Temporary Workers and Cash Holdings[*]

Jaehoon Hahn[a], Sandy Klasa[b], Hyuksoon Lim[c], S. Katie Moon[d]

September 11, 2022

Abstract:

We examine the effect of firm reliance on temporary workers on corporate cash holdings by exploiting the quasi-natural experiment created by a law in South Korea which made it more difficult for firms to use such workers. Although the law reduced firms' abilities to manage unexpected fluctuations in workloads, our evidence shows that firms which relied more on temporary workers prior to the law strategically lowered their cash holdings afterward because the law also raised union bargaining power. We further find that low cash holdings and subcontracting are complementary mechanisms South Korean firms used to reduce union bargaining power.

[a] Yonsei School of Business, Yonsei University, Seoul, Korea 03722, hahnj@yonsei.ac.kr
[b] Eller College of Management, University of Arizona, Tucson, AZ 85721, sklasa@eller.arizona.edu
[c] Eller College of Management, University of Arizona, Tucson, AZ 85721, hyuksoonlim@email.arizona.edu
[d] Leeds School of Business, University of Colorado, Boulder, CO 80309, katie.moon@colorado.edu

I. Introduction

In most countries there is rising and pervasive use of temporary workers, whereby workers are obtained through temporary work agencies or hired on fixed-term contracts. This is particularly the case for temporary work agencies, which in the U.S. and worldwide have experienced 10 to 20 percent annual employment growth rates over recent decades, and now account for large fractions of fluctuations in national employment rates (Autor (2003), Dey, Houseman, and Polivka (2012), Houseman and Heinrich (2015), Katz and Krueger (2019), and WEC (2020)). Because workers acquired through temporary work agencies remain employees of the agency, they offer flexibility to the client firms who can easily discharge the workers, if necessary. The use of these workers also allows client firms to markedly reduce their labor costs from recruitment, training, social benefits, overtime pay, and tax and salary administration. Further, because workers attained from an agency are not covered by client firms' collective bargaining agreements, this enables the firms to lower union bargaining power (Abraham (1990), Gramm and Schnell (2001), and Houseman (2001)).

Given that, on average, about 60% of economic output accrues to workers in the form of wages (Giandrea and Sprague (2017)) and that a growing fraction of labor costs pertains to compensation for temporary workers, it is surprising that we know relatively little about how a firm's ability to rely on these workers impacts its other financial decisions. In this paper, we examine how this ability impacts corporate cash holdings decisions.

A reduced ability to use temporary workers could affect corporate cash holdings in two principal ways. On one hand, prior work shows that powerful unions impact major corporate decisions and that to gain bargaining advantages over unions firms reduce cash holdings (Klasa, Maxwell, and Ortiz-Molina (2009)), CEO pay (Huang, Jiang, Lie, and Que (2017)), and investment (Chava, Danis, and Hsu (2020)), increase leverage (Matsa (2010)), and engage in asset sales (Lie and Que (2019)). Because a lower facility to use temporary workers typically raises union bargaining power and when firms have to negotiate with stronger unions, they strategically hold less cash to improve their bargaining position, this generates the following empirical prediction that we

test: *A reduced ability to rely on temporary workers raises unions' bargaining power, which prompts firms to lower their cash holdings to strengthen their bargaining position relative to unions.*

On the other hand, prior work also shows that employment protection legislation results in more conservative corporate financial policies because increases in the fixed component of firms' labor costs raise their operating leverage (Simintzi, Vig, and Volpin (2015) and Serfling (2016)). Further, Chino (2021) provides evidence that suggests legal restrictions on firms' abilities to use temporary workers provided by an agency result in a higher cost of equity capital because such restrictions reduce firms' flexibility. These findings lead to the ensuing competing prediction that we also test: *The inflexibility and operating risk resulting from a decreased ability to rely on temporary workers spur firms to raise their cash reserves for precautionary purposes.*

To investigate the effect of a firm's ability to rely on temporary workers for a large fraction of its labor inputs on its cash holdings, we exploit a negative exogenous shock to South Korean firms' ability to use such workers. To protect temporary workers, South Korea adopted a law in 2007 that restricted to two years the maximum duration of using temporary workers who are employed by a temporary work agency, who are on a fixed-term contract, or who are part-time workers. The law required firms to provide affected workers with permanent work contracts two years after they began working at a firm.

The adoption of the law resulted in a significant reduction in the fraction of workers in South Korea who were temporary workers that was mostly driven by a substantial drop in the number of workers employed by temporary work agencies. The increase in the legal protection of temporary workers associated with this law was arguably exogenous, thus making it a potentially useful source of identification. Specifically, because the law was put into effect only eight months after its passage and there was little prior political campaign for it, the event is unlikely to be systematically associated with lobbying or anticipated by firms. Importantly, the law adoption raised union bargaining power because in South Korea, as in many other countries, temporary workers obtained from agencies or hired on fixed-term or part-time contracts rarely belonged to a union. At the same

time, the law increased firms' fixed costs and operating leverage. Thus, our setting provides us with the opportunity to examine how a firm's facility to significantly rely on temporary workers for its labor inputs impacts its cash holdings policy via the concurrent effects of this facility on union bargaining power and the ability to manage idiosyncratic or cyclical fluctuations in workloads.

We first show that the adoption of the law increased union bargaining power. Using a difference-in-differences approach, we document that for firms that relied more on temporary workers before the law adoption, the number of temporary (permanent) workers employed by a firm went down (up) after the law adoption. We also find that for these firms after the law adoption the likelihoods that a worker not belonging to a union becomes a union member or that a non-unionized firm becomes unionized both increased. Relatedly, we document that replacing temporary workers with permanent workers raised the likelihood of a firm's workers going on strike. Further, we show that at the date of the law passage unionized firms that relied more on temporary workers experienced negative abnormal stock returns.

Next, we employ difference-in-differences tests that use the law adoption to gauge the effect of a drop in a firm's ability to rely on temporary workers on its cash holdings. Our key result is that the law adoption led to a statistically and economically significant decrease in the cash holdings of firms that relied more before the law adoption on temporary workers who became protected by the law, referred to as high PTW (protected temporary worker) firms. Importantly, this result is not driven by a decrease in these firms' cash flow after the law adoption. These findings imply that although the law adoption decreased firms' abilities to manage unexpected fluctuations in workloads, thereby raising the precautionary motive to hold larger cash reserves, firms lowered their cash holdings to mitigate increased union bargaining power also caused by the law adoption.[1]

Supporting the parallel trends assumption that is central to a causal interpretation of our

---

[1] Consistent with the notion that in South Korea, like in the U.S., firms that bargain with more powerful unions strategically hold less cash to improve their bargaining position vis-à-vis unions, we also find that in South Korea there is a negative association between cash holdings and firm-level unionization rates.

results, the trends in the cash holdings of high PTW firms and other firms before the law adoption are statistically indistinguishable. Also, the reduction in the cash holdings of high PTW firms occurred only after the law adoption. These results suggest the increase in the bargaining advantages enjoyed by unions due to the law adoption caused high PTW firms to reduce their cash holdings.

We next investigate cross-sectional variation in the effect of the law adoption on the cash holdings of high PTW firms. These analyses not only provide insights on the economic mechanisms that lead to this effect, but also shed light on whether our results have a causal interpretation. This is because if a variable omitted from our benchmark regression model were to drive this negative effect, not only would that variable have to be uncorrelated with all of the control variables in that model, but it would also have to explain all of the cross-sectional results we find.

First, we find that the drop in cash holdings after the law adoption only holds for unionized high PTW firms. Next, we further classify unionized firms depending on if a firm has a credit rating or belongs to a chaebol business group. Firms with a credit rating have easier access to external capital and firms belonging to a chaebol benefit from internal capital markets within chaebol business groups (Almeida, Kim, and Kim (2015) and Kim (2020)). Thus, low levels of cash holdings would be seen as a more credible signal that a firm cannot concede to unions' demands when the firm does not have a credit rating or does not belong to a chaebol. Consistent with this prediction, we find that among high PTW firms that were unionized only those that did not have a credit rating or did not belong to a chaebol significantly reduced their cash holdings after the law adoption. These three cross-sectional results support the notion that high PTW firms strategically reduced their cash holdings subsequent to the law adoption to improve their bargaining position relative to unions.

We also exploit cross-sectional variation in the ex-ante operating leverage of firms prior to the law adoption. We expect the result that high PTW firms lowered their cash holdings after the law adoption to raise their bargaining power with unions to be driven by firms with lower ex-ante operating leverage, for whom increasing operating risk by lowering cash holdings would be less costly. Consistent with this notion and with operating leverage mattering, we find that only high

4

PTW firms with lower ex-ante operating leverage reduced their cash holdings after the law adoption.

As an alternative to focusing on the ex-ante level of protected temporary workers, we consider the average wages paid to a firm's employees given that temporary workers typically have the lowest wages among a firm's workers and so firms that rely more on these workers will have lower average wages. In line with our results for the ex-ante level of protected temporary workers, we show that after the law adoption there was a statistically and economically important decrease in the cash holdings of firms with lower average wages, that this decrease only took place subsequent to the law adoption, and that it only occurred for firms that were unionized.

We also investigate whether the law adoption reduced the market's valuation of high PTW firms' cash holdings because higher cash holdings can weaken these firms' bargaining position with unions and consequently allow unions to extract a larger fraction of firm profits. We find that indeed the market's valuation of high PTW firms' cash holdings decreased subsequent to the law adoption. Moreover, highlighting the economic mechanism behind this result, this decrease only occurred for high PTW firms that were unionized.

Next, we consider that firms could try to mitigate the effect of the stronger union bargaining power after the law adoption by outsourcing work previously done by temporary workers. We document that for unionized high PTW firms the likelihood of using subcontracting significantly increased after the law adoption, while for non-unionized high PTW firms there was no change in this likelihood. We also find that high PTW firms that did not use subcontracting before but used it after the law adoption decreased their cash holdings after the law adoption. However, for other high PTW firms there was no change in their cash holdings after the law adoption. Put together, these findings suggest that reducing cash holdings and starting to use subcontracting are complementary mechanisms that South Korean firms used to reduce union bargaining power after the law adoption.

Finally, given that arguments made in prior work (e.g., Matsa (2010), Simintzi, Vig, and Volpin (2015), and Serfling (2016)) lead to predictions that increases in union bargaining power (operating leverage) result in firms raising (lowering) their financial leverage, we examine the effect

of the law adoption on leverage. We find that, on average, high PTW firms reduced their leverage following the law adoption. Interestingly, this result is driven by non-unionized high PTW firms and there was no change in the leverage of unionized high PTW firms after the law adoption.

These results suggest that unionized high PTW firms did not alter their financial leverage due to the opposing impacts of increases in both union bargaining power and operating leverage resulting from the law adoption. However, non-unionized high PTW firms reduced their financial leverage due to the rise in their operating leverage after the law adoption given that they were less concerned about union bargaining power. Although these findings contrast with our results for cash holdings, they are consistent with prior work (e.g., Lev (1974), Ferri and Jones (1979), Mandelker and Rhee (1984), Reinartz and Schmid (2016), and Chen, Harford, and Kamara (2019)) that reports a strong negative relation between operating and financial leverage and attributes this to the fact that even when firms are financially distressed they need to pay contractual operating costs before making interest payments, which can force firms into bankruptcy. These results also support the argument that in the presence of financing frictions cash should not be viewed as negative debt (e.g., Acharya, Almeida, and Campello (2007)). Relatedly, these findings point to the interesting fact that in order to meet their particular needs, at times, firms make contrasting decisions with respect to cash holdings and financial leverage.

Overall, the results in this paper imply that a firm's ability to rely on temporary workers for a significant fraction of its labor inputs can have important effects on its other major financial decisions. The fact that the use of temporary workers is widespread and increasing in many countries, especially the use of workers from temporary work agencies, underscores the importance of understanding these effects. Our findings highlight that these effects depend on the extent to which a firm bargains with powerful unions and its operating leverage. For instance, when labor laws make it difficult for firms to use temporary workers as a major source of labor inputs and they consequently face greater operating risk, firms that bargain with strong unions trade off the benefits of holding more cash to reduce their operating risk with the costs resulting from a less favorable

6

bargaining position with unions.

In closely related work, Kuzmina (2021) examines government subsidies in Spain that encourage firms to convert workers' fixed-term contracts to permanent contracts. Using an instrumental variable estimation methodology, she finds that firms that make such conversions reduce their leverage. While her paper and ours are alike in terms of examining how utilizing more temporary workers affects financial policies, our analysis differs from hers because we conduct a difference-in-differences analysis exploiting a labor law that largely impacted temporary agency workers (rather than workers on fixed-term contracts). Our study also differs from hers because she does not consider the effect of temporary workers on the bargaining position of unions but focuses only on the effect of the use of these workers on operating leverage.

Our paper also sheds further light on how strategic interactions that arise in the bargaining between firms and organized labor impact corporate decisions (e.g., Klasa, Maxwell, Ortiz-Molina (2009), Matsa (2010), Schmalz (2015), Huang, Jiang, Lie, and Que (2017), Lie and Que (2019), Chava, Danis, and Hsu (2020), and Kini, Shen, Shenoy, and Subramaniam (2021)). More broadly, it complements work that shows how labor market frictions due to workers' risk of becoming unemployed (Agrawal and Matsa (2013) and Brown and Matsa (2016)), labor mobility (Klasa, Ortiz-Molina, Serfling, and Srinivasan (2018) and Jeffers (2021)), and firms' needs for skilled workers (Ghaly, Dang, and Stathopoulos (2017) and Shen (2021)) affect their financial policy decisions. Likewise, it also adds to the existing evidence on how firms' decisions are affected by their strategic interactions with input suppliers (e.g., Fee and Thomas (2004), Kale and Shahrur (2007), Ellis, Fee, and Thomas (2012), and Kulchania and Thomas (2017)).

The remainder of the paper is organized as follows. Section II discusses institutional details on the temporary worker protection law and unions in South Korea. Section III discusses related literature on the increasing use of temporary workers and the benefits and costs to firms of relying on these workers. Section IV describes our sample and data. Sections V and VI report empirical results. Finally, Section VII concludes.

II.   Institutional background

A.   Temporary worker protection legislation

After South Korea received a loan from the International Monetary Fund in 1997 due to a transitory liquidity shortfall, the fundamental structure of the South Korean economy underwent abrupt changes. One of the changes was allowing the increased use of temporary workers in the labor markets to provide firms with more flexible labor costs. As a result, the number of temporary workers in South Korea rapidly increased. As shown in Panel A of Table 1, in 2005 temporary workers accounted for 19.2% of the workforce in South Korea.

Compared to permanent workers, temporary workers earned lower wages, had inferior working conditions, and faced a higher likelihood of becoming unemployed. Because of this, on November 30, 2006, the South Korean National Assembly passed a law that restricted the maximum duration of retaining temporary workers obtained through temporary work agencies or hired on fixed-term or part-time contracts to two years.[2] Specifically, the law obliged firms to provide these workers with permanent work contracts two years after they began working at a firm. The law was adopted and put into place only eight months after its passage and there was little prior political campaign for it. As such, the law passage and adoption were unlikely to be systematically associated with lobbying or anticipated by firms, and the increase in the legal protection of temporary workers associated with this law was arguably exogenous. Given that workers from temporary work agencies were more likely to work for more than two years at a given firm than were temporary workers on fixed-term or part-time contracts, the law was expected to have the largest impact on the former group of workers.[3] In Section V.A, we confirm that this was indeed the case.

