Employment Protection Laws and Corporate Liquidity Management

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Abstract

This paper investigates the relation between employment protection and corporate liquidity management (i.e., cash holding and cash saving decisions). Theory suggests that employment protection increases firms' labor adjustment costs. We use difference-in-differences estimation method exploiting changes in employment protection laws as a source of variation in labor adjustment costs in 20 countries over the period 1990-2007. We find that, in response to an increase in employment protection, firms increase their cash buffers and propensities to save cash from the funds raised internally and externally. The effect is stronger for firms with relatively small size, high cash flow volatility, and high labor intensity. Overall, our findings suggest that firms' precautionary motives for cash savings increase as labor adjustment costs and therefore operating leverage increases.

Keywords: cash holdings, cash savings, employment protection

JEL classification: G31, G32, K31

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1. Introduction

Extant literature shows that cash holdings vary both across countries and across firms in a country over time. As Keynes (1936) argued firms set their level of cash holdings based on their expectations about potential financial frictions. A large body of research on cash holdings has attempted to explore how various factors influence firms' cash holding behaviour. However, it still remains to be a puzzle why there is so much variation in cash holdings across firms and across countries over time. In this paper, we attempt to shed some light on this puzzle by investigating how changes in countries' employment protection influences liquidity management, i.e. cash holdings and cash savings, decisions using a sample of 20 countries over the period 1990-2007. To our knowledge, our paper is the first cross-country study on the impact of changes in employment protection on firms' liquidity management.

There is a large body of research on the effects of labour market institutions, i.e. labour unions, legislation on minimum wages, and employment protection, on economic performance (e.g., Nickell and Layard, 1999; Autor, Kerr, Kugler, 2007; Griffith and Macartney, 2014). A change in labour market institutions, in particular, a change in employment protection legislation, can have important implications for labour adjustment costs, i.e. hiring and firing costs (Blanchard and Portugal, 2001). As employment protection increases, firms are likely to experience higher labour adjustment costs (Autor, Kerr, Kugler, 2007). In an environment with strict employment protection, the number of employee dismissals is likely to be low. Further, firms' risk of hiring new employees will be high when there is a strong employment protection (Millan et al., 2013). If firms hire a new employee, who turns out to be of low quality, then the cost of firing the employee will be relatively high. Additionally, firms will not be able to downsize in an efficient manner if they experience a shock to their cash flows. Thus, firms will lower the number of employees they hire (or fire) as employment protection becomes stronger.

The role of employment protection in the determination of cash holdings is a priori uncertain. On the one hand, stronger employment protection can induce firms to lower their cash holdings. Firms strategically hold lower levels of cash to improve their bargaining position against workers (e.g., Schmalz, 2015; Klasa, Maxwell, and Ortiz-Molina, 2009). Klasa, Maxwell, and Ortiz-Molina (2009) show that firms manage their cash holdings downward as a way to gain bargaining advantage over labour during negotiations. This bargaining power view then yields a prediction that, in so far as an increase in employment protection improves bargaining position of labour, firms will respond by lowering their cash reserves. On the other hand, stronger employment protection can lead to higher cash holdings. Strict employment protection introduces higher labour adjustment costs. As labour adjustment costs, and, thus, operating leverage, rise, firms attempt to create financial flexibility. Having large fixed labour cost obligations due to stricter employment protection would increase firms' risk of financial distress when there is a demand shock. These firms are likely to have difficulties in debt payment and violations of debt covenants. As Titman (1984) and Titman and Wessels (1988) argue, financial distress can be costly for firms, hence a large cash buffer can reduce firms' risk of financial distress (John, 1993).[1] Thus, we expect firms to increase their precautionary demand for cash as employment protection becomes stricter.

Employment protection laws can also influence firms' cash saving behaviour, i.e. the extent to which firms save cash from their cash flows, proceeds from equity issuance and debt issuance. As prior studies document, stringent employment protection leads to more limited access to external financing (Alimov, 2013; Simintzi, Vig and Volpin, 2015). Almeida et al. (2004) show that financially constrained firms' cash flow sensitivity of cash should be positive,

[1] Alternatively we can refer to the literature on irreversible investment. As argued in the investment-based asset pricing literature (e.g., Zhang, 2005), the irreversibility of physical capital investment makes a firm vulnerable to the business-cycle risk. In a similar vein, if its labor input becomes more costly to reverse, the firm is more likely to suffer from negative shocks. As a result, an increase in labor protection can encourage firms to build up precautionary cash buffers to hedge against the financial distress risk.

while for unconstrained firm there might not be any significant relation. Thus, we predict a higher cash flow sensitivity of cash when employment protection law becomes more stringent. Similarly, firms can increase their marginal propensity to save cash from the proceeds of debt issuance and equity issuance as they face stricter employment protection laws.

We examine the relation between employment protection and corporate cash holding, and cash saving behaviour using the EPL index developed by the OECD. In our empirical analysis, we exploit the variation in the EPL index across years and across countries to identify how labour laws influence firms' cash holdings decisions. Thus, we use difference-in-difference estimation method to examine whether firms increase their cash savings from cash flows, and debt and equity issuance when labour regulations become more stringent. In our regression model, we control for the firm fixed effects to absorb unobserved heterogeneities at the firm- and country-levels. Industry-times-year fixed effects control for the time-varying industry specific attributes.

Our results show that firms increase their precautionary demand for cash holdings, when employment protection laws become stricter increasing labour adjustment costs. Thus, firms maintain higher cash balances as a buffer against a possible cash flow shock which could make it difficult to keep up with labour adjustment costs. Our findings are consistent with the survey results from Graham and Harvey (2001) showing that CEOs try to maintain financial flexibility when they make corporate decisions. We observe that the impact of employment protection on cash holdings and cash savings is more pronounced for small firms, firms with high cash flow volatility, and firms with high labour intensity. As labour market rigidities impede on the firms' hiring and firing decisions, these firms seem to increase their financial flexibility through their liquidity management policies. Our findings support the view that firms adjust their liquidity management policies so as to preserve the flexibility to respond to shocks in their cash flows and growth opportunities.

Our paper is closely related to Simintzi, Vig and Volpin (2015), and Alimov (2015), and complements their findings. Both of these studies investigate how changes in employment protection laws influence firms' access to debt financing using cross-country data. Simintzi, Vig and Volpin (2015) show that stricter employment protection laws reduce firms' leverage. The authors interpret their findings to suggest that high operating leverage, due to fixed labor claims, crowds out financial leverage. Alimov (2015) provides further evidence that stringent labour laws have a negative impact on firms' ability to raise debt financing, i.e. bank debt. His results show that EPL influences bank debt contracting increasing the price and non-price terms of bank loans offered to corporations. Our paper differs from these studies in that we focus on how employment protection influences firms' liquidity management decisions including cash holdings and cash savings decisions.

