Employment Protection Laws and Corporate Liquidity Management

Ahmet Karpuz* Kirak Kim* Neslihan Ozkan*

University of Bristol *University of Bristol* *University of Bristol*

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Abstract

This paper shows that a country's labor protection laws have a significant impact on corporate cash policy. Theory suggests that employment protection increases firms' labor adjustment costs. We use a difference-in-differences method that exploits the changes in employment protection laws as a source of variation in labor adjustment costs across 20 countries from 1985–2007. We find that, in response to an increase in employment protection, firms increase their cash buffers; the effect is stronger for firms with relatively high labor turnover, small size, and high cash flow volatility. Moreover, an increase in labor protection leads to higher propensities to save cash out of the funds raised internally and externally and an increase in the value of excess cash. Overall, our findings suggest that as labor adjustment costs, and therefore operating leverage, increase, firms' precautionary demand for cash increases, supporting the notion that labor-market rigidity can be an important determinant of financial policy.

Keywords: employment protection, cash holding, cash saving

JEL classification: G31, G32, K31

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Abstract

This paper shows that a country's labor protection laws have a significant impact on corporate cash policy. Theory suggests that employment protection increases firms' labor adjustment costs. We use a difference-in-differences method that exploits the changes in employment protection laws as a source of variation in labor adjustment costs across 20 countries from 1985–2007. We find that, in response to an increase in employment protection, firms increase their cash buffers; the effect is stronger for firms with relatively high labor turnover, small size, and high cash flow volatility. Moreover, an increase in labor protection leads to higher propensities to save cash out of the funds raised internally and externally and an increase in the value of excess cash. Overall, our findings suggest that as labor adjustment costs, and therefore operating leverage, increase, firms' precautionary demand for cash increases, supporting the notion that labor-market rigidity can be an important determinant of financial policy.

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1. Introduction

Cash holdings of corporations across the world have recently received much of attention. In this fast growing literature, academic studies have investigated various factors affecting firms' cash holdings. This paper aims to extend our understanding of corporate cash policy by studying implications of changes in labor protection laws. For many firms, labor is arguably an important input and, as suggested by extant research in the labor economics literature, a regulatory shock to employment contracts is likely to have an impact on various incentives of firms (see, e.g., Griffith and Macartney, 2014). Few studies to date, however, have exploited this labor-side angle to study corporate cash holdings. We fill this void in the literature by investigating firms' cash policy in response to intertemporal variations in employment protection laws (EPL, henceforth) across 20 countries over the period 1985–2007.

A large body of literature has established that the changes in labor market institutions, such as minimum wages, labor union, and employment protection, have an impact on various aspects of an economy including productivity, innovation, and the allocation of resources (Nickell and Layard, 1999; Autor, Kerr and Kugler, 2007; Griffith and Macartney, 2014). A regulatory shock to labor protection, which is the focus of our study, is likely to change the costs of firing and hiring employees of firms. As Blanchard and Portugal (2001) argue, an increase in employment protection renders the dismissal of employees more costly. In turn, the risk of hiring new employees also increases, because stricter labor protection implies that even if the quality of a firm's new hires turns out to be lower than expected, the firm will find it difficult to fire such employees (Millan et al., 2013). Moreover, when a firm faces a negative shock to cash flow, it will not be able to

downsize its workforce. Therefore, stronger employment protection can lead to a reduction in hiring—not just that in dismissals.

However, the role of employment protection in the determination of cash holdings is *a priori* unclear; to our knowledge, there is no theoretical work nor is there direct empirical evidence that provides a definitive guidance as to what the relationship should be.

A well-established view on the impact of the labor-side frictions on firm decision-making is related to the employees' bargaining power and the firms' strategic use of their financial policies. (Bronars and Deere, 1991; Matsa, 2010; Klasa, Maxwell, and Ortiz-Molina, 2009; Schmalz, 2015). These studies find that in response to the unionization of its employees, a firm increases leverage and lower cash holdings. They argue that unionization increases the employees' bargaining power in wage negotiation, therefore providing the firm an incentive to counteract this effect and avoid an increase in the cost of its inputs.[1] If stronger labor protection grants employees more bargaining power in the wage negotiation with their employer, its impact on corporate cash policy could be in the same as that of the unionization. The bargaining-power hypothesis therefore yields a prediction that following an increase in labor protection, firms should decrease the level of cash.

However, labor protection may well exert an effect that works in the opposite direction. To the extent that the protection increases the cost of firing employees, the precautionary demand for cash may be high for a firm operating in a high employment-protection environment. Due to the low flexibility in the adjustment of its labor, the firm is likely to be left with a large amount of *fixed* labor capital even in a low-productivity state, such as a recession. Even if its workforce is not fully utilized in these bad states of

[1] In other words, if a firm has a low leverage ratio and a large cash cushion, the firm would find it more difficult to refuse the labor union's request of a wage increase.

economy, the firm will still have to service its wage claims. Keeping a large amount of fixed wage obligations means a relatively high risk of financial distress, because such a firm is more likely to miss on its debt payments and violate debt covenants. As financial distress can be costly for firms (Titman and Wessels, 1988), a firm with a large amount of fixed wage obligations has an incentive to hold more cash buffers, which can reduce the risk of financial distress (John, 1993). That is, as the labor-side rigidity pushes up a firm's operating leverage, it needs to create financial flexibility. Therefore, the operating-leverage argument leads to an empirical prediction that firms should increase their precautionary demand for cash as employment protection becomes stricter.

Our empirical analysis exploits intertemporal variation in employment protection laws across countries to identify how labor laws influence firms' cash holding decisions. Using a difference-in-differences research design, we find that when employment protection laws become stricter, firms increase their cash holdings. Our evidence suggests that firms maintain a higher level of cash buffers to hedge against a potential negative shock that makes it difficult to keep up with labor adjustment costs. Our finding is consistent with the survey result from Graham and Harvey (2001) showing that CEOs try to maintain financial flexibility when they make corporate decisions.

We assess the robustness of our finding in various ways. We repeat our estimations using the matched sample. In addition, we check whether there is any difference in pre-treatment trends—i.e., difference in cash prior to a change in labor protection. We also repeat our estimation using different components of the EPL index. Moreover, we show that the impact of employment protection on cash holdings is more pronounced for firms that have relatively higher labor turnover, are small in asset size, and have relatively high

cash flow volatility. As labor market rigidities can impede the firms' hiring and firing decisions, these firms seem to increase their financial flexibility through their liquidity policies. Our findings support the view that firms adjust their liquidity policies so as to preserve the flexibility to respond to potential shocks in their cash flows and growth opportunities.

To further support our main finding, we extend our analysis in several ways. Employment protection laws can also influence firms' cash saving behavior, i.e., the extent to which firms save cash from their cash flows, proceeds from equity and debt issuances. 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) argue that cash flow sensitivity of cash should be higher among the financially constrained firms. In line with their argument, we find that when employment protection law becomes more stringent, firms increase their propensities to save cash out of cash flow and the proceeds from debt and equity issuances. Moreover, we show that the value of excess cash is higher when the employment protection increases.

This paper deepens our understanding of the impact of labor-side frictions on firm financial decisions. By providing evidence that firms adjust their liquidity buffers in response to variation in employment protection, our work contributes to the growing literature studying the interaction of law, labor market, and corporate actions. The recent studies closely related to ours also document a significant impact of employment protection laws on firms' capital structure choice and the cost of debt financing. Simintzi, Vig and Volpin (2015) show that stricter employment protection laws result in a decrease in 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

evidence that stringent labor laws results in an increase in loan pricing and non-price terms in bank debt contracts. Our work, focusing on firms' liquidity management, provides the corroborating evidence that variation in labor protection laws has an implication for the capital market participants. Importantly, the perception is not just from firms' perspective, but also that of capital suppliers, as evidenced by an increase in the market value of excess cash following an increase in labor protection. Similarly, as shown by Alimov (2015), creditors are likely to command higher premia in response to such a change leading to the risk associated with fixed wage claims. Firms' attempt to hold higher cash buffers is consistent with the relatively more costly external financing.