Importantly, it was difficult for firms in South Korea to circumvent the temporary worker

---

[2] While the adoption of the temporary worker protection legislation enhanced the protection of these three types of temporary workers, other types of temporary workers, including contract workers, at-home workers, and on-call workers, were not protected by the new legislation. Contract workers are temporary workers who are employed by specialty firms such as security firms or landscaping firms, and they temporarily work at a client firm conducting a task requested by the client firm. At-home workers refer to workers who are designated as temporary workers because they work from their homes. On-call workers are temporary workers who are called in to work, on an as-needed basis.
[3] See "All workers, average tenure of 4 years and 6 months," *Moneytoday*, October 19, 2005.

protection legislation by discharging protected temporary workers before they had worked for 24 months at the firm. This was due to the press and public in South Korea being highly critical of firms that took such actions. For instance, in 2007 the Eland Group in South Korea fired a large number of its temporary workers working in its discount stores. This led to boycotts of these stores and resulting losses of almost $17 million for Eland Group.[4]

B.   Unions in South Korea

Under the government-driven transition from an agricultural-based economy to an industrial economy, South Korea experienced rapid economic developments during the 1970s through large exports to other countries. To maintain these exports, increases in wages were largely suppressed by the government and the bargaining power of unions was modest (Song (1999)).

In 1987, political democratization led to large nationwide labor protests, and many labor unions were organized in South Korea. During this period, the number of labor disputes increased from 265 in 1986 to 3,749 in 1987, and the number of labor unions rose from 2,725 in 1987 to 6,142 in 1988.[5] Overall, labor unions became very powerful in South Korea. For instance, over our 2002-2012 sample period, the unionization rate for large publicly traded firms in South Korea (the U.S.) is approximately 41% (14%).[6] Further, over this period, 2,129 (2,288) strikes and lockouts occurred in South Korea (the U.S.).[7] Given the much smaller size of the South Korean economy relative to that in the U.S. (GDP of $1.0 trillion vs. $13.8 trillion) and 23.4 million total workers in South Korea (relative to 141.1 million total workers in the U.S.), the data suggest that over our sample period union bargaining power in South Korea is very significant.

We note that although unionization rates in South Korea around the time of the passage of the temporary worker protection legislation were quite high, temporary workers seldomly belonged

---

[4] See "Spread of Eland boycott movement," *Hankyoreh*, July 11, 2007
[5] See Park and Park (1989).
[6] See the Korean Statistical Information Service and Marciukaityte (2015).
[7] Statistics on work stoppages and strikes are collected from the International Labor Organization and the Federal Mediation and Conciliation Service.

to a union. For instance, according to the Korean Statistical Information Service, in 2006 the proportion of temporary employees who were members of labor unions was 6.1%, while this percentage for permanent employees was 44.4%. Further, the percentage of workers employed by temporary work agencies who belonged to a union was close to zero. These statistics highlight why the passage of the legislation was expected to raise union bargaining power.

III. Growth, benefits, and costs of the use of temporary workers

Throughout the world, firms' use of temporary workers is widespread and increasing. Most of the growth in the U.S. is due to temporary work agencies, which have experienced annual employment growth rates of about 10-20% over the last several decades, partly in response to the recognition of exceptions to the employment-at-will doctrine in 46 states from 1973 to 1995 (Autor (2003), Houseman and Heinrich (2015), Katz and Krueger (2019), and WEC (2020)). Highlighting the importance of temporary work agencies in the U.S., Dey, Houseman, and Polivka (2012) and Houseman (2014) report that these agencies, which provide workers to a variety of different industry sectors, are responsible for about 10% of employment growth in the U.S. Further, during recessions and their aftermath, they account for 30-40% of the fluctuations in U.S. employment rates.

Subsequent to the lifting of restrictions on temporary work agencies in many countries including Italy, the Netherlands, Germany, France, the United Kingdom, and Japan, these agencies have become commonplace and experienced similarly high annual employment growth rates. Further, in these countries, temporary work agencies have had large effects on labor activity. For instance, in Germany during the 2000s about half of new job creation was attributable to these agencies (Spermann (2011) and Houseman (2014)).

Although in the U.S. the fraction of the workforce that is hired on fixed-term contracts has remained quite low, in other countries over recent decades there has been significant growth in this fraction. This is particularly the case in Europe, where the use of fixed-term contracts markedly grew during the 1980s as a way to counteract high unemployment rates in part caused by strong

employment protection laws (e.g., Bentolila and Dolado (1994) and Bentolila, Dolado, and Jimeno (2012)). From the 1980s to the 1990s, the fraction of the European workforce that was employed using such contracts grew from about 4% to 10%. The highest increases in this fraction occurred in Spain and Portugal, where it peaked at 25% and 23%, respectively. Panel A in Table 1 shows that in South Korea the fraction of the workforce hired on fixed-term contracts grew to 8.3% by 2005.

A major benefit to firms of using temporary workers obtained through temporary work agencies or hired on fixed-term contracts is that this allows firms to reduce their fixed labor costs and increase their flexibility and ability to manage idiosyncratic or cyclical fluctuations in workloads.[8] In terms of workers acquired through an agency, the workers can be easily discharged once they are no longer needed (with minimal risk of legal action on the part of the worker), while for fixed-term contracts a firm can dismiss a worker at the end of the contract without difficulty.

Another important purported benefit to firms of using temporary workers is that this can help to reduce union bargaining power (Abraham (1990), Gramm and Schnell (2001), and Houseman (2001)).[9] Given that workers obtained from a temporary work agency are employees of the agency, they will not become members of client firms' unions or be covered by collective bargaining agreements that these firms have with unions. Thus, if more of a firm's workers are obtained from an agency, this reduces unions' bargaining power. Workers who are hired on fixed-term contracts are less likely to become union members, and hence when more of these workers are employed by a firm this should also lower the bargaining position of organized labor. However, as discussed in Kuzmina (2021), in some countries such as Spain, workers hired on fixed-term contracts are covered by firms' collective bargaining agreements with organized labor.

Because temporary work agencies specialize in recruiting, screening, and providing training

---

[8] See Polivka and Nardone (1989), Golden and Appelbaum (1992), and Bentolila and Dolado (1994) for discussions of how temporary workers can help firms handle nonsystematic changes in demand, fiercer domestic and international competitions, and accelerated technical changes.

[9] As a result, a priori unions should try to resist attempts by firms to hire large numbers of temporary workers. However, unions could go along with the hiring of some temporary workers if these workers can act as a buffer when a firm is in distress, so that they would be let go in bad times rather than unionized workers with permanent labor contracts (Bentolila and Dolado (1994)).

to workers, other advantages for firms of using temporary workers, which are specific to workers obtained from such agencies, are that client firms can significantly reduce their labor costs pertaining to the hiring of new workers (Autor (2001)). Further, by obtaining workers through an agency, client firms also avoid having to pay social benefits to the workers or having to incur tax and salary administration expenses for these workers (Houseman (2014)).

The major cost for firms of using temporary workers is that these workers may choose to invest less in their firm-specific human capital and exert less effort, thereby lowering firm productivity. Supporting this notion, extant work shows that a larger use of temporary workers is associated with decreases in various measures for the productivity of a firm's capital and its labor force (Boeri and Garibaldi (2007), Berson and Ferrari (2015), and Dolado, Ortigueira, and Stucchi (2016)). This effect is expected to be more accentuated when temporary workers are obtained from agencies because such workers typically earn lower pay and face a lower likelihood of being hired on a permanent basis following their temporary assignment compared with temporary workers hired on fixed-term contracts (Amuedo-Dorantes, Malo, and Muñoz-Bullón (2008) and Autor, Houseman, and Kerr (2017)). Thus, when firms make decisions about whether to replace permanent workers with temporary workers, they trade off an increased ability to manage fluctuations in workloads and reduced union bargaining power with potential declines in firm productivity. Further, this trade-off is likely to be more pronounced when firms hire workers from temporary work agencies.

IV. Sample and data

A. Sample used for tests

The sample used for our tests consists of all industrial firms that are publicly traded in South Korea over the 2002-2012 period. The sample period starts five years before the law adoption and ends five years after its adoption. Firms are excluded from the sample if they (1) are not publicly traded, (2) have missing values for the variables of interest, or (3) are financial or utility firms. The final sample consists of 16,244 firm-year observations for 1,975 unique firms.

B.   Accounting and financial data

Accounting and financial data are obtained from the Data Guide Pro database provided by FnGuide. From Data Guide Pro, we access stock returns and price information and also accounting information from the balance sheets, income statements, and cash flow statements of firms traded over the Korea Stock Exchange (KSE) and the Korea Securities Dealers Automated Quotation (KOSDAQ). Data Guide Pro provides stock price information from 1980 onwards and financial statement information from 1983 onwards. This database is similar to the merged CRSP-Compustat database in the U.S. in the sense that both databases provide accounting and stock price-related data.

C.   Temporary employees and union-related data

We collect data on temporary workers, unions, union strikes, wage increase rates suggested by firms and unions, the number of employees in each establishment, and unions' perception of the credibility of management information used in collective bargaining from the Workplace Panel Survey. The Korea Labor Institute has conducted the Workplace Panel Survey biannually since 2005, two years before the adoption of the temporary worker protection law. The survey consists of a random sample of workplaces with 30 or more employees in South Korea. It is important to note that we are unable to comprehensively match establishments in the Workplace Panel Survey with firms in the Data Guide Pro database. Although the survey provides detailed information on a firm's workforce and its financial performance, firm identification is not provided. Hence, some of the variables we construct and use are industry averages calculated at the two-digit Korean Standard Industrial Classification (KSIC) level, which is the most granular industry classification provided by the Workplace Panel Survey, and which is similar to two-digit SIC codes in the U.S.

We also supplement our data with the following two firm-level datasets. First, we obtain data on firm unionization rates from corporate filings. Until 2008, publicly-traded firms in South Korea submitted their unionization rates in annual filings filed with the Data Analysis, Retrieval, and Transfer system (DART), comparable to 10-K filings submitted to the SEC's EDGAR in the

13

U.S. We collect filings in 2005 and using textual analysis we are able to extract firm unionization rates for a subset of firms in our sample. Second, we attempt to match each establishment in the Workplace Panel Survey to a firm in Data Guide Pro using available financial information.

D.   Korean Labor and Income Panel Study

The Korean Labor and Income Panel Study is a nationally representative sample of surveyed individuals in South Korea. Participants in the study are surveyed once a year. These data are the only labor-related panel dataset in South Korea. The data identify a worker's employment status (permanent worker or temporary worker), three-digit KSIC code of the workplace where an individual works, marriage status, education, whether the workplace where an individual is employed has a union, and whether an individual is a member of a union. The data have been surveyed since 1998 and started with 5,000 households. Similar to the Workplace Panel Survey, firm identification is not disclosed in this dataset. Therefore, for our individual-level tests that use temporary worker ratios, we use industry averages for these ratios calculated at the three-digit KSIC level. Noteworthy, across the analyses we conduct in the paper in each case, we use the most granular industry-level classification that is available when using a particular dataset.

V.   Empirical results

A.   Univariate statistics

Panel A of Table 1 reports statistics for various temporary and permanent worker-related industry-level ratios, calculated for two-digit KSIC industries using establishment-level data from the Workplace Panel Survey. Consistent with the temporary worker protection law leading to a reduction in the use of temporary workers in South Korea, the total temporary worker ratio, the number of temporary workers divided by the sum of the number of permanent and temporary workers, decreased from 0.192 to 0.137 between 2005 and 2009. Likewise, the protected temporary worker ratio, the number of temporary workers that are affected by the law divided by the total number of permanent and temporary workers was reduced from 0.142 to 0.087 between these two

years. Relatedly, and consistent with an increase in union bargaining power as a result of the adoption of the temporary worker protection law, this panel also shows that the permanent worker ratio increased between 2005 and 2009.

Importantly, Panel A of Table 1 also shows that most of the drop in the protected temporary worker ratio came from a large reduction in the temporary agency worker ratio from 0.046 to 0.007 between 2005 and 2009. In comparison, the fixed-term contract worker ratio and the part-time worker ratio went down, respectively, from 0.083 to 0.073 and 0.013 to 0.007 from 2005 to 2009.

In Panel A of Table A1, we report summary statistics for firm-level variables. Average cash holdings/book assets over our sample period was 0.077, while the average unionization rate of South Korean publicly traded firms in 2005 was 21.2%. Panel B of Table A1 provides the average protected temporary worker and total temporary worker ratios in 2005 and 2009 by industry, sorted in descending order by the protected temporary worker ratio in 2005. This panel reveals that industries with high versus low values for the protected temporary worker ratio and the total temporary worker ratio are from a broad spectrum of the South Korean Economy.

B.   Relation of union bargaining power with temporary workers

In our tests, we assume that a lower number of temporary workers increases union bargaining power, and hence the temporary worker protection law enhanced this power. In Panel B of Table 1 and in Tables 2 and 3, we examine the validity of this assumption. Because the conversion of some of a firm's temporary workers into permanent workers should increase union bargaining power, in Table 1, Panel B we examine at the firm-level and in a multivariate framework whether we find evidence that the temporary worker protection law adoption led to a decrease in firms' use of temporary workers and to an increase in their use of permanent workers. To do so, we use data from the biennial Workplace Panel Survey over the years 2005, 2007, 2009, and 2011 to examine the impact of the law adoption on the number of a firm's protected temporary workers, total temporary workers, permanent workers, or total workers scaled by the firm's book assets. The main

explanatory variable of interest in the Table 1, Panel B models is a firm's protected temporary worker (PTW) ratio in 2005, the fraction of the firm's total workers in that year who were temporary workers that became protected by the law adoption in 2007, interacted with an indicator that takes a value of one from 2007 onward and zero otherwise. In the four models in this panel, we control for variables that could affect a firm's demand for workers: the natural logarithm of book assets, return on assets, sales growth, asset tangibility, capital expenditures, and financial leverage.[10]

Supporting the notion that after the law adoption firms converted protected temporary workers to permanent workers, in models 1 and 2 in Panel B of Table 1 we find significant negative coefficients on *Firm PTW Ratio × Post*, while in model 3 we find a significant positive coefficient on this variable. We estimate that if the mean value of the firm protected temporary worker ratio in 2005 is 50% higher this would result in a 42.4% larger decrease in the number of firms' workers who are protected temporary workers relative to its sample mean, a 32.7% larger reduction in the total number of a firms' workers who are temporary workers relative to its sample mean, and a 10.1% greater increase in the number of a firm's workers who are permanent workers relative to its sample mean. Noteworthy, the fact that the law adoption had large negative impacts on both the numbers of protected temporary workers and total temporary workers suggests that firms did not simply replace protected with unprotected temporary workers. Finally, in model 4, we find that the law adoption did not affect the total number of a firm's workers. This further implies that firms reacted to the adoption of the law by reducing the number of their protected temporary workers and replacing these workers with permanent workers.