Overall, our study contributes to cash holdings and labour market literature in several ways. First, our findings contribute to our understanding of how firms manage their liquidity in the face of stringent employment protection laws. We provide insights on how employment protection affects firm's cash holding and cash saving decisions, i.e. cash saving from firm's cash flows, and issuance of debt and equity. As Riddick and Whited (2009) show a high cash holding does not necessarily imply a high, positive sensitivity of the cash saving to cash flow; nor does a low cash holding imply a low sensitivity. We document that stronger employment protection induces firms to hold more cash and save more from their cash flow, debt issuance and equity issuance. Thus, we show that employment protection is an important determinant of firm's cash savings in our sample countries. Furthermore, we report that the positive relation between corporate cash holdings and employment protection is more pronounced for financially constrained firms, i.e. small firms. Finally, firms with higher labour intensity and greater cash flow volatility save more cash from their cash flows, debt issuance and stock issuance when employment protection becomes stronger.

The rest of the paper proceeds as follows. Next section reviews the related literature. Section 3 presents our empirical model, while Section 4 describes data, sample construction and discusses empirical results. Section 5 concludes.

2. Literature review

2.1. Corporate cash holdings and cash savings

Recently there has been considerable concern about why firms have been increasing their cash holdings creating a corporate savings glut across the US, Europe and Japan.[2] There remain a number of unanswered questions concerning how firms decide about their cash holdings. Here, our main question is whether employment protection can be important in understanding recent corporate cash holdings behaviour. We aim to advance our understanding of how firms manage their liquidity in the face of stringent employment protection laws. Our study is related to the literature on the determination of corporate cash holdings, such as Opler et al. (1999), Ozkan and Ozkan (2004) and Bates, Kahle, and Stulz (2009). In this literature, firms accumulate cash when financial market frictions limit their access to external financing sources. This is referred to as precautionary motive for holding cash. Almeida et al (2004) find that financially constrained firms show a positive cash flow sensitivity of cash, that is, a propensity to save cash from positive cash flow shocks.

Recently Eisfeldt and Muir (2015) report a strong, positive correlation between external financing and cash savings at the aggregate level. They argue that firms raise costly external finance and allocate some of the funds to liquid assets, when the total return to liquidity accumulation, including its value as a hedging asset, is high. Almeida et al. (2011)'s model shows that firms have incentives to choose financial policies to minimize the impact of

[2] See "corporates are driving the global savings glut", June 24, 2005, JP Morgan research paper.

financing frictions. Thus, they hold more cash and increase their cash savings from cash flows when financial frictions are important. Moreover, internal financing should be more valuable for firms with limited access to external capital markets, i.e. financially constrained firms, than those with easy access to external financing, i.e. financially unconstrained firms. Mc Lean (2011) and Mc Lean and Zhao (2015) investigates firms' cash savings from externally raised funds, i.e. equity issuance and debt issuance. We extend the extant literature on cash policy decisions by investigating how changes in employment protection can influence firms' cash holdings and cash savings.

2.2. Employment protection and corporate financial policy

Employment protection legislation aims to protect employees from arbitrary, unfair or discriminatory actions on the part of employers. In so doing, it might lead to an increase in the cost of hiring and firing of employees, and raise the adjustment costs of labour. There is a considerable variation in employment protection across countries, but there have been very few cross-country studies of the impact of employment protection on corporate financial decisions.

Theoretical papers show that employment protection lowers firm level hiring and firing (e.g., Bertola, 1990; Lafontaina and Sivadasan, 2009). EPL increases the cost of firing and therefore leads to fewer dismissals when firms experience a negative shock. Conversely, when firms are faced with a positive shock, they make decisions on their optimal employment level considering the fact that employees may have to be fired in the future, and their employment response is smaller. When adjustment costs are high, firms will retain less productive current employees and they will not hire potentially more productive new recruits. Thus, we observe lower adjustment speed of employment when EPL is stricter.

Caballero et al. (2013) provide empirical evidence that firms have higher adjustment costs when job security laws are stricter. For their analysis, they use a sample 60 countries from 1980

to 1998. Lafontaina and Sivadasan (2009) also document strong evidence that strict labour regulations dampen firm's responses to demand and supply shocks. They use data from a single firm with operations across different countries. Their findings suggest that labour market rigidities reduce firms' ability to adjust their labour level when they are faced with demand or productivity fluctuations. Thus, strict EPL can hamper the reallocation of resources and impede aggregate productivity growth. Blanchard and Portugal (2001) also find that higher employment protection leads to lower layoffs of workers since it increases the firing costs as well as strengthening the bargaining power of workers. Thus, firms are forced to pay high firing costs or keep less productive workers. As a consequence, cost of production would increase.

Saint-Paul (2002) argues that labour market rigidities influence firms' incentives for R&D and international specialization. In his analysis, he distinguishes between 'primary innovation', which is the introduction of a new good, and 'secondary innovation', which involves cost reduction and improving existing products rather than creating new products. In a country with high firing costs, firms will tend to engage in secondary innovation rather than primary innovation. Thus, labour market rigidities create a bias against specialization in high tech areas.

Matsa (2010) finds that once states adopt legislation that reduces union bargaining power, firms with concentrated labour markets reduce debt relative to otherwise similar firms in other states. For their empirical analysis they use exogenous variation in state-level labour laws. Klasa, Maxwell, and Ortiz-Molina (2009) examine the relation between unionization and corporate cash holdings. They find that firms strategically lower their cash holdings as a way to strengthen their bargaining position against labour unions. Moreover, Schmalz (2015) find that the impact of unionization on cash holdings differ between financially constrained and unconstrained firms. Unionization has a positive impact on cash holdings of unconstrained firms, while there is a negative impact for financially constrained firms. Simintzi, Vig and

Volpin (2015) show that firms consider labour adjustment costs in their capital structure decisions. Alimov (2015) argues that labour regulation can influence how lenders assess borrowing firms' credit risk. Stringent labour regulations can limit firms' ability to adjust labour in response to a shock, thereby influencing firm performance and credit risk. Our paper adds to the growing empirical literature on the interaction between labor markets and finance (e.g., Atanassov and Kim, 2009; Chen, Kacperczyk, and Ortiz-Molina, 2012; Fairhurst and Serfling, 2015; Serfling, 2016).

3. Empirical model

We study the impact of EPL on firms' cash holdings and cash saving propensities for a sample of 20 countries from 1990 to 2007. In our regression model for cash holdings, we include a set of firm-specific variables, which have been shown to determine firms' cash level (e.g., Opler et al., Ozkan and Ozkan, 2004). To estimate firms' propensity to save cash from their cash flows, debt issuance, and equity issuance, we follow McLean (2011) and McLean and Zhao (2015). Specifically, we run the following regression models for cash holdings and cash savings:

$$Cash_{i,t} = \gamma EPL_{k,t-1} + \Psi X_{i,t} + f_i + f_{j\times t} + \varepsilon_{i,t} \tag{1}$$

$$\begin{aligned} \Delta Cash_{i,t} = {} & \gamma_0 EPL_{k,t-1} + \gamma_1 \left(EPL_{k,t-1} \times CashFlow_{i,t}\right) \\ & + \gamma_2 \left(EPL_{k,t-1} \times EquityIssue_{i,t}\right) \\ & + \gamma_3 \left(EPL_{k,t-1} \times DebtIssue_{i,t}\right) + \Psi X_{i,t} + f_i + f_{j\times t} + \varepsilon_{i,t} \end{aligned} \tag{2}$$

where we denote individual firms by subscript *i*, industries by *j*, countries by *k*, and year by *t*. $EPL_{k,t-1}$ is the employment protection measure, whose value ranges between zero and six.[3]

[3] We report the results based on the lagged value of the EPL index. We also experiment with the current EPL and arrive at the same conclusion.