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

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 labor. 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 work shows 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), using a sample 60 countries from 1980–1998, provide empirical evidence that firms have higher adjustment costs when job security laws are stricter. In a similar vein, Lafontaina and Sivadasan (2009) document strong evidence that strict labor regulations dampen firm's responses to demand and supply shocks by using the data on firms with operations across different countries. Their findings suggest that labor market rigidities reduce firms' ability to adjust their labor level when they are faced with demand or productivity fluctuations. Strict EPL, therefore, 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 labor 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, labor 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 labor markets reduce debt relative to otherwise similar firms in other states. For their empirical analysis they use exogenous variation in state-level labor 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 labor 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 labor adjustment costs in their capital structure decisions. Alimov (2015) argues that labor regulation can influence how lenders assess borrowing firms' credit risk. Stringent labor regulations can limit firms' ability to adjust labor 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 (Atanassov and Kim, 2009; Chen, Kacperczyk, and Ortiz-Molina, 2012; Fairhurst and Serfling, 2015; Serfling, 2016).

3. Empirical model, sample, and data

3.1. Empirical model

We exploit the intertemporal variations in labor protection across 20 countries and investigate how firms' cash policy responds following changes in employment protection legislations. Specifically, using the firm-level panel data, we employ a difference-in-differences (DID) methodology to estimate the following equation:

$$Cash_{i,t} = \gamma EPL_{k,t-1} + \Phi X_{i,t} + \Psi Z_{k,t} + f_i + g_{j\times t} + \varepsilon_{i,t} \quad (1)$$

where we denote individual firms by subscript *i*, industries by *j*, countries by *k*, and year by *t*. $EPL_{k,t-1}$ is the measure of employment protection (Section 3.3 provides more details on the EPL measure).[2] Firm fixed effects f_i control for firm- and country-specific unobservable heterogeneities that may affect firms' liquidity policy. Similarly, industry-times-year fixed effects $g_{j\times t}$ absorb the time-varying industry characteristics such as investment opportunities.[3] The vector of covariates $X_{i,t}$ contains firm-level controls; following the extant studies (e.g., Opler et al., 1999; Ozkan and Ozkan, 2004; Bates, Kahle, and Stulz, 2009), we include firm size (natural logarithm of beginning-of-year book assets), Q (market-to-book ratio), leverage ratio (total debt to assets), property, plant, and equipment (PPE henceforth), net working capital (NWC henceforth), cash flow, capital expenditure (CAPEX henceforth), R&D-to-sales, and a binary indicator for the dividend-paying firms. PPE, NWC, cash flow and capex are normalized by the beginning-of-year book assets. As discussed in the aforementioned studies, these firm characteristics are likely to be the basic determinants of the level of firms' cash holdings for the reasons related to agency theory, precautionary motive, or economic tradeoff argument. To control for the heterogeneity in economic conditions and investor protection, we include in $Z_{k,t}$ GDP growth, GDP per capita, and the creditor rights index (Djankov, McLiesh and Shleifer, 2007). As the employment laws vary at the country level, we cluster standard errors at the country level.

Our DID research design allows us to examine the relationship between the within-

[2] 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.

[3] The industry classification is based on Fama-French 12 industries.

country variations in the EPL and the within-firm variations in cash holding. To wit, suppose that country A underwent an increase in EPL in 2000, while country B had no such change, and that cash holding of a firm in country A and that of a firm in country B are measured from 1999 through 2001. Then, one can calculate the changes in cash holdings for each firm in countries A and B, and therefore can compare the difference in such changes between the two firms. As equation (1) includes firm-specific intercepts f_i, the coefficient γ captures the difference in changes in cash holdings between firms with and without changes in EPL.

3.2. Data and sample construction

Our sample includes firms in 20 countries from 1985–2007 for which the EPL data are available. Like Simintzi, Vig, and Volpin (2015), we stop in 2007, because global financial crisis has had a substantial impact on both firms' cash holdings and labor laws. The firm-level financial information is from the Worldscope database. We exclude firms in financial industries (SIC 6000–6999), utilities (4900–4999), and government-related sectors (9000–9999). We also apply the data filters common in the literature (e.g., Bates, Kahle and Stulz, 2009) to exclude the firm-year observations for which the value of book assets is smaller than $10 million in 2007 dollar, the value of cash holding exceeds that of total assets, or values are missing for the main variables used in our baseline regression equation (1).

We collect data on the country-level variables from various sources. GDP growth and GDP per capita are from International Monetary Fund (IMF) database. The proxy for creditor rights is the creditor rights index from Djankov, McLiesh and Shleifer (2007). In our

additional robustness tests, we also employ union density (obtained from OECD), governments' spending on labor-related activities (from OECD), and the governments' political orientation (Database of Political Institutions from the World Bank).

3.3. Measurement of employment protection

Our main variable of interest is the measure of employment protection. 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.[4] 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-indicators). The values of the indices change from 0 to 6, and a higher score represents stricter employee protection.

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

3.4. Summary statistics and the univariate comparison

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 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]

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.

[Insert Table 2]

[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).

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 5.1 reports the results estimated from the propensity score-matched sample).

4. Results and discussion

4.1. Effect of EPL on cash holding

In this section, we investigate the impact of EPL on firms' cash holdings by employing a DID methodology outlined in Section 3. We present our baseline estimation results and extend our analysis in several ways to address potential concerns.

4.1.1. Difference in differences: first look

We begin by presenting a graph that summarizes the key result of this paper. Figure 1 plots the within-firm variation in excess cash holding from $t-3$ to $t+3$, where t is the

reference year in which a change in EPL takes place (i.e., three years before and after a change in EPL). The excess cash is net of firm-specific effects, country's economic conditions, and the time-varying industry conditions.[6] The figure plots the means for the groups of firms that experienced an increase in EPL at time t (the dotted line with "+" markers) and that experienced a decrease in EPL (the dotted line with "–" markers), as well as the comparison group of firms that had no such change (the solid line with the squares). The firms with an increase in EPL at t have relatively lower excess cash before the change and relatively higher excess cash after the change—compare to their long-run average—while exactly the opposite is observed for the firms with a decrease in EPL. No such pattern occurs to the firms with no change in EPL.

[Insert Figure 1]

Turning to our regression analysis, we report in Table 3 the estimation results of our baseline regression. Our regression includes firm fixed effects f_i and industry-times-year fixed effects $g_{j\times t}$ (not displayed), as well as various firm- and country-level control variables. In column 1, we control for only firm-level characteristics and, in column 2, we include both firm- and country-level controls. Our proxy for the labor protection is the EPL index and in all cases, the coefficient on EPL is positive and statistically significant at the 1% level. The effect is large in economic magnitude: column 2 shows that in response to an increase in EPL, firms increase their cash holdings by 210 basis points, an increase of 22% (13%) relative to the sample median (mean). The coefficients on other variables, such as firm size, Q, leverage, PPE, NWC, cash flow, CAPEX, R&D, are similar to those reported by previous studies, and for brevity, we omit our discussion on these variables.

[6] That is, the residuals are estimated from the firm fixed effects model that controls for all variables, except EPL, in equation (1).

[Insert Table 3]

To the extent that the EPL index captures the difficulty of firing employees and thus proxies for labor adjustment costs, we believe the positive coefficient on EPL is consistent with the precautionary motive for cash. It is well-established in the literature that holding cash involves various direct and indirect costs, such as opportunity costs of holding low-return assets or agency costs of free cash flow. Therefore, our DID estimation suggests that, when employment protection is relatively high, the marginal benefits of holding cash exceed the 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 demand for cash.