In Table 2, Panel A, we investigate if the extent to which a firm's workforce consists of temporary workers is associated with the likelihood that its workers go on strike. Specifically, we provide results from regressions of whether a firm's workers go on strike in a given year and the

---

[10] In the analyses in Panel B of Table 1, Panel B of Table 9, and Table A5 we control for return on assets rather than cash flow to assets, which is used in other tests, because in these analyses we use data from the Workplace Panel Survey and it is not possible to calculate cash flow to assets using this dataset.

number of strikes a firm experiences over a year on the firm's temporary worker ratio, the fraction of its workers who are temporary workers, and control variables. For this analysis, our sample period is the years 2005, 2007, 2009, and 2011 because we use biennial establishment-level strike and temporary worker data from the Workplace Panel Survey. We control for the natural logarithm of the number of a firm's employees, a measure for if unions believe the information given by management in collective bargaining negotiations is credible, and the difference in the annual wage increase requested by unions and that suggested by firms. Further, we control for year fixed effects.

The results in Panel A of Table 2 are strongly supportive of the notion that when a firm relies less on temporary workers, union bargaining power increases. The findings for both models in this panel show that the temporary worker ratio is significantly negatively associated with the likelihood that a firm's workers strike in a given year and also the number of strikes it experiences over a year. These findings are also economically important. We estimate that a one-standard deviation increase in the temporary worker ratio would result in a 23.8% drop in the likelihood a firm's workers would go on strike relative to the unconditional likelihood they strike in a given year and a 52.7% decrease in the number of strikes a firm experiences over a year relative to the sample mean for this variable.

In Panel B of Table 2, for the sample period of 2002-2012, we use individual-level survey data from the Korean Labor and Income Panel Study to examine how the likelihood that a worker becomes a union member or that a firm becomes unionized is related to the temporary worker ratio in 2005 interacted with an indicator that takes a value of one from 2007 onward and zero otherwise. For the tests in this panel, we do not have a measure for the temporary worker ratio at the firm-level because the data is at the individual-level. Therefore, we aggregate the individual-level data at the three-digit KSIC industry-level, which is the most granular industry-level classification available from the Korean Labor and Income Panel Study, and calculate an industry-level measure for the temporary worker ratio. We note that the Korean Labor and Income Panel Study does not report what type of temporary worker an individual is. Therefore, as in Panel A of Table 2, both temporary workers who become protected by the law and temporary workers who do not are included in the

calculation of the temporary worker ratio.

In the Table 2, Panel B regression models we control for whether the worker is a permanent worker, has attained a higher level of education, is married, and individual and year fixed effects. Because we control for individual fixed effects, we use linear probability models. In model 1 the dependent variable is whether the worker is a union member, while in model 2 it is whether the firm where the individual works is unionized.

The results for model 1 show that a worker was significantly more likely to become a union member after the adoption of the temporary worker protection law if firms in the worker's industry relied more on temporary workers prior to the law adoption. This is consistent with the law adoption increasing union bargaining power. We estimate that relative to the unconditional likelihood that a worker belonged to a union, a one-standard deviation increase in the temporary worker ratio would result in an 11.1% rise in the likelihood that a worker becomes a union member.

The findings for model 2 document that the firm where a worker was employed was significantly more likely to become unionized after the adoption of the temporary worker protection law if the firm was in an industry that relied more on temporary workers prior to the law adoption. Relative to the unconditional likelihood that a firm was unionized, a one-standard deviation increase in the temporary worker ratio would result in a 3.9% increase in the likelihood that a firm becomes unionized. Overall, the evidence in Table 2, Panels A and B is strongly supportive of the prediction that union bargaining power increased after the law adoption.

In Table 3, we examine cumulative abnormal returns around the law passage and consider how the industry PTW ratio and industry unionization relate to these returns. This allows us to shed additional light into whether the law passage raised union bargaining power for firms that relied more on temporary workers who became protected by the law. The dependent variable in the Table 3 models is the industry average of cumulative abnormal returns across all firms within the same two-digit KSIC industry over the event window from days -3 to +3 around the passage date of the law. Expected returns are calculated using the market model with a 252-day estimation window.

In model 1 of Table 3, we include only the two-digit KSIC industry PTW ratio and unionization rate as predictor variables and document insignificant coefficients on both variables. In model 2, we interact the two variables and find a significant negative coefficient on the interaction term. We estimate that if both of the industry variables are increased by one standard deviation, this would lead to cumulative abnormal returns that would be 88 basis points more negative.

In models 3 and 4 of Table 3, we replace the industry unionization rate variable with the industry union existence rate variable. The latter variable is the fraction of firms with a union within the same two-digit KSIC industry. Consistent with the results for model 1, in model 3 we do not find significant coefficients on the stand-alone industry PTW ratio and union existence rate variables. However, in model 4 we document a significant negative coefficient on the interaction of the industry PTW ratio and union existence rate variables. We estimate that if both the industry PTW ratio and the union existence rate variables are increased by one standard deviation, this would result in cumulative abnormal returns that would be 94 basis points more negative. Hence, the Table 3 results further support the argument that the adoption of the temporary worker protection law raised union bargaining power for firms that depended more on temporary workers.

C.   Effect of temporary worker protection law on cash holdings

Table 4 reports difference-in-differences estimates of the impact of the adoption of the temporary worker protection law on cash holdings. Although the Workplace Panel Survey provides information on certain firm-level accounting data items and we use this data in our Table 1, Panel B tests, a firm's cash holdings are not collected in the survey. Hence, for our cash holdings-related tests, we use data from Data Guide Pro. As discussed in Section IV.C, firm identification is not provided in the Workplace Panel Survey and thus we cannot comprehensively match firms in the Workplace Panel Survey with firms in the Data Guide Pro database. So, as in Table 1, Panel A and Table 3, using the Workplace Panel Survey data, we calculate for two-digit KSIC industries, the most granular industry classification provided by the survey, the fraction of the workers in an

industry who are temporary workers that became protected by the law. In our main cash holdings-related tests we proxy for a firm's protected temporary worker ratio with this industry ratio.

In the Table 4 models, the dependent variables are cash to book assets and cash to net assets, where net assets are book assets minus cash. Because firms that employ many temporary workers that become protected are more affected by the law adoption, an interaction term between the industry-level protected temporary worker ratio calculated in 2005, before the law adoption, and the variable Post is included as the main variable of interest in the regression models. Post is equal to one after the adoption of the temporary worker protection law and zero otherwise. In addition to standard control variables used in cash holdings models, we also include firm and year fixed effects to control for time-invariant firm characteristics and economy-wide fluctuations or trends in our variables of interest over our sample period.

The results for models 1 and 3 of Table 4 provide evidence that high PTW firms (firms in industries that have a higher protected temporary worker ratio) reduced their cash holdings after the law adoption. The law adoption has a negative and statistically significant impact on both cash to assets and cash to net assets for high PTW firms. This reduction in cash holdings supports the prediction that high PTW firms strategically lowered their cash holdings after the law adoption to improve their bargaining position relative to unions. The estimated coefficients imply that this negative relation is not only statistically significant, but also economically significant. We estimate that relative to the sample means a one-standard deviation increase in the PTW ratio would result in an 8.5% (10.8%) drop in a firm's cash to assets (cash to net assets) ratio after the law adoption.[11]

In models 2 and 4 of Table 4, we study the timing of changes in cash holdings relative to the timing of the law adoption. If reverse causality drives our results, we should observe a decreasing trend in the cash holdings of high PTW firms prior to the law adoption. Such evidence would cast

---

[11] Supporting the proposition that in South Korea, as in the U.S., firms that bargain with powerful unions strategically hold less cash to improve their bargaining position, in Tables A2 and A3 in the Internet Appendix we show that in South Korea there is a negative association between cash holdings and firm-level unionization rates. Further, we find that this association is driven by firms with low operating leverage for whom low cash holdings should be less costly.

doubt on the validity of our empirical approach, as it would imply a violation of the parallel trends assumption that the trends in the cash holdings of high PTW firms and other firms are parallel prior to the law adoption. In models 2 and 4 we include as independent variables $Year^{-3}$, $Year^{-2}$, $Year^{-1}$, $Year^{+0}$, $Year^{+1}$, $Year^{+2}$, and $Year^{3+}$, which are equal to one if the temporary worker protection law will be adopted in three years, two years, one year, this year, or it was adopted one year ago, two years ago, or three or more years ago, and equal to zero otherwise. We interact each year indicator variable with the protected temporary worker ratio.

We find that the coefficients on Industry PTW Ratio $\times$ $Year^{-3}$, Industry PTW Ratio $\times$ $Year^{-2}$, and Industry PTW Ratio $\times$ $Year^{-1}$ are close to zero and statistically insignificant, while the coefficients on Industry PTW Ratio $\times$ $Year^{+0}$, Industry PTW Ratio $\times$ $Year^{+1}$, and Industry PTW Ratio $\times$ $Year^{+2}$ are negative and statistically significant. Overall, these results show that high PTW firms decreased their cash holdings relative to other firms only after the law adoption. Hence, reverse causality or a violation of the parallel trends assumption does not explain our key result that the law adoption led high PTW firms to reduce their cash holdings.

D.   Cross-sectional variation in the effect of the law on cash holdings

Consistent with a bargaining position prediction, our results show that high PTW firms decreased their cash holdings after the law adoption. To provide additional evidence that bargaining with unions explains these reductions, we run analyses that examine the determinants of cross-sectional variation in the effect of the law change on cash holdings. These analyses shed additional light on the economic mechanisms behind our results. They also provide further evidence that our main results are causal because if the results in the main regressions were driven by an omitted variable, then such a variable would also have to explain the cross-sectional results reported here.

In Table 5 we examine cross-sectional variation in our main results in several ways. First, we investigate whether the reduction in cash holdings is more pronounced for high PTW firms identified to have a union. We use the firm-level unionization rates extracted from corporate filings

in 2005 for a subset of the firms in our sample discussed in Section IV.C. Based on the firm-level unionization rates, we split the sample into firms with a positive unionization rate in model 1 and with a zero-unionization rate, and therefore without a union in model 2 and compare the effect of the law change on cash holdings between the two groups. If high PTW firms indeed strategically reduced their cash holdings for the purpose of increasing their bargaining position relative to unions, then the reduction in cash holdings should only be observed in high PTW firms with a union. Consistent with this expectation, the results for models 1 and 2 show that the coefficients on Industry PTW Ratio $\times$ Post are negative and statistically significant only for firms with a union.

In Table A4 in the Internet Appendix, we re-estimate the effect of the law adoption on cash holdings to ensure that the firms with and without a union have similar observable characteristics including the protected temporary worker ratio. To do so, we match each treatment firm (firms with a union) to one control firm (firms without a union) in 2005 without replacement based on the closest propensity score obtained from a probit regression using the protected temporary worker ratio, the natural logarithm of book assets, and cash flow to assets as predictors of treatment. The results in this table show that the treatment and matched control groups do not differ significantly in any of the matching characteristics and that after propensity score matching, we continue to find that the law adoption had a negative impact on cash holdings only for firms with a union.

We also examine whether the reduction in the cash holdings of unionized high PTW firms was stronger for firms that have more difficulty raising external financing. This allows us to further examine if the negative relation between the cash holdings of high PTW firms and the law adoption likely occurs in the context of bargaining issues. We anticipate that if this relation arises because high PTW firms choose the level of their cash reserves taking into account their effect on bargaining with unions, then this relationship should be weaker for high PTW firms that can easily raise external capital. This is because for these firms lower cash holdings are less credible evidence that a firm cannot concede to unions' demands. To measure the degree to which firms can easily obtain external capital, we consider if a firm has a credit rating (Faulkender and Petersen (2006)). Since firms with

a credit rating have access to public bond markets, they can more easily alleviate cash shortfalls.

To test this prediction, in models 3 and 4 of Table 5 we further split the sample of firms with a union into two groups of firms by whether a firm has a credit rating. In model 3, we find a negative and statistically significant coefficient on Industry PTW Ratio × Post for the subsample of firms that have a union, but do not have a credit rating. Conversely, in model 4, we do not find a significantly negative coefficient on this variable for the firms with a union that also have a credit rating. These results suggest that, as predicted, unionized high PTW firms with a credit rating rely less on small cash balances to gain bargaining advantages over unions.

We also consider whether a firm belongs to a chaebol business group because such firms benefit from easier access to capital through internal capital markets that exist within chaebol business groups (Almeida, Kim, and Kim (2015) and Kim (2020)). Thus, for such firms, smaller cash holdings are also a less reliable signal that a firm cannot accommodate unions' demands. In models 5 and 6 of Table 5, we split the sample of firms with a union into, respectively, firms that are not part of a chaebol or that are part of a chaebol. We find a negative and statistically significant coefficient on Industry PTW Ratio × Post for the subsample of firms that have a union and are not part of a chaebol, but we do not find this for firms with a union that are part of a chaebol. Thus, as expected, unionized high PTW firms that are part of a chaebol group rely less on low cash balances to obtain bargaining advantages. Overall, the results for models 1-6 of Table 5 provide additional confidence to the interpretation that high PTW firms strategically reduced their cash holdings after the law adoption to gain bargaining advantages relative to unions.[12]

E.   Effect of operating leverage

The results so far support the prediction that high PTW firms strategically reduced their cash

---

[12] Using a reduced sample for which we have data on the firm-level PTW ratio in 2005, in Table A5 in the Internet Appendix we show that this ratio is unrelated to whether a firm has a credit rating or is part of a chaebol. Therefore, this ratio itself does not proxy for a firm's access to external capital or whether it has easier access to capital via internal capital markets that exist within chaebol business groups.

holdings after the law adoption to gain bargaining advantages over labor unions. The competing prediction on the effect of the law adoption on these firms' cash holdings is that they would raise their cash holdings because their operating leverage increases when their ability to use temporary workers is reduced. To shed light on this issue, we compare firms with high versus low operating leverage before the law adoption. Specifically, we calculate the average value of operating leverage following the methodology in Chen, Harford, and Kamara (2019) for each firm from 2002 to 2006.

In models 7 and 8 of Table 5, we split the sample into two groups of firms with ex-ante operating leverage below and above the median of its distribution. Consistent with operating leverage mattering, the results show that only high PTW firms with lower ex-ante operating leverage significantly reduced their cash holdings after the law change.

Because operating leverage includes fixed labor costs that could be related to union bargaining power, we recalculate operating leverage after subtracting labor costs from selling, general, and administrative expenses. We report the results in Table A6 in the Internet Appendix. Our findings are very similar using this adjusted operating leverage measure. This implies the model 7 and 8 results in Table 5 are not driven by operating leverage from labor costs. Overall, our results suggest that high PTW firms' strategic reduction of their cash holdings in response to the law adoption was mitigated if they had higher operating leverage and hence faced higher operating risk.

F.   Balanced panel results

Recent work such as Borusyak, Jaravel, and Spiess (2021), Goodman-Bacon (2021), and Roth, Sant'Anna, Bilinski, and Poe (2022) raises concerns about empirical studies that use staggered difference-in-differences designs. However, this work shows that when all the individuals or firms in a sample are treated at the same time and the panel is balanced, easily interpretable estimates can be obtained.[13] To alleviate potential concerns that could be due to the fact that we do not use a balanced panel in our main tests, in Tables A7 and A8 in the Internet Appendix we report the results

---

[13] For instance, see Roth, Sant'Anna, Bilinski, and Poe (2022, p.44).

when we re-estimate the regression models in Tables 4 and 5 using a balanced panel. We create the balanced panel by only keeping firms that are observed every year during our sample period. We find that the Table A7 and A8 results are very similar to those in Tables 4 and 5.