We also consider, in lieu of the EPL index, a binary indicator $D_{k,t-1}^{\text{High EPL}}$ that takes one if the country's EPL index value is above the sample median (1.42) and zero otherwise. In our estimation we include firm-specific fixed effects, f_i, to control for firm- and country-specific unobservable heterogeneities that may affect firms' liquidity policy. Industry-times-year fixed effects $f_{j\times t}$ absorb the time-varying industry characteristics such as investment opportunities (industry classification is based on Fama-French 12 industries). $X_{i,t}$ is the vector of covariates that contains firm- and country-level controls. We include cash flow, equity issue, debt issue, other source of funds, *Q*, size, property, plant, and equipment (PPE henceforth), net working capital (NWC henceforth), and GDP growth.

We include firm-specific fixed effects in our regression model and, compare firms in the countries with changes in EPL and those with no such changes. The coefficient γ in equation (1) therefore captures the difference in changes in cash between firms with and without changes in EPL.

In equation (2), the variables of main interest are the interactions of EPL with cash flow, equity issue, and debt issue. One can argue that the relation between cash savings, $\Delta Cash$, and these funds may be direct as any internally or externally raised fund inflows would lead to an increase in the firm's end-of-year cash balance. While we do not view these variables as the factors driving a firm's cash policy, the coefficients on these funds, as discussed in McLean (2011), can be best interpreted as the firms' propensity to save out of cash flows, proceeds from equity issuance and debt issuance (see Almeida, Campello, and Weisbach (2004) for a similar argument). The coefficients on the three interaction terms $\gamma_{n\in\{1,2,3\}}$ then capture the changes in these propensities in response to changes in the EPL.

Q, the natural logarithm of book assets, PPE, and NWC, respectively, proxy for investment demand, firm size, asset tangibility, and liquidity substitutes. Like others (e.g., Opler et al.,

1999; Bates, Kahle, and Stulz, 2009), we include these variables in our cash regression model considering agency theory, precautionary motive, or economic tradeoff argument.

4. Data, sample characteristics and empirical results

4.1. Data and sample construction

We start our sample with all of the firms from 20 developed countries over the period of 1990–2007 from the Worldscope database. Following prior studies, firms from financial sector (SIC codes 6000–6999), utilities (SIC codes 4900–4999), and government related sector (SIC codes 9000–9999) are excluded.[4] All the firm-level financial variables including cash, share issuance, and debt issuance are obtained from the Worldscope database, while GDP growth variable is from International Monetary Fund (IMF) database. We extract the measures of employment protection (Employment protection legislation index) from the OECD database. Observations with the value of total assets less than $10 million (in 2007 dollars) and with the value of cash holdings greater than the value of total assets are excluded. As a result of this filtering process, we are left with a sample of 70,063 firm-year observations with 9,642 unique firms.

4.2. Descriptive statistics

Table 1 reports the summary statistics for the variables used in our study. *Cash* is cash and cash equivalents, $\Delta Cash$ is the annual change in *Cash*, *Cash Flow* is net income plus depreciation, *Equity Issue* is proceeds from equity issuance, *Debt Issue* is proceeds from long-term debt issuance, *Other Sources* is the sum of disposal of fixed assets, decrease in investment, and other sources of funds, *PPE* is property, plant and equipment, and *NWC* is net working

[4] See, for instance, Bates, Kahle, and Stulz (2009).

capital minus cash holding. These variables are then scaled by the beginning-of-year assets. Further, we also include *Tobin's Q*, the market value of equity plus total assets minus book equity divided by book value of total assets, *Size*, the natural logarithm of total assets in 2007 dollars. All the financial variables are winsorized at 1% in both tails. We find that the descriptive statistics these variables are consistent with those reported by extant studies.[5]

[Insert Table 1]

4.3. Measurement of employment protection and the univariate comparison

Numerous studies since Lazear (1990) have used the EPL (Employment Protection Legislation) index as a proxy for measuring level of job security for workers in a specific country. We use the summary EPL index (more precisely, the "unweighted average of version-1 sub-indicator for regular contracts and temporary contracts"), reported by the OECD.[6] Simintzi, Vig, and Volpin (2015) develop their own employment protection indicator by surveying the major labor reforms in each country. They consider labor reforms related to both regular and temporary job contracts, and, therefore, their indicator captures an effect similar to the OECD's summary EPL index.

Each year, OECD publishes EPL indices for each member country by surveying various legislations concerning the length of the notice period, amount of severance payment provisions, and the administrative requirements for an employer to lay off employees. OECD first computes a score for each of these categories (called "sub-components") and these scores are combined to construct different versions of sub-indicators and summary indices (e.g., sub-indicators for regular and temporary workers and summary indices based on these sub-

[5] For example, in his study using international data from 32 countries, McLean (2015) reports the mean (median) cash to assets of 0.17 (0.10). The statistics for other variables are also similar to those reported in Ozkan and Ozkan (2004), Khurana et al. (2006), and Mclean and Zhao (2015).

[6] Throughout this paper, the term EPL index or EPL denotes this summary index.

indicators). The values of the indices change from 0 to 6, and a higher score represents stricter employee protection.

[Insert Table 2]

Table 2 reports the EPL index values for each of 20 countries included in our sample along with the median cash ratios. The standard deviations of the EPL index for each country suggest that the stringency of EPL varies not just across countries, but also within country over our sample period for the majority of countries (i.e., all except Canada and Switzerland). Figure 1 also shows these within country variations over the period 1990-2007.

Table 2 also provides the univariate comparison of cash ratios within each country (columns 5–9). Using the country-level mean EPL, we first divide firm-years within each country into low and high EPL regimes in that country and employ Wilcoxon rank-sum test for median differences to see if firms hold more (or less) cash in a high EPL regime than low EPL regime. To account for the firm-level heterogeneity in cash holding, we first obtain the firm-level demeaned cash ratio and compute the country median of this within-firm-transformed cash variable. The result of this comparison provides the *prima facie* evidence for the case: for 12 out of 18 countries that have at least one change (i.e., Canada and Switzerland are excluded), we see that median cash to assets is higher in the high-EPL regime of the country and, for 10 (8) out of 12 countries, these differences are significant at 10% (1%) level. Out of the six countries for which the median cash ratios are lower in the high-EPL regime, only three countries exhibit statistically significant differences. (Section 4.2 reports the results estimated from the propensity score-matched sample).

4.4. Empirical Results

In this section, we present and discuss our estimation results about the impact of EPL on cash holdings and cash savings.

4.4.1 The effect of EPL on cash holding

We begin with our investigation of the impact of changes in EPL on firms' cash holdings. Table 3 reports estimation results for equation (1). Firm fixed effects f_i and industry-times-year fixed effects $f_{j\times t}$ are not displayed. Our proxy for the labor protection is the EPL index in columns 1 and 2, while it is the binary construct D^{HighEPL} in column 3 and 4. The coefficients on control variables, such as *Q*, firm size, PPE, and NWC, are similar to those reported by previous studies, and for brevity, we omit our discussion on these variables.