As discussed in, among others, Bertrand and Mullainathan (2003), our DID approach mitigates the concern that the observed difference in the outcome variable is driven by some unobservable attributes that are different across firms. We alleviate this concern further in two ways: first, we repeat our estimation using a matched sample (Section 4.1.2); second, we examine firms' responses in years before and after changes in EPL—an analysis analogous to the one in Figure 1—and see whether there are any difference in pretreatment trends (Section 4.1.3).

4.1.2. Estimation using a matched sample

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 calculate the mean EPL for each country and assign a firm-year observation to the treated group if the country's EPL in that year is above its mean (Canada and Switzerland

are excluded in this analysis). We estimate a probit model to compute the probability of being treated as a function of the firm- and country-level covariates, as well as industry- and year- fixed effects. We then match each observation in the treated group to those in the control group based on these propensity scores (predicted probabilities). We use one-to-one nearest-neighbor matching to select control firms with the smallest possible propensity-score differences within caliper distance of 0.01.

[Insert Table 4]

Table 4 reports the estimation results for the matched sample. In column 1, propensity scores are based only on firm size, Q and industry- and year-fixed effects. In column 2, we match firms on all firm- and country-level controls in equation (1), as well as industry- and year-fixed effects. Like before, our regression examines the within-firm variation in cash holdings, and therefore, the treatment effect captures the difference between the two groups in within-firm differences in cash. Our inference is the same as the one drawn on the previous results: 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.

4.1.3. Pretreatment trends

We further address the concern of unobserved heterogeneities by explicitly checking whether there are any difference in pretreatment trends. Employing the approach taken by Bertrand and Mullainathan (2003), we investigate the dynamic effects of the EPL on cash. Specifically, in equation (1), we replace EPL_{t-1} with two sets of four dummy variables: $incr\_before^{-1}$ is a binary indicator that equals one if a firm is observed one year prior to an increase in EPL (i.e., the firm is observed in year $t-1$ and will experience an

increase in EPL in year t); $incr\_before^{0}$ is a binary indicator that equals one if a firm is observed in the year in which an increase in EPL takes place; $incr\_after^{1}$ is a binary indicator that equals one if a firm experienced an increase in EPL last year; and $incr\_after^{2+}$ is a binary indicator that equals one if a firm experienced an increase in EPL at least two years ago. A set of four dummy variables $decr\_before^{-1}$, $decr\_before^{0}$, $decr\_after^{1}$, and $decr\_after^{2+}$ are defined in the same manner for a decrease in EPL in year t. Unlike the passage of the business combination law studied in Bertrand and Mullainathan (2003), changes in EPL can occur more than once for a country and, in this case, the effect of a change in EPL can be confounded by the subsequent changes. To avoid this problem, we exclude the countries that underwent multiple changes in EPL during our sample period.

[Insert Table 5]

Table 5 reports the result. The dummy variable $incr\_before^{-1}$ ($decr\_before^{-1}$) allows us to assess whether a relatively higher (lower) level of cash already exists even before an increase (decrease) in EPL takes place. Finding a positive (negative) and significant coefficient on $incr\_before^{-1}$ ($decr\_before^{-1}$) would be problematic, because it could be an indication of heterogeneity in cash policy prior to a change in EPL, that of reverse causality, or both. We see that the coefficients on $incr\_before^{-1}$ and $incr\_before^{0}$ are either insignificant or negative (i.e., in the opposite direction), while the coefficients on $incr\_after^{1}$ and $incr\_after^{2+}$ are positive and significant. Similarly, the coefficients on $decr\_before^{-1}$ and $decr\_before^{0}$ are insignificant and smaller in magnitude than those on $decr\_after^{1}$ and $decr\_after^{2+}$.

4.1.4. Components of EPL

[Insert Table 6]

We repeat our estimations using different sub-indicators of EPL. As discussed in Section 3, the OECD's EPL index is a composite index consisted of the two sub-indicators, respectively, for regular workers (EPR_v1) and temporary workers (EPT_v1), while each of these indicators is the result of combining various items. These indicators, along with the summary EPL index, are available from 1985. The third sub-indicator is the one measuring the difficulty of collective dismissal (EPC); this one is only available from 1998 and therefore is not part of the summary EPL index. Although we do not have strong priors about which component of EPL matters more to firms and their cash policy, investigating sub-indicators separately allows us to assess the robustness of the results we found using the summary EPL index. We can also evaluate whether the legislations related to collective dismissal has impact on firms' cash holdings. Table 6 reports the estimation results, and we see that each sub-indicator of EPL on its own has a significant impact on firms' cash holdings. Whether it is related to permanent, temporary employees, or collective dismissal, a labor legislation—translated into the index—seems to induce firms' action. Finding the effect of sub-indictors also reassures us the validity of the use of the summary EPL index.

4.2. Cross-sectional heterogeneity

In this section, to sharpen our main finding further, we examine whether the impact of a change in EPL differs across firms. In particular, we are interested in the firm attributes that theories suggest should drive the cross-sectional difference in the empirical relationship between labor protection and cash holding we have found.

4.2.1. Labor turnover rate

First, we check whether a high labor turnover rate intensifies such relationship. Since the labor-side friction—more precisely, operating leverage induced by labor rigidity—is main economic channel through which the EPL influences firms' cash holding, we expect the effect to be more pronounced for the firms with high labor turnover rates. It is conceivable that firms in certain industries naturally require high labor turnover for technological reasons and these firms are likely to be affected more by an increase in firing costs.

We construct a measure of industry-level labor turnover using the Quarterly Workforce Indicator (QWI) data provided by the U.S. Census Bureau.[7] As the QWI coverage is reasonably high (70% of jobs) from 1998, we use the data for the 1998–2007 period to obtain hires (*HirA*), separations (*Sep*), beginning-of-period employment (*Emp*) and end-of-period employment (*EmpEnd*). Following Abowd and Vilhuber (2011), we calculate the labor turnover rate for each industry as $TurnOver = \frac{HirA+Sep}{0.5(Emp+EmpEnd)}$. As the QWI data use North American Industry Classification System (NAICS) as the industry classification, we compute the means for each four-digit NAICS and map them into their three-digit SIC counterparts. One of the advantages of using the QWI data is that it provides a more comprehensive coverage than does Davis, Haltiwanger and Schuh's measure (1996) used in other studies (Alimov, 2015; Simintzi, Vig and Volpin, 2015). Because of its "fuller capture of short duration jobs," as noted by Davis and Haltiwanger (2014, p.6, footnote 6), the QWI data yields the U.S. national mean turnover rate almost twice higher than that

[7] The QWI job data has much larger coverage than the previous ones (e.g., BLS data). The data is based on the micro data collected for the Longitudinal Emloyer-Household Dynamics (LEHD) program at the U.S. Census Bureau. QWI began with the surveys as early as 1993 by 18 participating states covering about 30% of jobs, and, by 2001, the number of participating states has increased to 47 covering more than 90% of jobs in private sectors (Abowd and Vilhuber, 2011). We thank John Haltiwanger for his comments introducing us to the QWI data.

from the JOLTS data.[8] Moreover, while Davis, Haltiwanger and Schuh's measure (1996) covers only 20 manufacturing industries based on two-digit SIC (SIC between 2000 and 3999), QWI data can provide the turnover rate measure for over 200 industries based on four-digit NAICS or, equivalently, over 60 industries based on two-digit SIC or three-digit NAICS.

[Insert Table 7]

Table 7 reports the results. We include, along with all other controls in equation (1), an interaction of EPL and the industry turnover measure $TurnOver$. In column 1, we use the baseline sample and in column 2, the matched sample is employed. Since the regression includes firm fixed effects, the coefficient on the turnover measure itself cannot be estimated. Again, the focus of our estimation here is to assess whether the impact of change in labor protection varies across firms with different labor turnover rates. We find that the interaction term is positive and significant at the 10% or 5% level, consistent with our intuition discussed: an increase in labor adjustment costs is more problematic for firms that require higher labor turnover, and thus causes these firms to increase cash buffers more.