G.   Effect of the law adoption on firm cash flow

Although we control for firm cash flow in our regression models, one concern could still be that the overall negative effect of the law adoption on high PTW firms' cash holdings is due to an increase in labor costs and a resulting decrease in cash flow after the legislation adoption. In Table A9 in the Internet Appendix, we regress cash flow on the interaction variable, Industry PTW Ratio × Post, and control variables and find an insignificant coefficient on this variable. This result is inconsistent with high PTW firms' cash holdings dropping after the legislation adoption due to their cash flow going down. Given that the Table 5 results show that the negative effect of the law adoption on high PTW firms' cash holdings only exists for firms with a union, we also report in Table A9 in the Internet Appendix whether for unionized firms there is a significant drop in cash flow after the legislation adoption. We do not find any evidence that this is the case.

H.   Effect of the law adoption on the market's valuation of cash holdings

Our results suggest that large cash reserves were particularly costly for high PTW firms after the law adoption due to the effect of bargaining with labor unions. To further investigate this issue, we examine how stock market participants valued these firms' cash holdings using the methodology developed by Faulkender and Wang (2006).

Table 6 provides the results of these analyses. The dependent variable in the Table 6 models is a firm's excess stock returns defined as the firm's annualized stock returns calculated from monthly stock returns minus the firm's matched 5×5 size and book-to-market portfolio's value-weighted returns. The results for model 1 for the full sample show that the coefficient on the triple interaction term, Industry PTW Ratio × Post × ΔC_t, is significantly negative, indicating that the

marginal value of an extra South Korean Won of cash holdings decreased for high PTW firms after the law adoption. We estimate that after the law adoption a one-standard deviation increase in the PTW ratio would lead to a 9.8% decrease in the value of an incremental Won of cash reserves. This result supports the view that stock market participants believed due to bargaining issues with unions an extra Won of cash holdings was less valuable for high PTW firms after the law adoption.

We also split the sample into groups of firms with and without a union in models 2 and 3, respectively. We find that the results for model 1 are driven by firms with a union. The coefficient estimate on the triple interaction variable in model 2 is larger in magnitude and stronger in statistical significance than that in model 1. In contrast, the coefficient on this variable in model 3 for firms without a union is close to zero and insignificant. These results are additional support for the notion that high PTW firms with a union decreased their cash holdings after the adoption of the legislation because larger cash holdings would weaken their bargaining position relative to unions.

VI.   Additional analyses

The main variable of interest in the Table 4-6 models is the industry protected temporary worker ratio. As already discussed, we use this variable because for our main sample we do not have data on the firm-level protected temporary worker ratio. Although the industry measure reflects the typical employment practices of firms in each industry, there could still be a concern about firm heterogeneity with respect to these practices. In this section, we address this concern using firm-level measures for reliance on temporary workers. Also, using firm-specific data on subcontracting, we examine the relation between if a firm starts to use subcontracting after the law adoption to reduce union bargaining power and if it reduces its cash holdings. Finally, we investigate the effect of the law adoption on firms' financial leverage.

A.   Firm-level wage measure

We first run analogous tests to those in Tables 4 and 5 by replacing the industry-level PTW ratio with a variable for firm-level wages. Data Guide Pro provides information on total wage

expenses and the total number of employees in a firm. This allows us to calculate average wages at the firm level for a large number of observations in our sample. We exploit the fact that a firm's average wage per employee is negatively associated with the extent to which the firm relies on temporary workers. This is because temporary workers are those in the lowest average-wage group of a firm, consistent with the purpose of the law adoption to protect such workers. Specifically, we use 1/Average wages, the inverse of the natural logarithm of the average wage per employee, as a firm-level proxy for the protected temporary worker ratio. Table 7 provides results from the regressions of cash holdings on the interaction of 1/Average wages and Post.

In models 1 and 5 of Table 7, the coefficients on the interaction variables are significant and negative, consistent with the results in models 1 and 3 of Table 4. In models 2 and 6 of Table 7, similar to the findings in models 2 and 4 of Table 4, the coefficients on the interaction variables only become significant after the law adoption, and therefore reverse causality or a violation of the parallel trends assumption does not explain the Table 7, model 1 and 5 findings. As in Table 5, we split the sample into two groups of firms with and without a union to examine whether attempts to reduce union bargaining power after the law adoption likely lead to the Table 7, model 1 and 5 results. In models 3, 4, 7, and 8 of Table 7, as expected, we find that the negative coefficient on the interaction of 1/Average wages and Post is only statistically significant among firms with a union.

B.   Firm-level PTW ratio

Next, for a small subset of the firms in our sample, we calculate the firm-level PTW ratio. We do so by matching data between the Workplace Panel Survey and the Data Guide Pro database. Because firm identification is confidential in the Workplace Panel Survey, we use disclosed accounting data in the Workplace Panel Survey and the Data Guide Pro database as matching variables. Specifically, we use total assets, total debt, total sales, and net income as the matching variables and then calculate Euclidean distances between the potential matched observations and only keep the matched observations with the smallest Euclidean distances. We then manually check

whether other financial variables are similar between the matched observations. We are able to match the data for 146 firms included in the two databases. Using these firms, we estimate the same models as in Table 7, but using the firm-level PTW ratio and report the results in Table 8.

The results in models 1-8 of Table 8 are very similar to our findings reported in Tables 4 and 5. Overall, the findings reported in Sections VI.A and VI.B using firm-level measures for the extent to which a firm relies on temporary workers further strengthen the argument that our results reported in Tables 4-6 are indeed driven by firms reacting to increases in union bargaining power after the firms' abilities to rely on temporary workers were curtailed.

C.   Evidence from subcontracting

Firms could try to mitigate the increase in union bargaining power after the law adoption by outsourcing work previously done by protected temporary workers. Importantly, the use of subcontracting to decrease union bargaining power after the law adoption could have a substitute or complementary relation with a firm lowering its cash holdings to reduce union bargaining power. To test for these opposite predictions, we split the set of firms used for our tests in Table 8, for which we are able to match data from the Workplace Panel Survey with that in the Data Guide Pro database, into three groups of firms based on their use of subcontracting. Data for if a firm uses subcontracting is available for a majority of the observations in the Workplace Panel Survey.

The results for models 1, 2, 4, and 5 of Table 9, Panel A show that for firms that did not alter their use of subcontracting from before to after the law adoption, those that continuously used or did not use subcontracting, there is an insignificant association between the interaction of the firm PTW ratio and Post with cash holdings.[14] In contrast, the results for models 3 and 6 document that for firms that did not use subcontracting before but used it after the law adoption, there is a significant negative association between the interaction variable and cash holdings. This result interestingly

---

[14] Although not tabulated, we also find that for those firms that used subcontracting before the law adoption but did not use it after the law adoption, there is an insignificant association between the interaction of the firm-level PTW ratio and Post with cash holdings.

suggests that lowering cash holdings and starting to use subcontracting are complementary mechanisms that firms in South Korea utilized to decrease union bargaining power following the law adoption. So far as we are aware, this is the first result in the literature on how subcontracting can be used to lower union bargaining power in conjunction with lower cash holdings.

To shed further light into whether unionized firms in South Korea used more subcontracting after the law adoption to mitigate the increase in union bargaining power, in Panel B of Table 9 we estimate linear probability models in which the dependent variable is an indicator for if a firm uses subcontracting in a given year. The main independent variable of interest is the interaction of the Firm PTW Ratio and Post. We include firm and year fixed effects in the models. Further, as in Panel B of Table 1, we control for the natural logarithm of book assets, return on assets, sales growth, asset tangibility, capital expenditures, and financial leverage. All of the variables used in the tests in this panel are constructed with data from the Workplace Panel Survey.

The Table 9, Panel B results show that for unionized high PTW firms the likelihood of using subcontracting significantly increased after the law adoption. However, for non-unionized high PTW firms there was no change in this likelihood. Using the results in model 1, we estimate that for unionized firms after the law adoption a one-standard deviation increase in the PTW ratio would lead to a 14.5% increase in the likelihood of using subcontracting relative to its unconditional likelihood. Overall, the Table 9, Panel B findings are further evidence that after the law adoption, in addition to lowering their cash holdings to lessen union bargaining power, unionized firms in South Korea also raised their use of subcontracting.

D.   Effect of the law adoption on financial leverage

As previously discussed, Matsa (2010) shows that firms strategically increase their financial leverage to gain bargaining advantages over unions. Also, Simintzi, Vig, and Volpin (2015) and Serfling (2016) report that the passage of stronger worker protection laws, which increase firms' operating leverage, causes firms to reduce their financial leverage. Therefore, we also examine the

effect of the law adoption on financial leverage.

Table 10 reports the difference-in-differences estimates of the impact of the law adoption on financial leverage, measured as book leverage. The models are similar to those in Table 4, except that the dependent variable is financial leverage, and we control for standard control variables used in financial leverage models. The model 1 findings show that, overall, high PTW firms reduced their financial leverage after the law adoption. The model 2 and 3 results document that the model 1 results are driven by non-unionized high PTW firms and that the financial leverage of unionized high PTW firms did not significantly change after the law adoption. Further, the model 4-6 results show that for the full sample and for non-unionized firms the reduction in high PTW firms' debt ratios occurred only after the law adoption. In terms of economic significance, we estimate that unconditional on a firm being unionized, a one-standard deviation increase in the PTW ratio would result in a 2.7% decrease in a firm's debt ratio after the law adoption relative to the sample mean for book leverage. Conditional on a firm not being unionized, a similar increase in the PTW ratio would lead to a 5.6% reduction in a firm's debt ratio.

Put together, the Table 10 results suggest that for unionized high PTW firms the opposing impacts of rises in both union bargaining power and operating leverage caused by the law adoption resulted in these firms, on average, not altering their financial leverage. On the other hand, after the law adoption non-unionized high PTW firms lowered their financial leverage due to the increase in their operating leverage given that they were not concerned about union bargaining power.

Although the Table 10 results contrast with the findings for cash holdings, they are consistent with prior work that reports a strong and robust negative relation between operating and financial leverage (e.g., Lev (1974), Ferri and Jones (1979), Mandelker and Rhee (1984), Reinartz and Schmid (2016), and Chen, Harford, and Kamara (2019)). This work attributes this negative relation to the fact that even when firms are financially distressed, they are required to pay contractual operating costs before making interest payments, which can drive firms into bankruptcy. Thus, firms' first-order reactions to an increase in operating leverage might be more to reduce financial

leverage as compared to increasing their cash holdings. The differences in our findings for cash holdings and financial leverage are also consistent with the argument that in the presence of financing frictions cash should not be viewed as negative debt (e.g., Acharya, Almeida, and Campello (2007)). Further, these results highlight the fact that, at times, firms make contrasting decisions for cash holdings and financial leverage.

VII. Conclusion

In this paper, we provide novel evidence on the effect of firms' reliance on temporary workers on their cash holdings by exploiting the 2007 adoption of a temporary worker protection law in South Korea. Our paper is timely because in the U.S. and many other countries there has been rising and widespread use of temporary workers, especially workers obtained from temporary work agencies. However, there is surprisingly scant evidence on how a firm's ability to rely on temporary workers for a significant fraction of its labor inputs affects its other major financial policy decisions. We test two competing predictions on how this ability affects firms' cash holdings. A bargaining power-related prediction is that a smaller ability to rely on temporary workers raises unions' bargaining advantages, leading firms to lower their cash holdings to strengthen their bargaining position relative to unions. Conversely, an inflexibility-related prediction is that the increased operating risk resulting from a lower facility to rely on temporary workers causes firms to raise their cash reserves for precautionary purposes.

We show that the law adoption led to a large drop in the fraction of workers in South Korea who were temporary workers and that this drop was due to a marked reduction in the number of workers from temporary work agencies. We also report several pieces of evidence which document that the drop in the use of temporary workers raised union bargaining power in South Korea. Our main result is that the law adoption led to a significant decrease in the cash holdings of firms that relied more on temporary workers who became protected by the legislation. Supporting the proposition that this result is driven by firms strategically reducing their cash holdings to gain

bargaining advantages over unions, it only holds for firms that are unionized. Further, within unionized firms, it only holds for firms without a credit rating and firms that do not belong to a chaebol business group, for whom lower cash holdings is a more credible signal that a firm cannot concede to unions' demands. Also, the decrease in cash holdings after the law adoption only holds for firms with lower ex-ante operating leverage for whom raising operating risk by reducing cash holdings is less costly.

In line with our results for changes in the level of firms' cash reserves, the incremental value of a South Korean Won of cash reserves for firms that relied on temporary workers who became protected went down after the law adoption, and this result was driven by unionized firms. For firms that relied on temporary workers who became protected, we also document a complementary relation between reducing cash holdings after the law adoption to gain bargaining advantages vis-à-vis unions and beginning to use subcontracting to further obtain bargaining power over unions.

Finally, we show that non-unionized firms that relied on temporary workers reduced their financial leverage after the law adoption, but that there was no change in the leverage of unionized firms that relied on such workers. This suggests that for unionized firms the opposing effects of increases in both union bargaining power and operating leverage due to the law adoption resulted in these firms not making changes to their debt levels. However, non-unionized firms decreased their financial leverage due to the rise in their operating leverage after the law adoption. These findings are consistent with the argument that in the presence of financing frictions cash should not be considered as negative debt (e.g., Acharya, Almeida, and Campello (2007)) and highlight how on occasion firms make contrasting cash holdings and financial leverage choices.

Overall, our study provides novel insights into how a firm's ability to rely on temporary workers for a significant fraction of its labor inputs can have important effects on its major financial decisions. Given the increasing and pervasive use of temporary workers around the world, our findings motivate future research which could consider how firms' reliance on temporary workers relates to a number of other financial policy decisions.

References

Abraham, K. G. "Restructuring the employment relationship: The growth of market-mediated work arrangements." *New Developments in the Labor Market: Toward a New Institutional Paradigm*, (1990), 85-119.

Acharya, V. V.; H. Almeida; and M. Campello. "Is cash negative debt? A hedging perspective on corporate financial policies." *Journal of Financial Intermediation*, 16 (2007), 515-554.

Agrawal, A., and D. A. Matsa. "Labor unemployment risk and corporate financing decisions." *Journal of Financial Economics*, 108 (2013), 449-470.

Almeida, H.; C. S. Kim; and H. B. Kim. "Internal capital markets in business groups: Evidence from the Asian financial crisis." *Journal of Finance*, 70 (2015), 2539-2586.

Amuedo-Dorantes, C.; M. A. Malo; and F. Muñoz-Bullón. "The role of temporary help agency employment on temp-to-perm transitions." *Journal of Labor Research*, 29 (2008), 138-161.

Autor, D. H. "Why do temporary help firms provide free general skills training?" *The Quarterly Journal of Economics*, 116 (2001), 1409-1448.

Autor, D. H. "Outsourcing at will: The contribution of unjust dismissal doctrine to the growth of employment outsourcing." *Journal of Labor Economics*, 21 (2003), 1-42.

Autor, D. H.; S. N. Houseman; and S. P. Kerr. "The effect of work first job placements on the distribution of earnings: An instrumental variable quantile regression approach." *Journal of Labor Economics*, 35 (2017), 149-190.

Bentolila, S., and J. J. Dolado. "Labour flexibility and wages: lessons from Spain." *Economic Policy*, 9 (1994), 53-99.

Bentolila, S., J. J. Dolado; and J. F. Jimeno. "Reforming an insider-outsider labor market: the Spanish experience." *IZA Journal of European Labor Studies*, 1 (2012), 1-29.

Berson, C., and N. Ferrari. "Financial incentives and labour market duality." *Labour Economics*, 37 (2015), 77-92.

Boeri, T., and P. Garibaldi. "Two tier reforms of employment protection: a honeymoon effect?" *The Economic Journal*, 117 (2007), 357-385.

Borusyak, K.; X. Jaravel; and J. Spiess. "Revisiting event study designs: Robust and efficient estimation." *Working Paper*, (2021).

Brown, J., and D. A. Matsa. "Boarding a sinking ship? An investigation of job applications to distressed firms." *Journal of Finance*, 71 (2016), 507-550.

Chava, S.; A. Danis; and A. Hsu. "The economic impact of right-to-work laws: Evidence from collective bargaining agreements and corporate policies." *Journal of Financial Economics*, 137 (2020), 451-469.

Chen, Z.; J. Harford; and A. Kamara. "Operating leverage, profitability, and capital structure." *Journal of Financial and Quantitative Analysis*, 54 (2019), 369-392.

Chino, A. "Alternative work arrangements and cost of equity: Evidence from a quasi-natural experiment." *Journal of Financial and Quantitative Analysis*, 56 (2021), 569-606.

Dey, M.; S. N. Houseman; and A. E. Polivka. "Manufacturers' outsourcing to staffing services." *ILR Review*, 65 (2012), 533-559.

Dolado, J. J.; S. Ortigueira; and R. Stucchi. "Does dual employment protection affect TFP? Evidence from Spanish manufacturing firms." *SERIEs*, 7 (2016), 421-459.

Ellis, J. A.; C. E. Fee; and S. E. Thomas. "Proprietary costs and the disclosure of information about customers." *Journal of Accounting Research*, 50 (2012), 685-727.

Faulkender, M., and M. Petersen. "Does the source of capital affect capital structure?" *Review of Financial Studies* 19 (2006), 45-79.

Faulkender, M., and R. Wang. "Corporate financial policy and the value of cash." *Journal of Finance*, 61 (2006), 1957-1990.

Fee, C. E., and S. Thomas. "Sources of gains in horizontal mergers: evidence from customer, supplier, and rival firms." *Journal of Financial Economics*, 74 (2004), 423-460.

Ferri, M. G., and W. H. Jones. "Determinants of financial structure: A new methodological approach." *Journal of Finance*, 34 (1979), 631-644.

Ghaly, M.; V. Anh Dang; and K. Stathopoulos. "Cash holdings and labor heterogeneity: the role of skilled labor." *Review of Financial Studies*, 30 (2017), 3636-3668.

Giandrea, M. D., and S. A. Sprague. "Estimating the US labor share." *Monthly Labor Review*, (2017), 1-18.

Golden, L., and E. Appelbaum. "What was driving the 1982–88 boom in temporary employment? Preference of workers or decisions and power of employers." *American Journal of Economics and Sociology*, 51 (1992), 473-493.

Goodman-Bacon, A. "Difference-in-differences with variation in treatment timing." *Journal of Econometrics*, 225 (2021), 254-277.

Gramm, C. L., and J. F. Schnell. "The use of flexible staffing arrangements in core production jobs." *ILR Review*, 54 (2001), 245-258.

Houseman, S. N. "Why employers use flexible staffing arrangements: Evidence from an establishment survey." *ILR Review*, 55 (2001), 149-170.

Houseman, S. N. "Temporary work is not generally a stepping-stone to regular employment." *IZA World of Labor*, (2014), 1-21.

Houseman, S. N., and C. J. Heinrich. "Temporary help employment in recession and recovery." *Upjohn Institute for Employment Research Working Paper*, (2015).

Huang, Q.; F. Jiang; E. Lie; and T. Que. "The effect of labor unions on CEO compensation." *Journal of Financial and Quantitative Analysis*, 52 (2017), 553-582.

Jeffers, J. "The impact of restricting labor mobility on corporate investment and entrepreneurship." *Working Paper*, (2021).

Kale, J. R., and H. Shahrur. "Corporate capital structure and the characteristics of suppliers and customers." *Journal of Financial Economics*, 83 (2007), 321-365.

Katz, L. F., and A. B. Krueger. "The rise and nature of alternative work arrangements in the United States." *ILR Review* 72 (2019), 382-416.

Kim, J. "Business group dominance and capital allocation externalities: Evidence from Korean chaebols." *Korea Advanced Institute of Science and Technology Research Paper*, (2020).

Kini, O.; M. Shen; J. Shenoy; and V. Subramaniam. "Labor unions and product quality failures." *Management Science*, (2021), 1-39.

Klasa, S.; W. F. Maxwell; and H. Ortiz-Molina. "The strategic use of corporate cash holdings in collective bargaining with labor unions." *Journal of Financial Economics*, 92 (2009), 421-442.

Klasa, S.; H. Ortiz-Molina; M. Serfling; and S. Srinivasan. "Protection of trade secrets and capital structure decisions." *Journal of Financial Economics*, 128 (2018), 266-286.

Kulchania, M., and S. Thomas. "Cash reserves as a hedge against supply-chain risk." *Journal of Financial and Quantitative Analysis*, 52 (2017), 1951-1988.

Kuzmina, O. "Employment Flexibility and Capital Structure: Evidence from a Natural Experiment." *Center for Economic Policy Research Paper*, (2021).

Lev, B. "On the association between operating leverage and risk." *Journal of Financial and Quantitative Analysis*, 9 (1974), 627-641.

Lie, E., and T. Que. "Union concessions following asset sales and takeovers." *Journal of Financial and Quantitative Analysis*, 54 (2019), 393-424.

Mandelker, G. N., and S. G. Rhee. "The impact of the degrees of operating and financial leverage on systematic risk of common stock." *Journal of Financial and Quantitative Analysis*, 19 (1984), 45-57.

Matsa, D. A. "Capital structure as a strategic variable: Evidence from collective bargaining." *Journal of Finance*, 65 (2010), 1197-1232.

Marciukaityte, D. "Right-to-work laws and financial leverage." *Financial Management*, 44 (2015), 147-175.

Park, D., and K. Park. "Labor unions in South Korea." *Korea Labor Institute Research Series*, (1989).

Polivka, A. E., and T. Nardone. "On the definition of contingent work." *Monthly Labor Review*, 112 (1989), 9-16.

Reinartz, S. J., and T. Schmid. "Production flexibility, product markets, and capital structure decisions." *Review of Financial Studies*, 29 (2016), 1501-1548.

Roth, J.; P. H. Sant'Anna; A. Bilinski; and J. Poe. "What's Trending in Difference-in-Differences? A Synthesis of the Recent Econometrics Literature." *Working Paper*, (2022).

Schmalz, M. "Unionization, cash, and leverage." *Working Paper*, (2015).

Serfling, M. "Firing costs and capital structure decisions." *Journal of Finance*, 71 (2016), 2239-2286.

Shen, M. "Skilled labor mobility and firm value: evidence from green card allocations." *Review of Financial Studies*, 34 (2021), 4663-4700.

Simintzi, E.; V. Vig; and P. Volpin. "Labor protection and leverage." *Review of Financial Studies*, 28 (2015), 561-591.

Song, H. G. "Labour unions in the Republic of Korea: Challenge and choice." *International Institute for Labour Studies Working Paper*, (1999).

Spermann, A. "The new role of temporary agency work in Germany." *Institute for the Study of Labor Working Paper*, (2011).

World Employment Confederation Economic Report, (2020).

Table 1
Temporary worker protection law and employment

This table reports industry-level worker ratios and results from OLS regressions of employment on the adoption of the temporary worker protection law. *Total temporary worker ratio* (*Protected temporary worker ratio*, *Temporary agency worker ratio*, *Fixed-term contract worker ratio*, *Part-time worker ratio*, *Permanent worker ratio*) is the two-digit KSIC industry average of the number of temporary workers (workers that are affected by the temporary workers protection legislation, temporary agency workers, fixed-term contract workers, part-time workers, permanent workers) divided by the sum of the number of permanent and temporary workers. The Panel B sample period spans the 2005, 2007, 2009, and 2011 years. The dependent variables are the number of protected temporary workers, total temporary workers, permanent workers, and total workers scaled by total book assets. *Firm PTW Ratio* is the fraction in 2005 of a firm's workers who are protected temporary workers, and it is obtained from Workplace Panel Survey. *Post* is an indicator that equals one from 2007 onwards and zero otherwise. *Log of book assets* is the natural logarithm of book assets. *Return on assets* is net income divided by book assets. *Sales growth* is the natural logarithm of sales divided by lagged sales. *Tangibility* is property, plant, and equipment divided by book assets. *Capital expenditures to assets* is capital expenditures divided by book assets. *Leverage* is total debt divided by book assets. Korean Won values are expressed in 2015 KRW. Firm-level continuous variables are winsorized at their 1st and 99th percentiles. Standard errors are corrected for heteroscedasticity and clustering at the firm level (*t*-statistics are in parentheses). *, **, *** denote significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Industry-level worker ratios			
	Mean	SD	*N*
Total temporary worker ratio in 2005	0.192	0.141	54
Total temporary worker ratio in 2009	0.137	0.127	54
Protected temporary worker ratio in 2005	0.142	0.126	54
Protected temporary worker ratio in 2009	0.087	0.112	54
Temporary agency worker ratio in 2005	0.046	0.048	54
Temporary agency worker ratio in 2009	0.007	0.010	54
Fixed-term contract worker ratio in 2005	0.083	0.093	54
Fixed-term contract worker ratio in 2009	0.073	0.106	54
Part-time worker ratio in 2005	0.013	0.031	54
Part-time worker ratio in 2009	0.007	0.016	54
Permanent worker ratio in 2005	0.808	0.141	54
Permanent worker ratio in 2009	0.863	0.127	54

Table 1 (*Continued*)

Dependent variable:	Protected temporary workers/book assets	Total temporary workers/book assets	Permanent workers/ book assets	Total workers/ book assets
	(1)	(2)	(3)	(4)
Firm PTW Ratio × Post	-0.012***	-0.012***	0.013***	-0.002
	(-3.51)	(-3.23)	(3.25)	(-0.65)
Log of book assets	-0.001*	-0.002**	-0.007***	-0.010***
	(-1.78)	(-2.26)	(-4.83)	(-4.36)
Return on assets	0.001	-0.000	-0.005	-0.006
	(0.62)	(-0.17)	(-0.84)	(-0.77)
Sales growth	-0.000	-0.000	0.001	0.001
	(-0.20)	(-0.09)	(1.18)	(0.70)
Tangibility	-0.000	-0.001	-0.000	0.000
	(-0.03)	(-0.59)	(-0.03)	(0.07)
Capital expenditures to assets	-0.003**	-0.003	-0.003	-0.009
	(-2.22)	(-1.61)	(-0.70)	(-1.47)
Leverage	0.001	0.002	0.011***	0.014***
	(0.62)	(1.26)	(3.42)	(2.97)
Firm fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Adjusted R^2	0.600	0.603	0.723	0.873
Observations	3,600	3,600	3,600	3,600

Panel B: Effect of the temporary worker protection legislation on employment

Table 2
Temporary workers and union bargaining power

This table reports results from regressions of union bargaining power measures on temporary workers. The Panel A sample period is 2005, 2007, 2009, and 2011, while in Panel B it is 2002-2012. The first model in Panel A is a probit regression and marginal effects are reported. All the other models in this table are OLS models. In Panel A, the dependent variable in the first model takes a value of one if a firm experiences a strike during a given year and zero otherwise. The dependent variable in the second model is the number of strikes a firm experiences over a given year. *Firm temporary worker ratio* is the fraction of workers of each firm who are temporary workers. *Log of number of employees* is the natural logarithm of the number of employees in each firm. *Management information credibility* are discrete values of unions' perceptions of the credibility of firm financial information provided by firms to unions and range from 1 to 4, with higher values indicating greater credibility. *Wage increase difference* is the difference between the wage increase rate requested by unions and that suggested by management. In Panel B, we use data from the Korean Labor and Income Panel Study. The dependent variable in Panel B is union member indicator (union existence indicator) and it equals one if an individual is a member of a union (if a firm has a union) and zero otherwise. *2005 Industry temporary worker ratio* is the average value of the temporary worker ratio in a three-digit KSIC industry in 2005. *Post* is an indicator that equals one from 2007 onwards and zero otherwise. *Permanent worker* (*Higher education*, *Married*) is an indicator that equals one if an individual is a permanent worker (has received at least a bachelor's degree, is married) and zero otherwise. Firm-level continuous variables are winsorized at their 1st and 99th percentiles. Standard errors in Panel A (B) are corrected for heteroscedasticity and clustering at the firm (individual) level (*t*-statistics are in parentheses). *, **, *** denote significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Temporary workers and union strikes

Dependent variable:	Strike indicator	Number of strikes
	(1)	(2)
Firm temporary worker ratio	-0.042**	-0.468**
	(-2.38)	(-2.47)
Log of number of employees	0.009***	0.049
	(2.89)	(1.29)
Management information credibility	-0.029***	-0.242**
	(-4.18)	(-2.31)
Wage increase difference	0.002**	0.008
	(2.45)	(0.83)
Year fixed effects	Yes	Yes
Pseudo R^2 (Adjusted R^2)	0.099	0.006
Observations	2,165	2,165

Panel B: Temporary workers, union membership, and union existence

Dependent variable:	Union member indicator	Union existence indicator
	(1)	(2)
2005 Industry temporary worker ratio × Post	0.049***	0.030**
	(4.29)	(2.17)
Permanent worker	0.045***	0.058***
	(9.67)	(9.70)
Higher education	0.008	0.025
	(0.50)	(1.21)
Married	0.002	-0.014*
	(0.30)	(-1.67)
Individual fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
Adjusted R^2	0.606	0.622
Observations	51,098	51,098

Table 3

Temporary worker protection legislation and cumulative abnormal returns

This table reports results from OLS regressions of cumulative abnormal returns on the adoption of the temporary worker protection law. The dependent variable is the average value of the cumulative abnormal returns across all firms within the same two-digit KSIC industry over the event window around the passage date of the temporary worker legislation (days -3 to +3). We use the market model with a 252-day estimation window and require a minimum of 100 valid returns to be included in the sample. We use a 63-day gap between the estimation window and the event window to ensure that the anticipation of the event does not affect the estimation of the expected return. *Industry PTW Ratio* is the average value of the protected temporary worker ratio in a two-digit KSIC industry in 2005, and it is obtained from the Workplace Panel Survey. *Unionization rate* is calculated in 2005 for a two-digit KSIC industry and it is the number of workers belonging to unions divided by the number of total workers in the industry. *Union existence rate* is the average value of an indicator that equals one if a firm has a union and zero otherwise for a two-digit KSIC industry in 2005. Standard errors are corrected for heteroscedasticity (*t*-statistics are in parentheses). *, **, *** denote significance at the 10%, 5%, and 1% levels, respectively.

Dependent variable: CAR (days -3 to +3)				
	(1)	(2)	(3)	(4)
Industry PTW Ratio	-0.017	0.060	-0.019	0.076*
	(-0.50)	(1.53)	(-0.57)	(1.84)
Unionization rate	0.023	0.085		
	(0.71)	(1.63)		
Industry PTW Ratio × Unionization rate		-0.387**		
		(-2.34)		
Union existence rate			0.009	0.064
			(0.35)	(1.45)
Industry PTW Ratio × Union existence rate				-0.314**
				(-2.31)
R^2	0.020	0.092	0.009	0.099
Observations	54	54	54	54

Table 4
Temporary worker protection legislation and cash holdings

This table reports results from OLS regressions of cash holdings on the adoption of the temporary worker protection law. The sample spans the 2002-2012 period. The dependent variables are cash to assets and cash to net assets. *Industry PTW Ratio* is the average value of the protected temporary worker ratio in a two-digit KSIC industry in 2005. *Post* is an indicator that equals one from 2007 onwards and zero otherwise. *Year^{-3}*, *Year^{-2}*, *Year^{-1}*, *Year^{+0}*, *Year^{+1}*, *Year^{+2}*, and *Year^{3+}* are equal to one if the year is 2004, 2005, 2006, 2007, 2008, 2009, or 2010 or later, respectively, and zero otherwise. All the other variables used in the regressions are defined in Table A1. Korean Won values are expressed in 2015 KRW. Firm-level continuous variables are winsorized at their 1st and 99th percentiles. Standard errors are corrected for heteroscedasticity and clustering at the firm level (*t*-statistics are in parentheses). *, **, *** denote significance at the 10%, 5%, and 1% levels, respectively.

Dependent variable:	Cash to assets		Cash to net assets	
	(1)	(2)	(3)	(4)
Industry PTW Ratio × Post	-0.052***		-0.080***	
	(-2.74)		(-2.75)	
Industry PTW Ratio × Year^{-3}		0.018		0.031
		(0.66)		(0.69)
Industry PTW Ratio × Year^{-2}		-0.006		0.006
		(-0.20)		(0.11)
Industry PTW Ratio × Year^{-1}		-0.020		-0.022
		(-0.74)		(-0.48)
Industry PTW Ratio × Year^{+0}		-0.067***		-0.101***
		(-2.80)		(-2.71)
Industry PTW Ratio × Year^{+1}		-0.074***		-0.118***
		(-2.79)		(-2.94)
Industry PTW Ratio × Year^{+2}		-0.069***		-0.099***
		(-2.70)		(-2.60)
Industry PTW Ratio × Year^{3+}		-0.034		-0.041
		(-1.19)		(-0.93)
Log of number of employees	-0.005***	-0.005***	-0.009***	-0.009***
	(-2.79)	(-2.80)	(-3.52)	(-3.52)
Market-to-book assets	0.015***	0.015***	0.023***	0.023***
	(8.91)	(8.93)	(8.53)	(8.52)
Log of book assets	-0.002	-0.001	-0.001	-0.001
	(-0.70)	(-0.61)	(-0.40)	(-0.31)
Cash flow to assets	0.085***	0.085***	0.121***	0.121***
	(7.95)	(7.92)	(7.14)	(7.11)
Net working capital to assets	-0.109***	-0.109***	-0.175***	-0.175***
	(-13.96)	(-13.98)	(-13.99)	(-14.01)
Capital expenditures to assets	-0.086***	-0.086***	-0.131***	-0.131***
	(-8.80)	(-8.77)	(-8.89)	(-8.86)
Leverage	-0.135***	-0.135***	-0.206***	-0.206***
	(-17.18)	(-17.20)	(-16.24)	(-16.25)
Industry cash flow risk	-0.014	-0.011	-0.020	-0.016
	(-0.99)	(-0.82)	(-0.96)	(-0.76)
Dividend payer	0.001	0.001	0.001	0.001
	(0.72)	(0.70)	(0.26)	(0.25)
R&D to sales	0.056	0.055	0.086	0.084
	(1.34)	(1.32)	(1.34)	(1.31)
Firm fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Adjusted R^2	0.469	0.469	0.445	0.445
Observations	16,244	16,244	16,244	16,244

Table 5

Temporary worker protection legislation, unionization, access to capital, and operating leverage

This table reports results from OLS regressions of cash holdings on the adoption of the temporary worker protection law. The sample spans the 2002-2012 period. The dependent variables are cash to assets and cash to net assets. *Industry PTW Ratio* is the average value of the protected temporary worker ratio in a two-digit KSIC industry in 2005. *Post* is an indicator that equals one from 2007 onwards and zero otherwise. Control variables are the same as in Table 4. The sample is split based on the existence of a union, a credit rating, belonging to a chaebol group, and the median value of operating leverage. *Operating leverage* is calculated following Chen, Harford, and Kamara (2019) as the average of selling, general, and administrative expenses divided by lagged book assets from 2002 to 2006. All the other variables used in the regressions are defined in Table A1. Korean Won values are expressed in 2015 KRW. Firm-level continuous variables are winsorized at their 1st and 99th percentiles. Standard errors are corrected for heteroscedasticity and clustering at the firm level (*t*-statistics are in parentheses). *, **, *** denote significance at the 10%, 5%, and 1% levels, respectively.

Union	Yes	No	Yes	Yes	Yes	Yes		
Credit rating			No	Yes				
Chaebol					No	Yes		
Operating leverage							Low	High

Panel A: Dependent variable is cash to assets

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Industry PTW Ratio × Post	-0.058**	-0.057	-0.070***	0.004	-0.070***	0.009	-0.078**	-0.013
	(-2.44)	(-1.63)	(-2.77)	(0.13)	(-2.85)	(0.25)	(-2.45)	(-0.53)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.468	0.491	0.475	0.468	0.472	0.462	0.451	0.445
Observations	3,971	4,827	2,980	991	3,413	558	7,888	7,875

Panel B: Dependent variable is cash to net assets

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Industry PTW Ratio × Post	-0.064**	-0.088	-0.080**	0.014	-0.080**	0.018	-0.109**	-0.026
	(-2.08)	(-1.65)	(-2.41)	(0.31)	(-2.47)	(0.40)	(-2.27)	(-0.71)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.435	0.468	0.442	0.440	0.438	0.452	0.432	0.415
Observations	3,971	4,827	2,980	991	3,413	558	7,888	7,875

Table 6

Temporary worker protection legislation and market valuation of cash holdings

This table reports results from OLS regressions of market value of cash holdings on the adoption of the temporary worker protection law. The sample spans the 2002-2012 period. The dependent variable is the firm's excess stock return defined as the firm's annual fiscal year stock return minus the value-weighted return for 5×5 size and book-to-market portfolios. *Industry PTW Ratio* is the average value of the protected temporary worker ratio in a two-digit KSIC industry in 2005. *Post* is an indicator that equals one from 2007 onwards and zero otherwise. C_t is cash holdings, E_t is earnings (operating income plus interest and deferred tax liabilities), NA_t is net assets (total assets minus cash), RD_t is research and development costs, I_t is interest expenses, D_t is dividend payment, L_t is total debt divided by total debt plus market value of equity, and NF_t is net financing (total equity issuance minus repurchases plus debt issuance minus debt redemption). Independent variables, except L_t, are divided by the lagged market value of equity. $\varDelta$ means the variable is calculated as the change from *t-1* to *t*. The sample is split based on the existence of a union. Korean Won values are expressed in 2015 KRW. Firm-level continuous variables are winsorized at their 1st and 99th percentiles. Standard errors are corrected for heteroscedasticity and clustering at the firm level (*t*-statistics are in parentheses). *, **, *** denote significance at the 10%, 5%, and 1% levels, respectively.

Dependent variable: Excess stock return			
Union		Yes	No
	(1)	(2)	(3)
Industry PTW Ratio × Post × Δ C_t	-1.813*	-3.361***	-0.608
	(-1.88)	(-3.12)	(-0.35)
Industry PTW Ratio × Δ C_t	1.509**	1.238*	0.711
	(2.27)	(1.73)	(0.51)
Post × Δ C_t	0.188*	0.319**	0.178
	(1.81)	(2.29)	(0.90)
Industry PTW Ratio × Post	-0.393***	0.014	-0.649***
	(-3.09)	(0.09)	(-3.19)
Industry PTW Ratio	0.125	-0.389**	0.397*
	(1.01)	(-2.54)	(1.84)
Post	0.048***	0.016	0.124***
	(3.07)	(0.66)	(4.85)
Δ C_t	0.722***	0.471	0.953***
	(4.95)	(1.60)	(3.77)
Δ E_t	0.380***	0.571***	0.504***
	(12.95)	(9.34)	(9.59)
Δ NA_t	0.055***	0.047***	0.033**
	(6.61)	(2.93)	(2.05)
Δ RD_t	1.699***	0.608	2.179***
	(4.38)	(0.60)	(2.94)
Δ I_t	-1.035***	-1.921***	-0.964***
	(-5.97)	(-5.87)	(-2.65)
Δ D_t	0.802**	1.918***	1.044*
	(2.26)	(2.81)	(1.96)
C_{t-1}	0.232***	0.115**	0.212***
	(7.44)	(2.04)	(4.00)
L_t	-0.674***	-0.510***	-0.662***
	(-24.68)	(-8.55)	(-13.39)
NF_t	0.077***	0.059**	0.111***
	(4.39)	(2.08)	(3.28)
C_{t-1} × Δ C_t	-0.084	-0.243	-0.300
	(-0.80)	(-1.24)	(-1.60)
L_t × Δ C_t	-1.043***	-0.507	-1.400***
	(-5.52)	(-1.28)	(-4.26)
Adjusted R^2	0.124	0.119	0.121
Observations	14,015	3,645	4,339

Table 7
Temporary worker protection legislation, wages, and cash holdings

This table reports results from OLS regressions of cash holdings on the adoption of the temporary worker protection law. The sample spans the 2002-2012 period. The dependent variables are cash to assets and cash to net assets. *1/Average wages* is the inverse of natural logarithm of average wages per employee for a firm. *Post* is an indicator that equals one from 2007 onwards and zero otherwise. *Year^{-3}, Year^{-2}, Year^{-1}, Year^{+0}, Year^{+1}, Year^{+2},* and *Year^{3+}* are equal to one if the year is 2004, 2005, 2006, 2007, 2008, 2009, or 2010 or later, respectively, and zero otherwise. *1/Average wages* is included as a control variable. Other control variables are the same as in Table 4. All the other variables used in the regressions are defined in Table A1. Korean Won values are expressed in 2015 KRW. Firm-level continuous variables are winsorized at their 1st and 99th percentiles. Standard errors are corrected for heteroscedasticity and clustering at the firm level (*t*-statistics are in parentheses). *, **, *** denote significance at the 10%, 5%, and 1% levels, respectively.

Dependent variable:	Cash to assets				Cash to net assets			
Union			Yes	No			Yes	No
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1/Average wages × Post	-4.105***		-6.190***	-0.104	-5.606**		-7.630**	-0.551
	(-2.64)		(-2.69)	(-0.03)	(-2.42)		(-2.43)	(-0.12)
1/Average wages × Year^{-3}		2.336				3.020		
		(1.09)				(0.94)		
1/Average wages × Year^{-2}		1.422				2.120		
		(0.63)				(0.62)		
1/Average wages × Year^{-1}		0.491				1.128		
		(0.23)				(0.34)		
1/Average wages × Year^{+0}		-0.933				-1.959		
		(-0.48)				(-0.67)		
1/Average wages × Year^{+1}		-4.415**				-5.796**		
		(-2.29)				(-2.02)		
1/Average wages × Year^{+2}		-3.823*				-4.872		
		(-1.96)				(-1.64)		
1/Average wages × Year^{3+}		-2.487				-2.921		
		(-1.58)				(-1.25)		
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.491	0.491	0.500	0.526	0.461	0.461	0.468	0.504
Observations	12,565	12,565	3,241	3,944	12,565	12,565	3,241	3,944

43

Table 8
Temporary worker protection legislation, firm-level protected temporary worker ratio, and cash holdings
This table reports results from OLS regressions of cash holdings on the adoption of the temporary worker protection law using the firm-level protected temporary worker ratio. The sample spans the 2002-2012 period. The dependent variables are cash to assets and cash to net assets. *Firm PTW Ratio* is the protected temporary worker ratio of a firm in 2005. We are able to obtain the firm-level protected temporary worker ratio by matching data between the Workplace Panel Survey and the Data Guide Pro database. Because firm identification is confidential in the Workplace Panel Survey, we use disclosed accounting data in the Workplace Panel Survey and the Data Guide Pro database as matching variables. We use total assets, total debt, total sales, and net income as the matching variables and then calculate Euclidean distances between the potential matched observations and only keep the matched observations with the smallest Euclidean distances. We then manually check whether other financial variables are similar between the matched observations. We are able to match the data for 146 firms included in the two databases. *Post* is an indicator that equals one from 2007 onwards and zero otherwise. *Year^{-3}*, *Year^{-2}*, *Year^{-1}*, *Year^{+0}*, *Year^{+1}*, *Year^{+2}*, and *Year^{3+}* are equal to one if the year is 2004, 2005, 2006, 2007, 2008, 2009, or 2010 or later, respectively, and zero otherwise. Control variables are the same as in Table 4. All the other variables used in the regressions are defined in Table A1. Korean Won values are expressed in 2015 KRW. Firm-level continuous variables are winsorized at their 1st and 99th percentiles. Standard errors are corrected for heteroscedasticity and clustering at the firm level (*t*-statistics are in parentheses). *, **, *** denote significance at the 10%, 5%, and 1% levels, respectively.

Dependent variable:	Cash to assets				Cash to net assets			
Union			Yes	No			Yes	No
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Firm PTW Ratio × Post	-0.103***		-0.151***	-0.054	-0.136**		-0.205***	-0.054
	(-2.86)		(-3.24)	(-0.90)	(-2.54)		(-2.81)	(-0.66)
Firm PTW Ratio × Year^{-3}		-0.010				-0.020		
		(-0.22)				(-0.31)		
Firm PTW Ratio × Year^{-2}		0.052				0.103		
		(0.65)				(0.82)		
Firm PTW Ratio × Year^{-1}		-0.029				-0.028		
		(-0.48)				(-0.32)		
Firm PTW Ratio × Year^{+0}		-0.046				-0.055		
		(-0.99)				(-0.79)		
Firm PTW Ratio × Year^{+1}		-0.125***				-0.160***		
		(-2.92)				(-2.77)		
Firm PTW Ratio × Year^{+2}		-0.104**				-0.118*		
		(-2.28)				(-1.77)		
Firm PTW Ratio × Year^{3+}		-0.107**				-0.129**		
		(-2.37)				(-2.13)		
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.528	0.528	0.505	0.547	0.507	0.507	0.460	0.541
Observations	1,295	1,295	604	691	1,295	1,295	604	691

Table 9
Temporary worker protection legislation and subcontracting

This table reports results from regressions of cash holdings and subcontracting on the adoption of the temporary worker protection law. In Panel A, we use manually matched data between the Workplace Panel Survey and the Data Guide Pro database and the sample period is 2002-2012. In this panel the dependent variables are cash to assets and cash to net assets and we use OLS. *Firm PTW Ratio* is the protected temporary worker ratio of a firm in 2005, as in Table 8. *Post* is an indicator that equals one from 2007 onwards and zero otherwise. Control variables are the same as in Table 4. In Panel B, we use data from Workplace Panel Survey and the sample period is 2005, 2007, 2009, and 2011. The dependent variable equals one if a firm uses subcontracting during a given year and zero otherwise. Control variables are the same as in Panel B of Table 1 and they are defined in that table. All the other variables used in the regressions are defined in Table A1. Korean Won values are expressed in 2015 KRW. Firm-level continuous variables are winsorized at their 1st and 99th percentiles. Standard errors are corrected for heteroscedasticity and clustering at the firm level (*t*-statistics are in parentheses). *, **, *** denote significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Temporary worker protection legislation, subcontracting, and cash holdings

Dependent variable:	Cash to assets			Cash to net assets		
Subcontracting in 2005	Yes	No	No	Yes	No	No
Subcontracting in 2011	Yes	No	Yes	Yes	No	Yes
	(1)	(2)	(3)	(4)	(5)	(6)
Firm PTW Ratio × Post	-0.060	0.037	-0.303**	-0.058	0.054	-0.425**
	(-1.34)	(0.36)	(-2.62)	(-0.85)	(0.42)	(-2.55)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.419	0.480	0.355	0.373	0.480	0.317
Observations	294	284	134	294	284	134

Panel B: Temporary worker protection legislation and subcontracting

Dependent variable: Subcontracting indicator		
Union	Yes	No
	(1)	(2)
Firm PTW Ratio × Post	0.273**	-0.002
	(2.24)	(-0.02)
Log of book assets	0.020	0.020
	(0.82)	(0.78)
Return on assets	0.152	0.091
	(0.99)	(0.68)
Sales growth	0.088*	-0.032
	(1.71)	(-0.87)
Tangibility	0.019	0.014
	(0.20)	(0.14)
Capital expenditures to assets	0.034	-0.252*
	(0.30)	(-1.94)
Leverage	-0.025	-0.009
	(-0.34)	(-0.12)
Firm fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
Adjusted R^2	0.392	0.350
Observations	1,608	2,147

Table 10

Temporary worker protection legislation and financial leverage

This table reports results from OLS regressions of financial leverage on the adoption of the temporary worker protection law. The sample spans the 2002-2012 period. The dependent variable is book leverage. *Industry PTW Ratio* is the average value of the protected temporary worker ratio in a two-digit KSIC industry in 2005. *Post* is an indicator that equals one from 2007 onwards and zero otherwise. *Year^{-3}*, *Year^{-2}*, *Year^{-1}*, *Year^{+0}*, *Year^{+1}*, *Year^{+2}*, and *Year^{3+}* are equal to one if the year is 2004, 2005, 2006, 2007, 2008, 2009, or 2010 or later, respectively, and zero otherwise. Control variables are *Log of number of employees*, *Log of book assets*, *Cash flow to assets*, *Tangibility*, *Market-to-book assets*, *Dividend payer*, and *Modified Z-score*. *Tangibility* is property, plant, and equipment divided by book assets. *Modified Z-score* is 1.2 times working capital divided by book assets plus 1.4 times retained earnings divided by book assets plus 3.3 times earnings before interest and tax divided by book assets plus sales divided by book assets. All the other variables used in the regressions are defined in Table A1. Korean Won values are expressed in 2015 KRW. Firm-level continuous variables are winsorized at their 1st and 99th percentiles. Standard errors are corrected for heteroscedasticity and clustering at the firm level (*t*-statistics are in parentheses). *, **, *** denote significance at the 10%, 5%, and 1% levels, respectively.

Dependent variable: Financial leverage						
Union		Yes	No		Yes	No
	(1)	(2)	(3)	(4)	(5)	(6)
Industry PTW Ratio × Post	-0.092*	0.002	-0.175**			
	(-1.89)	(0.03)	(-2.40)			
Industry PTW Ratio × Year^{-3}				0.009	0.050	-0.022
				(0.22)	(0.98)	(-0.34)
Industry PTW Ratio × Year^{-2}				-0.011	0.002	-0.023
				(-0.24)	(0.03)	(-0.38)
Industry PTW Ratio × Year^{-1}				-0.086	-0.058	-0.107
				(-1.53)	(-0.72)	(-1.34)
Industry PTW Ratio × Year^{+0}				-0.131**	-0.108	-0.149*
				(-2.21)	(-1.31)	(-1.80)
Industry PTW Ratio × Year^{+1}				-0.138*	-0.051	-0.218**
				(-1.95)	(-0.49)	(-2.25)
Industry PTW Ratio × Year^{+2}				-0.135*	-0.030	-0.226**
				(-1.83)	(-0.25)	(-2.38)
Industry PTW Ratio × Year^{3+}				-0.087	0.062	-0.216**
				(-1.32)	(0.78)	(-2.29)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.773	0.816	0.733	0.773	0.816	0.732
Observations	8,953	4,041	4,912	8,953	4,041	4,912

Temporary Workers and Cash Holdings

Internet Appendix

Table A1
Summary statistics

This table reports summary statistics of the variables in the main sample. Variables are constructed with data from the Korean datasets, Data Guide Pro, Workplace Panel Survey, and Data Analysis, Retrieval, and Transfer System (DART). Firms in the financial or utility industries are excluded from the sample. Korean Standard Industrial Classification (KSIC) two-digit SIC codes are used to classify industries. The sample spans the 2002-2012 period. *Capital expenditures to assets* is capital expenditures divided by book assets. *Cash flow to assets* is operating income before depreciation after interest, dividends, and taxes divided by book assets. *Cash to assets* is cash holdings divided by book assets. *Cash to net assets* is cash holdings divided by book assets minus cash holdings. *Chaebol group member* is collected from the Korea Fair Trade Commission and is an indicator that equals one if a firm belongs to a chaebol group and zero otherwise. *Dividend payer* equals one if dividend payment is positive and zero otherwise. *Firm temporary worker ratio* is the fraction of workers of each firm who are temporary workers. *Industry cash flow risk* is the industry average of the standard deviation of cash flow to assets for the previous 10 years for firms that have at least three annual observations. *Leverage* is total debt divided by book assets. *Log of book assets* is the natural logarithm of book assets. *Log of number of employees* is the natural logarithm of the total number of employees in a firm. *Management information credibility* are discrete values of unions' perceptions of the credibility of firm financial information provided by firms to unions and range from 1 to 4, with higher values indicating greater credibility. *Market-to-book assets* is the sum of market value of equity and book assets minus book value of equity divided by book assets. *Net working capital to assets* is current assets minus current liabilities minus cash holdings divided by book assets. *Number of strikes* is the number of strikes a firm experiences during a given year. *Operating leverage* is calculated following Chen, Harford, and Kamara (2019) as the average of selling, general, and administrative expenses divided by lagged book assets from 2002 to 2006. *R&D to sales* is research and development costs divided by sales. *Strike indicator* takes a value of one if a firm experiences a strike during a given year and zero otherwise. *Unionization rate* is collected from firms' annual disclosure filings and is the number of employees belonging to unions divided by the number of total employees for a firm in 2005. *Wage increase difference* is the difference between the wage increase rate requested by unions and that suggested by management. *Protected temporary worker ratio* (*PTWR*) is the two-digit KSIC industry average of the number of temporary workers that are affected by the temporary workers protection legislation (temporary agency workers, fixed-term contract workers, and part-time workers) divided by the sum of the number of permanent and temporary workers. *Temporary worker ratio* (*TWR*) is the two-digit KSIC industry average of the number of temporary workers divided by the sum of the number of permanent and temporary workers. Korean Won values are expressed in 2015 KRW. Firm-level continuous variables are winsorized at their 1st and 99th percentiles.

Panel A: Firm-level variables

	Mean	SD	*N*
Capital expenditures to assets	0.043	0.068	16,244
Cash flow to assets	0.001	0.110	16,244
Cash to assets	0.077	0.079	16,244
Cash to net assets	0.093	0.118	16,244
Chaebol group member	0.066	0.248	16,244
Dividend payer	0.540	0.498	16,244
Firm temporary worker ratio	0.165	0.187	2,165
Industry cash flow risk	0.114	0.076	16,244
Leverage	0.468	0.239	16,244
Log of book assets	14.183	1.502	16,244
Log of number of employees	5.341	1.285	16,244
Management information credibility	2.983	0.458	2,165
Market-to-book assets	1.173	0.703	16,244
Net working capital to assets	0.091	0.234	16,244
Number of strikes	0.185	2.008	1,873
Operating leverage	0.209	0.207	2,044
R&D to sales	0.014	0.030	16,244
Strike indicator	0.034	0.180	1,875
Unionization rate	0.212	0.312	846
Wage increase difference	4.171	4.143	2,165

1

Panel B: Industry-level averages for the protected temporary worker ratio and the temporary worker ratio

Industry	2005		2009	
	PTWR	TWR	PTWR	TWR
Retail trade, except motor vehicles and motorcycles	0.484	0.514	0.209	0.371
Food and beverage service activities	0.394	0.394	0.274	0.312
Sports activities and amusement activities	0.360	0.471	0.149	0.370
Research and development	0.274	0.298	0.260	0.283
Business facilities management and services	0.251	0.267	0.224	0.242
Real estate	0.247	0.299	0.291	0.291
Arts and recreation related services	0.243	0.328	0.152	0.215
Broadcasting activities	0.233	0.242	0.085	0.103
Personal services	0.225	0.234	0.159	0.159
Accommodation services	0.224	0.264	0.152	0.316
Education services	0.213	0.233	0.230	0.267
Warehousing	0.210	0.216	0.071	0.114
Business support services	0.209	0.262	0.306	0.324
Postal services and telecommunications	0.188	0.229	0.071	0.115
Computer programming, consultancy, and related activities	0.169	0.216	0.043	0.043
Information service activities	0.153	0.181	0.029	0.029
Manufacture of food products	0.144	0.191	0.051	0.115
Publishing activities	0.131	0.134	0.088	0.098
Wholesale	0.107	0.158	0.050	0.089
Specialized construction activities	0.103	0.260	0.034	0.158
Waste collection, treatment, and disposal activities; materials recovery	0.099	0.099	0.016	0.016
Manufacture of pharmaceuticals	0.091	0.172	0.047	0.058
Manufacture of other transport equipment	0.091	0.176	0.050	0.174
Professional services	0.090	0.112	0.067	0.067
Architectural, engineering, and other scientific technical services	0.086	0.094	0.036	0.038
Manufacture of wearing apparel and clothing accessories	0.081	0.173	0.030	0.059
General construction	0.079	0.198	0.098	0.186
Manufacture of pulp, paper, and paper products	0.073	0.118	0.012	0.059
Manufacture of other non-metallic mineral products	0.073	0.163	0.020	0.138
Printing and reproduction of recorded media	0.072	0.078	0.027	0.037
Other professional, scientific, and technical services	0.068	0.068	0.023	0.024
Manufacture of electronic components	0.066	0.086	0.024	0.044

Table A1 (*Continued*)

Panel B: Industry-level averages for the protected temporary worker ratio and the temporary worker ratio

Industry	2005		2009	
	PTWR	TWR	PTWR	TWR
Manufacture of chemicals and chemical products	0.056	0.111	0.028	0.088
Manufacture of rubber and plastics products	0.054	0.078	0.017	0.073
Manufacture of textiles, except apparel	0.051	0.126	0.012	0.024
Other manufacturing	0.047	0.063	0.052	0.087
Manufacture of other machinery and equipment	0.042	0.085	0.016	0.060
Land transport and transport via pipelines	0.042	0.043	0.044	0.050
Manufacture of motor vehicles, trailers, and semitrailers	0.039	0.089	0.015	0.055
Manufacture of fabricated metal products	0.038	0.087	0.020	0.042
Manufacture of basic metals	0.038	0.153	0.013	0.129
Manufacture of electrical equipment	0.030	0.044	0.019	0.037
Manufacture of medical, precision, and optical instruments	0.003	0.008	0.004	0.029

Table A2
Unionization, cash holdings, and operating leverage

This table reports results from OLS regressions of cash holdings on unionization rates. The sample spans the 2002-2012 period. The dependent variables are cash to assets and cash to net assets. *Unionization rate* is the number of workers belonging to unions divided by the number of total workers for a firm in 2005. *Operating leverage* is calculated following Chen, Harford, and Kamara (2019) as the average of selling, general, and administrative expenses divided by lagged book assets from 2002 to 2006. *Low* indicates firms with operating leverage lower than the median value. *High* indicates firms with operating leverage higher than the median value. All the other variables used in the regressions are defined in Table A1. Korean Won values are expressed in 2015 KRW. Firm-level continuous variables are winsorized at their 1st and 99th percentiles. Standard errors are corrected for heteroscedasticity and clustering at the firm level (*t*-statistics are in parentheses). *, **, *** denote significance at the 10%, 5%, and 1% levels, respectively.

Dependent variable:	Cash to assets			Cash to net assets		
Operating leverage		Low	High		Low	High
	(1)	(2)	(3)	(4)	(5)	(6)
Unionization rate	-0.019***	-0.020***	-0.010	-0.024***	-0.026***	-0.011
	(-3.25)	(-2.97)	(-0.93)	(-3.01)	(-3.00)	(-0.70)
Log of number of employees	-0.001	0.001	-0.005*	-0.003	-0.000	-0.008**
	(-0.76)	(0.42)	(-1.85)	(-1.21)	(-0.02)	(-1.97)
Market-to-book assets	0.020***	0.026***	0.015***	0.029***	0.038***	0.022***
	(7.73)	(5.12)	(4.86)	(7.30)	(4.88)	(4.58)
Log of book assets	-0.001	-0.001	-0.001	-0.002	-0.002	-0.003
	(-0.93)	(-0.74)	(-0.52)	(-1.14)	(-0.85)	(-0.81)
Cash flow to assets	0.102***	0.095***	0.103***	0.136***	0.120***	0.140***
	(5.11)	(3.40)	(3.76)	(4.27)	(2.96)	(3.11)
Net working capital to assets	-0.055***	-0.024	-0.091***	-0.097***	-0.050**	-0.149***
	(-4.74)	(-1.59)	(-5.19)	(-5.24)	(-2.12)	(-5.33)
Capital expenditures to assets	-0.123***	-0.098***	-0.149***	-0.177***	-0.140***	-0.216***
	(-7.37)	(-4.31)	(-6.15)	(-7.38)	(-4.41)	(-6.03)
Leverage	-0.094***	-0.068***	-0.130***	-0.141***	-0.102***	-0.194***
	(-7.93)	(-4.43)	(-7.13)	(-7.75)	(-4.38)	(-6.88)
Industry cash flow risk	0.045**	0.028	0.059**	0.060**	0.033	0.083**
	(2.43)	(1.47)	(2.13)	(2.40)	(1.24)	(2.21)
Dividend payer	-0.001	0.000	-0.001	-0.001	0.000	-0.001
	(-0.26)	(0.06)	(-0.13)	(-0.29)	(0.06)	(-0.17)
R&D to sales	0.046	0.081	0.008	0.047	0.090	-0.001
	(0.62)	(0.61)	(0.09)	(0.41)	(0.46)	(-0.01)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.116	0.091	0.127	0.111	0.090	0.123
Observations	8,850	4,426	4,424	8,850	4,426	4,424

Table A3

Unionization, cash holdings, and adjusted operating leverage

This table reports results from OLS regressions of cash holdings on unionization rates. The sample spans the 2002-2012 period. The dependent variables are cash to assets and cash to net assets. *Unionization rate* is the number of workers belonging to unions divided by the number of total workers for a firm in 2005. *Adjusted operating leverage* is calculated as the average of selling, general, and administrative expenses minus labor expenses divided by lagged book assets from 2002 to 2006. *Low* indicates firms with adjusted operating leverage lower than the median value. *High* indicates firms with adjusted operating leverage higher than the median value. All the other variables used in the regressions are defined in Table A1. Korean Won values are expressed in 2015 KRW. Firm-level continuous variables are winsorized at their 1st and 99th percentiles. Standard errors are corrected for heteroscedasticity and clustering at the firm level (*t*-statistics are in parentheses). *, **, *** denote significance at the 10%, 5%, and 1% levels, respectively.