[Insert Table 3]

In columns 1 and 2, we observe that, in response to an increase in EPL, firms increase their cash holding by 3% and this effect is statistically significant. To the extent that the EPL index captures the difficulty of firing employees and thus proxies for labor adjustment costs, the positive coefficient for EPL suggests that firms increase their cash holdings when they face higher labor adjustment costs. As widely argued in the extant literature, holding cash involves various direct and indirect costs, such as opportunity costs of holding low-return assets or agency cost of free cash flow. Therefore, our difference-in-difference estimation suggests that, when employment protection increases, marginal benefits of holding cash is greater than marginal costs of doing so. Presumably, the difficulty in adjusting labor is likely to leave firms with a large amount of fixed wage claims. This operating leverage then increases the financial distress risk, thereby driving firms' precautionary motives for holding cash. Moreover, if the increase in employment protection also induces the bargaining power channel to come into

play (i.e., firms' attempt to lower financial slack to counteract the increased bargaining power of employees), our estimates could be viewed as the ones that are attenuated due to this competing effect. To control the bargaining power, we follow the literature and include unionization rate ($Unionization_t$) in column 3 (see, for instance, Klasa et al., 2009)[7]. The negative and significant coefficient on $Unionization_t$ suggests that firms lower their cash level to gain bargaining power against employees, which is consistent with the findings in Klasa et al. 2009. More importantly, after controlling unionization rate, the coefficient on EPL is still positive and significant. In columns 4 and 5 we use a binary variable, D^{HighEPL}, as a proxy for measuring employment protection and observe that our results remain the same. Controlling unionization rate in column 6 does not change these results.

4.4.2 Propensity score matching estimation

Next, we check robustness of our estimation results using the propensity score matching estimation method. One can raise a concern that some unobservable attributes of the treated firms (i.e. firms in a stricter EPL environment) may drive our results in Table 3. To address this issue, we match the firms in the treated group with those in the control group based on various firm characteristics and examine the difference in their cash holding behavior.

We use two stratification schemes for the treatment assignment. In the first scheme, a firm-year is assigned to the treated group if the country's EPL in that year is above the within-country mean (Canada and Switzerland are excluded in this scheme). The second scheme employs the sample median EPL (i.e., median across all countries and over time) as the treatment assignment in a similar fashion. Using one of these treatment assignment schemes,

[7]Unionization rate is the ratio of the number of wage and salary earners that are members of a trade union divided by total number of wage and salary earners. The data is taken from OECD Database.

we estimate a probit model to compute the probability of being treated as a function of the covariates included in $X_{i,t}$ and indicators for the two-digit SIC codes and years. We then match each observation in the treated group to those in the control group based on these propensity scores (predicted probabilities). We employ one-to-one nearest-neighbor matching with replacement that minimizes the absolute values of the differences between the predicted probabilities (caliper distance of 0.001).

[Insert Table 4]

Table 4 reports the differences in the cash to assets ratios between the treated and control groups formed via the two treatment assignment schemes described above. Since the cash ratios have undergone a within transformation (i.e., demeaned at the firm level) before this test, the identification strategy is in line with the one used in equation (1). The treatment effect therefore captures the mean difference between the two groups in (within-firm) difference in cash holding. Our inference is the same as the one drawn on the regression results reported in Table 3: when firms operate in a high EPL regime, they hold more cash. We conclude that stricter employment protection encourages firms to build up their liquidity buffers.

4.4.3 The effect of EPL on saving propensities

In this section, we examine firms' propensities to save out of the funds raised internally and externally (i.e., cash flows and proceeds from equity and debt issuance). As discussed in Section 3.3, these cash saving propensities are estimated using equation (2). Interaction of the EPL index with cash flow capture the impact of EPL on cash flow sensitivity of cash. Similarly, interactions of EPL index with equity issuance and debt issuance shows whether changes in EPL influences firms' cash saving propensity from equity issuance and debt issuance.

[Insert Table 5]

Table 5 reports the estimation results based on the EPL index (column 1) and the dummy indicator D^{HighEPL} (column 2). In columns 3 and 4, we drop interaction terms in equation (2) and repeat our test for the subsamples formed on the binary indicator D^{HighEPL} to ensure that our result remains unaffected when we remove potential biases due to the inclusion of the dummy variable and its interactions with others.[8] We find qualitatively similar results for the EPL index and the binary construct and, in what follows, we restrict our attention to column 1 of Table 5.

Our result on the cash saving propensities is consistent with McLean's finding (2011). The coefficients on cash flow, equity and debt issuance are, on average, positive and statistically significant. For the sample mean of EPL, which is 2, the sensitivity of cash saving to cash flow, equity issue, and debt issue are 18, 37, and 4 cents, respectively.[9] As McLean documents, firms save a greater fraction of equity issue proceeds than that of cash flows or debt issue proceeds. More importantly, we find that an increase in the EPL has a positive and significant impact on these saving propensities as captured by the interaction terms[10]. In response to labor law reforms that would raise the EPL index score by one unit, firms increase cash saving, by five, three, and three cents, respectively, out of each additional dollar raised from cash flow, equity issue, and debt issue. This is a sizable impact. Inside the empirical distribution of the EPL index (from 0.6 to 4.1) in our sample, the increments in these saving propensities, respectively, can be as large as 16, 9, and 10 cents.

[8] While the EPL index exhibits a fair amount of within-country variation for most countries (see Table 2), the dummy variable D^{HighEPL} has small within variation, because a country with a relatively high (low) EPL value tends to have a high (low) value over time. Due to the small within variation, the coefficients on D^{HighEPL} and its interactions with other variables could be biased in the within estimation.

[9] For example, the propensity to save out of cash flow at the mean EPL is calculated as $0.085 + 2 \times 0.046 = 0.18$.

[10] In unreported tests, controlling unionization rate or its interactions with cash sources do not change this finding.

This increased saving pattern observed for the firms in a high EPL regime supports the notion that the rigidity in the labor adjustment induces the operating leverage and financial distress risk thereby giving rise to firms' precautionary motive for cash saving.

4.4.4 Firm size, cash flow volatility, and labor intensity

In this section, we further examine how employment protection influences firms' liquidity management. If an increase in employment protection causes a concern of financial distress and encourages firms to hold more cash, this effect is likely to be stronger among firms that are small, i.e., financially constrained, that have a high cash flow volatility, and that rely on labor input more than physical capital. Thus, we estimate equations (1) and (2) for subsamples of firms classified based on firm size, which is a proxy for financing constraints, cash flow volatility, which is a proxy for precautionary motive, and labor intensity, which is a proxy for measuring labor adjustment costs.

We use firm size (total assets in 2007 dollars) as a proxy for measuring being financially constrained. We compute the firm-level volatility of cash flow to assets using all firm-year observations between 1990 and 2007 which have at least five observations. Our measure of labor intensity is the firm-level mean of employment (the number of full-time employees) to PPE. To form subsamples, we classify firms, in each year, into deciles of each of these proxies, i.e. firm size, cash flow volatility and labor intensity. We take the firms in the bottom and top 30 percentiles of each measure and label them as small and large groups, low- and high- cash flow volatility groups, and low- and high- labor intensity groups.