4.2.2. Firm size and cash flow volatility

Next, we examine the differences in the effect of EPL on cash between the groups of firms with different size and cash flow volatility. If an increase in labor protection causes firms' concern of distress and thus precautionary demand for cash, this effect is likely to be stronger for the group of firms that are financially constrained (small firms) and that have

[8] The national mean turnover rate is 0.45 and is very close to that reported by Davis and Haltiwanger (2014).

a high volatility in their cash flow. To this end, we estimate equation (1) for subsamples sorted on firm size (total assets in 2007 dollar) and cash flow volatility. We compute the firm-level volatility of cash flow to assets using all data points available between 1985 and 2007. We require at least five observations in this calculation. To prepare the subsamples, we classify firms, in each year, into deciles of each of these variables, i.e., firm size and cash flow volatility. We then take the firms in the bottom and top 30 percentiles of each measure.

[Inset Table 8]

Table 8 reports estimation results for these subsamples. In columns 1 and 2, we see that the impact of employment protection on cash holdings is stronger for small firms. This is consistent with an intuition that smaller firms have more difficulty in getting access to external capital markets. Therefore, these firms are likely to have greater incentive to increase liquidity buffers in anticipation of distress risk that arises from labor rigidity. Similarly, the estimation results in columns 3 and 4 show that higher cash-flow volatility can amplify firms' precautionary demand for cash in response to an increase in employment protection.

In summary, these subsample test results offer further support for the precautionary saving hypothesis. Since the rigidity in labor adjustment can bring about a surge in operating leverage and thus financial distress risk, rational firms are likely to increase precautionary cash buffers to hedge against this risk. We find that firms' cash holdings do respond positively to an increase in employment protection, and that this response, unsurprisingly, is stronger among the firms that suffer more from the distress risk.

4.3. Additional tests

In this section, we perform three additional tests to lend further support to our main finding. First, we check if other country-level characteristics drive out the effect of EPL. Second, we investigate how firms' propensities to save out of cash flow and debt and equity issuances change following a change in EPL. Third, we examine how the value of excess cash holdings changes with EPL.

4.3.1. Other country-level characteristics

Because a country's labor law reforms are less likely to be affected by individual firms, a concern of reverse causation—i.e., the concern that individual firms' financial policy drives changes in labor laws—is likely to be less severe. However, some country-level characteristics may be important in determining a country's labor law reforms and our estimation may suffer from the omitted-variable bias. For example, if the unionization rate of a country is high, a perception in favor of labor protection is more likely to be formed in that country.[9] Similarly, a government' spending on labor, such as unemployment benefits, public employment services, and training, may lead to an increase in labor protection. Moreover, the political orientation of a government—whether the elected government is the left-wing or right-wing—may also affect the country's labor law reforms.

[Insert Table 9]

We consider these variables in Table 9. In column 1, we add the union density in equation (1) and find that the effect of EPL remains almost the same as before (see Table 3,

[9] If the unionization, as shown in the previous studies (e.g., Bronars and Deere, 1991; Klasa, Maxwell and Ortiz-Molina, 2009), encourages the firms' strategic use of financial policy, firms' cash holdings may correlate negatively with the extent to which employees are unionized (i.e., firms attempt to lower financial slack to counteract an increase in the bargaining power of employees).

column 2). A negative coefficient on $Unionization_{k,t}$, albeit insignificant, appears to be consistent with the bargaining-power hypothesis discussed in the literature (see footnote 9). In addition to the union density, we add governments' spending on labor $LaborSpending_{k,t}$ in column 2 and find our result remains unchanged. In column 3, we also include $LeftWing_{k,t}$, a variable indicating the political orientation of the government. Across all specifications, we arrive at the same conclusion as before.

4.3.2. Does EPL affect firms' propensities to save?

In this section, we examine firms' propensities to save cash out of the funds raised internally and externally. We estimate firms' propensities to save and assess how these propensities change following an increase in EPL. Specifically, we estimate the regression similar to the one used in McLean (2011), and McLean and Zhao (2015), but augment it to include three interaction terms of EPL with cash flow, equity issuance and debt issuance as follows:

$$\begin{aligned}\Delta Cash_{i,t} = {} & \gamma_1 EPL_{k,t-1} + \gamma_2 CashFlow_{i,t} + \gamma_3 EquityIssue_{i,t} + \gamma_4 DebtIssue_{i,t} \\ & + \gamma_5\left(EPL_{k,t-1} \times CashFlow_{i,t}\right) + \gamma_6\left(EPL_{k,t-1} \times EquityIssue_{i,t}\right) \\ & + \gamma_7\left(EPL_{k,t-1} \times DebtIssue_{i,t}\right) + \Phi X_{i,t} + \Psi Z_{k,t} + f_i + g_{j\times t} + \varepsilon_{i,t}\end{aligned} \quad (2)$$

where $\Delta Cash_{i,t}$ is one-year change in cash divided by the beginning-of-year assets. Equity and debt issuances are also scaled by the beginning-of-year assets, and we include firm size and Q, as well as the same set of controls in $Z_{k,t}$ as before. Since the relationship between cash saving, $\Delta Cash$, and cash flow and equity and debt issuances is mechanistic—any increase in internal or external funds would flow into a firm's end-of-year cash balance—, one cannot 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 and proceeds from equity and debt issuances

(see Almeida, Campello, and Weisbach (2004) for a similar argument). The coefficients on the three interaction terms $\gamma_{n\in\{5,6,7\}}$ then capture the changes in the impact of EPL on these propensities.

[Insert Table 10]

Table 10 reports the estimation results. The coefficients on cash flow, equity and debt issuances 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 15, 35, and 5 cents, respectively.[10] 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. In response to labor law reforms that would raise the EPL index score by one unit, firms increase cash saving by roughly 3–4 cents out of each additional dollar raised. Inside the empirical distribution of the EPL index (from 0.6 to 4.1) in our sample, the increments in these saving propensities can be as large as 10–14 cents.

4.3.3. Does EPL affect the value of excess cash?

We turn to the impact of EPL on the value of excess cash. To the extent that an increase in EPL causes firms' operating leverage and thus precautionary demand for cash, we expect the value of excess cash to be greater when firms face an increase in EPL. Our estimation draws from the model developed by Fama and French (1998). Specifically, we estimate the following equation, similar to the model employed by Pinkowitz, Stulz and

[10] For example, the propensity to save out of cash flow at the mean EPL is calculated as $0.063 + 2 \times 0.044 = 0.15$.

Williams (2006), Dittmar and Mahrt-Smith (2007), and Fresard and Salva (2010):

$$\begin{aligned} MV_{i,t} = {} & \beta_1 EPL_{k,t-1} + \beta_2 XCash_{i,t} + \beta_3 \left(EPL_{k,t-1} \times XCash_{i,t}\right) \\ & + \phi_1 E_{i,t} + \phi_2 \Delta E_{i,t} + \phi_3 \Delta E_{i,t+2} + \phi_4 RD_{i,t} + \phi_5 \Delta RD_{i,t} + \phi_6 \Delta RD_{i,t+2} \\ & + \phi_7 I_{i,t} + \phi_8 \Delta I_{i,t} + \phi_9 \Delta I_{i,t+2} + \phi_{10} D_{i,t} + \phi_{11} \Delta D_{i,t} + \phi_{12} \Delta D_{i,t+2} \\ & + \phi_{13} \Delta NA_{i,t} + \phi_{14} \Delta NA_{i,t+2} + \phi_{15} \Delta MV_{i,t+2} + \Psi Z_{k,t} + a_k + b_t + \varepsilon_{i,t} \end{aligned} \quad (3)$$

where $XCash_{i,t}$ is excess cash (see below for more details), $E_{i,t}$ is earnings before extraordinary items plus interest expenses, $RD_{i,t}$ is R&D expenses, $I_{i,t}$ is interest expenses, $D_{i,t}$ is dividends, $NA_{i,t}$ is net assets (total assets minus cash), a_k is country fixed effects, and b_t is year fixed effects. $\Delta y_{i,t}$ ($\Delta y_{i,t+2}$) indicates a change in the variable y from year $t-2$ to t (from year t to $t+2$). All variables are normalized by total assets at year t.