Dependent variable:	Cash to assets		Cash to net assets	
Adjusted operating leverage	Low	High	Low	High
	(1)	(2)	(3)	(4)
Unionization rate	-0.023***	-0.010	-0.030***	-0.011
	(-3.22)	(-0.98)	(-3.20)	(-0.79)
Log of number of employees	0.000	-0.004	-0.001	-0.006*
	(0.11)	(-1.56)	(-0.22)	(-1.78)
Market-to-book assets	0.022***	0.017***	0.033***	0.024***
	(4.61)	(5.29)	(4.33)	(5.01)
Log of book assets	-0.001	-0.003	-0.002	-0.005
	(-0.48)	(-1.35)	(-0.63)	(-1.49)
Cash flow to assets	0.105***	0.098***	0.137***	0.132***
	(3.66)	(3.70)	(3.26)	(3.02)
Net working capital to assets	-0.023	-0.092***	-0.050**	-0.148***
	(-1.43)	(-5.44)	(-2.02)	(-5.50)
Capital expenditures to assets	-0.119***	-0.128***	-0.170***	-0.187***
	(-5.15)	(-5.39)	(-5.19)	(-5.38)
Leverage	-0.061***	-0.136***	-0.094***	-0.199***
	(-3.68)	(-7.97)	(-3.76)	(-7.47)
Industry cash flow risk	0.039*	0.047*	0.050	0.065*
	(1.86)	(1.75)	(1.65)	(1.78)
Dividend payer	0.001	-0.001	0.001	-0.002
	(0.30)	(-0.27)	(0.27)	(-0.31)
R&D to sales	0.277*	-0.026	0.348	-0.044
	(1.70)	(-0.32)	(1.45)	(-0.35)
Year fixed effects	Yes	Yes	Yes	Yes
Adjusted R^2	0.089	0.142	0.087	0.136
Observations	4,413	4,393	4,413	4,393

Table A4
Temporary worker protection legislation and unionization:
propensity score matched sample analysis

This table reports results from OLS regressions of cash holdings on the adoption of the temporary worker protection law using a propensity score matched sample. The sample spans the 2002-2012 period. In the propensity score matching analysis, the treatment group is firms with a union, and the control group is firms without a union. Using a probit regression and data in 2005, we estimate the propensity score of being in the treatment group using *Industry PTW Ratio*, *Log of book assets*, and *Cash flow to assets*. We then match each treatment firm in 2005 to one control firm without replacement. Panel A tabulates the means of the matching variables and propensity scores for the treatment and control groups. Panel B presents results of tests that use propensity score matching and examines the impact of the adoption of the temporary worker protection law on firms' cash holdings. The dependent variables are cash to assets and cash to net assets. *Industry PTW Ratio* is the average value of the protected temporary worker ratio in a two-digit KSIC industry in 2005. *Post* is an indicator that equals one from 2007 onwards and zero otherwise. Control variables are the same as in Table 4. All the other variables used in the regressions are defined in Table A1. Korean Won values are expressed in 2015 KRW. Firm-level continuous variables are winsorized at their 1st and 99th percentiles. Standard errors are corrected for heteroscedasticity and clustering at the firm level (*t*-statistics are in parentheses). *, **, *** denote significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Comparison of means across matched samples in 2005

	Treatment	Control	*p*-value
	(1)	(2)	(3)
Propensity score	0.325	0.315	0.479
Industry PTW Ratio	0.088	0.086	0.749
Log of book assets	14.952	14.865	0.429
Cash flow to assets	0.015	0.011	0.614
Observations	374	374	

Panel B: Main regression

Dependent variable:	Cash to assets		Cash to net assets	
Union	Yes	No	Yes	No
	(1)	(2)	(3)	(4)
Industry PTW Ratio × Post	-0.058**	-0.064	-0.064**	-0.101
	(-2.44)	(-0.88)	(-2.08)	(-0.98)
Control variables	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Adjusted R^2	0.468	0.416	0.435	0.379
Observations	3,971	3,108	3,971	3,108

Table A5
Financial constraints and temporary workers

This table reports results from OLS regressions of the protected temporary worker ratio on whether a firm has a credit rating or belongs to a chaebol group. The sample period spans the 2005, 2007, 2009, and 2011 years. The dependent variable is firm PTW ratio, and it is obtained from Workplace Panel Survey. *Credit rating* is equal to one if a firm has a credit rating, and it is obtained from Data Guide Pro. *Chaebol* is equal to one if a firm belongs to a chaebol group. Control variables are the same as in Panel B of Table 1 and they are defined in that table. Korean Won values are expressed in 2015 KRW. Firm-level continuous variables are winsorized at their 1st and 99th percentiles. Standard errors are corrected for heteroscedasticity and clustering at the firm level (*t*-statistics are in parentheses). *, **, *** denote significance at the 10%, 5%, and 1% levels, respectively.

Dependent variable: Firm PTW Ratio								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Credit rating	0.017	0.015	0.015	0.008				
	(0.93)	(0.82)	(0.50)	(0.26)				
Chaebol					0.024	0.018	0.026	0.028
					(0.89)	(0.71)	(0.95)	(0.99)
Log of book assets		0.002		-0.001		0.004		-0.000
		(0.53)		(-0.21)		(0.90)		(-0.02)
Return on assets		0.073		-0.102		0.069		-0.103
		(1.03)		(-1.48)		(0.97)		(-1.51)
Sales growth		0.007		0.010		0.006		0.009
		(0.36)		(0.45)		(0.27)		(0.43)
Tangibility		-0.030		-0.138**		-0.032		-0.136**
		(-0.72)		(-2.55)		(-0.78)		(-2.50)
Capital expenditures to assets		-0.016		0.042		-0.012		0.041
		(-0.38)		(0.95)		(-0.30)		(0.93)
Leverage		0.003		0.091*		0.005		0.097*
		(0.11)		(1.84)		(0.18)		(1.96)
Firm fixed effects	No	No	Yes	Yes	No	No	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.026	0.022	0.398	0.407	0.026	0.022	0.400	0.410
Observations	581	581	571	571	581	581	571	571

Table A6
Temporary worker protection legislation and adjusted operating leverage

This table reports results from OLS regressions of cash holdings on the adoption of the temporary worker protection law. The sample spans the 2002-2012 period. The dependent variables are cash to assets and cash to net assets. *Industry PTW Ratio* is the average value of the protected temporary worker ratio in a two-digit KSIC industry in 2005. *Post* is an indicator that equals one from 2007 onwards and zero otherwise. Control variables are the same as in Table 4. The sample is split based on the median value of adjusted operating leverage before the adoption of the temporary worker protection law. *Adjusted operating leverage* is calculated as the average of selling, general, and administrative expenses minus labor expenses divided by lagged book assets from 2002 to 2006. All the other variables used in the regressions are defined in Table A1. Korean Won values are expressed in 2015 KRW. Firm-level continuous variables are winsorized at their 1st and 99th percentiles. Standard errors are corrected for heteroscedasticity and clustering at the firm level (*t*-statistics are in parentheses). *, **, *** denote significance at the 10%, 5%, and 1% levels, respectively.

Dependent variable:	Cash to assets		Cash to net assets	
Adjusted operating leverage	Low	High	Low	High
	(1)	(2)	(3)	(4)
Industry PTW Ratio × Post	-0.089***	-0.013	-0.127**	-0.025
	(-2.63)	(-0.55)	(-2.38)	(-0.71)
Control variables	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Adjusted R^2	0.481	0.433	0.459	0.404
Observations	7,868	7,851	7,868	7,851

Table A7
Temporary worker protection legislation and cash holdings (Balanced panel)

This table reports results from OLS regressions of cash holdings on the adoption of the temporary worker protection law. The sample is a balanced panel and spans the 2002-2012 period. The dependent variables are cash to assets and cash to net assets. *Industry PTW Ratio* is the average value of the protected temporary worker ratio in a two-digit KSIC industry in 2005. *Post* is an indicator that equals one from 2007 onwards and zero otherwise. $Year^{-3}$, $Year^{-2}$, $Year^{-1}$, $Year^{+0}$, $Year^{+1}$, $Year^{+2}$, and $Year^{3+}$ are equal to one if the year is 2004, 2005, 2006, 2007, 2008, 2009, or 2010 or later, respectively, and zero otherwise. Control variables are the same as in Table 4. All the other variables used in the regressions are defined in Table A1. Korean Won values are expressed in 2015 KRW. Firm-level continuous variables are winsorized at their 1st and 99th percentiles. Standard errors are corrected for heteroscedasticity and clustering at the firm level (*t*-statistics are in parentheses). *, **, *** denote significance at the 10%, 5%, and 1% levels, respectively.

Dependent variable:	Cash to assets		Cash to net assets	
	(1)	(2)	(3)	(4)
Industry PTW Ratio × Post	-0.053**		-0.074**	
	(-2.16)		(-2.05)	
Industry PTW Ratio × $Year^{-3}$		0.037		0.080
		(0.99)		(1.27)
Industry PTW Ratio × $Year^{-2}$		0.014		0.055
		(0.36)		(0.80)
Industry PTW Ratio × $Year^{-1}$		-0.044		-0.058
		(-1.60)		(-1.45)
Industry PTW Ratio × $Year^{+0}$		-0.084***		-0.117***
		(-3.05)		(-2.94)
Industry PTW Ratio × $Year^{+1}$		-0.050		-0.064
		(-1.51)		(-1.37)
Industry PTW Ratio × $Year^{+2}$		-0.090***		-0.114***
		(-3.11)		(-2.73)
Industry PTW Ratio × $Year^{3+}$		-0.027		-0.017
		(-0.74)		(-0.33)
Control variables	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Adjusted R^2	0.461	0.462	0.426	0.427
Observations	8,294	8,294	8,294	8,294

9

Temporary worker protection legislation, unionization, access to capital, and operating leverage (Balanced panel)

This table reports results from OLS regressions of cash holdings on the adoption of the temporary worker protection law. The sample is a balanced panel and spans the 2002-2012 period. The dependent variables are cash to assets and cash to net assets. *Industry PTW Ratio* is the average value of the protected temporary worker ratio in a two-digit KSIC industry in 2005. *Post* is an indicator that equals one from 2007 onwards and zero otherwise. Control variables are the same as in Table 4. The sample is split based on the existence of a union, a credit rating, belonging to a chaebol group, and the median value of operating leverage. *Operating leverage* is calculated following Chen, Harford, and Kamara (2019) as the average of selling, general, and administrative expenses divided by lagged book assets from 2002 to 2006. All the other variables used in the regressions are defined in Table A1. Korean Won values are expressed in 2015 KRW. Firm-level continuous variables are winsorized at their 1st and 99th percentiles. Standard errors are corrected for heteroscedasticity and clustering at the firm level (*t*-statistics are in parentheses). *, **, *** denote significance at the 10%, 5%, and 1% levels, respectively.

Union	Yes	No	Yes	Yes	Yes	Yes		
Credit rating			No	Yes				
Chaebol					No	Yes		
Operating leverage							Low	High

Panel A: Dependent variable is cash to assets

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Industry PTW Ratio × Post	-0.058**	-0.047	-0.071**	0.047	-0.070**	0.038	-0.100***	-0.014
	(-1.98)	(-1.10)	(-2.39)	(1.16)	(-2.37)	(0.90)	(-2.76)	(-0.46)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.479	0.480	0.491	0.476	0.485	0.464	0.480	0.441
Observations	3,091	3,212	2,200	891	2,574	517	4,147	4,147

Panel B: Dependent variable is cash to net assets

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Industry PTW Ratio × Post	-0.064*	-0.066	-0.081**	0.068	-0.078**	0.056	-0.135**	-0.021
	(-1.68)	(-1.03)	(-2.09)	(1.35)	(-2.03)	(1.08)	(-2.54)	(-0.48)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.446	0.451	0.455	0.446	0.449	0.453	0.450	0.406
Observations	3,091	3,212	2,200	891	2,574	517	4,147	4,147

Table A9
Temporary worker protection legislation and cash flow

This table reports results from OLS regressions of cash flow on the adoption of the temporary worker protection law. The sample spans the 2002-2012 period. The dependent variables are cash flow to assets and cash flow to sales. *Industry PTW Ratio* is the average value of the protected temporary worker ratio in a two-digit KSIC industry in 2005. *Post* is an indicator that equals one from 2007 onwards and zero otherwise. All the other variables used in the regressions are defined in Table A1. Korean Won values are expressed in 2015 KRW. Firm-level continuous variables are winsorized at their 1st and 99th percentiles. Standard errors are corrected for heteroscedasticity and clustering at the firm level (*t*-statistics are in parentheses). *, **, *** denote significance at the 10%, 5%, and 1% levels, respectively.

Dependent variable:	Cash flow to assets			Cash flow to sales		
Union		Yes	No		Yes	No
	(1)	(2)	(3)	(4)	(5)	(6)
Industry PTW Ratio × Post	-0.001	-0.029	0.019	0.029	-0.006	0.050
	(-0.06)	(-1.13)	(0.66)	(0.65)	(-0.19)	(0.72)
Log of number of employees	0.006**	-0.003	0.010***	0.024***	0.001	0.035***
	(2.46)	(-1.17)	(2.71)	(3.28)	(0.17)	(3.34)
Market-to-book assets	0.013***	0.023***	0.011***	0.006	0.026***	0.001
	(4.07)	(4.77)	(2.86)	(0.65)	(4.43)	(0.10)
Log of book assets	0.028***	0.020***	0.031***	0.041***	0.037***	0.042***
	(6.79)	(4.40)	(5.53)	(4.54)	(4.79)	(3.24)
Net working capital to assets	0.044***	0.023	0.057***	0.093***	0.024	0.129***
	(4.04)	(1.59)	(3.76)	(3.52)	(0.80)	(3.43)
Capital expenditures to assets	0.149***	0.155***	0.142***	0.209***	0.156***	0.232***
	(9.40)	(7.07)	(6.52)	(5.17)	(3.72)	(3.96)
Leverage	-0.146***	-0.140***	-0.145***	-0.164***	-0.150***	-0.166***
	(-9.89)	(-7.47)	(-7.16)	(-3.93)	(-5.57)	(-2.67)
Dividend payer	-0.004*	-0.001	-0.005	0.003	0.002	0.003
	(-1.68)	(-0.35)	(-1.60)	(0.55)	(0.61)	(0.49)
R&D to sales	-0.884***	-1.042***	-0.863***	-2.402***	-1.899***	-2.483***
	(-6.69)	(-6.05)	(-5.86)	(-6.43)	(-4.59)	(-5.82)
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.472	0.488	0.470	0.458	0.494	0.454
Observations	8,798	3,971	4,827	8,798	3,971	4,827

11