[Inset Table 6]

Table 6 reports estimation results for these subsamples.[11] We observe that the impact of employment protection on cash holdings is stronger for small firms (columns 1 and 2). To the extent that these firms have more difficulty in having access to external capital markets than large firms do, they are likely to have greater incentive to increase liquidity buffers in anticipation of distress risk that could arise from labor market rigidities. Similarly, the estimation results reported in columns 3–6 show that higher cash-flow volatility and labor intensity can amplify firms' precautionary motive of holding cash in response to an increase in employment protection. Although the differences in magnitude of coefficients in columns 3–6 appear to be small, the coefficients on the EPL for low cash-flow volatility and low labor intensity groups are statistically insignificant.

[Inset Table 7]

Turning our attention to firms' propensities to save from cash flow, debt issuance and equity issuance, we estimate equation (2) for our subsamples of firms as we do above. Table 7 reports the results.[12] Our conclusion drawn on these results are largely similar to the previous one. In response to an increase in employment protection, small firms increase their saving propensities in a much more salient fashion than do large firms. In fact, the increased employment protection has little impact on large firms' saving propensities. We note that the coefficient estimate for $EPL_{t-1} \times CashFlow_t$ is of similar magnitude in columns 3 and 4. However, the EPL does have a disproportionate effect on firms' propensity to save from debt issuance for our subsample of firms with high cash flow volatility. Interestingly, a negative coefficient on the debt issue variable itself suggests that, when employment protection is low, these firms do not seem to save cash from their cash flows, equity issuance and debt issuance.

[11] In untabulated results, we find our findings remain the same if we use the binary indicator D^{HighEPL} instead of the EPL index.

[12] Again, the results based on the dummy variable for high and low employment protection are not reported.

The results for the labor intensity subsamples are also consistent with the precautionary saving hypothesis.

In summary, these subsample test results offer further support for the precautionary saving hypothesis. We conclude that firms increase precautionary cash buffers and their saving propensities in response to an increase in employment protection, and that these responses, unsurprisingly, appear stronger among the firms that are likely to suffer more from the increased risk. Since the rigidity in labor adjustment can bring about a surge in operating leverage and thus financial distress risk, firms build up their cash savings to against this distress risk.

5. Conclusion

In this paper, we investigate the relationship between employment protection and corporate liquidity management across 20 developed countries over the period 1990-2007. Theory suggests that employment protection increases the cost of firing employees and, therefore, is likely to reduce firms' ability to adjust labor, and increase the amount of fixed wage claims. Thus, firms build up their precautionary savings as employment protection increases. Consistent with the precautionary saving hypothesis, we find that, in response to a country's labor protection reforms, which increase the EPL index score, firms increase cash holdings and their propensities to save from their cash flows, debt issuance and equity issuance. We demonstrate that these effects are stronger for small firms, firms with high cash-flow volatility, and firms with high labor intensity. Our findings show that labor market rigidities can influence corporate cash policies through the operating leverage channel leading to an increase precautionary demand for cash savings.