Excess cash is defined as firms' actual cash holding minus the normal level of cash predicted by various determinants used in equation (1). As the level of cash can vary significantly with country factors (e.g., Dittmar et al., 2003), we estimate the regressions with firm-fixed effects for each country separately to calculate the firm-level abnormal cash (see Fresard and Salva (2010) for the same approach). One problem in estimating $XCash_{i,t}$ is that the market-to-book ratio is used as the proxy for investment opportunities in equation (1), while it is the dependent variable in equation (3). To address this concern, we employ the instrument variable approach; specifically, we follow Dittmar and Mahrt-Smith (2007) and Fresard and Salva (2010) and use two years lagged sales growth as an instrument for market-to-book.

[Insert Table 11]

Table 11 reports the results. Following Fresard and Salva (2010), we only include the firms with positive excess cash in in columns 1 and 2, while we extend our sample by

setting the negative excess cash to zero in column 3. Consistent with our intuition discussed above, the value of excess cash increases when employment protection is high. When we repeat our estimations by including additional country characteristics introduced in Section 4.3.1, we also obtain similar results.

Our findings from these additional tests—i.e., an increase in firms' propensities to save and in the value of excess cash in response to an increase in EPL—, collectively, support the notion that the rigidity in the labor adjustment induces the operating leverage and financial distress risk thereby giving rise to firms' precautionary demand for cash holding.

5. Conclusion

In this paper, we investigate the relationship between employment protection and corporate cash policy across 20 countries over the period 1985–2007. 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. Firms therefore 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. We show that these effects are stronger for firms with high labor turnover, small firms, and firms with high cash flow volatility. Moreover, following an increase in EPL, firms' propensities to save cash out of cash flow and debt and equity issuances also increase and so does the value of excess cash. Overall, our findings suggest that labor market rigidities can influence corporate cash policies through the operating leverage channel leading to an increase in the precautionary demand for cash savings.

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Figure 1: Within-firm variation in cash around the changes in EPL

This figure plots the within-firm variation in excess cash holdings from $t-3$ to $t+3$, where t is the reference year in which a change in EPL takes place (i.e., three years before and after a change in EPL). The excess cash is net of firm-specific effects, country's economic conditions, and the time-varying industry conditions. See Section 4 for the estimation of residuals in more detail.

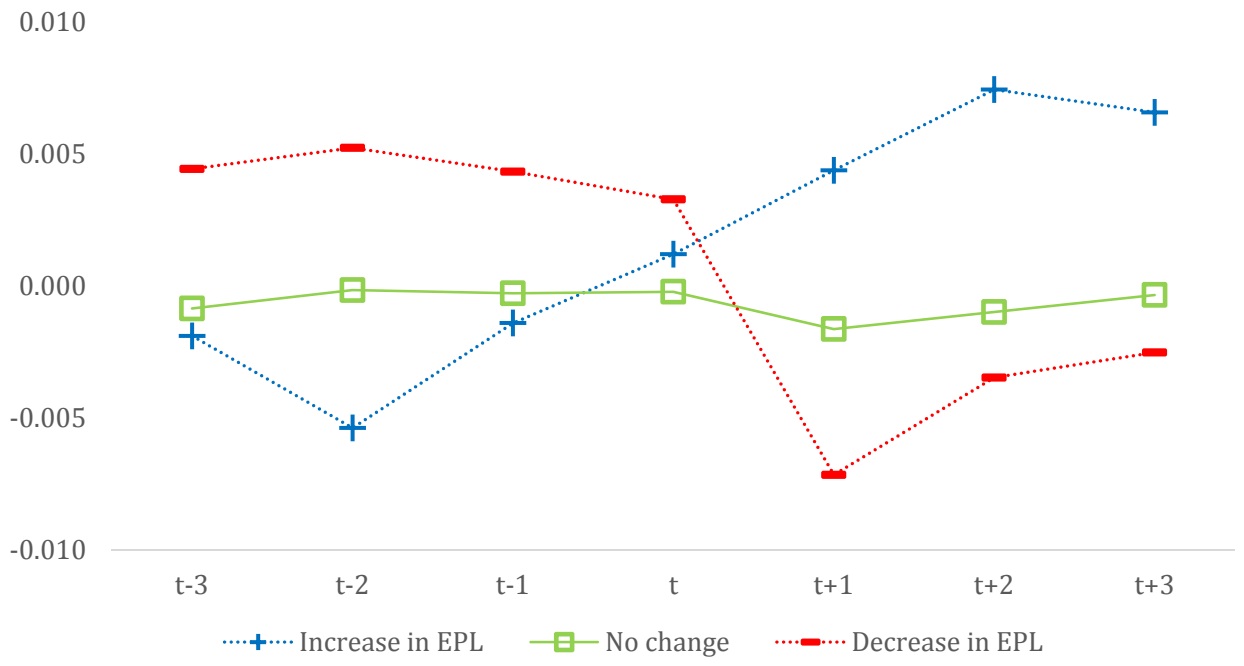

Table 1: Summary statistics

This table reports summary statistics for the whole sample used in the analysis. The data are taken from the non-regulated industrial firms in 20 countries in the Worldscope database for the period 1985–2007 that satisfy the data filters described in Section 3. All variables, except *Size*, *Q*, *R&D to sales*, *Dividend payer*, and country-level variables, are scaled by the beginning-of-year assets. Variables are winsorized at 1% in both tails.

	Mean (1)	Median (2)	SD (3)	N (4)
Firm-level variables:				
$Cash$	0.160	0.096	0.196	74,260
$\Delta Cash$	0.021	0.001	0.130	74,260
$Size$ (ln Assets , in \$2007, million)	12.70	12.59	1.84	74,260
Q (market to book)	1.94	1.38	1.79	74,260
$Leverage$	0.256	0.222	0.218	74,260
PPE (net property plant and equipment)	0.389	0.314	0.678	74,260
NWC (net working capital, net of cash)	0.034	0.025	0.192	74,260
$Cash\ flow$	0.080	0.084	0.124	74,260
$CAPEX$	0.078	0.049	0.099	74,260
$R\&D\ to\ sales$	0.021	0.000	0.073	74,260
$Dividend\ payer$	0.725	1.000	0.447	74,260
$Equity\ issue$	0.056	0.000	0.190	74,260
$Debt\ issue$	0.063	0.008	0.129	74,260
Country-level variables:				
$GDP\ growth$	2.460	2.530	1.589	74,260
$GDP\ per\ capita$ (in \$2007)	29,584	28,274	8,782	74,260
$Creditor\ rights$	2.41	2.00	1.27	74,260
$Unionization\ rate$	29.89	28.01	15.57	74,260
$Labor\ spending$	1.64	1.20	1.18	65,744
$Left\ wing$	1.83	1.00	0.97	72,334

