.01).

Therefore, the results in Table 7 imply that the negative relation between corporate cash holding and union membership is stronger (weaker) when a firm is in a country with a higher (lower) level of Centralization. This is consistent with Hypothesis 1.

5.8. Financial Constraints

If a firm is financially constrained, the risk of liquidity shortage stemming from a lower cash balance is more credible (Klasa et al., 2009). We expect that the negative relation between corporate cash holding and union membership is stronger (weaker) when a firm is financially constrained (unconstrained).

We follow the literature and use total payout as a measure of financial constraints. The variable Payout is defined as the ratio of dividends plus shares repurchases to assets. We divide the sample into two sub-groups separated by payout. A firm is financially constrained (unconstrained) if it does not have any payout (if it has payout).

Table 8 shows the results. In Panel A, we report the OLS regressions in Column 1 and 2. The coefficient of Union Membership in Column 1 is significantly more negative for the sub-group of financially unconstrained firms than the coefficient for the sub-group of financially constrained firms.

Panel A also shows the second stage of 2SLS estimations in Column 3 and 4. The coefficient of Union Membership in Column 3 is -1.474 (p-value = 0.01) for the sub-group of financially constrained firms. The coefficient of Union Membership in Column 4 is -0.600 (p-value = 0.01) for the sub-group of financially unconstrained firms. The over-identifying restrictions test and the Hausman test show that it is more proper to draw implications based on the 2SLS estimates. We also conduct a t-test of the difference in the coefficients of Union Membership between the two sub-groups separated by payout, and report the results in Panel

B. We find that the difference is -0.874 (p-value = 0.01).

Therefore, the results in Table 8 imply that the negative relation between corporate cash holding and union membership is stronger (weaker) when a firm is financially constrained (unconstrained). This is consistent with Hypothesis 1.

5.9. The Market Value of Corporate Cash Holdings

To better understand the negative relation between country-level union membership and corporate cash holdings, we examine how labor unions affect the market value of cash. We use the model of Fama and French (1998) to examine the market value of cash. This model has been widely used in the literature about corporate cash holdings (e.g. Dittmar and Mahrt-Smith, 2007; Bates, Kahle, and Stulz, 2009; Pinkowitz and Williamson, 2007).

We divide the sample into two sub-groups separated by union membership. A firm is in a country with higher (lower) union membership if its country-level union membership is above (below) the median. From the bargaining perspective, the market value of cash is higher for shareholders when the labor unions are weaker because of lower power of collective bargaining. Therefore, we expect the market value of corporate cash holdings is lower (higher) for firms in countries with higher (lower) union membership. We examine the difference in the market value of cash between the two sub-groups by using both OLS regressions and the Heckman two-stage estimation.

5.9.1. OLS regressions

We first use OLS regressions. We use the following equation based on Fama and French (1998).

$$\begin{aligned}
 V_{i,t} = & \beta_0 + \beta_1 C_{i,t} + \beta_2 E_{i,t} + \beta_3 dE_{i,t} + \beta_4 dE_{i,t+2} + \beta_5 R\&D_{i,t} + \beta_6 dR\&D_{i,t} + \beta_7 dR\&D_{i,t+2} \\
 & + \beta_8 D_{i,t} + \beta_9 dD_{i,t} + \beta_{10} dD_{i,t+2} + \beta_{11} I_{i,t} + \beta_{12} dI_{i,t} + \beta_{13} dI_{i,t+2} + \beta_{14} dNA_{i,t} \\
 & + \beta_{15} dNA_{i,t+2} + \beta_{16} dV_{i,t+2} + \text{Year Dummy Variables} + \\
 & \text{Industry Dummy Variables} + \text{Country Dummy Variable} + \varepsilon_{i,t} \quad (1)
 \end{aligned}$$

The coefficient β_1 in the Equation (1) is the measure of the market value of an additional

dollar. For each independent variable X_t is the level of the variable X in year t , divided by total assets in year t . dX_t is the change in the level of the variable X from year $t-2$ to year t , divided by total assets in year t ($dX_t = (X_t - X_{t-2})/A_t$). dX_{t+2} is the change in the level of the variable X from year $t + 2$ to year t , divided by total assets in year t ($dX_{t+2} = (X_{t+2} - X_t)/A_t$). V is the market value of the firm, which is defined as the sum of the market value of equity, the book value of short-term debt, and the book value of long-term debt.

Table 10 shows the results. In Panel A, we report the OLS regressions in Column 1 and 2. The coefficient of Union Membership in Column 1 is 1.454 (p-value = 0.01) for the sub-group of firms with lower country-level union membership. The coefficient of Union Membership in Column 2 is 1.006 (p-value = 0.01) for the sub-group of firms with higher country-level union membership. We conduct a t-test of the difference in the coefficients of Corporate Cash Holdings between the two sub-groups separated by union membership, and report the results in Panel B. We find that the difference is 0.445 (p-value = 0.01).

Therefore, the results in Panel A of Table 10 imply that the market value of corporate cash holdings is lower (higher) for firms in countries with higher (lower) union membership

5.9.2. Heckman Two-stage Estimation

Because Union Membership is an endogenous variable, we apply the Heckman (1979) two-stage estimation to mitigate the endogeneity problem. A firm can either be in a country with higher union membership or a country with lower union membership. In the first stage, we estimate a probit regression to model such probability that a firm is in a country with higher union membership. The dependent variable is a dummy variable that equals one if a firm is in a country with higher union membership and zero otherwise. We use the same variables in Table 4 as the independent variables. We obtain Inverse Mills Ratio from the probit estimates. The calculation of Inverse Mills Ratio follows the standard Heckman methodology.

Table 9 shows the probit regression. Among the independent variables, the coefficient of

Fraction of Female Workers is 9.246 (p-value = 0.01) and the coefficient of Average Age of the Workers is -0.247 (p-value = 0.01). The signs of the coefficients are consistent with their corresponding variables in Table 4.

In the second stage, we estimate the regressions with Inverse Mills Ratio as an additional control variable. This provides the treatment for the endogeneity problem. We report the results in Columns 3 and 4 in Panel A of Table 10. In the second-stage regressions of the Heckman two-stage estimation, the coefficient of Corporate Cash Holdings is 1.453 (p-value = 0.01) for the sub-group of firms that are in a country with lower union membership, and this coefficient is 1.009 (p-value = 0.01) for the sub-group of firms that are in a country with higher union membership. We conduct a t-test of the difference in the coefficients of Corporate Cash Holdings between the two sub-groups separated by union membership, and report the results in Panel B. We find that the difference is 0.444 (p-value = 0.01). Therefore, we find similar results after we use the Heckman two-stage estimation to control for the endogeneity problem.

5.10. Corporate Cash Holdings and Profitability

In this section, we investigate how labor unions affect the relation between corporate cash holdings and operating profitability. If firms hold a certain amount of cash holdings, workers in the countries with stronger labor unions may be able to get a larger part out of these cash holdings through collective bargaining because of higher bargaining power. Consequently, firms' operating profitability will be lower. Conversely, firms may retain these cash holdings if workers are in the countries with weaker labor unions because of lower bargaining power. Consequently, firms' operating profitability will be higher. Therefore, we expect that the contribution of corporate cash holdings to operating profitability is higher (lower) when the country-level union membership is lower (higher).¹¹

¹¹ There is still a debate in the literature regarding the relation between corporate cash holdings and operating profitability. While some papers find a positive relation between cash and operating profitability, other papers find a negative relation between them. However, our results do not depend on a general positive or negative

We use ROA as the measure of a firm's operating profitability. ROA is defined as the ratio of earnings before interests and taxes (EBIT) to total assets. We divide the sample into two sub-groups separated by country-level union membership. A firm is in a country with higher (lower) union membership if its country-level union membership is above (below) the median.

Table 11 shows the results. In Panel A, we report the OLS regressions in Column 1 and 2. The coefficient of Corporate Cash Holdings in Column 1 is 0.031 (p-value = 0.01) for the sub-group of firms with lower country-level union membership. The coefficient of Union Membership in Column 2 is 0.003 (p-value = 0.01) for the sub-group of firms with higher country-level union membership. We conduct a t-test of the difference in the coefficients of Corporate Cash Holdings between the two sub-groups separated by union membership, and report the results in Panel B. We find that the difference is 0.028 (p-value = 0.01).

We report the second stage of Heckman two-stage estimation in Columns 3 and 4 in Panel A of Table 11. The coefficient of Corporate Cash Holdings is 0.033 (p-value = 0.01) for the sub-group of firms that are in a country with lower union membership, and this coefficient is 0.003 (p-value = 0.01) for the sub-group of firms that are in a country with higher union membership. We conduct a t-test of the difference in the coefficients of Corporate Cash Holdings between the two sub-groups separated by union membership, and report the results in Panel B. We find that the difference is 0.030 (p-value = 0.01). Therefore, we find similar results after we use the Heckman two-stage estimation to control for the endogeneity problem.

Therefore, the results in Table 11 imply that the positive relation between corporate cash holdings and operating profitability is stronger for firms in countries with lower union membership. This is consistent with the interpretation that the contribution of corporate cash holdings to operating profitability is higher (lower) when the country-level union membership

relation between cash and operating profitability. Instead, our results depend on the difference in the coefficients of Corporate Cash Holdings between two sub-groups separated by country-level union membership.

is lower (higher). The results are consistent with the Hypothesis 1.

5.11. Corporate Cash Holdings and Labor Costs

In this section, we investigate how labor unions affect the relation between corporate cash holdings and labor costs. Given a certain amount of corporate cash holdings, workers in the countries with stronger labor unions may be able to get a larger part out of these cash holdings through collective bargaining to increase their wages and gain more benefits because of higher bargaining power. Consequently, firms' labor costs will be higher. Therefore, we expect that the contribution of corporate cash holdings to labor costs is higher (lower) when the country-level union membership is higher (lower).