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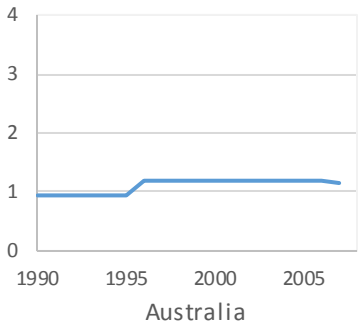
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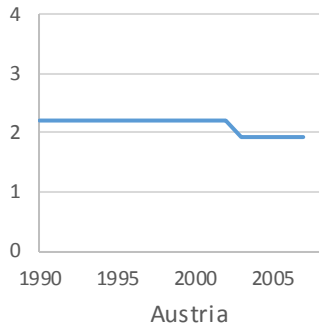
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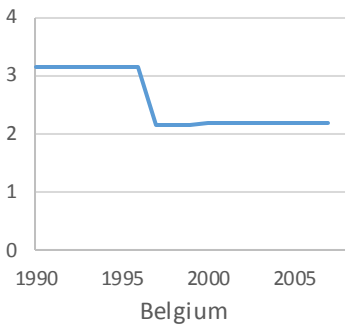
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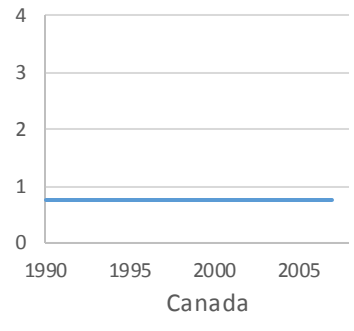
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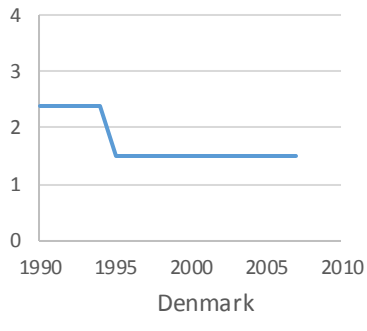
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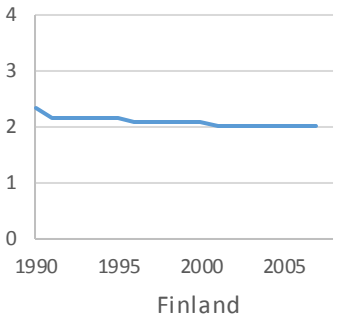
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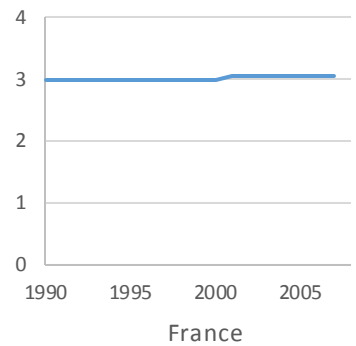
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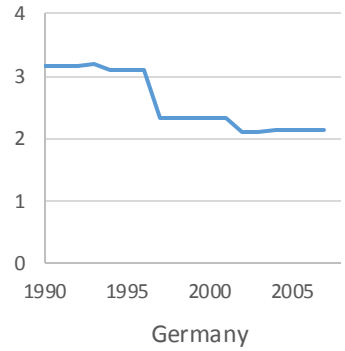
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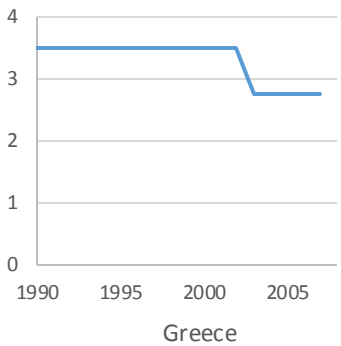
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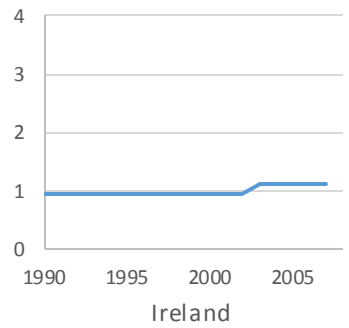
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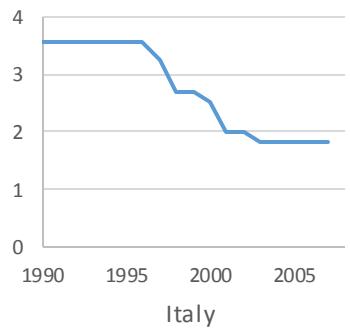
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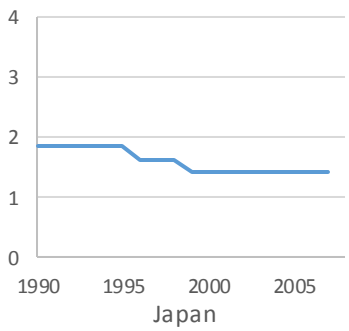
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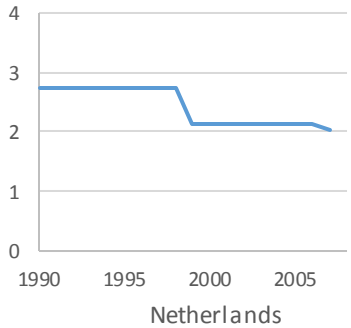
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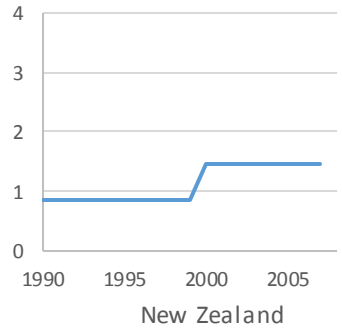
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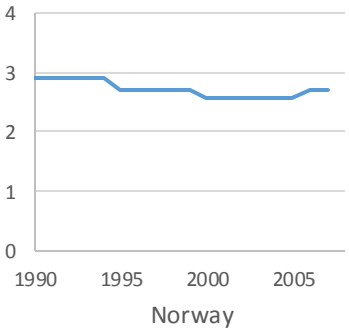
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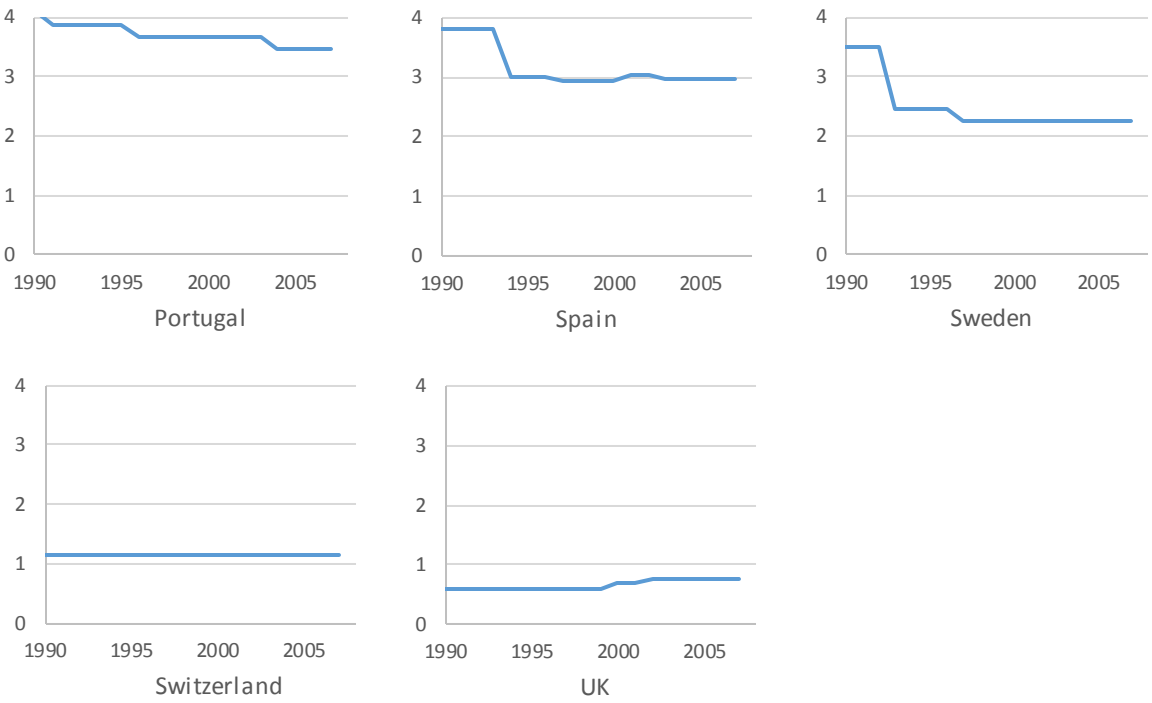

Figure 1: Within-country variations in the stringency of employee protection legislations over the period 1990-2007.

Table 1: Summary statistics

This table reports summary statistics for the whole sample used in the analysis. The number of firm-year observations is 70,063 for the baseline whole sample. The variables, except *Q*, *Size*, and *GDP growth*, are scaled by the beginning-of-year assets. All variables are winsorized at 1% in both tails. Section 4 provides the variable definitions in more detail.

	Mean (1)	Median (2)	SD (3)
$Cash$	0.160	0.095	0.198
$\Delta Cash$	0.020	0.001	0.131
$Cash\ flow$	0.076	0.081	0.125
$EquityIssue$ (share issue proceeds)	0.056	0.000	0.191
$DebtIssue$ (debt issue proceeds)	0.063	0.008	0.130
$Other\ sources\ of\ funds$	0.036	0.009	0.072
PPE (net property, plant and equipment)	0.384	0.309	0.691
NWC (net working capital, net of cash)	0.031	0.023	0.190
Q (market to book)	1.928	1.355	1.826
$Size$ (ln $Assets$, in 2007 dollars, million)	12.7	12.6	1.8
$GDP\ growth$	0.020	0.024	0.021

Table 2: Summary statistics for the EPL index and cash by country

This table reports, in columns 1–4, the summary statistics for the EPL index (OECD) and the median cash ratios by country and, in columns 5–8, the results of Wilcoxon rank-sum tests for the median difference in cash between low and high EPL regimes within each country. N is the number of firm-year observations in each country. In column 4, the median cash is the country median cash ratios; in column 7 and 8, it is the country median of within-transformed cash ratios (i.e., demeaned at the firm level) for low and high EPL regimes within that country. The high EPL regimes within each country are defined as the years for which the EPL index values are greater than the country mean EPL value. This split is unavailable for countries with no variation (i.e., Canada and Switzerland). In the last column, ***, **, and * indicate the statistical significance for the median difference at the 1%, 5%, and 10% levels, respectively.