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: Baseline DID estimation

This table reports the baseline results of estimating equation (1). The dependent variable is cash to assets. The data are from the non-regulated industrial firms in 20 countries in the Worldscope database for the period 1985–2007 that satisfy the data filters described in Section 3. All variables, except *Size*, *Q*, *R&D to sales*, *Dividend payer*, and country-level variables, are scaled by the beginning-of-year assets. Variables are winsorized at 1% in both tails. The standard errors robust to heteroscedasticity and clustering by country are reported in the brackets. ***, **, and * indicate the statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)
$EPL_{k,t-1}$	**0.033*** [0.012]**	**0.021*** [0.006]**
$Size_{i,t-1}$	-0.035*** [0.004]	-0.038*** [0.003]
$Q_{i,t-1}$	0.041*** [0.003]	0.041*** [0.003]
$Leverage_{i,t-1}$	-0.046* [0.025]	-0.053** [0.022]
$PPE_{i,t-1}$	0.001 [0.002]	0.001 [0.002]
$NWC_{i,t-1}$	-0.194*** [0.017]	-0.190*** [0.014]
$CashFlow_{i,t}$	0.098*** [0.019]	0.097*** [0.019]
$CAPEX_{i,t}$	-0.064*** [0.018]	-0.060*** [0.017]
$R\&D\ to\ sales_{i,t}$	0.091*** [0.026]	0.092*** [0.026]
$DividendPayer_{i,t}$	0.012*** [0.003]	0.012*** [0.003]
$GDP\ Growth_{k,t-1}$		0.002 [0.001]
$GDP\ per\ capita_{k,t-1}$		0.077*** [0.007]
$Creditor\ Rights_{k,t-1}$		0.005 [0.011]
N	74260	74260
Adjusted R^2	0.293	0.297
Firm FE	Yes	Yes
Industry*Year FE	Yes	Yes

Table 4: Estimation using matched samples

This table reports the results of estimating equation (1) using matched samples. The dependent variable is cash to assets. In column 1, propensity score matching is based on firm size, *Q* and industry- and year-fixed effects; in column 2, matching is based on all firm- and country-level controls in equation (1), as well as industry- and year-fixed effects. The data are from the non-regulated industrial firms in 20 countries in the Worldscope database for the period 1985–2007 that satisfy the data filters described in Section 3. All variables, except *Size*, *Q*, *R&D to sales*, *Dividend payer*, and country-level variables, are scaled by the beginning-of-year assets. Variables are winsorized at 1% in both tails. The standard errors robust to heteroscedasticity and clustering by country are reported in the brackets. ***, **, and * indicate the statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)
$EPL_{k,t-1}$	**0.014*** [0.004]**	**0.013*** [0.004]**
$Size_{i,t-1}$	-0.039*** [0.004]	-0.042*** [0.004]
$Q_{i,t-1}$	0.043*** [0.003]	0.043*** [0.002]
$Leverage_{i,t-1}$	-0.050* [0.025]	-0.048* [0.025]
$PPE_{i,t-1}$	0.000 [0.007]	-0.005 [0.010]
$NWC_{i,t-1}$	-0.195*** [0.013]	-0.195*** [0.013]
$CashFlow_{i,t}$	0.094*** [0.022]	0.085*** [0.018]
$CAPEX_{i,t}$	-0.037** [0.014]	-0.035 [0.022]
$R\&D\ to\ sales_{i,t}$	0.072** [0.029]	0.069** [0.026]
$DividendPayer_{i,t}$	0.014*** [0.004]	0.016*** [0.004]
$GDP\ Growth_{k,t-1}$	0.001 [0.001]	0.001 [0.001]
$GDP\ per\ capita_{k,t-1}$	0.070*** [0.009]	0.066*** [0.010]
$Creditor\ Rights_{k,t-1}$	-0.004 [0.009]	0.003 [0.008]
N	47880	47880
Adjusted R^2	0.309	0.302
Firm FE	Yes	Yes
Industry*Year FE	Yes	Yes

Table 5: Pretreatment trends

This table reports the dynamic effects of changes in EPL. The dependent variable is cash to assets. Two sets of four dummy indicators are prepared: $incr\_before^{-1}$ is a dummy that equals one if a firm is observed one year prior to an increase in EPL; $incr\_before^{0}$ is a dummy that equals one if a firm is observed in the year in which an increase in EPL takes place; $incr\_after^{1}$ is a dummy that equals one if a firm experienced an increase in EPL last year; and $incr\_after^{2+}$ is a dummy that equals one if a firm experienced an increase in EPL at least two years ago; then, another set of four dummy variables are defined in the same way for a decrease in EPL. The data are from the non-regulated industrial firms in 20 countries in the Worldscope database for the period 1985–2007 that satisfy the data filters described in Section 3. Regressions also include the firm- and country-level controls in equation (1). The standard errors robust to heteroscedasticity and clustering by country are reported in the brackets. ***, **, and * indicate the statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)
$incr\_before^{-1}$	-0.008**	-0.006
	[0.002]	[0.004]
$incr\_before^{0}$	-0.005	-0.002
	[0.019]	[0.020]
$incr\_after^{1}$	**0.025*** **	**0.028*** **
	[0.004]	**[0.004]**
$incr\_after^{2+}$	**0.038*** **	**0.041*** **
	[0.006]	**[0.004]**
$decr\_before^{-1}$	-0.017*	-0.014
	[0.007]	[0.008]
$decr\_before^{0}$	-0.017	-0.014
	[0.015]	[0.011]
$decr\_after^{1}$	**-0.028*** **	**-0.026***
	[0.004]	**[0.008]**
$decr\_after^{2+}$	**-0.051****	**-0.047***
	[0.016]	**[0.019]**
N	3448	3448
Adjusted R^2	0.299	0.265
Firm-level controls $X_{i,t}$	Yes	Yes
Country-level controls $Z_{k,t}$	Yes	Yes
Firm FE	Yes	Yes
Industry*Year FE	Yes	
Year FE		Yes

Table 6: Sub-indicators of EPL

This table reports the results of estimating equation (1) using the sub-indicators of EPL. The dependent variable is cash to assets. The summary EPL index is replaced with the sub-indicators for regular workers (column 1), temporary workers (column 2), and collective dismissal (column 3). The sub-indicator for collective dismissal is available from 1998–2007. The data are from the non-regulated industrial firms in 20 countries in the Worldscope database for the period 1985–2007 that satisfy the data filters described in Section 3. All variables, except *Size*, *Q*, *R&D to sales*, *Dividend payer*, and country-level variables, are scaled by the beginning-of-year assets. Variables are winsorized at 1% in both tails. The standard errors robust to heteroscedasticity and clustering by country are reported in the brackets. ***, **, and * indicate the statistical significance at the 1%, 5%, and 10% levels, respectively.

	Regular contract (EPL = EPR_v1) 1985–2007 (1)	Temporary contract (EPL = EPT_v1) 1985–2007 (2)	Collective dismissal (EPL = EPC) 1998–2007 (3)
$EPL_{k,t-1}$ (sub-indicators)	**0.027*** **[0.015]**	**0.010*** **[0.003]**	**0.032** **[0.013]**
$Size_{i,t-1}$	-0.037*** [0.003]	-0.038*** [0.003]	-0.053*** [0.005]
$Q_{i,t-1}$	0.041*** [0.003]	0.041*** [0.003]	0.041*** [0.004]
$Leverage_{i,t-1}$	-0.054** [0.022]	-0.053** [0.022]	-0.048* [0.024]
$PPE_{i,t-1}$	0.001 [0.002]	0.001 [0.002]	-0.002 [0.008]
$NWC_{i,t-1}$	-0.190*** [0.014]	-0.190*** [0.014]	-0.153*** [0.018]
$CashFlow_{i,t}$	0.097*** [0.019]	0.097*** [0.019]	0.075*** [0.022]
$CAPEX_{i,t}$	-0.059*** [0.017]	-0.060*** [0.017]	-0.029*** [0.010]
$R\&D\ to\ sales_{i,t}$	0.093*** [0.026]	0.092*** [0.026]	0.085* [0.043]
$DividendPayer_{i,t}$	0.012*** [0.003]	0.012*** [0.003]	0.005** [0.002]
$GDP\ Growth_{k,t-1}$	0.002 [0.001]	0.002 [0.001]	0.001 [0.002]
$GDP\ per\ capita_{k,t-1}$	0.081*** [0.008]	0.078*** [0.008]	0.089*** [0.006]
$Creditor\ Rights_{k,t-1}$	0.005 [0.012]	0.006 [0.011]	0.042*** [0.006]
N	74260	74260	44453
Adjusted R^2	0.297	0.297	0.316
Firm FE	Yes	Yes	Yes
Industry*Year FE	Yes	Yes	Yes