We obtain a sub-sample of the firms whose data of labor costs are available in Compustat. This sub-sample includes 77380 firm-year observations. We follow Chemmanur, Cheng and Zhang (2013) and define the labor costs as the average employee pay. The variable Average Labor Costs are the ratio of staff expenses to the number of employees. In the regressions, the dependent variable is the logarithm of Average Labor Costs. We follow Chemmanur, Cheng and Zhang (2013) and include size, leverage, average sales per employee, market to book ratio and tangibility as control variables. We divide the sample into two sub-groups separated by country-level union membership. A firm is in a country with higher (lower) union membership if its country-level union membership is above (below) the median.

Table 12 shows the results. In Panel A, we report the OLS regressions in Column 1 and 2. The coefficient of Corporate Cash Holdings in Column 1 is 0.334 (p-value = 0.01) for the sub-group of firms with lower country-level union membership. The coefficient of Union Membership in Column 2 is 0.504 (p-value = 0.01) for the sub-group of firms with higher country-level union membership. We conduct a t-test of the difference in the coefficients of Corporate Cash Holdings between the two sub-groups separated by union membership, and report the results in Panel B. We find that the difference is -0.170 (p-value = 0.01).

We report the second stage of Heckman two-stage estimation in Columns 3 and 4 in Panel A of Table 12. The coefficient of Corporate Cash Holdings is 0.335 (p-value = 0.01) for the sub-group of firms that are in a country with lower union membership, and this coefficient is 0.505 (p-value = 0.01) for the sub-group of firms that are in a country with higher union membership. We conduct a t-test of the difference in the coefficients of Corporate Cash Holdings between the two sub-groups separated by union membership, and report the results in Panel B. We find that the difference is -0.170 (p-value = 0.01). Therefore, we find similar results after we use the Heckman two-stage estimation to control for the endogeneity problem.

Therefore, the results in Table 12 imply that the positive relation between corporate cash holdings and labor costs is weaker for firms in countries with lower union membership. This is consistent with the interpretation that the contribution of corporate cash holdings to labor costs is higher (lower) when the country-level union membership is higher (lower). The results are consistent with the Hypothesis 1.

5.12. Corporate Cash Holdings and Strikes & Lockouts

The results in the previous analysis support the bargaining hypothesis. To further investigate whether corporate cash holdings directly affect the collective bargaining in a country, we examine the relation between corporate cash holdings and the country-level strikes & lockouts. We expect that if labor unions are more likely to organize collective bargaining when firms hold more cash, then there should be a positive relation between corporate cash holdings and the intensity of strikes & lockouts.

We collect the data of strikes & lockouts from the International Labor Organization. The data of strikes & lockouts start from 2000, and are available for 52 countries in our sample. We construct a variable called $\text{Log}(\text{Country-level Strikes \& Lockouts} + 1)$ ¹², where the Country-

¹² We use the $\text{Log}(\text{Country-level Strikes \& Lockouts} + 1)$ because the number of strikes & lockouts in some countries are zero.

level Strikes & Lockouts are defined as the total number of strikes and lockouts in a country. We also collect the data of labor force from International Labor Organization as an additional control variable. Labor Force is defined as the sum of all persons of working age who are employed and those who are unemployed. Since the data of strikes & lockouts are at the country level, we conduct the country-level analysis in a similar way as Table 3. We convert all firm-level variables into country-level variables by taking the average of the variables across the countries.

We report the results in Table 13. The coefficient of the Country-level Corporate Cash Holdings is 0.616 (p-value = 0.08). It implies that there will be more strikes & lockouts in a country when corporate cash holdings are higher in that country. Therefore, the results in Table 13 support the bargaining hypothesis in that labor unions will organize less collective bargaining when firms hold less cash.

6. Robustness Checks

We conduct robustness checks in this section.

6.1. The Validity of Instrumental Variables

Since we use country-level instrumental variables in our paper, they may be correlated with other country-level characteristics, which can lower the validity of the instrumental variables. For example, it has found that female workers earn less compared with male workers. On one hand, if there are more female workers in a country, the average salary in that country will be lower. Consequently, firms in that country will hold less cash. On the other hand, the coefficient of Fraction of Female Workers in Table 4 is positive, which means more female workers are associated with higher union membership. This leads to a negative relationship between corporate cash holding and union membership. However, it is driven by the gender pay gap rather than the bargaining power.

Therefore, we collect the data of global gender gap from the World Economic Forum. The global gender gap index measures the gender equality in different countries. The index is constructed based on the equality between women and men across four key areas: health, education, economy and politics. The data are available from 2006. For the sample period before 2006, we use the data of 2006 as a proxy of the index for each year. We use the data of 2006 as a proxy because there is limited variation of this index over time.¹³ The index ranges from 0 to 1. The higher index means that female and male are more equal in a country. We divide our sample into two sub-groups based on the median. A firm is in a country with lower (higher) gender gap if the index is above (below) the median.

Table 14 shows the results. We show the second stage of two 2SLS estimation for brevity. Column 1 shows that the coefficient of Union Membership is -1.273 (p-value = 0.01), and Column 2 shows that such coefficient is -1.264 (p-value = 0.01). We conduct t-test and find that the difference is -0.009 (p-value = 0.94). The results imply that after we control for the gender gap, we still find that firms in countries with higher union membership have less corporate cash holdings in both sub-groups. Therefore, the findings support the interpretation that the results are not entirely driven by the gender pay gap and that they are consistent with our bargaining hypothesis.

6.2. Collective Bargaining Coverage Rate

The consequence of collective bargaining may apply to the workers who do not belong to labor unions. For example, the union membership in France is 7.92%, which is much lower than the average union membership in our sample. However, the collective bargaining coverage rate in France is 95.8%¹⁴, implying that most French workers are covered by

¹³ We calculate the ratio of the range of the index in a country (defined as the difference between the maximum and the minimum of the index in a country in the period of 2006 to 2013) to the mean of this index in that country in such a period. We find that the average of ratio is 6.53% across all countries in our sample, which means that this index varies in a limited range.

¹⁴ This is the average country-level Collective Bargaining Coverage Rate in France from 1992 to 2013.

collective bargaining. In this case, there is a limitation to use union membership as the measure of bargaining power, given such a high collective bargaining coverage rate in France.

Therefore, we use collective bargaining coverage rate as an alternative measure of the bargaining power of labor unions. We collect the data of Collective Bargaining Coverage Rate from the Institutional Characteristics of Trade Unions, Wage Setting, State Intervention and Social Pacts (ICTWSS) database. The database reports the collective bargaining coverage rate in intervals. If the data is not available in a year, we use the data available in the most closest precedent year as a proxy for the Collective Bargaining Coverage Rate in that year.¹⁵ The variable Collective Bargaining Coverage Rate is defined as the percentage of workers who are covered by the collective bargaining agreements, including both unionized workers and ununionized workers.

We show the results about Collective Bargaining Coverage Rate in Table 15. We use the similar specifications as in previous tables. Column 1 of Panel A shows the results of OLS regression. The coefficient of Collective Bargaining Coverage Rate is -0.234 (p-value = 0.01). Column 2 shows the second stage of 2SLS estimation. The coefficient of Collective Bargaining Coverage Rate is -1.063 (p-value = 0.01). The results are similar with the previous tables that there is a negative relation between Collective Bargaining Coverage Rate and corporate cash holdings. We conduct the test on the market value of cash in countries whose Collective Bargaining Coverage Rate are above or below the median. Column 1 of Panel B shows that the coefficient of Corporate Cash Holdings is 1.485 (p-value = 0.01) in countries with lower collective bargaining coverage rate. Column 2 of Panel B shows the coefficient of Corporate Cash Holdings is 1.054 (p-value = 0.01) in countries with higher collective bargaining coverage rate. We conduct a t-test of the difference in the coefficients of Corporate Cash Holdings

¹⁵ For example, the data of Collective Bargaining Coverage Rate is available for France in 1990, 1997, 2004, 2008, 2009 and 2012. We use the data of 1990 as a proxy for the Collective Bargaining Coverage Rate in France between 1992 and 1996, use the data of 1997 as a proxy between 1998 and 2003, and so on.

between the two sub-groups separated by the Collective Bargaining Coverage Rate, and report the results in Panel C. We find that the difference is 0.431 (p-value = 0.01). Our results are consistent with the previous tables in that the value of cash is lower in countries with higher collective bargaining coverage rate. Therefore, we find similar results when we use collective bargaining coverage rate as alternative proxy for bargaining power of labor unions.

6.3. CPI Deflation

We use CPI deflated data and conduct the robustness check.¹⁶ We get the Consumer Price Index data across countries from World Bank. The variables are deflated to their corresponding level in 2010 using the CPI. We find consistent results with the CPI deflation.

7. Conclusion

We examine how the presence of labor unions affects corporate cash holdings in the international setting. We use country-level union membership as the measure of the bargaining power of labor unions across countries. We use two-stage least square estimation accompanied with the econometrics tests for the validity of the instruments and the specification.

We find that firms in countries with higher union membership have less corporate cash holdings. We divide the firms into sub-groups and find that this negative relationship is stronger for firms in the countries with weaker employment protection legislation, for firms in the countries with a higher degree of labor bargaining centralization, and for financially constrained firms. Moreover, we find that the market value of corporate cash holdings is lower for firms in countries with higher union membership. We also find that the positive relation between corporate cash holdings and operating profitability is stronger for firms in countries with lower union membership, and that the positive relation between corporate cash holdings

¹⁶ The results are not tabulated for brevity, and are available from the authors upon request.

and labor costs is weaker for firms in countries with lower union membership. Furthermore, we find that the number of strikes & lockouts is higher in countries with more corporate cash holdings. In addition, we conduct robustness checks by using gender gap and collective bargaining coverage rate, and find consistent results.

Our findings are consistent with the bargaining hypothesis, and we conclude that firms strategically choose corporate cash holdings to gain the bargaining position with labor in the international setting.

References

- Agrawal, A., 2012. Corporate governance objectives of labor union shareholders: Evidence from proxy voting. *Review of Financial Studies* 25, 187-226.
- Atanassov, J., Kim, E., 2009. Labor and corporate governance: International evidence from restructuring decisions. *Journal of Finance* 64, 341-374.
- Baldwin, C., 1983. Productivity and labor unions: An application of the theory of self-enforcing contracts. *Journal of Business*, 155-185.
- Bates, T., Kahle, K., Stulz, R., 2009. Why do U.S. firms hold so much more cash than they used to? *Journal of Finance* 64, 1985-2021.
- Blanchflower, D., 2006. A cross-country study of union membership. Working paper, Dartmouth College.
- Borisov, A., Gupta, N., Subramanian, K., 2013. Employment protection laws and cross-border mergers and acquisitions. Working paper, Indiana University.
- Bornhall, A., Daunfeldt, S., Rudholm, N., 2016. Employment protection legislation and firm growth: evidence from a natural experiment. *Industrial and Corporate Change*, forthcoming.
- Bronars, S., Deere, D., 1991. The threat of unionization, the use of debt, and the preservation of shareholder wealth. *Quarterly Journal of Economics* 106, 231–254.
- Chemmanur, T., Cheng, Y., Zhang, T. 2013. Human capital, capital structure, and employee pay: An empirical analysis. *Journal of Financial Economics* 110, 478-502.
- Chen, H., Kacperczyk, M., Ortiz-Molina, H., 2011. Labor unions, operating flexibility, and the cost of equity. *Journal of Financial and Quantitative Analysis* 46, 25–58.
- Danthine, J., Donaldson, J., 2002. Labour Relations and Asset Returns. *Review of Economic Studies*, 69, 41–64.
- Dasgupta, S., Sengupta, K., 1993. Sunk investment, bargaining and choice of capital structure. *International Economic Review*, 203-220.
- DeAngelo, H., DeAngelo, L., 1991. Union negotiations and corporate policy: A study of labor concessions in the domestic steel industry during the 1980s. *Journal of Financial Economics* 30, 3–43.
- D'Souza, J., Jacob, J., Ramesh, K., 2001. The use of accounting flexibility to reduce labor renegotiation costs and manage earnings. *Journal of Accounting and Economics* 30, 187–208.
- Dittmar, A., Mahrt-Smith, J., 2007. Corporate governance and the value of cash holdings. *Journal of Financial Economics* 83, 599–634.

- Dittmar, A., Mahrt-Smith, J., Servaes, H., 2003. International corporate governance and corporate cash holdings. *Journal of Financial and Quantitative Analysis* 38, 111-133.
- Fama, E., French, K., 1998. Taxes, financing decisions, and firm value. *Journal of Finance* 53, 819-843.
- Fernandes, N., Gonenc, H., 2016. Multinationals and cash holdings. *Journal of Corporate Finance* 39, 139-154.
- Greene, W.H., 1997, *Econometric analysis*, Prentice Hall.
- Hanka, G., 1998. Debt and the terms of employment. *Journal of Financial Economics* 48, 245–282.
- Harford, J., 1999. Corporate cash reserves and acquisitions. *Journal of Finance* 54, 1969-1997.
- Hausman, J.A., 1978. Specification tests in econometrics. *Econometrica* 46, 1251–1271.
- Heckman, J., 1979. Sample selection bias as a specification error. *Econometrica* 47, 153–161.
- Hirsch, B., 1980. The determinants of unionization: An analysis of interarea Differences. *Industrial and Labor Relations Review* 33, 147-161.
- Hirsch, B., 1982. The interindustry structure of unionism, earnings, and earnings dispersion. *Industrial and Labor Relations Review* 36, 22–39.
- Kahl, M., Lunn, J., Nilsson, M., 2014. Operating leverage and corporate financial policies. Working Paper, University of Texas at Austin.
- Kalcheva, I., Lins, K., 2007. International evidence on cash holdings and expected agency problems. *Review of Financial Studies* 20, 1087-1112.
- Klasa, S., Maxwell, W., Ortiz-Molina, H., 2009. The strategic use of corporate cash holdings in collective bargaining with labor unions. *Journal of Financial Economics* 92, 421-442.
- La Porta, R., Lopez-de-Silanes, E., Shleifer, A., Vishny, R., 1997. Legal determinants of external finance. *Journal of Finance* 52, 1131-1150.
- Lee, D., Mas, A., 2012. Long-run impacts of unions on firms: new evidence from financial markets, 1961-1999. *Quarterly Journal of Economics* 127, 333-378.
- Levine, R., Loayza, N., Beck, T., 2000. Financial intermediation and growth: Causality and causes. *Journal of Monetary Economics* 46, 31-77.
- Lins, K., Servaes, H., Tufano, P., 2010. What drives corporate liquidity? An international survey of cash holdings and lines of credit. *Journal of Financial Economics* 98, 160-176.
- Matsa, D., 2010. Capital structure as a strategic variable: Evidence from collective bargaining. *Journal of Finance* 65, 1197-1232.

- Mikkelson, W., Partch, M., 2003. Do persistent large cash reserves hinder performance? *Journal of Financial and Quantitative Analysis* 38, 275-294.
- Opler, T., Pinkowitz, L., Stulz, R., Williamson, R., 1999. The determinants and implications of corporate cash holdings. *Journal of Financial Economics* 52, 3-46.
- Perotti, E., Spier, K., 1993. Capital structure as a bargaining tool: The role of leverage in contract renegotiation. *The American Economic Review* 1131-1141.
- Pinkowitz, L., Stulz, R., Williamson, R., 2013. Is there a US high cash holdings puzzle after the financial crisis? Working Paper, Ohio State University.
- Pinkowitz, L., Williamson, R., 2007. What is the market value of a dollar of corporate cash? *Journal of Applied Corporate Finance* 19, 74-81.
- Scoville, J., 1971. Influences on unionization in the U.S. in 1966. *Industrial Relations* 10, 354-361.
- Shea, J., 1997. Instrument relevance in multivariate linear models: A simple measure. *Review of Economics and Statistics* 79, 348-352.
- Simintzi, E., Vig, V., Volpin, P., 2014. Labor protection and leverage. *Review of Financial studies*, forthcoming.
- Stock, J. H., Wright, J., Yogo, M., 2002. A survey of weak instruments and weak identification in generalized method of moments. *Journal of Business and Economic Statistics* 20, 518-529.
- Visser, J., 2006. Union membership statistics in 24 countries. *Monthly Labor Review*, Bureau of Labor Statistics 129, 38-49.

Table 1
Univariate Statistics

This table shows univariate statistics. We use a sample of 355715 firm-year observations from 66 countries between 1992 and 2013. Panel A reports univariate statistics. *Corporate Cash Holdings* is defined as the ratio of cash and marketable securities to non-cash assets, where non-cash assets is calculated as total assets minus cash and marketable securities. *Union Membership* is defined as the ratio of the total number of trade union members to the total number of paid employees in a country. *Size* is defined as natural logarithm of non-cash assets. *M/B* is defined as market value of equity plus non-cash assets minus book value of equity, divided by non-cash assets. *Leverage* is defined as the ratio of long-term debts to non-cash assets. *Capital Expenditures* is defined as the ratio of capital expenditures to non-cash assets. *Dividends* is defined as the ratio of dividends to non-cash assets. *Cash Flow* is defined as the ratio of income before extraordinary items to non-cash assets. *R&D* is defined as the ratio of research and development expenses to non-cash assets. *Net Working Capital* is defined as the ratio of working capital minus cash and marketable securities to non-cash assets. *Industry Cash Flow Volatility* is defined as the standard deviation of the median of *Cash Flow* in an industry classified by two-digit SIC codes in the prior 5 years. *Fraction of Female Workers* is defined as the fraction of female workers in the country a firm belongs to. *Average Age of the Workers* is the average age of the workers in the country a firm belongs to. *Employment Protection Legislation* is the OECD indicators of employment protection legislation that measure the procedures and costs involved in dismissing individuals or groups of workers and the procedures involved in hiring workers on fixed-term or temporary work agency contracts in a country. *Centralization* is an indicator of the degree of labor bargaining centralization in a country from the Institutional Characteristics of Trade Unions, Wage Setting, State Intervention and Social Pacts (ICTWSS) database. Panel B reports corporate cash holdings and union membership by countries. The mean of corporate cash holdings and union membership in a country are reported in the panel.

Panel A. Univariate Statistics

	Mean	Median	25th Percentile	75th Percentile	Standard Deviation
Corporate Cash Holdings	0.3418	0.1232	0.0429	0.3062	1.1283
Union Membership	0.2548	0.1860	0.1291	0.2788	0.2503
Size	18.9946	18.8875	17.6238	20.2646	2.0049
M/B	1.7130	1.2443	0.9577	1.8492	1.4564
Leverage	0.1457	0.0834	0.0014	0.2272	0.1794
Capital Expenditures	0.0732	0.0455	0.0220	0.0860	0.0897
Dividends	0.0142	0.0000	0.0000	0.0132	0.0368
Cash Flow	-0.0066	0.0305	-0.0159	0.0774	0.8318
R&D	0.0436	0.0000	0.0000	0.0137	0.4313
Net Working Capital	0.0232	0.0227	-0.0878	0.1671	0.2432
Industry Cash Flow Volatility	0.1258	0.0882	0.0544	0.1625	0.0955
Fraction of Female Workers	0.4385	0.4536	0.4188	0.4640	0.0381
Average Age of the Workers	39.7180	39.5565	38.3352	40.9619	2.1326
Employment Protection Legislation	1.3619	1.3690	0.2567	2.1944	0.9700
Centralization	0.2578	0.2241	0.1530	0.3092	0.1261

Panel B. Corporate Cash Holdings and Union Membership by Countries

Country	Corporate Cash Holdings	Union Membership	Country	Corporate Cash Holdings	Union Membership
Argentina	0.0918	0.3817	Malaysia	0.1992	0.1026
Australia	0.4199	0.2141	Malta	0.0996	0.5463
Austria	0.2042	0.3413	Mauritius	0.0463	0.2566
Belgium	0.2325	0.5431	Mexico	0.1064	0.1590
Brazil	0.1874	0.2533	Namibia	0.1759	0.3043
Bulgaria	0.1518	0.1657	Netherlands	0.1887	0.2165
Canada	0.3566	0.2876	New Zealand	0.1456	0.2173
Chile	0.0949	0.1443	Norway	0.3226	0.5435
China	0.3599	0.4574	Peru	0.1272	0.0418
Colombia	0.0834	0.1653	Philippines	0.1959	0.1454
Croatia	0.1056	0.3275	Poland	0.1620	0.1523
Cyprus	0.1598	0.5296	Portugal	0.0666	0.2150
Czech Republic	0.0976	0.2405	Russia	0.1440	0.3170
Denmark	0.2855	0.7095	Serbia	0.1195	0.2790
Egypt	0.2032	0.2750	Singapore	0.3163	0.1826
Estonia	0.1651	0.0924	Slovakia	0.0721	0.2556
Finland	0.2138	0.7262	Slovenia	0.0890	0.3189
France	0.2553	0.0792	South Africa	0.2079	0.3381
Germany	0.2809	0.2247	South Korea	0.2121	0.1043
Greece	0.1308	0.2425	Spain	0.1129	0.1668
Hungary	0.1389	0.1932	Sri Lanka	0.1245	0.1423
Iceland	0.2072	0.8316	Sweden	0.2905	0.7411
India	0.1358	0.1753	Switzerland	0.2769	0.1930
Indonesia	0.1627	0.1515	Tanzania	0.0972	0.2020
Ireland	0.3421	0.3686	Thailand	0.1664	0.0292
Israel	0.6136	0.3730	Trinidad and Tobago	0.2110	0.2100
Italy	0.1658	0.3498	Turkey	0.1547	0.0716
Japan	0.2522	0.2012	Ukraine	0.0428	0.6467
Kazakhstan	0.1755	0.4233	United Kingdom	0.3022	0.2935
Kuwait	0.1631	0.0230	United States	0.4542	0.1289
Latvia	0.0916	0.1640	Vietnam	0.2086	0.1460
Lithuania	0.0585	0.1080	Zambia	0.0536	0.0570
Luxembourg	0.2573	0.3852	Zimbabwe	0.0759	0.0750

Table 2
Union Membership and Corporate Cash Holdings

This table shows an OLS regression about union membership and corporate cash holdings. We use a sample of 355715 firm-year observations from 66 countries between 1992 and 2013. *Corporate Cash Holdings* is defined as the ratio of cash and marketable securities to non-cash assets, where non-cash assets is calculated as total assets minus cash and marketable securities. *Union Membership* is defined as the ratio of the total number of trade union members to the total number of paid employees in a country. *Size* is defined as natural logarithm of non-cash assets. *M/B* is defined as market value of equity plus non-cash assets minus book value of equity, divided by non-cash assets. *Leverage* is defined as the ratio of long-term debts to non-cash assets. *Capital Expenditures* is defined as the ratio of capital expenditures to non-cash assets. *Dividends* is defined as the ratio of dividends to non-cash assets. *Cash Flow* is defined as the ratio of income before extraordinary items to non-cash assets. *R&D* is defined as the ratio of research and development expenses to non-cash assets. *Net Working Capital* is defined as the ratio of working capital minus cash and marketable securities to non-cash assets. *Industry Cash Flow Volatility* is defined as the standard deviation of the median of *Cash Flow* in an industry classified by two-digit SIC codes in the prior 5 years. *Year Dummy Variables* are the dummy variables for the years in the sample and not reported in the table. *Industry Dummy Variables* are the dummy variables for the industries defined by two-digit SIC codes and not reported in the table. *Country Dummy Variables* are the dummy variables for the countries in the sample and not reported in the table. The standard errors are clustered at the firm level. The p-value is noted in the parentheses.

	Corporate Cash Holdings
Intercept	2.545 (0.01)
Union Membership	-0.187 (0.01)
Size	-0.106 (0.01)
M/B	0.021 (0.01)
Leverage	-0.247 (0.01)
Capital Expenditure	0.858 (0.01)
Dividends	2.266 (0.01)
Cash Flow	-0.326 (0.01)
R&D	0.969 (0.01)
Net Working Capital	-0.420 (0.01)
Industry Cash Flow Volatility	0.276 (0.01)
Year Dummy Variables	YES
Industry Dummy Variables	YES
Country Dummy Variables	YES
Number of Observations	355715
Adjusted R-square	0.53

Table 3
Union Membership and Corporate Cash Holdings: Country-level Analysis

This table shows an OLS regression on the country-level analysis about union membership and corporate cash holdings. We convert all firm-level variables into country-level variables by taking the average of the variables across the countries. The sample includes 974 country-year observations between 1992 and 2013. *Corporate Cash Holdings* is defined as the ratio of cash and marketable securities to non-cash assets, where non-cash assets is calculated as total assets minus cash and marketable securities. *Union Membership* is defined as the ratio of the total number of trade union members to the total number of paid employees in a country. *Size* is defined as natural logarithm of non-cash assets. *M/B* is defined as market value of equity plus non-cash assets minus book value of equity, divided by non-cash assets. *Leverage* is defined as the ratio of long-term debts to non-cash assets. *Capital Expenditures* is defined as the ratio of capital expenditures to non-cash assets. *Dividends* is defined as the ratio of dividends to non-cash assets. *Cash Flow* is defined as the ratio of income before extraordinary items to non-cash assets. *R&D* is defined as the ratio of research and development expenses to non-cash assets. *Net Working Capital* is defined as the ratio of working capital minus cash and marketable securities to non-cash assets. *Cash flow Volatility* is defined as the standard deviation of the median of *Cash Flow* in an industry classified by two-digit SIC codes in the prior 5 years. *Year Dummy Variables* are the dummy variables for the years in the sample and not reported in the table. *Industry Dummy Variables* are the dummy variables for the industries defined by two-digit SIC codes and not reported in the table. *Country Dummy Variables* are the dummy variables for the countries in the sample and not reported in the table. The p-value is noted in the parentheses.

Country-level Corporate Cash Holdings	
Intercept	1.281 (0.01)
Union Membership	-0.125 (0.01)
Country-level Size	-0.045 (0.01)
Country-level M/B	0.016 (0.03)
Country-level Leverage	-0.314 (0.01)
Country-level Capital Expenditure	0.687 (0.01)
Country-level Dividends	0.718 (0.01)
Country-level Cash Flow	-0.189 (0.01)
Country-level R&D	1.824 (0.01)
Country-level Net Working Capital	-0.024 (0.76)
Country-level Cash Flow Volatility	0.970 (0.01)
Year Dummy Variables	YES
Industry Dummy Variables	YES
Country Dummy Variables	YES
Number of Observations	974
Adjusted R-square	0.78

Table 4
Two-stage Least Square Estimation: First Stage

This table shows the first stage of two-stage least square estimation. We use a sample of 355715 firm-year observations from 66 countries between 1992 and 2013. *Union Membership* is defined as the ratio of the total number of trade union members to the total number of paid employees in a country. *Fraction of Female Workers* is defined as the fraction of female workers in the country a firm belongs to. *Average Age of the Workers* is the average age of the workers in the country a firm belongs to. *Size* is defined as natural logarithm of non-cash assets. *M/B* is defined as market value of equity plus non-cash assets minus book value of equity, divided by non-cash assets. *Leverage* is defined as the ratio of long-term debts to non-cash assets. *Capital Expenditures* is defined as the ratio of capital expenditures to non-cash assets. *Dividends* is defined as the ratio of dividends to non-cash assets. *Cash Flow* is defined as the ratio of income before extraordinary items to non-cash assets. *R&D* is defined as the ratio of research and development expenses to non-cash assets. *Net Working Capital* is defined as the ratio of working capital minus cash and marketable securities to non-cash assets. *Industry Cash Flow Volatility* is defined as the standard deviation of the median of *Cash Flow* in an industry classified by two-digit SIC codes in the prior 5 years. *Year Dummy Variables* are the dummy variables for the years in the sample and not reported in the table. *Industry Dummy Variables* are the dummy variables for the industries defined by two-digit SIC codes and not reported in the table. *Country Dummy Variables* are the dummy variables for the countries in the sample and not reported in the table. The p-value is noted in the parentheses.

	Union Membership
Intercept	-0.053 (0.02)
Fraction of Female Workers	2.151 (0.01)
Average Age of the Workers	-0.017 (0.01)
Size	-0.001 (0.01)
M/B	-0.002 (0.01)
Leverage	-0.005 (0.01)
Capital Expenditure	-0.036 (0.01)
Dividends	0.085 (0.01)
Cash Flow	-0.001 (0.17)
R&D	-0.003 (0.01)
Net Working Capital	-0.026 (0.01)
Industry Cash Flow Volatility	-0.019 (0.01)
Year Dummy Variables	YES
Industry Dummy Variables	YES
Country Dummy Variables	YES
Number of Observations	355715
Adjusted R-square	0.73
Partial F-statistic (p-value)	0.01
Partial R-square	0.32

Table 5
Two-stage Least Square Estimation: Second Stage

This table shows the second stage of two-stage least square estimation. We use a sample of 355715 firm-year observations from 66 countries between 1992 and 2013. *Corporate Cash Holdings* is defined as the ratio of cash and marketable securities to non-cash assets, where non-cash assets is calculated as total assets minus cash and marketable securities. *Union Membership* is defined as the ratio of the total number of trade union members to the total number of paid employees in a country. *Size* is defined as natural logarithm of non-cash assets. *M/B* is defined as market value of equity plus non-cash assets minus book value of equity, divided by non-cash assets. *Leverage* is defined as the ratio of long-term debts to non-cash assets. *Capital Expenditures* is defined as the ratio of capital expenditures to non-cash assets. *Dividends* is defined as the ratio of dividends to non-cash assets. *Cash Flow* is defined as the ratio of income before extraordinary items to non-cash assets. *R&D* is defined as the ratio of research and development expenses to non-cash assets. *Net Working Capital* is defined as the ratio of working capital minus cash and marketable securities to non-cash assets. *Industry Cash flow Volatility* is defined as the standard deviation of the median of *Cash Flow* in an industry classified by two-digit SIC codes in the prior 5 years. *Year Dummy Variables* are the dummy variables for the years in the sample and not reported in the table. *Industry Dummy Variables* are the dummy variables for the industries defined by two-digit SIC codes and not reported in the table. *Country Dummy Variables* are the dummy variables for the countries in the sample and not reported in the table. The standard errors are clustered at the firm level. The p-value is noted in the parentheses.

	Corporate Cash Holdings
Intercept	3.436 (0.01)
Union Membership	-1.265 (0.01)
Size	-0.142 (0.01)
M/B	0.019 (0.01)
Leverage	-0.112 (0.01)
Capital Expenditure	1.037 (0.01)
Dividends	2.631 (0.01)
Cash Flow	-0.278 (0.01)
R&D	4.077 (0.01)
Net Working Capital	-0.889 (0.01)
Industry Cash Flow Volatility	0.332 (0.01)
Year Dummy Variables	YES
Industry Dummy Variables	YES
Country Dummy Variables	YES
Number of Observations	355715
Adjusted R-square	0.39
Over-identifying Restrictions Test (p-value)	0.21
Hausman Test (p-value)	0.01

Table 6
Employment Protection Legislation

This table shows OLS regressions and the second-stage regressions of the 2SLS estimation for the sub-groups separated by the employment protection legislation. We use a sample of 289889 firm-year observations from 41 countries between 1992 and 2013. Panel A shows the regressions. *Corporate Cash Holdings* is defined as the ratio of cash and marketable securities to non-cash assets, where non-cash assets is calculated as total assets minus cash and marketable securities. *Employment Protection Legislation* is the OECD indicators of employment protection legislation that measure the procedures and costs involved in dismissing individuals or groups of workers and the procedures involved in hiring workers on fixed-term or temporary work agency contracts in a country. *Union Membership* is defined as the ratio of the total number of trade union members to the total number of paid employees in a country. *Size* is defined as natural logarithm of non-cash assets. *M/B* is defined as market value of equity plus non-cash assets minus book value of equity, divided by non-cash assets. *Leverage* is defined as the ratio of long-term debts to non-cash assets. *Capital Expenditures* is defined as the ratio of capital expenditures to non-cash assets. *Dividends* is defined as the ratio of dividends to non-cash assets. *Cash Flow* is defined as the ratio of income before extraordinary items to non-cash assets. *R&D* is defined as the ratio of research and development expenses to non-cash assets. *Net Working Capital* is defined as the ratio of working capital minus cash and marketable securities to non-cash assets. *Industry Cash flow Volatility* is defined as the standard deviation of the median of *Cash Flow* in an industry classified by two-digit SIC codes in the prior 5 years. *Year Dummy Variables* are the dummy variables for the years in the sample and not reported in the table. *Industry Dummy Variables* are the dummy variables for the industries defined by two-digit SIC codes and not reported in the table. *Country Dummy Variables* are the dummy variables for the countries in the sample and not reported in the table. The standard errors are clustered at the firm level. The p-value is noted in the parentheses. Panel B shows the difference in the coefficients of Union Membership between the two sub-groups.

Panel A. Regressions

	Corporate Cash Holdings			
	OLS		The Second Stage of 2SLS	
	EPL < Median	EPL ≥ Median	EPL < Median	EPL ≥ Median
Intercept	3.301 (0.01)	1.813 (0.01)	4.669 (0.01)	1.925 (0.01)
Union Membership	-0.312 (0.01)	-0.083 (0.01)	-1.001 (0.01)	-0.082 (0.16)
Size	-0.119 (0.01)	-0.080 (0.01)	-0.189 (0.01)	-0.080 (0.01)
M/B	0.011 (0.01)	0.035 (0.01)	0.016 (0.01)	0.036 (0.01)
Leverage	-0.321 (0.01)	-0.171 (0.01)	-0.188 (0.01)	-0.164 (0.01)
Capital Expenditure	1.019 (0.01)	0.667 (0.01)	1.374 (0.01)	0.673 (0.01)
Dividends	1.497 (0.01)	3.017 (0.01)	3.502 (0.01)	3.072 (0.01)
Cash Flow	-0.309 (0.01)	-0.459 (0.01)	-0.490 (0.01)	-0.463 (0.01)
R&D	0.916 (0.01)	0.978 (0.01)	4.237 (0.01)	0.974 (0.01)
Net Working Capital	-0.604 (0.01)	-0.239 (0.01)	-1.146 (0.01)	-0.239 (0.01)
Industry Cash Flow Volatility	0.039 (0.52)	0.234 (0.03)	0.032 (0.69)	0.071 (0.46)
Year Dummy Variables	YES	YES	YES	YES
Industry Dummy Variables	YES	YES	YES	YES
Country Dummy Variables	YES	YES	YES	YES
Number of Observations	160992	128897	160992	128897
Adjusted R-square	0.59	0.40	0.41	0.40
Over-identifying Restrictions Test (p-value)			0.46	0.38
Hausman Test (p-value)			0.01	0.04

Panel B. Difference in the Coefficients of Union Membership

The following table shows the difference in the coefficients of Corporate Cash Holdings between the two sub-groups separated by EPL and reports the p-value of the t-test in the parentheses.

	Union Membership	
	OLS	Second Stage of 2SLS Estimation
Difference	-0.229	-0.920
(p-value)	(0.01)	(0.01)

Table 7
Labor Bargaining Centralization

This table shows OLS regressions and the second-stage regressions of the 2SLS estimation for the sub-groups separated by the labor bargaining centralization. We use a sample of 259655 firm-year observations from 32 countries between 1992 and 2013. Panel A shows the regressions. *Corporate Cash Holdings* is defined as the ratio of cash and marketable securities to non-cash assets, where non-cash assets is calculated as total assets minus cash and marketable securities. *Centralization* is an indicator of the degree of labor bargaining centralization in a country from the Institutional Characteristics of Trade Unions, Wage Setting, State Intervention and Social Pacts (ICTWSS) database. *Union Membership* is defined as the ratio of the total number of trade union members to the total number of paid employees in a country. *Size* is defined as natural logarithm of non-cash assets. *M/B* is defined as market value of equity plus non-cash assets minus book value of equity, divided by non-cash assets. *Leverage* is defined as the ratio of long-term debts to non-cash assets. *Capital Expenditures* is defined as the ratio of capital expenditures to non-cash assets. *Dividends* is defined as the ratio of dividends to non-cash assets. *Cash Flow* is defined as the ratio of income before extraordinary items to non-cash assets. *R&D* is defined as the ratio of research and development expenses to non-cash assets. *Net Working Capital* is defined as the ratio of working capital minus cash and marketable securities to non-cash assets. *Industry Cash flow Volatility* is defined as the standard deviation of the median of *Cash Flow* in an industry classified by two-digit SIC codes in the prior 5 years. *Year Dummy Variables* are the dummy variables for the years in the sample and not reported in the table. *Industry Dummy Variables* are the dummy variables for the industries defined by two-digit SIC codes and not reported in the table. *Country Dummy Variables* are the dummy variables for the countries in the sample and not reported in the table. The standard errors are clustered at the firm level. The p-value is noted in the parentheses. Panel B shows the difference in the coefficients of Union Membership between the two sub-groups.

Panel A. Regressions

	Corporate Cash Holdings			
	OLS		The Second Stage of 2SLS	
	Centralization < Median	Centralization ≥ Median	Centralization < Median	Centralization ≥ Median
Intercept	1.150 (0.01)	2.237 (0.01)	3.044 (0.01)	2.952 (0.01)
Union Membership	-0.240 (0.01)	-0.319 (0.01)	-0.741 (0.01)	-9.934 (0.01)
Size	-0.044 (0.01)	-0.088 (0.01)	-0.118 (0.01)	-0.050 (0.01)
M/B	0.022 (0.01)	0.036 (0.01)	0.003 (0.10)	0.035 (0.01)
Leverage	-0.139 (0.01)	-0.294 (0.01)	-0.394 (0.01)	-0.134 (0.01)
Capital Expenditure	0.502 (0.01)	0.485 (0.01)	1.576 (0.01)	0.307 (0.01)
Dividends	0.715 (0.01)	2.881 (0.01)	1.790 (0.01)	1.590 (0.01)
Cash Flow	-0.027 (0.01)	-0.553 (0.01)	-0.245 (0.01)	-0.084 (0.01)
R&D	1.903 (0.01)	0.787 (0.01)	0.995 (0.01)	1.487 (0.01)
Net Working Capital	-0.174 (0.01)	-0.318 (0.01)	-0.669 (0.01)	-0.087 (0.01)
Industry Cash Flow Volatility	0.144 (0.01)	0.299 (0.01)	-0.197 (0.01)	0.087 (0.01)
Year Dummy Variables	YES	YES	YES	YES
Industry Dummy Variables	YES	YES	YES	YES
Country Dummy Variables	YES	YES	YES	YES
Number of Observations	129913	129742	129913	129742
Adjusted R-square	0.56	0.48	0.60	0.33
Over-identifying Restrictions Test (p-value)			0.22	0.82
Hausman Test (p-value)			0.01	0.01

Panel B. Difference in the Coefficients of Union Membership

The following table shows the difference in the coefficients of Union Membership between the two sub-groups separated by Centralization and reports the p-value of the t-test in the parentheses.

	Union Membership	
	OLS	Second Stage of 2SLS Estimation
Difference	0.078	9.193
(p-value)	(0.01)	(0.01)

Table 8
Financial Constraints

This table shows OLS regressions and the second-stage regressions of the 2SLS estimation for the sub-groups separated by the financial constraints. We use a sample of 355715 firm-year observations from 66 countries between 1992 and 2013. *Corporate Cash Holdings* is defined as the ratio of cash and marketable securities to non-cash assets, where non-cash assets is calculated as total assets minus cash and marketable securities. *Payout* is defined as the ratio of dividends plus shares repurchases to assets. *Union Membership* is defined as the ratio of the total number of trade union members to the total number of paid employees in a country. *Size* is defined as natural logarithm of non-cash assets. *M/B* is defined as market value of equity plus non-cash assets minus book value of equity, divided by non-cash assets. *Leverage* is defined as the ratio of long-term debts to non-cash assets. *Capital Expenditures* is defined as the ratio of capital expenditures to non-cash assets. *Dividends* is defined as the ratio of dividends to non-cash assets. *Cash Flow* is defined as the ratio of income before extraordinary items to non-cash assets. *R&D* is defined as the ratio of research and development expenses to non-cash assets. *Net Working Capital* is defined as the ratio of working capital minus cash and marketable securities to non-cash assets. *Industry Cash flow Volatility* is defined as the standard deviation of the median of *Cash Flow* in an industry classified by two-digit SIC codes in the prior 5 years. *Year Dummy Variables* are the dummy variables for the years in the sample and not reported in the table. *Industry Dummy Variables* are the dummy variables for the industries defined by two-digit SIC codes and not reported in the table. *Country Dummy Variables* are the dummy variables for the countries in the sample and not reported in the table. The standard errors are clustered at the firm level. The p-value is noted in the parentheses.

Panel A. Regressions

	Corporate Cash Holdings			
	OLS		The Second Stage of 2SLS	
	Payout = 0	Payout > 0	Payout = 0	Payout > 0
Intercept	2.912 (0.01)	2.340 (0.01)	4.563 (0.01)	3.207 (0.01)
Union Membership	-0.219 (0.01)	-0.072 (0.01)	-1.474 (0.01)	-0.600 (0.01)
Size	-0.120 (0.01)	-0.089 (0.01)	-0.200 (0.01)	-0.133 (0.01)
M/B	0.028 (0.01)	0.026 (0.01)	0.037 (0.01)	0.028 (0.01)
Leverage	-0.260 (0.01)	-0.246 (0.01)	-0.033 (0.01)	-0.046 (0.01)
Capital Expenditure	0.951 (0.01)	0.432 (0.01)	1.559 (0.01)	0.574 (0.01)
Cash Flow	-0.341 (0.01)	-0.179 (0.01)	-0.038 (0.01)	-0.047 (0.01)
R&D	0.946 (0.01)	1.224 (0.01)	4.924 (0.01)	4.159 (0.01)
Net Working Capital	-0.360 (0.01)	-0.680 (0.01)	-0.798 (0.01)	-0.857 (0.01)
Industry Cash Flow Volatility	0.246 (0.01)	0.286 (0.01)	0.376 (0.01)	0.521 (0.01)
Year Dummy Variables	YES	YES	YES	YES
Industry Dummy Variables	YES	YES	YES	YES
Country Dummy Variables	YES	YES	YES	YES
Number of Observations	262237	93478	262237	93478
Adjusted R-square	0.54	0.48	0.35	0.33
Over-identifying Restrictions Test (p-value)			0.36	0.31
Hausman Test (p-value)			0.01	0.01

Panel B. Difference in the Coefficients of Union Membership

The following table shows the difference in the coefficients of Union Membership between the two sub-groups separated by payout and reports the p-value of the t-test in the parentheses.

	Union Membership	
	OLS	Second Stage of 2SLS Estimation
Difference	-0.147	-0.874
(p-value)	(0.01)	(0.01)

Table 9
The Heckman Two-stage Estimation: First Stage

This table shows the probit regression. We use a sample of 355715 firm-year observations from 66 countries between 1992 and 2013. The dependent variable is a dummy variable that equals one if Union Membership is above the median, and equals zero otherwise. Union Membership is defined as the ratio of the total number of trade union members to the total number of paid employees in a country. *Fraction of Female Workers* is defined as the fraction of female workers in the country a firm belongs to. *Average Age of the Workers* is the average age of the workers in the country a firm belongs to. *Size* is defined as natural logarithm of non-cash assets. *M/B* is defined as market value of equity plus non-cash assets minus book value of equity, divided by non-cash assets. *Leverage* is defined as the ratio of long-term debts to non-cash assets. *Capital Expenditures* is defined as the ratio of capital expenditures to non-cash assets. *Dividends* is defined as the ratio of dividends to non-cash assets. *Cash Flow* is defined as the ratio of income before extraordinary items to non-cash assets. *R&D* is defined as the ratio of research and development expenses to non-cash assets. *Net Working Capital* is defined as the ratio of working capital minus cash and marketable securities to non-cash assets. *Industry Cash Flow Volatility* is defined as the standard deviation of the median of *Cash Flow* in an industry classified by two-digit SIC codes in the prior 5 years. *Year Dummy Variables* are the dummy variables for the years in the sample and not reported in the table. *Industry Dummy Variables* are the dummy variables for the industries defined by two-digit SIC codes and not reported in the table. *Country Dummy Variables* are the dummy variables for the countries in the sample and not reported in the table. The p-value is noted in the parentheses.

	Probit Regression
Intercept	-1.918 (0.99)
Fraction of Female Workers	9.246 (0.01)
Average Age of the Workers	-0.247 (0.01)
Size	-0.001 (0.92)
M/B	-0.002 (0.82)
Leverage	0.202 (0.01)
Capital Expenditure	-0.112 (0.17)
Dividends	0.583 (0.01)
Cash Flow	0.151 (0.01)
R&D	-0.501 (0.01)
Net Working Capital	-0.013 (0.69)
Industry Cash Flow Volatility	-0.470 (0.02)
Year Dummy Variables	YES
Industry Dummy Variables	YES
Country Dummy Variables	YES
Number of Observations	355715
Pseudo R-square	0.71

Table 10
The Market Value of Corporate Cash Holdings

This table shows OLS regressions and the second stage of Heckman two-stage estimation about the market value of corporate cash holdings for the sub-groups separated by union membership. We use a sample of 251947 firm-year observations from 66 countries between 1992 and 2013. Panel A shows the regressions. For each independent variable X_t , is the level of the variable X in year t, divided by total assets in year t. dX_t is the change in the level of the variable X from year t - 2 to year t, divided by total assets in year t ($dX_t = (X_t - X_{t-2})/A_t$). dX_{t+2} is the change in the level of the variable X from year t + 2 to year t, divided by total assets in year t ($dX_{t+2} = (X_{t+2} - X_t)/A_t$). V is the market value of the firm, which is defined as the sum of the market value of equity, the book value of short-term debt, and the book value of long-term debt. *Union Membership* is defined as the ratio of the total number of trade union members to the total number of paid employees in a country. C is cash and marketable securities. E is earnings, which is defined as earnings before extraordinary items plus interest, deferred tax credits, and investment tax credits. A is total assets. $R\&D$ is the research and development expenses. I is the interest expenses. D is dividends. NA is non-cash assets, which is defined as total assets minus cash and marketable securities. *Inverse Mills Ratio* is obtained from the probit estimates in Table 10 (see text for the details). *Year Dummy Variables* are the dummy variables for the years in the sample and not reported in the table. *Industry Dummy Variables* are the dummy variables for the industries defined by two-digit SIC codes and not reported in the table. *Country Dummy Variables* are the dummy variables for the countries in the sample and not reported in the table. The standard errors are clustered at the firm level. The p-value is noted in the parentheses. Panel B shows the difference in the coefficients of Corporate Cash Holdings between the two sub-groups.

Panel A. Regressions

	V_t			
	OLS		Second Stage of Heckman Two-stage Estimation	
	Union Membership < Median	Union Membership ≥ Median	Union Membership < Median	Union Membership ≥ Median
Intercept	1.238 (0.01)	1.233 (0.01)	1.341 (0.01)	1.259 (0.01)
C_t	1.454 (0.01)	1.006 (0.01)	1.454 (0.01)	1.009 (0.01)
E_t	-0.794 (0.01)	-0.360 (0.01)	-0.794 (0.01)	-0.364 (0.01)
dE_t	1.474 (0.01)	0.911 (0.01)	1.474 (0.01)	0.912 (0.01)
dE_{t+2}	-0.514 (0.01)	-0.330 (0.01)	-0.513 (0.01)	-0.335 (0.01)
$R\&D_t$	1.027 (0.01)	0.919 (0.01)	1.026 (0.01)	0.917 (0.01)
$dR\&D_t$	3.929 (0.01)	2.567 (0.01)	3.928 (0.01)	2.581 (0.01)
$dR\&D_{t+2}$	3.410 (0.01)	2.138 (0.01)	3.410 (0.01)	2.134 (0.01)
D_t	11.152 (0.01)	7.618 (0.01)	11.158 (0.01)	7.667 (0.01)
dD_t	-0.044 (0.89)	0.359 (0.05)	-0.044 (0.89)	0.339 (0.06)
dD_{t+2}	4.990 (0.01)	3.204 (0.01)	4.994 (0.01)	3.218 (0.01)
I_t	3.315 (0.01)	3.455 (0.01)	3.317 (0.01)	3.488 (0.01)
dI_t	-0.238 (0.18)	-1.640 (0.01)	-0.240 (0.18)	-1.624 (0.01)
dI_{t+2}	0.696 (0.01)	0.447 (0.01)	0.692 (0.01)	0.450 (0.01)
dNA_t	0.031 (0.01)	0.046 (0.01)	0.031 (0.01)	0.047 (0.01)
dNA_{t+2}	0.261 (0.01)	0.169 (0.01)	0.261 (0.01)	0.169 (0.01)
dV_{t+2}	-0.024 (0.01)	-0.007 (0.01)	-0.024 (0.01)	-0.007 (0.01)
Inverse Mills Ratio			0.068 (0.01)	-0.166 (0.01)
Year Dummy Variables	YES	YES	YES	YES
Industry Dummy Variables	YES	YES	YES	YES
Country Dummy Variables	YES	YES	YES	YES
Number of Observations	129215	122732	129215	122732
Adjusted R-square	0.36	0.29	0.36	0.29

Panel B. Difference in the Coefficients of Corporate Cash Holdings

The following table shows the difference in the coefficients of Corporate Cash Holdings between the two sub-groups separated by union membership and reports the p-value of the t-test in the parentheses.

	Corporate Cash Holdings	
	OLS	Second Stage of Heckman Two-stage Estimation
Difference	0.448	0.445
(p-value)	(0.01)	(0.01)

Table 11
Corporate Cash Holdings and Profitability

This table shows OLS regressions and the second stage of Heckman two-stage estimation for the sub-groups separated by union membership. We use a sample of 355715 firm-year observations from 66 countries between 1992 and 2013. Panel A shows the regressions. ROA is defined as the ratio of EBIT to total assets. *Union Membership* is defined as the ratio of the total number of trade union members to the total number of paid employees in a country. *Corporate Cash Holdings* is defined as the ratio of cash and marketable securities to non-cash assets, where non-cash assets is calculated as total assets minus cash and marketable securities. *Size* is defined as natural logarithm of non-cash assets. *M/B* is defined as market value of equity plus non-cash assets minus book value of equity, divided by non-cash assets. *Leverage* is defined as the ratio of long-term debts to non-cash assets. *Capital Expenditures* is defined as the ratio of capital expenditures to non-cash assets. *Dividends* is defined as the ratio of dividends to non-cash assets. *Cash Flow* is defined as the ratio of income before extraordinary items to non-cash assets. *R&D* is defined as the ratio of research and development expenses to non-cash assets. *Net Working Capital* is defined as the ratio of working capital minus cash and marketable securities to non-cash assets. *Inverse Mills Ratio* is obtained from the probit estimates in Table 10 (see text for the details). *Year Dummy Variables* are the dummy variables for the years in the sample and not reported in the table. *Industry Dummy Variables* are the dummy variables for the industries defined by two-digit SIC codes and not reported in the table. *Country Dummy Variables* are the dummy variables for the countries in the sample and not reported in the table. The standard errors are clustered at the firm level. The p-value is noted in the parentheses. Panel B shows the difference in the coefficients of Corporate Cash Holdings between the two sub-groups.

Panel A. Regressions

	ROA			
	OLS		Second Stage of Heckman Two-stage Estimation	
	Union Membership < Median	Union Membership ≥ Median	Union Membership < Median	Union Membership ≥ Median
Intercept	-0.463 (0.01)	-0.198 (0.01)	-0.469 (0.01)	-0.197 (0.01)
Corporate Cash Holdings	0.031 (0.01)	0.003 (0.01)	0.033 (0.01)	0.003 (0.01)
Size	0.030 (0.01)	0.013 (0.01)	0.030 (0.01)	0.013 (0.01)
M/B	0.002 (0.01)	0.007 (0.01)	0.002 (0.01)	0.007 (0.01)
Leverage	-0.068 (0.01)	-0.025 (0.01)	-0.069 (0.01)	-0.025 (0.01)
Capital Expenditure	0.061 (0.01)	0.040 (0.01)	0.060 (0.01)	0.040 (0.01)
Dividends	0.309 (0.01)	2.079 (0.01)	0.302 (0.01)	2.081 (0.01)
Cash Flow	-0.719 (0.01)	-0.237 (0.01)	-0.732 (0.01)	-0.237 (0.01)
R&D	0.210 (0.01)	0.085 (0.01)	0.214 (0.01)	0.085 (0.01)
Net Working Capital	-0.148 (0.01)	-0.135 (0.01)	-0.152 (0.01)	-0.135 (0.01)
Inverse Mills Ratio			0.001 (0.63)	-0.003 (0.01)
Year Dummy Variables	YES	YES	YES	YES
Industry Dummy Variables	YES	YES	YES	YES
Country Dummy Variables	YES	YES	YES	YES
Number of Observations	177400	178315	177400	178315
Adjusted R-square	0.42	0.37	0.42	0.37

Panel B. Difference in the Coefficients of Corporate Cash Holdings

The following table shows the difference in the coefficients of Corporate Cash Holdings between the two sub-groups separated by union membership and reports the p-value of the t-test in the parentheses.

	Corporate Cash Holdings	
	OLS	Second Stage of Heckman Two-stage Estimation
Difference	0.028	0.030
(p-value)	(0.01)	(0.01)

Table 12
Corporate Cash Holdings and Labor Costs

This table shows OLS regressions and the second stage of Heckman two-stage estimation about corporate cash holdings and labor costs for the sub-groups separated by union membership. We use a sample of 77380 firm-year observations from 63 countries between 1992 and 2013. Panel A shows the regressions. *Log (Average Labor Costs)* is defined as the logarithm of average labor costs, where average labor costs are the ratio of staff expenses to the number of employees. *Union Membership* is defined as the ratio of the total number of trade union members to the total number of paid employees in a country. *Corporate Cash Holdings* is defined as the ratio of cash and marketable securities to assets. *Size* is defined as the logarithm of market value of assets. *Leverage* is defined as the ratio of long-term debts to market value of assets. *Average Sales per Employee* is the ratio of sales to the number of employees. *M/B* is defined as market value of equity plus assets minus book value of equity, divided by assets. *Tangibility* is the ratio of plant, property and equipment to assets. *Inverse Mills Ratio* is obtained from the probit estimates in Table 10 (see text for the details). *Year Dummy Variables* are the dummy variables for the years in the sample and not reported in the table. *Industry Dummy Variables* are the dummy variables for the industries defined by two-digit SIC codes and not reported in the table. *Country Dummy Variables* are the dummy variables for the countries in the sample and not reported in the table. The standard errors are clustered at the firm level. The p-value is noted in the parentheses. Panel B shows the difference in the coefficients of Corporate Cash Holdings between the two sub-groups.

Panel A. Regressions

	Log (Average Labor Costs)			
	OLS		Second Stage of Heckman Two-stage Estimation	
	Union Membership < Median	Union Membership ≥ Median	Union Membership < Median	Union Membership ≥ Median
Intercept	7.193 (0.01)	7.630 (0.01)	7.249 (0.01)	7.655 (0.01)
Corporate Cash Holdings	0.334 (0.01)	0.504 (0.01)	0.335 (0.01)	0.505 (0.01)
Size	-0.009 (0.01)	0.001 (0.69)	-0.009 (0.01)	0.001 (0.71)
Leverage	-0.018 (0.65)	0.092 (0.04)	-0.016 (0.68)	0.092 (0.04)
Average Sales per Employee	0.464 (0.01)	0.428 (0.01)	0.464 (0.01)	0.429 (0.01)
M/B	0.001 (0.82)	0.008 (0.08)	0.001 (0.87)	0.008 (0.09)
Tangibility	-0.043 (0.10)	0.007 (0.81)	-0.043 (0.10)	0.007 (0.80)
Inverse Mills Ratio			0.053 (0.01)	-0.102 (0.25)
Year Dummy Variables	YES	YES	YES	YES
Industry Dummy Variables	YES	YES	YES	YES
Country Dummy Variables	YES	YES	YES	YES
Number of Observations	38981	38399	38981	38399
Adjusted R-square	0.56	0.43	0.56	0.43

Panel B. Difference in the Coefficients of Corporate Cash Holdings

The following table shows the difference in the coefficients of Corporate Cash Holdings between the two sub-groups separated by union membership and reports the p-value of the t-test in the parentheses.

	Corporate Cash Holdings	
	OLS	Second Stage of Heckman Two-stage Estimation
Difference	-0.170	-0.170
(p-value)	(0.01)	(0.01)

Table 13
Corporate Cash Holdings and Strikes & Lockouts: Country-level Analysis

This table shows an OLS regression on the country-level analysis about Corporate Cash Holdings and Strikes & Lockouts. We convert all firm-level variables into country-level variables by taking the average of the variables across the countries. The sample includes 781 country-year observations between 1992 and 2013 from 52 countries. *Strikes & Lockouts* are defined as the total number of strikes and lockouts in a country. *Corporate Cash Holdings* is defined as the ratio of cash and marketable securities to non-cash assets, where non-cash assets is calculated as total assets minus cash and marketable securities. *Labor Force* is defined as the sum of all persons of working age who are employed and those who are unemployed. *Size* is defined as natural logarithm of non-cash assets. *M/B* is defined as market value of equity plus non-cash assets minus book value of equity, divided by non-cash assets. *Leverage* is defined as the ratio of long-term debts to non-cash assets. *Capital Expenditures* is defined as the ratio of capital expenditures to non-cash assets. *Dividends* is defined as the ratio of dividends to non-cash assets. *Cash Flow* is defined as the ratio of income before extraordinary items to non-cash assets. *R&D* is defined as the ratio of research and development expenses to non-cash assets. *Net Working Capital* is defined as the ratio of working capital minus cash and marketable securities to non-cash assets. *Cash flow Volatility* is defined as the standard deviation of the median of *Cash Flow* in an industry classified by two-digit SIC codes in the prior 5 years. *Year Dummy Variables* are the dummy variables for the years in the sample and not reported in the table. *Industry Dummy Variables* are the dummy variables for the industries defined by two-digit SIC codes and not reported in the table. *Country Dummy Variables* are the dummy variables for the countries in the sample and not reported in the table. The p-value is noted in the parentheses.

	Log (Country-level Strikes & Lockouts + 1)
Intercept	9.855 (0.01)
Country-level Corporate Cash Holdings	0.616 (0.08)
Log (Country-level Labor Force)	-0.384 (0.01)
Country-level Size	0.220 (0.03)
Country-level M/B	0.043 (0.53)
Country-level Leverage	0.544 (0.60)
Country-level Capital Expenditure	-0.447 (0.81)
Country-level Dividends	2.446 (0.36)
Country-level Cash Flow	-0.437 (0.69)
Country-level R&D	10.301 (0.03)
Country-level Net Working Capital	1.612 (0.07)
Country-level Cash Flow Volatility	-4.705 (0.10)
Year Dummy Variables	YES
Industry Dummy Variables	YES
Country Dummy Variables	YES
Number of Observations	781
Adjusted R-square	0.90

Table 14
Robustness Check: Gender Gap

This table shows the second-stage regressions of the 2SLS estimation for the sub-groups separated by the Gender Gap. We use a sample of 355715 firm-year observations from 66 countries between 1992 and 2013. Panel A shows the regressions. *Gender Gap* index is from the World Economic Forum and is constructed based on the equality between women and men across four key areas: health, education, economy and politics (see text for details). *Corporate Cash Holdings* is defined as the ratio of cash and marketable securities to non-cash assets, where non-cash assets is calculated as total assets minus cash and marketable securities. *Union Membership* is defined as the ratio of the total number of trade union members to the total number of paid employees in a country. *Size* is defined as natural logarithm of non-cash assets. *M/B* is defined as market value of equity plus non-cash assets minus book value of equity, divided by non-cash assets. *Leverage* is defined as the ratio of long-term debts to non-cash assets. *Capital Expenditures* is defined as the ratio of capital expenditures to non-cash assets. *Dividends* is defined as the ratio of dividends to non-cash assets. *Cash Flow* is defined as the ratio of income before extraordinary items to non-cash assets. *R&D* is defined as the ratio of research and development expenses to non-cash assets. *Net Working Capital* is defined as the ratio of working capital minus cash and marketable securities to non-cash assets. *Industry Cash Flow Volatility* is defined as the standard deviation of the median of *Cash Flow* in an industry classified by two-digit SIC codes in the prior 5 years. *Year Dummy Variables* are the dummy variables for the years in the sample and not reported in the table. *Industry Dummy Variables* are the dummy variables for the industries defined by two-digit SIC codes and not reported in the table. *Country Dummy Variables* are the dummy variables for the countries in the sample and not reported in the table. The standard errors are clustered at the firm level. The p-value is noted in the parentheses. Panel B shows the difference in the coefficients of Union Membership between the two sub-groups.

Panel A. Regressions

	Corporate Cash Holdings	
	Second Stage of 2SLS	
	Gender Gap < Median	Gender Gap ≥ Median
Intercept	3.092 (0.01)	4.085 (0.01)
Union Membership	-1.273 (0.01)	-1.264 (0.01)
Size	-0.130 (0.01)	-0.160 (0.01)
M/B	0.015 (0.01)	0.018 (0.01)
Leverage	-0.060 (0.01)	-0.125 (0.01)
Capital Expenditure	1.192 (0.01)	0.739 (0.01)
Dividends	3.124 (0.01)	2.223 (0.01)
Cash Flow	-0.010 (0.27)	-0.601 (0.01)
R&D	4.495 (0.01)	3.437 (0.01)
Net Working Capital	-0.800 (0.01)	-1.146 (0.01)
Industry Cash Flow Volatility	-0.155 (0.01)	0.673 (0.01)
Year Dummy Variables	YES	YES
Industry Dummy Variables	YES	YES
Country Dummy Variables	YES	YES
Number of Observations	239191	116524
Adjusted R-square	0.40	0.39
Over-identifying Restrictions Test (p-value)	0.18	0.63
Hausman Test (p-value)	0.01	0.01

Panel B. Difference in the Coefficients of Union Membership

The following table shows the difference in the coefficients of Union Membership between the two sub-groups separated by Gender Gap and reports the p-value of the t-test in the parentheses.

	Union Membership Second Stage of 2SLS Estimation
Difference	-0.009
(p-value)	(0.94)

Table 15
Robustness Check: Collective Bargaining Coverage Rate

This table shows the robustness check by using Bargaining Coverage Rate as an alternative measure of bargaining power. We use a sample of 219720 firm-year observations from 55 countries between 2000 and 2013. Panel A shows the determinants of the Corporate Cash Holdings. We report the OLS regression and the second stage of two-stage least square estimation. *Corporate Cash Holdings* is defined as the ratio of cash and marketable securities to non-cash assets, where non-cash assets is calculated as total assets minus cash and marketable securities. *Collective Bargaining Coverage Rate* is calculated as the number of employees whose pay and/or conditions of employment are determined by one or more collective agreement(s) in a country divided by the total number of employees in that country. *Size* is defined as natural logarithm of non-cash assets. *M/B* is defined as market value of equity plus non-cash assets minus book value of equity, divided by non-cash assets. *Leverage* is defined as the ratio of long-term debts to non-cash assets. *Capital Expenditures* is defined as the ratio of capital expenditures to non-cash assets. *Dividends* is defined as the ratio of dividends to non-cash assets. *Cash Flow* is defined as the ratio of income before extraordinary items to non-cash assets. *R&D* is defined as the ratio of research and development expenses to non-cash assets. *Net Working Capital* is defined as the ratio of working capital minus cash and marketable securities to non-cash assets. *Industry Cash Flow Volatility* is defined as the standard deviation of the median of *Cash Flow* in an industry classified by two-digit SIC codes in the prior 5 years. *Year Dummy Variables* are the dummy variables for the years in the sample and not reported in the table. *Industry Dummy Variables* are the dummy variables for the industries defined by two-digit SIC codes and not reported in the table. *Country Dummy Variables* are the dummy variables for the countries in the sample and not reported in the table. The p-value is noted in the parentheses.

Panel B shows the second stage of Heckman two-stage estimation about the market value of corporate cash holdings for the sub-groups separated by Collective Bargaining Coverage Rate. We use a sample of 163788 firm-year observations from 55 countries between 2000 and 2013. For each independent variable X_t is the level of the variable X in year t , divided by total assets in year t . dX_t is the change in the level of the variable X from year $t - 2$ to year t , divided by total assets in year t ($dX_t = (X_t - X_{t-2})/A_t$). dX_{t+2} is the change in the level of the variable X from year $t + 2$ to year t , divided by total assets in year t ($dX_{t+2} = (X_{t+2} - X_t)/A_t$). V is the market value of the firm, which is defined as the sum of the market value of equity, the book value of short-term debt, and the book value of long-term debt. C is cash and marketable securities. E is earnings, which is defined as earnings before extraordinary items plus interest, deferred tax credits, and investment tax credits. A is total assets. $R\&D$ is the research and development expenses. I is the interest expenses. D is dividends. NA is non-cash assets, which is defined as total assets minus cash and marketable securities. Inverse Mills Ratio is obtained from the probit estimates in Table 10 (see text for the details). *Year Dummy Variables* are the dummy variables for the years in the sample and not reported in the table. *Industry Dummy Variables* are the dummy variables for the industries defined by two-digit SIC codes and not reported in the table. *Country Dummy Variables* are the dummy variables for the countries in the sample and not reported in the table. The p-value is noted in the parentheses. Panel C shows the difference in the coefficients of Corporate Cash Holdings between the two sub-groups. The p-value is noted in the parentheses.

Table 15 (Continued)**Panel A. Collective Bargaining Coverage Rate and Corporate Cash Holdings**

	Corporate Cash Holdings	
	OLS	The Second Stage of 2SLS
Intercept	3.321 (0.01)	3.450 (0.01)
Collective Bargaining Coverage Rate	-0.234 (0.01)	-1.063 (0.01)
Size	-0.139 (0.01)	-0.140 (0.01)
M/B	0.022 (0.01)	0.021 (0.01)
Leverage	-0.146 (0.01)	-0.159 (0.01)
Capital Expenditure	1.038 (0.01)	1.050 (0.01)
Dividends	2.325 (0.01)	2.367 (0.01)
Cash Flow	-0.362 (0.01)	-0.362 (0.01)
R&D	3.870 (0.01)	3.842 (0.01)
Net Working Capital	-1.028 (0.01)	-1.032 (0.01)
Industry Cash Flow Volatility	0.426 (0.01)	0.414 (0.01)
Year Dummy Variables	YES	YES
Industry Dummy Variables	YES	YES
Country Dummy Variables	YES	YES
Number of Observations	290565	290565
Adjusted R-square	0.41	0.41
Over-identifying Restrictions Test		0.31
Hausman Test		0.01

Table 15 (Continued)

Panel B. Market Value of Cash - Regressions

	V_t	
	Second Stage of Heckman Two-stage Estimation	
	Collective Bargaining Coverage Rate < Median	Collective Bargaining Coverage Rate \geq Median
Intercept	1.462 (0.01)	1.134 (0.01)
C_t	1.485 (0.01)	1.054 (0.01)
E_t	-0.754 (0.01)	-0.361 (0.01)
dE_t	1.548 (0.01)	0.737 (0.01)
dE_{t+2}	-0.518 (0.01)	-0.338 (0.01)
$R\&D_t$	0.995 (0.01)	0.891 (0.01)
$dR\&D_t$	4.029 (0.01)	2.299 (0.01)
$dR\&D_{t+2}$	3.303 (0.01)	1.854 (0.01)
D_t	10.746 (0.01)	9.014 (0.01)
dD_t	0.758 (0.04)	0.079 (0.64)
dD_{t+2}	4.970 (0.01)	3.617 (0.01)
I_t	3.192 (0.01)	1.620 (0.01)
dI_t	-0.065 (0.74)	0.506 (0.01)
dI_{t+2}	0.653 (0.01)	0.625 (0.01)
dNA_t	0.030 (0.01)	0.065 (0.01)
dNA_{t+2}	0.261 (0.01)	0.184 (0.01)
dV_{t+2}	-0.018 (0.01)	-0.021 (0.01)
Inverse Mills Ratio	-0.068 (0.01)	-0.057 (0.01)
Year Dummy Variables	YES	YES
Industry Dummy Variables	YES	YES
Country Dummy Variables	YES	YES
Number of Observations	111493	106870
Adjusted R-square	0.37	0.34

Panel C. Market Value of Cash - Difference in the Coefficients of Corporate Cash Holdings

The following table shows the difference in the coefficients of Corporate Cash Holdings between the two sub-groups separated by Collective Bargaining Coverage Rate and reports the p-value of the t-test in the parentheses.

	Corporate Cash Holdings (C_t)
	Second Stage of Heckman Two-stage Estimation
Difference	0.431
(p-value)	(0.01)