					Low and high EPL regimes by country				
	EPL			Cash	Number of observations		Country median of firm-level demeaned cash		
	N	Mean	SD	Median	Low EPL regime	High EPL regime	Low EPL regime	High EPL regime	Difference
Country	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(8) – (7)
Australia	4908	1.104	0.117	0.071	581	4327	-0.011	-0.007	0.004
Austria	455	2.132	0.125	0.098	169	286	-0.005	-0.007	-0.001
Belgium	634	2.552	0.477	0.072	529	105	-0.008	-0.003	0.004 *
Canada	7524	0.750	0.000	0.050	n/a	n/a	n/a	n/a	n/a
Denmark	1432	1.750	0.403	0.116	1017	415	-0.018	0.011	0.029 ***
Finland	1235	2.096	0.080	0.079	543	692	-0.017	-0.004	0.012 ***
France	5571	3.007	0.034	0.105	2936	2635	-0.005	-0.010	-0.005 ***
Germany	3584	2.575	0.462	0.075	2935	649	-0.008	0.000	0.008 ***
Greece	426	3.286	0.345	0.058	316	110	-0.003	0.000	0.003 *
Ireland	782	0.980	0.081	0.108	552	230	-0.011	-0.017	-0.006
Italy	2065	2.738	0.762	0.094	1082	983	-0.019	-0.007	0.012 ***
Japan	14945	1.598	0.184	0.138	12323	2622	-0.010	0.020	0.030 ***
Netherlands	2123	2.421	0.310	0.064	1066	1057	-0.012	-0.004	0.008 ***
New Zealand	616	1.131	0.303	0.020	259	357	-0.010	-0.002	0.008 ***
Norway	1269	2.705	0.133	0.141	970	299	-0.013	-0.009	0.004
Portugal	481	3.697	0.168	0.035	105	376	0.000	-0.006	-0.007 ***
Spain	849	3.168	0.350	0.059	688	161	-0.005	-0.008	-0.003
Sweden	1867	2.499	0.453	0.099	1659	208	-0.012	0.001	0.013 ***
Switzerland	1822	1.140	0.000	0.118	n/a	n/a	n/a	n/a	n/a
UK	17475	0.659	0.069	0.076	9552	7923	-0.007	-0.012	-0.005 ***

Table 3: Cash regressions

This table reports the results of estimating equation (1). The dependent variable is cash to assets. The measure of employment protection is the EPL index in columns 1 and 2 and the binary indicator D^{HighEPL} in columns 3 and 4. The variables, except *Q*, *Size*, and *GDP growth*, are scaled by the beginning-of-year assets. The standard errors in the brackets are corrected for heteroscedasticity and clustering by country. ***, **, and * indicate the statistical significance at the 1%, 5%, and 10% levels, respectively.

	EPL index			D^{HighEPL} in lieu of the EPL index		
	(1)	(2)	(3)	(4)	(5)	(6)
EPL_{t-1}	**0.027****	**0.027****	0.024**	**0.021****	**0.028*****	0.027***
	[0.011]	[0.011]	[0.011]	[0.009]	[0.009]	[0.008]
$CashFlow_t$	0.094***	0.158***	0.159***	0.093***	0.157***	0.158***
	[0.021]	[0.018]	[0.018]	[0.021]	[0.018]	[0.018]
$EquityIssue_t$		0.282***	0.283***		0.282***	0.283***
		[0.017]	[0.017]		[0.017]	[0.017]
$DebtIssue_t$		-0.005	-0.006		-0.004	-0.005
		[0.025]	[0.025]		[0.025]	[0.025]
$Others_t$		0.216***	0.216***		0.217***	0.216***
		[0.027]	[0.027]		[0.027]	[0.027]
Q_{t-1}	0.040***	0.023***	0.023***	0.040***	0.023***	0.023***
	[0.002]	[0.001]	[0.001]	[0.002]	[0.001]	[0.001]
$Size_{t-1}$	-0.036***	-0.022***	-0.022***	-0.035***	-0.021***	-0.021***
	[0.005]	[0.005]	[0.005]	[0.005]	[0.005]	[0.005]
PPE_{t-1}	-0.001	-0.005	-0.005	-0.001	-0.005	-0.005
	[0.004]	[0.005]	[0.005]	[0.004]	[0.005]	[0.005]
NWC_{t-1}	-0.167***	-0.181***	-0.181***	-0.168***	-0.181***	-0.181***
	[0.018]	[0.017]	[0.017]	[0.018]	[0.017]	[0.017]
$GDP\ Growth_{t-1}$	0.001	0.001	0.001	0.001	0.002	0.001
	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]
$Unionization_t$			-0.152**			-0.216**
			[0.072]			[0.089]
Obs	70,063	70,063	70,050	70,063	70,063	70,050
Adjusted R^2	0.286	0.377	0.377	0.285	0.375	0.376
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry × Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Table 4: Difference in cash estimated from the propensity score-matched sample

This table reports the difference in the firm-level demeaned cash estimated from the propensity score-matched sample. The treatment assignment is carried out as follows: in the first row, a firm-year observation is assigned to the treated group if the country's EPL index value in that year is greater than the within-country mean (this split is unavailable for countries with no variation, i.e., Canada and Switzerland); in the second row, it is assigned to the treated group if the country's EPL value in that year is above the whole sample median. Using one of these treatment assignment schemes, a probit model estimates the propensity scores as a function of covariates. Firms in the treated are then matched with those in the control group on the calculated propensity scores. The one-to-one nearest-neighbor matching algorithm is used. Section 4 describes the matching procedure in more detail. The mean difference in the within-transformed cash ratios (i.e., demeaned at the firm level) is tested against the propensity score-matched sample. ***, **, and * indicate the statistical significance at the 1%, 5%, and 10% levels, respectively.

	Cash to assets, demeaned at the firm level			
Treatment assignment	Low EPL (control group) (1)	High EPL (treated group) (2)	Difference (2) – (1)	Obs
High EPL within country (treated if above the within-country mean)	-0.004	0.001	0.005*** [3.353]	41,682
High EPL across countries (treated if above the sample median)	-0.010	0.002	0.013*** [9.712]	47,070

Table 5: Saving propensities

This table reports the results of estimating equation (2). The dependent variable is $\Delta Cash$ to assets. The measure of employment protection is the EPL index in column 1 and the binary indicator D^{HighEPL} in column 2. The results in columns 3 and 4 are for the subsamples formed on D^{HighEPL}. The variables, except *Q*, *Size*, and *GDP growth*, are scaled by the beginning-of-year assets. The standard errors in the brackets are corrected for heteroscedasticity and clustering by country. ***, **, and * indicate the statistical significance at the 1%, 5%, and 10% levels, respectively.

	EPL index	D^{HighEPL} in lieu of the EPL index		
	Interactions	Interactions	Subsamples	
			Low EPL	High EPL
	(1)	(2)	(3)	(4)
EPL_{t-1}	0.002	-0.021**		
	[0.004]	[0.009]		
$(EPL_{t-1} \times CashFlow_t)$	**0.046****	**0.081****		
	[0.017]	[0.032]		
$(EPL_{t-1} \times EquityIssue_t)$	**0.027****	**0.061*****		
	[0.013]	[0.019]		
$(EPL_{t-1} \times DebtIssue_t)$	**0.029****	**0.088****		
	[0.013]	[0.041]		
$CashFlow_t$	0.085***	0.118***	**0.122*****	**0.195*****
	[0.022]	[0.016]	[0.016]	[0.026]
$EquityIssue_t$	0.319***	0.337***	**0.343*****	**0.389*****
	[0.017]	[0.009]	[0.011]	[0.017]
$DebtIssue_t$	-0.022	-0.012	**-0.006**	**0.075***
	[0.025]	[0.010]	[0.012]	[0.039]
$Others_t$	0.200***	0.199***	0.240**	0.146**
	[0.055]	[0.056]	[0.077]	[0.053]
Q_{t-1}	0.015***	0.015***	0.016***	0.015***
	[0.001]	[0.001]	[0.001]	[0.001]
$Size_{t-1}$	-0.007**	-0.007**	-0.003	-0.016***
	[0.003]	[0.003]	[0.004]	[0.004]
PPE_{t-1}	-0.004	-0.004	-0.018	-0.002
	[0.003]	[0.003]	[0.013]	[0.001]
NWC_{t-1}	-0.125***	-0.126***	-0.117***	-0.141***
	[0.011]	[0.012]	[0.009]	[0.016]
$GDP\ Growth_{t-1}$	-0.002***	-0.002***	-0.001	-0.003***
	[0.000]	[0.000]	[0.001]	[0.001]
Obs	70,063	70,063	32,770	37,293
Adjusted R^2	0.364	0.365	0.362	0.383
Firm FE	Yes	Yes	Yes	Yes
Industry × Year FE	Yes	Yes	Yes	Yes

Table 6: Cash regressions for the subsamples formed on size, cash flow volatility, and labor intensity

This table reports the results of estimating equation (1) for the subsamples formed on firm size (columns 1 and 2), cash flow volatility (columns 3 and 4), and the labor intensity (columns 5 and 6). The dependent variable is cash to assets. The measure of employment protection is the EPL index. The standard errors in the brackets are corrected for heteroscedasticity and clustering by country. ***, **, and * indicate the statistical significance at the 1%, 5%, and 10% levels, respectively.

	Firm size		Cash flow volatility		Labor intensity	
	Small	Large	Low	High	Low	High
	(1)	(2)	(3)	(4)	(5)	(6)
EPL_{t-1}	**0.033****	**0.016**	**0.017**	**0.024****	**0.022**	**0.023****
	[0.012]	[0.011]	[0.014]	[0.011]	[0.015]	[0.009]
$CashFlow_t$	0.182***	0.184***	0.307***	0.161***	0.190***	0.204***
	[0.021]	[0.029]	[0.051]	[0.020]	[0.037]	[0.032]
$EquityIssue_t$	0.327***	0.165***	0.286***	0.280***	0.310***	0.262***
	[0.035]	[0.026]	[0.062]	[0.026]	[0.031]	[0.035]
$DebtIssue_t$	0	0.038	0.100*	-0.035	0.075*	-0.047
	[0.027]	[0.023]	[0.051]	[0.031]	[0.038]	[0.036]
$Others_t$	0.243***	0.165***	0.085***	0.259***	0.168***	0.242***
	[0.046]	[0.023]	[0.015]	[0.032]	[0.016]	[0.038]
Q_{t-1}	0.023***	0.021***	0.023***	0.023***	0.030***	0.021***
	[0.001]	[0.003]	[0.003]	[0.001]	[0.003]	[0.001]
$Size_{t-1}$	-0.039***	-0.014**	-0.011	-0.030***	0.002	-0.034***
	[0.008]	[0.006]	[0.007]	[0.004]	[0.006]	[0.005]
PPE_{t-1}	-0.033*	-0.075**	-0.168***	-0.001	-0.057**	0
	[0.018]	[0.030]	[0.042]	[0.002]	[0.022]	[0.001]
NWC_{t-1}	-0.215***	-0.189***	-0.272***	-0.155***	-0.146***	-0.218***
	[0.018]	[0.031]	[0.040]	[0.012]	[0.039]	[0.017]
$GDP\ Growth_{t-1}$	0.000	-0.001	0.000	0.002	0.002*	0.000
	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]
Obs	21,025	21,012	18,713	18,691	17,604	17,587
Adjusted R^2	0.438	0.25	0.313	0.415	0.352	0.393
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry × Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Table 7: Saving propensities for the subsamples formed on size, cash flow volatility, and labor intensity

This table reports the results of estimating equation (2) for the subsamples formed on firm size (columns 1 and 2), cash flow volatility (columns 3 and 4), and the labor intensity (columns 5 and 6). The dependent variable is $\Delta Cash$ to assets. The measure of employment protection is the EPL index. The standard errors in the brackets are corrected for heteroscedasticity and clustering by country. ***, **, and * indicate the statistical significance at the 1%, 5%, and 10% levels, respectively.

	Firm size		Cash flow volatility		Labor intensity	
	Small (1)	Large (2)	Low (3)	High (4)	Low (5)	High (6)
EPL_{t-1}	0.001	0.003	0.006	0.008*	0.003	0.002
	[0.009]	[0.003]	[0.006]	[0.004]	[0.005]	[0.005]
$(EPL_{t-1} \times CashFlow_t)$	**0.075*** **	**0.004**	**0.044**	**0.041***	**0.002**	**0.052** **
	[0.024]	[0.032]	[0.050]	[0.020]	[0.028]	[0.021]
$(EPL_{t-1} \times EquityIssue_t)$	**0.051***	**0.027**	**-0.04**	**0.023**	**0.046**	**0.046***
	[0.027]	[0.028]	[0.062]	[0.019]	[0.027]	[0.025]
$(EPL_{t-1} \times DebtIssue_t)$	**0.050** **	**0.015**	**0.008**	**0.056*** **	**0.025**	**0.037** **
	[0.021]	[0.014]	[0.021]	[0.019]	[0.021]	[0.016]
$CashFlow_t$	0.092***	0.117***	0.169	0.109***	0.192***	0.100***
	[0.025]	[0.039]	[0.121]	[0.027]	[0.040]	[0.020]
$EquityIssue_t$	0.352***	0.148***	0.394**	0.326***	0.283***	0.272***
	[0.044]	[0.050]	[0.141]	[0.035]	[0.051]	[0.044]
$DebtIssue_t$	-0.03	0.002	0.06	-0.063**	0.03	-0.061*
	[0.037]	[0.032]	[0.063]	[0.029]	[0.037]	[0.032]
$Others_t$	0.289***	0.138***	0.03	0.257***	0.117**	0.264***
	[0.070]	[0.033]	[0.041]	[0.064]	[0.044]	[0.077]
Q_{t-1}	0.015***	0.013***	0.016***	0.015***	0.018***	0.014***
	[0.001]	[0.002]	[0.002]	[0.001]	[0.002]	[0.001]
$Size_{t-1}$	-0.026***	-0.015***	-0.017***	-0.005	-0.004	-0.010***
	[0.003]	[0.004]	[0.006]	[0.003]	[0.007]	[0.002]
PPE_{t-1}	-0.027**	0.005	-0.073***	-0.002**	-0.031*	-0.001**
	[0.011]	[0.016]	[0.014]	[0.001]	[0.016]	[0.000]
NWC_{t-1}	-0.182***	-0.077***	-0.151***	-0.128***	-0.109***	-0.137***
	[0.018]	[0.017]	[0.021]	[0.015]	[0.023]	[0.017]
$GDP\ Growth_{t-1}$	-0.003**	-0.003***	-0.003***	-0.001*	-0.001	-0.001
	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]
Obs	21025	21012	18713	18691	17604	17587
Adjusted R^2	0.447	0.17	0.22	0.406	0.32	0.378
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry × Year FE	Yes	Yes	Yes	Yes	Yes	Yes