Table 7: Effect of labor turnover

This table reports the results of estimating equation (1) augmented with the interaction of EPL and labor turnover. Labor turnover rates are calculated using the Quarterly Workforce Indicators database available from the U.S. Census Bureau (see Section 4 for more details). The dependent variable is cash to assets. The data are from the non-regulated industrial firms in 20 countries in the Worldscope database for the period 1985–2007 that satisfy the data filters described in Section 3. All variables, except *Size*, *Q*, *R&D to sales*, *Dividend payer*, and country-level variables, are scaled by the beginning-of-year assets. Variables are winsorized at 1% in both tails. The standard errors robust to heteroscedasticity and clustering by country are reported in the brackets. ***, **, and * indicate the statistical significance at the 1%, 5%, and 10% levels, respectively.

	Baseline sample (1)	Matched sample (2)
$EPL_{k,t-1}$	0.016** [0.007]	0.005 [0.006]
$(EPL_{k,t-1} \times LaborTurnOver_j)$	**0.026*** **[0.016]**	**0.027**** **[0.013]**
$Size_{i,t-1}$	-0.046*** [0.005]	-0.051*** [0.007]
$Q_{i,t-1}$	0.037*** [0.007]	0.037*** [0.009]
$Leverage_{i,t-1}$	-0.047** [0.022]	-0.027 [0.021]
$PPE_{i,t-1}$	0.002* [0.001]	0.001 [0.011]
$NWC_{i,t-1}$	-0.187*** [0.012]	-0.189*** [0.016]
$CashFlow_{i,t}$	0.101*** [0.032]	0.133*** [0.039]
$CAPEX_{i,t}$	-0.025 [0.029]	0.002 [0.030]
$R\&D\ to\ sales_{i,t}$	0.036*** [0.013]	0.017 [0.013]
$DividendPayer_{i,t}$	0.014*** [0.003]	0.018*** [0.004]
$GDP\ Growth_{k,t-1}$	0.002 [0.001]	0 [0.001]
$GDP\ per\ capita_{k,t-1}$	0.081*** [0.005]	0.068*** [0.009]
$Creditor\ Rights_{k,t-1}$	0.006 [0.009]	0.002 [0.007]
N	70187	33477
Adjusted R^2	0.297	0.301
Firm FE	Yes	Yes
Industry*Year FE	Yes	Yes

Table 8: Effect of firm size and cash flow volatility

This table reports the results of estimating equation (1) for the subsamples based on firm size and cash flow volatility. Section 4 explains the sample sorting scheme in more details. The dependent variable is cash to assets. The data are from the non-regulated industrial firms in 20 countries in the Worldscope database for the period 1985–2007 that satisfy the data filters described in Section 3. All variables, except *Size*, *Q*, *R&D to sales*, *Dividend payer*, and country-level variables, are scaled by the beginning-of-year assets. Variables are winsorized at 1% in both tails. The standard errors robust to heteroscedasticity and clustering by country are reported in the brackets. ***, **, and * indicate the statistical significance at the 1%, 5%, and 10% levels, respectively.

	Firm size		Cash flow volatility	
	Small	Large	Low	High
	(1)	(2)	(3)	(4)
$EPL_{k,t-1}$	**0.039*** [0.008]**	**0.012 [0.008]**	**0.017 [0.012]**	**0.026** [0.010]**
$Size_{i,t-1}$	-0.062*** [0.006]	-0.022*** [0.004]	-0.038*** [0.006]	-0.042*** [0.003]
$Q_{i,t-1}$	0.044*** [0.002]	0.024*** [0.002]	0.034*** [0.006]	0.041*** [0.002]
$Leverage_{i,t-1}$	-0.111*** [0.018]	0.047** [0.018]	0.050 [0.037]	-0.099*** [0.023]
$PPE_{i,t-1}$	0.003 [0.009]	-0.077** [0.035]	-0.152*** [0.043]	0.004*** [0.001]
$NWC_{i,t-1}$	-0.210*** [0.020]	-0.184*** [0.023]	-0.263*** [0.025]	-0.169*** [0.017]
$CashFlow_{i,t}$	0.101*** [0.018]	0.196*** [0.029]	0.300*** [0.053]	0.095*** [0.015]
$CAPEX_{i,t}$	-0.024 [0.025]	0.010 [0.021]	-0.033 [0.038]	0.002 [0.017]
$R\&D\ to\ sales_{i,t}$	0.075** [0.036]	0.195** [0.093]	0.179 [0.142]	0.094*** [0.027]
$DividendPayer_{i,t}$	0.019*** [0.005]	0.006 [0.004]	0.009*** [0.003]	0.015*** [0.005]
$GDP\ Growth_{k,t-1}$	-0.001 [0.002]	0.001 [0.001]	0.001 [0.001]	0.000 [0.002]
$GDP\ per\ capita_{k,t-1}$	0.091** [0.037]	0.065*** [0.010]	0.071*** [0.007]	0.066** [0.028]
$Creditor\ Rights_{k,t-1}$	-0.016* [0.008]	0.001 [0.008]	-0.001 [0.008]	-0.020* [0.010]
N	22,289	22,274	20,008	19,973
Adjusted R^2	0.313	0.267	0.324	0.330
Firm FE	Yes	Yes	Yes	Yes
Industry*Year FE	Yes	Yes	Yes	Yes

Table 9: Additional country-level characteristics

This table reports the results of estimating equation (1) augmented with additional country-level controls. The dependent variable is cash to assets. The data are from the non-regulated industrial firms in 20 countries in the Worldscope database for the period 1985–2007 that satisfy the data filters described in Section 3. All variables, except *Size*, *Q*, *R&D to sales*, *Dividend payer*, and country-level variables, are scaled by the beginning-of-year assets. Variables are winsorized at 1% in both tails. The standard errors robust to heteroscedasticity and clustering by country are reported in the brackets. ***, **, and * indicate the statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)
$EPL_{k,t-1}$	**0.020*** [0.007]**	**0.025** [0.010]**	**0.023** [0.009]**
$Size_{i,t-1}$	-0.038*** [0.003]	-0.037*** [0.003]	-0.036*** [0.003]
$Q_{i,t-1}$	0.041*** [0.003]	0.042*** [0.003]	0.042*** [0.003]
$Leverage_{i,t-1}$	-0.053** [0.022]	-0.046** [0.021]	-0.047** [0.021]
$PPE_{i,t-1}$	0.001 [0.002]	-0.007 [0.008]	-0.007 [0.008]
$NWC_{i,t-1}$	-0.190*** [0.014]	-0.183*** [0.014]	-0.185*** [0.014]
$CashFlow_{i,t}$	0.097*** [0.019]	0.107*** [0.023]	0.106*** [0.023]
$CAPEX_{i,t}$	-0.059*** [0.016]	-0.053** [0.019]	-0.054** [0.019]
$R\&D\ to\ sales_{i,t}$	0.091*** [0.026]	0.076** [0.031]	0.073** [0.031]
$DividendPayer_{i,t}$	0.012*** [0.003]	0.013*** [0.003]	0.014*** [0.003]
$GDP\ Growth_{k,t-1}$	0.002 [0.001]	0.000 [0.001]	0.000 [0.001]
$GDP\ per\ capita_{k,t-1}$	0.075*** [0.007]	0.068*** [0.008]	0.067*** [0.007]
$Creditor\ Rights_{k,t-1}$	0.004 [0.012]	0.000 [0.010]	0.001 [0.009]
$Unionization\ rate_{k,t-1}$	-0.001 [0.001]	-0.000 [0.001]	-0.000 [0.001]
$Labor\ spending_{k,t-1}$		-0.005 [0.006]	-0.003 [0.006]
$Left\ wing_{k,t-1}$			0.002 [0.002]
N	74260	65744	63818
Adjusted R^2	0.297	0.291	0.292
Firm FE	Yes	Yes	Yes
Industry*Year FE	Yes	Yes	Yes

Table 10: Saving propensities

This table reports the results of estimating equation (2). The dependent variable is the one-year change in cash to assets. The data are from the non-regulated industrial firms in 20 countries in the Worldscope database for the period 1985–2007 that satisfy the data filters described in Section 3. All variables, except *Size*, *Q*, and country-level variables, are scaled by the beginning-of-year assets. Variables are winsorized at 1% in both tails. The standard errors robust to heteroscedasticity and clustering by country are reported in the brackets. ***, **, and * indicate the statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)
$EPL_{k,t-1}$	0.000	-0.005
	[0.003]	[0.004]
$CashFlow_{i,t-1}$	0.063***	0.062**
	[0.021]	[0.026]
$EquityIssue_{i,t-1}$	0.284***	0.278***
	[0.025]	[0.037]
$DebtIssue_{i,t-1}$	-0.031	-0.020
	[0.024]	[0.025]
$(EPL_{k,t-1} \times CashFlow_{i,t-1})$	**0.044****	**0.043****
	[0.018]	**[0.019]**
$(EPL_{k,t-1} \times EquityIssue_{i,t-1})$	**0.034****	**0.036***
	[0.015]	**[0.019]**
$(EPL_{k,t-1} \times DebtIssue_{i,t-1})$	**0.039*****	**0.029****
	[0.013]	**[0.012]**
$Size_{i,t-1}$	-0.009**	-0.007*
	[0.003]	[0.004]
$Q_{i,t-1}$	0.017***	0.017***
	[0.001]	[0.001]
$GDP\ Growth_{k,t-1}$	-0.001	-0.002***
	[0.001]	[0.000]
$GDP\ per\ capita_{k,t-1}$	0.037***	0.032***
	[0.005]	[0.005]
$Creditor\ Rights_{k,t-1}$	0.000	-0.005*
	[0.003]	[0.003]
$Unionization\ rate_{k,t-1}$		-0.001***
		[0.000]
$Labor\ spending_{k,t-1}$		0.001
		[0.002]
$Left\ wing_{k,t-1}$		0.001
		[0.001]
N	74260	63818
Adjusted R^2	0.333	0.327
Firm FE	Yes	Yes
Industry*Year FE	Yes	Yes

Table 11: Value of excess cash

This table reports the results of estimating equation (3). The dependent variable is market to book ratio. Section 4 provides variable definition in detail. The data are from the non-regulated industrial firms in 20 countries in the Worldscope database for the period 1985–2007 that satisfy the data filters described in Section 3. All variables, except country-level variables, are scaled by the beginning-of-year assets. Variables are winsorized at 1% in both tails. The standard errors robust to heteroscedasticity and clustering by country are reported in the brackets. ***, **, and * indicate the statistical significance at the 1%, 5%, and 10% levels, respectively.

	Firms with $XCash > 0$ (1)	Firms with $XCash > 0$ (2)	Setting $XCash = 0$ if negative (3)	Firms with $XCash > 0$ (4)	Setting $XCash = 0$ if negative (5)
$XCash_{i,t}$	0.740***	0.465***	0.529***	0.460***	0.530***
	[0.025]	[0.082]	[0.098]	[0.085]	[0.104]
$EPL_{k,t-1}$		-0.141**	-0.042	-0.135	-0.016
		[0.058]	[0.056]	[0.080]	[0.080]
$(XCash_{i,t} \times EPL_{k,t-1})$		**0.290*** **	**0.222** **	**0.322*** **	**0.240** **
		[0.074]	**[0.113]**	**[0.075]**	**[0.115]**
$E_{i,t}$	-1.463***	-1.461***	-1.808***	-1.338**	-1.692***
	[0.128]	[0.448]	[0.346]	[0.477]	[0.366]
$\Delta E_{i,t}$	0.358***	0.368***	0.422***	0.337**	0.394***
	[0.075]	[0.125]	[0.110]	[0.123]	[0.102]
$\Delta E_{i,t+2}$	-0.304***	-0.318	-0.288**	-0.245	-0.220
	[0.087]	[0.222]	[0.119]	[0.239]	[0.128]
$RD_{i,t}$	4.165***	3.964***	4.195***	3.092***	3.455***
	[0.382]	[1.131]	[1.114]	[0.892]	[0.948]
$\Delta RD_{i,t}$	2.841***	3.009***	2.003***	2.674***	1.805***
	[0.533]	[0.822]	[0.283]	[0.782]	[0.277]
$\Delta RD_{i,t+2}$	3.887***	3.797**	3.185***	2.823**	2.598***
	[0.513]	[1.473]	[0.873]	[1.237]	[0.734]
$I_{i,t}$	-0.034	0.459	3.844*	-0.138	3.298
	[0.936]	[1.691]	[1.982]	[1.710]	[2.017]
$\Delta I_{i,t}$	-1.964***	-1.617*	-2.591***	-1.398	-2.245**
	[0.710]	[0.853]	[0.698]	[1.135]	[0.853]
$\Delta I_{i,t+2}$	-2.482***	-2.479*	-1.210	-2.492**	-1.242
	[0.690]	[1.428]	[1.013]	[0.973]	[0.814]
$D_{i,t}$	12.667***	12.449***	12.158***	11.709***	11.584***
	[0.845]	[2.381]	[2.368]	[2.419]	[2.398]
$\Delta D_{i,t}$	0.069	0.549	0.152	0.470	-0.364
	[0.676]	[0.859]	[1.256]	[0.830]	[1.076]
$\Delta D_{i,t+2}$	4.837***	4.628***	3.695**	4.015***	3.117**
	[0.525]	[1.428]	[1.589]	[1.244]	[1.348]

(*continued*)

Table 11 (continued)

	Firms with $XCash > 0$ (1)	Firms with $XCash > 0$ (2)	Setting $XCash = 0$ if negative (3)	Firms with $XCash > 0$ (4)	Setting $XCash = 0$ if negative (5)
$\Delta NA_{i,t}$	0.296***	0.285***	0.240***	0.254**	0.221***
	[0.033]	[0.081]	[0.055]	[0.102]	[0.065]
$\Delta NA_{i,t+2}$	0.326***	0.307***	0.257***	0.253***	0.214***
	[0.026]	[0.081]	[0.078]	[0.076]	[0.066]
$\Delta MV_{i,t+2}$	-0.098***	-0.092*	-0.075	-0.069	-0.054
	[0.014]	[0.045]	[0.048]	[0.041]	[0.040]
$GDP\ Growth_{k,t-1}$		0.071***	0.064***	0.059***	0.061***
		[0.021]	[0.020]	[0.011]	[0.012]
$GDP\ per\ capita_{k,t-1}$		-0.295	-0.146	-0.300*	-0.080
		[0.174]	[0.138]	[0.166]	[0.145]
$Creditor\ Rights_{k,t-1}$		0.417***	0.315***	0.307***	0.263***
		[0.076]	[0.070]	[0.057]	[0.058]
$Unionization\ rate_{k,t-1}$				-0.015**	-0.006
				[0.006]	[0.007]
$Labor\ spending_{k,t-1}$				-0.063**	-0.038
				[0.029]	[0.027]
$Left\ wing_{k,t-1}$				0.053***	0.017
				[0.016]	[0.016]
N	29503	29496	68255	25456	59547
Adjusted R^2	0.422	0.438	0.375	0.469	0.386
Country FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes