

Operating Leverage and Corporate Cash Management: Evidence from Labor Law Reform in Brazil

ABSTRACT

We explore how the end of the compulsory union contribution in Brazil has affected firms' cash holdings. Using a difference-in-differences research design, we show that the reduction of labor rigidity after enactment of the Labor Law Reform impacted firm cash holdings by dampening operating leverage effects, especially if they are characterized as unconstrained and on the upper distribution of the cost structure. Further, we find evidence that selling, general, and administrative (SG&A) costs—which are deemed “stickier”—become less sensitive to sales shocks after the reform. We show that the main effect is borne out of a reduction in labor rigidity costs through the operating leverage channel. Our results are consistent with the hypothesis of ex post financial flexibility regarding labor frictions.

Keywords: Cash holdings; Operating leverage; Labor reform.

1. Introduction

As a fundamental factor of production, labor is a relevant friction regarding firm financing decisions. Empirical evidence shows that this friction is borne out of union bargaining power (Klasa, Maxwell and Órtiz-Molina, 2009; Chen, Kacperczyk and Órtiz-Molina, 2010; Matsa, 2010) and changes to the workforce landscape (Simintzi, Vig and Volpin, 2015; Dessaint, Golubov and Volpin, 2017). We explore the effects of the repeal of the compulsory union contribution in Brazil as an exogenous shock on firm cash holdings.¹ We show that enactment of the reform that made union contributions voluntary changed the Brazilian labor market environment, allowing for a more dynamic—and hence flexible—labor relationship. In effect, firms decreased their cash holdings after enactment of the law, consistent with the ex post hypothesis of financial flexibility through decreased operating leverage (Chen, Harford and Kamara, 2019; Kahl, Lunn and Nilsson, 2019).

Empirical and anecdotal evidence suggest that a more dynamic labor market environment results in less litigation between workers and firms. Enactment of law 13,467/2017 in November 2017 (also known as Labor Law Reform—LLR—or *Reforma Trabalhista* in Portuguese), resulted in an immediate 6.4% decrease in labor-related legal disputes (as of February 2018). In fact, this is the first period over a 5-year horizon to show a downward movement in litigation (Fernandes and Castanho, 2018). Key in identifying whether firm cash holdings are impacted by the reform is to consider enactment of the law “as good as random.” Exploiting this exogenous variation in firm finances rules out endogenous explanations of changes in firm liquidity management by showing that the main channel affecting firm cash holdings is the change in operating leverage after enactment of the LLR.

Schmalz (2015) describes two views regarding labor and corporate finance. One is the bargaining motive—where firms strategically choose policies to attain a better negotiating position regarding union claims. The other regards increased operating risk arising from rigid labor conditions—the flexibility motive. Both can be present, depending on the timing of such decisions. Kahl, Lunn and Nilsson (2019) argue that increased fixed costs—such as labor rigidity pressed by unions—may impose restrictions that imply financial constraint behavior by firms, even when, in fact, there is no such behavior. Our setting tackles this specific scenario since, with the end of the compulsory tax, union bargaining strength has weakened due to losses to their revenues. Kuzmina (2018) indicates that more flexible labor contracts minimize the expected costs of distress through the operating–financial leverage mechanism, while Serfling (2016) indicates that increased labor adjustment costs imply less firm debt.

We provide further evidence that changes to labor laws, specifically those that diminish union bargaining power, reduce firm fixed costs and are responsible for changes to firm capital structure, such as cash-to-assets ratio. With enactment of the law, a 10 percentage point increase in operating leverage corresponds to a reduction in cash-to-assets of 1.21 percentage points or almost R\$16 million (US\$4 million) in mean cash value. In turn, this drop in cash holdings represents a decrease of 6.20% ($= 0.121/0.130 - 1$) compared to the estimate before passage of the law. We show that the

¹ Throughout the paper we use cash holdings and cash-to-assets interchangeably to refer to the same variable, i.e., cash and equivalents scaled by total assets.

channel for this change is the operating–financial leverage mechanism. After enactment of the bill, the elasticity of selling, general, and administrative (SG&A) expenses to a change in firm sales changed to approximately 16% of previous values, indicating a considerable reduction in responsiveness. These results indicate that the Brazilian labor market became more dynamic, exerting less pressure on firms to retain cash to accommodate labor rigidity.

Building on this setting, we show that firms that are above the median operating leverage are indeed more responsive to the change in the Brazilian labor market environment, indicating that the degree of cost “stickiness” is relevant. Using a subsample test, we show that firms in the manufacturing sector are more considerably affected by the LLR, via the operating leverage channel. We also test the effects of the reform on the degree of financial constraint of the firm using the KZ (Kaplan and Zingales, 1997), WW (Whited and Wu, 2006), and SA (Size and Age; Hadlock and Pierce, 2010) indexes. Interestingly, unconstrained firms are considerably more affected by the new labor regime, which supports the hypothesis of Kahl, Lunn and Nilsson (2019) that unconstrained firms may act as constrained when fixed costs are high.

In addition, we estimate how cash is used after the labor reform and show that firms reduce their financial leverage ratios even more—consistent with the idea of reducing risk and following less conservative financial policies. In turn, this result also indicates the two-fold prediction raised by Schmalz (2015) that both the bargaining motive and financial flexibility can coexist. Finally, using a propensity score matching procedure as a robustness test, we investigate whether our results are driven by differences along the observed dimension of firms. We show that the results are persistent for the unconstrained subsample once we account for propensity score weights on the baseline framework—indicating the operating leverage effect on cash holdings.

This paper relates to the theoretical and empirical literature on the effect of changes in labor rigidity and its relation to corporate finance. Diverging from most of the recent literature, we study the specific framework of the Brazilian labor market after the labor reform. The Brazilian case provides an interesting point of view when compared to the American labor market. First, in Brazil, unions are category-specific while in the US unionization is mostly intra-firm. Second, Brazil is an emerging market, characterized by low productivity of labor and a notable non-tradeable sector. Its economy is widely dependent on exports—especially commodities.

2. Brazilian context

Brazilian labor rights are defined by the *Consolidação das Leis do Trabalho* (CLT—Consolidation of Labor Laws), which governs workers’ right to work, social security, minimum wage, vacation rights, and workers’ aid/security, among other issues. The law was enacted May 1, 1943 by president Getulio Vargas. The decree–law no. 5352—which identifies the CLT—has had almost 500 modifications since its inception; the most recent and relevant one, as of 2020, is the LLR of 2017.

The 2001–2015 period in Brazil is marked by a commodities boom and institutional changes that led to an increase in formal employment and decreased inequality (Firpo and Pieri, 2018). After the economic turmoil of 2014, uncertainty over the conduct of fiscal policy and political difficulties, in tandem with decreased foreign demand (lower commodity prices) and changes to the global economic landscape

(European Central Bank, 2016) led to a challenging scenario for Brazilian growth. In 2015, Brazil suffered the worst recession in its history (Firpo and Pieri, 2018), marked by declining wages and increasing unemployment. As documented by the Brazilian Government (International Labour Organization, 2018), in 2016 unemployment rose to 11.3%—the highest in modern recordkeeping, with an increased proportion of informal jobs (44% of total jobs), low labor productivity, and a high degree of judicialization, leading to a pressing necessity for labor reform.

Following the impeachment of President Dilma Rousseff in 2016, vice-president Michel Temer took office proposing a series of structural reforms ranging from education to pension/social security, a fiscal expenditure ceiling, modernization of infrastructure and the business environment, and addressing issues that hindered development of a more friendly framework for firms. A key understanding was that reform of the labor law was fundamental to diminish surging unemployment levels and to modernize and ensure a more competitive and dynamic labor market, through less restrictive rules.

The LLR aimed to change close to 100 provisions, such as vacation agreements, firing costs and changes to unemployment requirements, compensatory time off, pregnancy leave, home office rules, equal-pay-for-equal-work, outsourcing, part-time and intermittent work agreements, and termination accords, among others. One of the most significant changes, which raised discontent among trade union officials, was repeal of the compulsory union contribution. The first round of approval was set by the Brazilian Chamber of Deputies in April 2017 and the reform proceeded to further consent with no modifications by the Federal Senate on July 13, 2017. The law was enacted in November of the same year but went to the Brazilian Supreme Court (*Supremo Tribunal Federal* in Portuguese) for supplemental discussion over its validity. The Brazilian Supreme Court reached agreement, declaring the reform constitutional in its June 28 and 29, 2018 sessions.

Focusing specifically on union relations, the LLR ended the compulsory union contribution, deeming the collection of union dues to be subject to employee authorization. Also, the law allowed that collective negotiations would supersede the law regarding working shifts, home office / on-call regimes / intermittent work, and minimum intervention in collective agreements by courts, among other issues. As a result of the end of the union contribution, the Inter-Union Department of Statistics and Socio-Economic Studies (*Departamento Intersindical de Estatística e Estudos Socioeconômicos* – DIEESE, 2018) estimated that trade union institutions saw a fall of approximately 90% in their revenues in April 2018 over the same month of the previous year. According to Caldas (2017), there are 16,491 unions in Brazil—11,240 are employee-specific and 5,251 are employer-specific. These elevated numbers mark Brazil as the world-leader in union institutions, followed by South Africa, with 191 union organizations. Although Brazilian trade union figures are strikingly larger than South Africa's, Brazil's trade union density rate—i.e., unionization over the total workforce—ranks below in percentage, according to information from the International Labour Organization, as depicted in Figure 1.

[Insert Figure 1 about here]

Note that union affiliation rates in Brazil are not a proper indicator of union strength. Campos (2016) documents that, historically, Brazilian unions have not depended on worker coverage to represent them in collective bargaining. Negotiations

between firms and unions applied to all workers, whether union members or not. Also, the collection of compulsory contributions over wages funded the whole union structure, including federations, confederations, and union centrals. In such fashion, with the repeal of the compulsory contributions from worker wages to fund union structures, anecdotal evidence (Pinho, 2019) reports that union contributions fell around 95% from previous values (R\$3.4 billion—close to US\$0.85 billion) just two years after enactment of the law. Thus, we hypothesize that diminished union strength is responsible for a change in firm cash management policies after the LLR.

3. Data

3.1 Variables

Our sample covers Brazilian companies listed on the B3 stock exchange—*Brasil Bolsa Balcão* (formerly, *BM&F Bovespa*), throughout the first quarter of 2017 to the third quarter of 2018—since this allows us to evenly split the sample period around the voting and enactment of the law in the fourth quarter of 2017 (more precisely, November 2017). We exclude firms with missing total assets and negative total equity values and restrict Standard Industry Classification (SIC) codes to values excluding the 4900-4999 and 6000-6999 ranges—thus eliminating financial institutions and utility companies, as their corporate finance practices differ from other sectors. Then, industries are aggregated by two-digit SIC code. All firm-quarter variables are extracted from the Standard & Poor Capital IQ database.

The dependent variable of interest is cash holdings. The usual control variables from the cash and liquidity management literature are included, following the specifications from Bates, Kahle and Stulz (2009), including net working capital, cash flow, leverage, acquisitions, market-to-book ratio, size, capital expenditures, and industry cash flow volatility. The attentive reader may note that the research and development variable is not considered in the baseline framework. Note that Brazilian companies respond to different accounting practices when recording research and development expenses, which limits the investigation of intangible capital effects on cash holdings as a robustness test. Detailed information regarding all variable construction is found in the Appendix.

Further, to investigate whether operating leverage changed with passage of the law, we proxy it as the cost of goods sold plus selling, general, and administrative expenses scaled by total assets. A dummy variable for dividend payment is a proxy for financing constraints in the baseline framework. All these variables are winsorized at the 1st and 99th percentiles of their distributions. We also interact covariates with the shock variable, which is set in the fourth quarter of 2017, to avoid any confoundedness or noise in the regressions. Thus, the final sample comprises 1,068 firm-quarter-year observations.

3.2 Descriptive statistics

Table 1 presents summary statistics for the dependent and independent variables at the baseline specification, reporting the mean, standard deviation, 25th, median, and 75th percentiles of the distribution. The mean and median values of cash holdings are, respectively, 7.88% and 5.76%. The average firm has cash flow estimates of 1%, net working capital of 15.9%, and capital expenditures of close to 1% of their total asset values. The leverage ratio of the average firm is approximately 19% of total assets.

Acquisitions expenditure is close to zero during the period under analysis, while the average firm trades at 1.601 market-to-book value. Size is R\$2.7 billion (US\$675 million) in value for the average firm's total assets. Industry cash flow volatility has a mean of 2.37% and a median of 1.94%, and operating leverage has a mean (median) of 16.8% (14.8%) of total asset values.

[Insert Table 1 about here]

4. Research design

4.1 Identification strategy and methodology

Our identification strategy relies on enactment of the Brazilian LLR in the fourth quarter of 2017 as a source of exogenous shock to disentangle possible endogenous relations between cash holdings and operating leverage. The typical regression framework is a difference-in-differences setting, where an indicator variable is switched on from the fourth quarter of 2017 onwards (*LLR* variable) and interacted with operating leverage to estimate changes to firm cash-to-assets ratio, as follows:

$$\text{Cash Holdings}_{i,q} = \mu_i + \delta_q + \beta_1 \text{LLR} \times \text{Op. Lever}_{i,q} + \gamma' \mathbf{X}_{i,q} + \varepsilon_{i,q}$$

Subscripts i and q denote a firm at a given quarter-year of the sample and vector \mathbf{X} comprises the firm-level control variables as described in Section 3. To control for unobserved invariant heterogeneity, μ_i and δ_q indicate the presence of firm- and quarter-year fixed effects, which in turn subsume the use of the time dummy regarding enactment of the LLR. Further, we implement investigations using cross-industry variation estimates. Across all tables, standard errors are corrected by clustering at the most granular level (firm), following the guidelines specified by Bertrand, Mullainathan and Duflo (2004). Finally, the operating leverage variable is pre-dated to its last value before the shock—when it is not interacted with the LLR variable—across all specifications.

4.2 Empirical results: baseline estimation

Figure 2 presents the relation of cash holdings throughout the sample period. We regress the cash-to-assets variable on quarter-year fixed effects and on time of adoption dummy variables, which indicates the relative period regarding passage of the LLR (on the x-axis). This procedure follows Acharya, Baghai and Subramanian (2014). Visual inspection indicates a declining trend of cash holdings after enactment of the law (denoted by period 0). The dashed lines indicate the 90% confidence interval, which is estimated without clustering at the firm-level.

[Insert Figure 2 about here]

Table 2 indicates the baseline empirical results of cash holdings after LLR enactment. Initially, without adoption of any source of invariant heterogeneity control, such as firm- or quarter-year-fixed effect (Column 1), the LLR had a negative effect of 1.2 percentage points (p.p.) on the cash-to-assets ratio for 10 p.p. of operating leverage—at the 5% level. Thus, enactment of the law is positively associated with Brazilian firms' cash holdings (coefficient estimate of 0.024) over the period following the fourth quarter of 2017—significant at the 10% statistical inference level. Also, the effect of operating leverage before enactment of the law is statistically and economically significant for our sample of Brazilian firms, indicating an effect of -1.29

p.p. for 10 p.p. of operating leverage. Also in Table 2, in Column 2 and controlling for firm-inherent characteristics, estimates of operating leverage and the interaction term of operating leverage after enactment of the law remain stable, showing a negative relation to cash holdings—significant at the 10% level. A 10 p.p. change to operating leverage after the reform indicates a negative change of 1.17 p.p. to cash holdings. Before enactment, the effect of a 10 p.p. increase to operating leverage corresponded to a 1.26 p.p. decrease to cash holdings.

[Insert Table 2 about here]

Column 3 provides estimates adding the usual covariates used in the cash holdings literature without any sort of adjustment, such as pre-dating or interacting the variables with the respective shock. Column 4 provides estimates where the covariates are interacted with the shock variable, to control for any sort of confoundedness effect that may drive our results. Note that across Columns 1 to 4, estimates of operating leverage before the reform present quite stable coefficient values, even after adding firm fixed effects, quarter-year fixed effects, and firm covariates. Across all specifications from Columns 1 to 4, the interaction term indicates that the effect of operating leverage on cash holdings is weakened after the end of compulsory union contribution—at varying degrees of statistical significance. The most granular specification (Column 4) indicates the diminished effect of operating leverage on cash holdings after the reform—at the 10% significance level. One standard deviation of operating leverage ($= 0.13 \times -0.121 \times \text{mean cash value}$) corresponds to a fall of almost R\$15 million (US\$3.75 million) in cash value. Before the labor reform, one standard deviation of operating leverage implies a fall of close to R\$16 million (US\$4 million). These estimates correspond to the following scheme: as labor costs become less prominent after passage of the law, under the financial flexibility hypothesis, the effect of operating leverage on cash holdings becomes weaker. That is, for the same degree of cost rigidity, the impact on cash holdings becomes smaller and less significant—indicating that less conservative financial policies could be undertaken by firms.

4.3 Elasticity of SG&A to sales after LLR: the operating leverage channel

Next, we investigate how sensitive selling, general, and administrative costs are to changes in sales after the LLR. The hypothesis is as follows: if the change to the labor market environment with the end of the compulsory union contribution decreased the rigidity of labor costs, this would translate to a decrease in SG&A costs, which are deemed stickier (Chen, Harford and Kamara, 2019) than costs of goods sold (COGS). In turn, this change indicates whether SG&A costs—which are tied to operating expenses such as wages—are affected by passage of the LLR. Alternative tests of operating leverage and its sensitivity to firm performance can be found in Mandelker and Rhee (1984) and Eisfeldt and Papanikolaou (2013), where EBIT is regressed on sales to estimate the degree of operating leverage. Kahl, Lunn and Nilsson (2019) estimate the cost structure of a firm by regressing innovations in growth rates of operating costs on innovations in growth rates of sales, while Chen, Harford and Kamara (2019) compare the use of COGS and SG&A by regressing these operating costs on increases and decreases in firm revenues. These approaches are limited due to the restricted nature of financial reporting, since firms do not disclose whether these costs are fixed (Kuzmina, 2018). This leads to the use of proxies for estimating operating leverage. Accordingly, we follow Novy-Marx (2011) and use the sum of COGS and SG&A to the book value of assets as a proxy of operating leverage. Also, over the short-run, all costs are deemed

fixed. Thus, even if the proposed variable fails to account for the “real” nature of firm operating costs, this measurement problem would lead to an attenuation bias—which would go against our hypothesis.

In Table 3, we employ an adapted procedure that borrows part of the framework of Chen, Harford and Kamara (2019) combined with Mandelker and Rhee (1984). We estimate regressions of changes to the natural logarithm of SG&A to changes to log sales and its interaction with the *LLR* indicator variable. The dependent variable *change in log SG&A* is defined as the natural logarithm of SG&A costs in period *t* over the log of SG&A in *t-1*; change in log sales follows a similar definition but uses as a reference the total revenue of the firm, while *LLR* is the indicator variable, which is switched on after the fourth quarter of 2017.

[Insert Table 3 about here]

Across all four columns in Table 3, both changes to sales and sales after LLR are significant—although exhibiting different levels of statistical significance—and with the expected signs as given by the hypothesis. Column 3 provides estimates with the inclusion of firm covariates, while in Column 4 the estimation is run on covariates interacted with the LLR indicator variable. At the most granular of settings (Column 4), a 1% change in sales after the end of the compulsory union contribution represents an increase of 0.035% (= 0.260-0.225) in SG&A costs, which in turn is close to a 14% change (= 0.035/0.26) in sales before enactment of the law. This estimate suggests that the degree of operating leverage, through relaxation of labor rigidity, is significantly reduced after the end of the union contribution.

4.4 Industry specificity: heterogeneous effect and cross-sectional heterogeneity

Industries may respond differently to labor market outcomes, since their inherent characteristics impose requirements such as specific skills of the labor force, which impact their cash management policies (Ghaly, Dang and Stathopoulos, 2017). However, industries’ time-invariant characteristics are swept away with the introduction of firm (industry) fixed effects. Brazilian anecdotal evidence (IBGE, 2018) shows that a growing share of unionization stems from general industry and trade, i.e., manufacturing. Although union membership has fallen year after year, if unions exert pressure over firms’ financing decisions on an ex ante (bargaining) or ex post (financial flexibility) basis, this effect should be more pronounced for manufacturing firms. Thus, we estimate the effects of operating leverage after the reform on subsamples identified by an indicator variable that is set to 1 for firms within the 19 to 40 two-digit SIC code range, and 0 otherwise. Estimates are presented in Table 4.

[Insert Table 4 about here]

In all columns identified with the manufacturing sector, both operating leverage and its effect after the reform are economically and statistically significant, whereas for firms that are not identified as part of the manufacturing sector, the degree of operating leverage—both before and after the fourth quarter of 2017—is indistinguishable from zero. The coefficients of the interaction terms once we add firm fixed effects, quarter-year fixed effects and firm-level covariates remain stable, ranging from a -2.32 to -2.26 p.p. effect on cash holdings for each 10 p.p. change to operating leverage after enactment of the law for the subsample of manufacturing firms. Focusing on the most granular setting in Table 4 (Column 5), the result indicates that after enactment of the

law, the effect of operating leverage on cash holdings decreases by 2.26 p.p. for each 10 p.p. of operating leverage. All these estimates are statistically significant at mixed statistical inference levels, but never falling short of the usual 5% level. For manufacturing firms, a one standard deviation change in operating leverage after the labor reform represents an effect of almost R\$28 million ($= -0.226 \times 0.086 \times \text{mean cash values for manufacturing firms}$; US\$7 million) in decreased cash values. Note that, as indicated in previous estimates, Columns 3 and 4 are estimated with the usual covariates without any sort of adjustment to avoid confoundedness, while estimates in Columns 5 and 6 are the result of regression of the dependent variable on the interaction between covariates and the post indicator variable.

In Table 5, we estimate a framework that considers the interaction of industry and quarter-year fixed effects. The reasoning is as follows: firms' inherent characteristics, such as industrial classification, already embed some unionization characteristics. However, since union strength varies over time, the sole adoption of industry (or firm) fixed effects fails to capture such variation. Since union data are aggregated at the industry level, controlling for industry interacted with quarter-year aims to control for changing industry trends and shocks, not only correlated with unionization, but also other factors such as productivity, economic, and/or sales shocks, which may impose biases on the estimates. Across all columns estimated on the subsample of manufacturing firms, the effects of operating leverage after enactment of the law, in tandem with operating leverage before the law, present similar estimates to those in the baseline results—all economically and statistically significant at the 5% level. Our setting provides further evidence and alleviates endogeneity concerns over particular shocks to a specific set of industries driving the results. Finally, the cautious reader may question whether unionization rates should be adopted in the estimation to avoid any confoundedness. Since industry unionization rates are recorded at yearly frequency, one can argue that over a such a small quarterly horizon, these figures are much more stable than a year-based estimate.

[Insert Table 5 about here]

4.5 Effects of LLR on cash holdings: financial constraints

The financial constraints literature posits that the precautionary motive to hoard cash is more prevalent in constrained firms (Almeida, Campello and Weisbach, 2004). However, firms may exhibit constrained behavior even when they are not constrained, according to the degree of stickiness of their fixed costs (Kahl, Lunn and Nilsson, 2019). Next, we investigate how passage of the labor bill has affected the cash holdings of constrained and unconstrained Brazilian firms, through the operating leverage channel. Firms are characterized as constrained (unconstrained) according to whether they are above (below) the median of the distribution of the KZ (Kaplan and Zingales, 1997), SA (Hadlock and Pierce, 2010), and WW (Whited and Wu, 2006) indexes. For this set of estimates, we present results where the covariates interact with the shock variable.

[Insert Table 6 about here]

Table 6 presents the results of estimates on each subsample (constrained or unconstrained), as well as how each of these financial constraint measures are constructed. Columns 1 and 2 separate firms according to the KZ index, while Columns 3 and 4 correspond to the estimation procedure under the classification of the SA index.

Finally, Columns 5 and 6 present the estimates from the partition of constrained/unconstrained classification using the WW index. To some extent, estimates from the SA and WW index indicate that unconstrained firms were responsive to the labor reform while constrained firms were not. This may seem puzzling at first, however, it may indicate the hypothesis of Kahl, Lunn and Nilsson (2019)—that is, if unconstrained firms exhibit constrained behavior through increased operating leverage, a reduction of the effect of operating leverage through less rigid costs may induce such firms to change their cash policies. More precisely, estimates from Column 4 (Column 6) indicate that a 10 p.p. increase in operating leverage after enactment corresponds to a decrease of 2.05 (3.45) p.p. to the cash-to-assets ratio, both significant at the 5% level. Further, the effects of operating leverage before the reform are highly economically and statistically significant at the 1% level. The estimates from the KZ index indicate that both constrained and unconstrained firms are indifferent to the shock, since their cash holdings are unchanged after the LLR. Note that opposing effects regarding the KZ index are already documented in the literature, which may raise questions about the validity of the KZ index as a measure of financial constraint (Almeida, Campello and Weisbach, 2004; Hadlock and Pierce, 2010).

Next, to avoid the influence of any specific classification distortion that may be borne out of the estimations of the KZ, SA, or WW indexes, we categorize a firm as constrained/unconstrained only if all three measures classify these observations accordingly. The attentive reader should recall that for each specific financing constraint index (KZ, SA, or WW), the distribution is split between unconstrained and constrained firms according to their position (whether below or above the median). Thus, when we aggregate using the “synthetic” indicator, only a set of 127 (941) firm-quarters is characterized as constrained (unconstrained). Focusing exclusively on unconstrained firms to further analyze whether unconstrained firms may behave as constrained, we estimate a more granular setting where observations are characterized as high or low fixed costs according to their position in the operating leverage distribution. Firms that are above (below) the median are identified as high (low) cost. If firms’ costs stickiness may differ to some extent, the degree of this rigidity may influence the decision to hoard cash due to a precautionary motive. By partitioning the sample into high and low fixed costs, operating leverage should be commensurate with how firms are positioned along the cost structure distribution. The attentive reader may question whether the choice of bundling firms into one singular financial constraint indicator may introduce additional noise, instead of providing a solution. It is worth mentioning that, according to the estimates from the KZ index in Table 5—which counterpoints the SA and WW index coefficients—one could argue this classification procedure could tilt results toward no significance or point toward an effect of the interaction term on constrained firms, thus going against our hypothesis. As Table 6 and Table 7 depict, this seems not to be the case.

Table 7 corresponds with the estimates on the degree of the cost structure. Indistinctly, across all columns of firms classified as high cost, the effect of the interaction term presents similar estimates, both economically and statistically significant at the 5% level. In turn, at the most granular setting (Column 5), an increase of 10 p.p. in the interaction term of interest leads to a decrease of 2.66 p.p., while before the law was enacted, the operating leverage impact on cash holdings considering the same variation of 1 p.p. was 2.74 p.p. to the cash-to-assets ratio. Finally, this result indicates that even unconstrained firms—when they are positioned above the median of the cost structure distribution—may hoard some of their cash for precautionary motives

(e.g., labor adjustment costs) due to cost “stickiness,” which in turn could lead to constrained behavior.

[Insert Table 7 about here]

4.6 Effects of LLR on cash holdings: uses of cash

With less restriction on cash holdings after the reform, excess cash could have been used to repay debt, pay dividends / repurchase shares, or even invest. Next, we investigate how this rigidity-free cash volume was used, by testing which variables show significant change after the LLR, in tandem with cash holdings. Across columns in Table 8, we use as the dependent variable leverage, net leverage (sum of short- and long-term debt minus cash), market leverage (leverage scaled by the market value of assets—the latter defined as the sum of short- and long-term debt plus market capitalization), total dividends paid (including repurchases) and capital expenditures—all scaled by total assets, except for market leverage. We restrict this battery of tests to the subsample of unconstrained firms, according to the synthetic financial constraint indicator classification, which is built as explained in section 4.5. All variables are winsorized at the usual 1% and 99% tails of the distribution.

[Insert Table 8 about here]

As Table 8 indicates, unconstrained firms’ leverage ratio shows significant change after enactment of the law (Column 1), at the 5% level. The effect of operating leverage after the fourth quarter of 2017 is significantly smaller than its effects before enactment—more precisely, a 10 p.p. change in operating leverage corresponds to a 2.61 p.p. decrease in debt. Also, this result is consistent with the hypothesis of the operating–financial leverage effect, as discussed in the recent literature. However, the effects of the interaction term provide an even larger reduction to leverage values. We hypothesize this set of unconstrained firms may have taken advantage of the diminished labor market rigidity to repay/rebalance their leverage ratios—tilting their cash policy toward a less stringent financial policy. Also, this effect is consistent with the hypothesis of diminishing firm risk by retiring debt (strategic motive), since labor claims and/or bargaining power are muted. As argued by Schmalz (2015), this result provides further evidence of the bargaining and financial flexibility motive coexisting with respect to labor friction and firm financial policy.

Also in Table 8, once we account for net leverage—which subtracts from the numerator the level of cash available from the sum of short- and long-term leverage, market leverage, and dividends paid, the effects of the reform are not statistically significant—except for market leverage values at the 10% level. The reason for this may be two-fold: first, market movements may already capture leverage changes through stock returns (Welch, 2004); second, the use of leverage values introduces noise to the estimate.

5. Robustness tests

5.1 Propensity score matched sample: LLR effects on unconstrained firms

A legitimate concern is that results may be driven by differences in the distribution of firms, i.e., observations being compared are considerably different from one another along their observational dimensions. To circumvent this issue, we match firms using a propensity score matching (PSM) procedure, by considering as “treated”

firms that are above the median of the cost structure distribution. The PSM includes firm covariates from the baseline regression, industry, and quarter-year indicator variables. The reliance on matching on industry and quarter-year variables accounts for unobserved heterogeneity that may be correlated with the effects of post-reform operating leverage. The matching procedure is estimated through a logit regression and a caliper of 0.01, seeking one exact match. Observations that are off the common support are excluded from the analysis. After obtaining estimates from this initial procedure, we run once again the baseline regression using propensity score as weights. Panel A of Table 9 illustrates the covariate balancing test, while Panel B presents estimates from the difference-in-differences regression framework with the aforementioned weighting scheme.

[Insert Table 9 about here]

Even after the matching procedure, the set of covariates, cashflow, acquisitions, and financial constraints (dividend dummy), exhibits some degree of difference—at varying degrees of statistical significance. All the other covariates exhibit no difference at the usual statistical inference levels. In Panel B, Columns 1 and 2 correspond to the difference-in-differences regression on the whole sample—excluding observations that are off common support—using the propensity scores as weights. As indicated, no significant changes to cash holdings occur before or after the labor reform (Column 1), but a statistically significant effect at the 10% level on both periods is evident, once we adjust the covariates to incorporate the effects of the shock (Column 2). Once the test focuses on the subsample of unconstrained firms, the effects estimated on the baseline framework persist. Strictly, the effect of a 10 p.p. change in operating leverage after the reform is a decrease of 2.54 p.p. on cash holdings; analogously, before the reform, the negative operating leverage effect on cash holdings is 2.48 p.p. for each 10 p.p. change to the cost structure. Further, since we estimate the effect of the LLR in a regression framework adjusting the covariates with the interaction of the shock variable, results are even stronger—a 10 p.p. increase after the reform is associated (and is economically significant) with a 2.62 p.p. decrease in cash ratios. Also, the effect before the law is still significant at the 1% level and represents a decrease of 2.60 p.p. to unconstrained firms' cash ratios. This change is close to the magnitude presented throughout this paper.

5.2 Seasonality effects: expanding the time horizon under analysis

Another issue that may taint estimates is a potential seasonality effect not captured by the quarter-year fixed effects. The hypothesis is as follows: since the period under scrutiny accounts for only one fourth quarter observation (namely, the fourth quarter of 2017), the linear model may fail to account for potential biases that may arise from inherent characteristics, such as dividend season, window dressing, auditing effects, and/or any other unobserved factor that may be correlated with accounting decisions for the closing of the fiscal/calendar year. To address these issues, we expand the horizon of analysis by including the fourth quarter of 2016 and the fourth quarter of 2018. We then estimate the baseline model under this setting—while preserving all other regression framework characteristics. The results are presented in Table 10.

[Insert Table 10 about here]

As Table 10 illustrates, estimates are not sensitive to any noise borne out of seasonality effects that the baseline linear model fails to account for: point estimates are

close to those estimated in previous tables and are economically significant, while presenting statistical significance at the 1% level—for operating leverage both before and after the LLR. In sum, the diminishing effect on operating leverage persists.

6. Conclusion

This paper shows how Brazilian firms' cash holdings are impacted by the LLR. The recent empirical literature discusses how labor adjustment costs impose policy restrictions on firms, through the bargaining and/or the financial flexibility motive. Consistent with the latter motive, we show that after LLR, the effect of operating leverage is weakened, i.e., it has a reduced impact on cash holdings. The mechanism that transmits this effect stems from a reduction in the sensitivity of SG&A costs to sales, after the reform. Also, we produce evidence that unconstrained, high fixed costs, and manufacturing firms are the subsamples most impacted by the reform.

These findings suggest that unconstrained firms may exhibit constrained behavior, even when they are not constrained—according to their cost structure; high fixed cost firms can undertake less conservative financial policies due to less stringent labor adjustment costs. In industries regarded as more prone to unionization or less labor specific, such as manufacturing, the curtailment in operating leverage is stronger. We also show that a less stringent effect on the cost structure leads to a change in cash policy, negatively impacting firm leverage. We posit that firms may retire debt to reduce risk, since restrictions imposed by labor market friction decline post-reform. This hypothesis is in line with the arguments of Schmalz (2015) that both the ex ante bargaining and ex post financial flexibility motives regarding labor frictions on firm policies can coexist.

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Figure 1. Trade Union Density – Percentage of Total Workforce

The figure shows the trade union density, the percentage of the total workforce, by country in 2016. Data from the International Labour Organization (ILO).

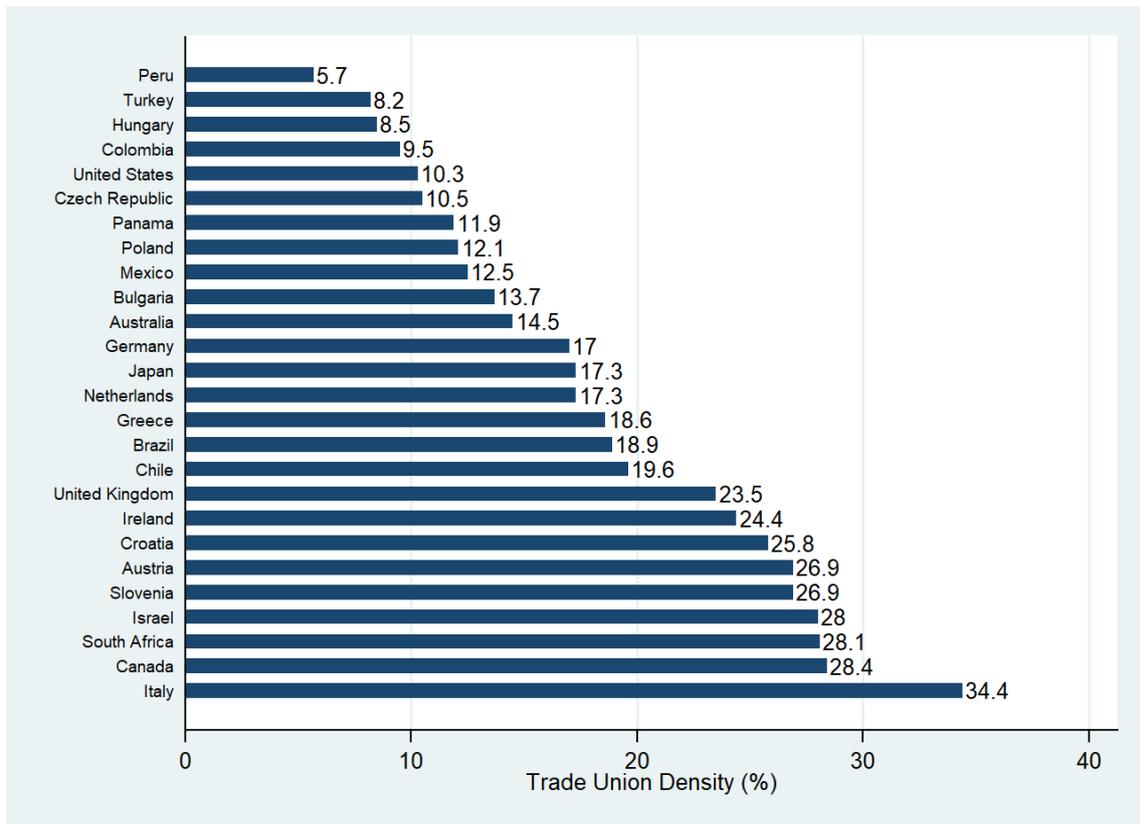


Figure 2. The Effect of the Enactment of the Labor Law Reform on Cash Holdings

This figure shows the effect of the Brazilian labor law reform (LLR), which turned union contributions voluntary, on cash holdings. The y-axis plots estimates from regressing cash holdings on quarter-year fixed effects and dummy variables regarding the period of the enactment of the law (4th quarter 2017). The x-axis denotes the quarter relative to the adoption. The dashed lines correspond to the upper and lower limit of the 90% confidence intervals. The sample period is from the 1st quarter of 2017 to the 3rd quarter of 2018, comprising 1,068 quarter-year observations.

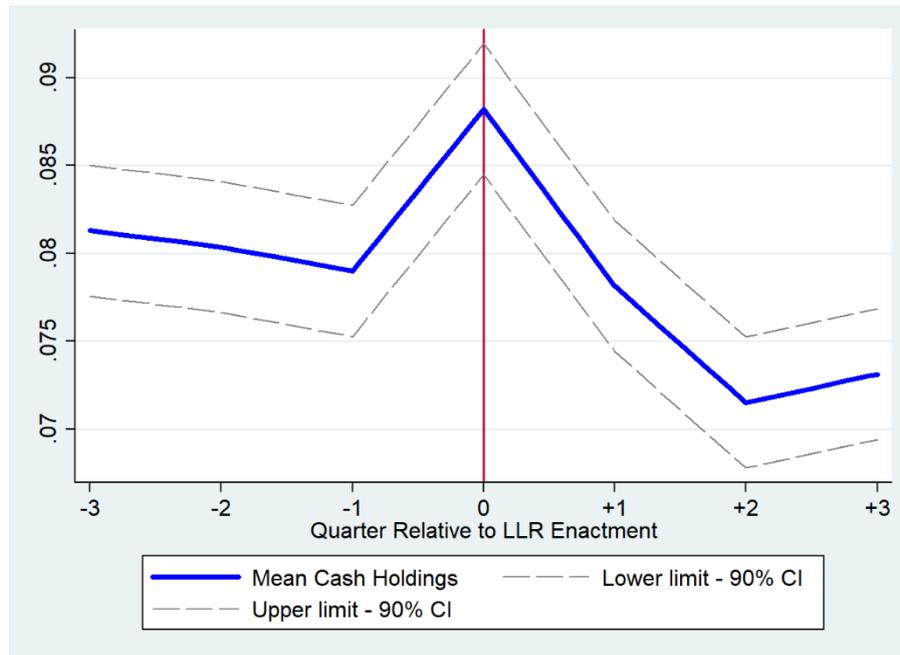


Table 1. Descriptive Statistics

This table reports descriptive statistics for the main variables. The sample consists of firms listed in B3 stock exchange (*Brasil Bolsa Balcão*), in the 2-digit SIC Code excluding the 4900-4999 and 6000-6999 intervals. Sample spans from the 1st quarter of 2017 to the 3rd quarter of 2018, which comprises 1,068 firm-quarter observations. All continuous variables are winsorized in the 1st and 99th percentiles.

	Mean	Std. Dev.	P25	Median	P75
Dependent Variable					
Cash holdings	0.079	0.073	0.022	0.058	0.114
Firm-level Data					
Cash flow	0.010	0.028	0.000	0.012	0.023
Net working capital	0.159	0.181	0.040	0.154	0.267
Capital expenditures	-0.007	0.007	-0.009	-0.005	-0.002
Leverage	0.189	0.159	0.053	0.162	0.290
Acquisitions	-0.001	0.005	0	0	0
Market-to-book	1.606	1.065	0.984	1.215	1.799
Size	7.924	1.820	6.715	7.805	9.057
Ind. CF volatility	0.024	0.017	0.011	0.019	0.029
Dividend dummy	0.419	0.494	0	0	1
Operating leverage	0.168	0.130	0.076	0.148	0.213

Table 2. Cash Holdings and the Labor Law Reform

This table reports the results of OLS regressions of cash holdings on the continuous intensity treatment variable $LLR \times$ Operating leverage for firms listed in B3 stock exchange (*Brasil Bolsa Balcão*) aggregated in the 2-digit codes excluding the intervals 4900-4999 and 6000-6999. $LLR \times$ Operating leverage is the interaction term for the period of the enactment of the Brazilian labor law reform with operating leverage. All firm-level variables are winsorized in the 1st and 99th percentile. Cluster-robust standard errors are estimated at the firm level unless otherwise listed and are reported in parenthesis. *, ** and *** indicate significance at the 10%, 5% and 1% level, respectively.

	(1)	(2)	(3)	(4)
LLR	0.024*			
	(0.010)			
LLR \times Op. leverage	-0.120**	-0.117*	-0.095	-0.121*
	(0.060)	(0.064)	(0.061)	(0.062)
Operating leverage	-0.129**	-0.126**	-0.110*	-0.130**
	(0.059)	(0.063)	(0.059)	(0.060)
Cash flow			-0.033	-0.044
			(0.045)	(0.057)
Net working capital			0.131***	0.015
			(0.037)	(0.017)
Capital expenditures			0.229	0.224
			(0.320)	(0.319)
Leverage			-0.007	0.021
			(0.040)	(0.031)
Acquisitions			0.561	1.157***
			(0.369)	(0.363)
Market-to-book			0.028	0.003
			(0.017)	(0.003)
Size			0.037	-0.002
			(0.030)	(0.002)
Ind. CF volatility			0.135	0.200
			(0.145)	(0.145)
Dividend dummy			0.005	0.002
			(0.004)	(0.005)
Firm Fixed Effects	Yes	Yes	Yes	Yes
Quarter-Year Fixed Effects	No	Yes	Yes	Yes
Observations	1,068	1,068	1,068	1,068
Adjusted R ²	0.791	0.796	0.809	0.799

Table 3. Change in SG&A: Sensitivity to Change in Sales After the LLR

This table reports the results of OLS regressions of $\Delta\text{Log SG\&A}$ on $\Delta\text{Log Sales} \times \text{LLR}$ for firms listed in B3 stock exchange (*Brasil Bolsa Balcão*) aggregated in the 2-digit codes excluding the intervals 4900-4999 and 6000-6999. LLR is an indicator variable that indicates the period after the 4th quarter of 2017. All firm-level variables are winsorized in the 1st and 99th percentile. Cluster-robust standard errors are estimated at the firm level unless otherwise listed and are reported in parenthesis. *, ** and *** indicate significance at the 10%, 5% and 1% level, respectively.

	(1)	(2)	(3)	(4)
$\Delta\text{Log Sales}$	0.346*** (0.089)	0.269** (0.107)	0.257*** (0.107)	0.260** (0.108)
$\Delta\text{Log Sales} \times \text{LLR}$	-0.223*** (0.077)	-0.214** (0.106)	-0.216** (0.106)	-0.225** (0.111)
LLR	0.042*** (0.012)			
Firm-Level Controls	No	No	Yes	Yes
Firm Fixed Effects	No	Yes	Yes	Yes
Quarter-Year FE	No	Yes	Yes	Yes
Observations	1,015	1,015	1,015	1,015
Adjusted R ²	0.079	0.008	0.020	0.017

Table 4. Cash Holdings and the LLR: Manufacturing Firms

This table reports the results of OLS regressions of cash holdings on the continuous intensity treatment variable $LLR \times$ Operating leverage for subsamples of manufacturing and non-manufacturing firms listed in B3 stock exchange (*Brasil Bolsa Balcão*) aggregated in the 2-digit codes excluding the intervals 4900-4999 and 6000-6999. $LLR \times$ Operating leverage is the interaction term for the period of the enactment of the Brazilian labor law reform with operating leverage. Firms within the 19-40 2-digit SIC code interval are considered as the manufacturing sector. All firm-level variables are winsorized in the 1st and 99th percentile. Cluster-robust standard errors are estimated at the firm level unless otherwise listed and are reported in parenthesis. *, ** and *** indicate significance at the 10%, 5% and 1% level, respectively.

Manufacturing	Yes	No	Yes	No	Yes	No
	(1)	(2)	(3)	(4)	(5)	(6)
LLR	0.041** (0.014)	0.011 (0.013)				
$LLR \times$ Op. leverage	-0.226*** (0.082)	-0.032 (0.049)	-0.238*** (0.089)	-0.012 (0.058)	-0.226** (0.090)	-0.036 (0.051)
Operating leverage	-0.230*** (0.080)	-0.041 (0.055)	-0.228*** (0.080)	-0.032 (0.065)	-0.213** (0.083)	-0.053 (0.059)
Cash flow			0.020 (0.053)	-0.054 (0.071)	-0.017 (0.084)	-0.034 (0.070)
Net working capital			0.119*** (0.040)	0.159*** (0.059)	0.019 (0.023)	0.031 (0.029)
Capital expenditures			-0.046 (0.527)	0.272 (0.304)	-0.186 (0.556)	0.519 (0.381)
Leverage			-0.019 (0.038)	-0.015 (0.087)	0.032 (0.033)	0.025 (0.060)
Acquisitions			1.055** (0.519)	-0.094 (0.390)	1.565*** (0.457)	0.215 (0.299)
Market-to-book			0.026 (0.023)	0.040 (0.025)	0.006** (0.003)	-0.002 (0.004)
Size			0.058 (0.038)	0.052 (0.044)	-0.003 (0.002)	-0.002 (0.002)
Ind. CF volatility			0.337** (0.166)	-0.330 (0.228)	0.361 (0.236)	0.042 (0.221)
Dividend dummy			0.007 (0.005)	0.004 (0.005)	0.004 (0.006)	0.003 (0.006)
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Quarter-Year FE	No	No	Yes	Yes	Yes	Yes
Observations	570	498	570	498	570	498
Adjusted R ²	0.825	0.727	0.840	0.755	0.837	0.733

Table 5. Cash Holdings and the LLR: Cross-sectional Heterogeneity

This table reports the results of OLS regressions of cash holdings on the continuous intensity treatment variable $LLR \times$ Operating leverage for subsamples of manufacturing and non-manufacturing firms listed in B3 stock exchange (*Brasil Bolsa Balcão*) aggregated in the 2-digit codes excluding the intervals 4900-4999 and 6000-6999. $LLR \times$ Operating leverage is the interaction term for the period of the enactment of the Brazilian labor law reform with operating leverage. Firms within the 19-40 2-digit SIC code interval are considered as the manufacturing sector. All firm-level variables are winsorized in the 1st and 99th percentile and pre-dated to the respective shock. Cluster-robust standard errors are estimated at the firm level unless otherwise listed and are reported in parenthesis. *, ** and *** indicate significance at the 10%, 5% and 1% level, respectively.

Manufacturing	Yes	No	Yes	No
	(1)	(2)	(3)	(4)
LLR \times Op. leverage	-0.206** (0.099)	-0.042 (0.072)	-0.209** (0.103)	-0.073 (0.086)
Operating leverage	-0.215** (0.098)	-0.011 (0.074)	-0.222** (0.103)	-0.025 (0.081)
Firm Controls	No	No	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes	Yes
Industry \times Quarter-Year FE	Yes	Yes	Yes	Yes
Observations	570	498	570	498
Adjusted R ²	0.819	0.739	0.823	0.746

Table 6. Cash Holdings and the LLR: the Effect of Financial Constraints

This table reports the results of OLS regressions of cash holdings on the continuous intensity treatment variable $LLR \times$ Operating leverage for financially constrained and unconstrained firms listed in B3 stock exchange (*Brasil Bolsa Balcão*) aggregated in the 2-digit codes excluding the intervals 4900-4999 and 6000-6999. $LLR \times$ Operating leverage is the interaction term for the period of the enactment of the Brazilian labor law reform with operating leverage. Firms are characterized according to their rank by the KZ, SA, and WW index. The KZ index is defined as $-1.002 \times$ Cash flow $+ 0.283 \times$ Market-to-book $+ 3.139 \times$ Debt $-39.368 \times$ Dividends $-1.315 \times$ Cash holdings, while SA is $-0.737 \times$ Size $+ 0.043 \times$ Size² $-0.040 \times$ Age, lastly the WW index is defined as $-0.091 \times$ Cash flow $-0.062 \times$ Dividend dummy $+ 0.021 \times$ Long-term debt $-0.044 \times$ Size $+ 0.102 \times$ Industry sales growth $- 0.035 \times$ Sales growth. Firms above (below) median of the distribution of each index are considered constrained (unconstrained). All firm-level variables are winsorized in the 1st and 99th percentile. Cluster-robust standard errors are estimated at the firm level unless otherwise listed and are reported in parenthesis. *, ** and *** indicate significance at the 10%, 5% and 1% level, respectively.

	KZ index		SA index		WW index	
	Const.	Unconst.	Const.	Unconst.	Const.	Unconst.
LLR \times Op. leverage	-0.151 (0.095)	-0.177 (0.107)	-0.039 (0.051)	-0.205** (0.088)	-0.064 (0.068)	-0.345** (0.141)
Operating leverage	-0.148 (0.100)	-0.205** (0.095)	-0.041 (0.054)	-0.219*** (0.077)	-0.050 (0.072)	-0.358*** (0.133)
Cash flow	-0.040 (0.135)	-0.055 (0.070)	-0.029 (0.087)	-0.050 (0.073)	-0.053 (0.080)	-0.068 (0.125)
Net working capital	0.046 (0.034)	0.014 (0.026)	0.023 (0.028)	0.009 (0.025)	0.009 (0.021)	0.028 (0.033)
Capital expenditures	-0.298 (0.599)	0.430 (0.331)	0.016 (0.472)	0.252 (0.359)	-0.018 (0.443)	0.315 (0.560)
Leverage	0.049 (0.062)	0.035 (0.076)	0.034 (0.046)	-0.006 (0.038)	0.017 (0.040)	0.023 (0.047)
Acquisitions	0.700* (0.400)	1.494** (0.577)	0.485** (0.021)	2.075*** (0.500)	0.471 (0.472)	1.229*** (0.343)
Market-to-book	0.007 (0.005)	-0.002 (0.005)	0.001 (0.004)	0.000 (0.007)	0.002 (0.004)	0.007 (0.005)
Size	-0.003 (0.002)	-0.000 (0.002)	-0.001 (0.002)	-0.003 (0.003)	0.000 (0.003)	0.001 (0.004)
Ind. CF volatility	0.245 (0.244)	0.160 (0.210)	0.349 (0.247)	0.187 (0.247)	0.345 (0.217)	0.042 (0.207)
Dividend dummy	-0.005 (0.006)	0.002 (0.007)	0.009 (0.008)	0.003 (0.006)	0.012 (0.011)	-0.003 (0.007)
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Quarter-Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	518	550	509	559	541	527
Adjusted R ²	0.810	0.821	0.744	0.858	0.819	0.760

Table 7. Cash Holdings and the LLR: High Fixed Costs Firms

This table reports the results of OLS regressions of cash holdings on interaction term $LLR \times$ Operating leverage for a subsample of above and below the median of the operating leverage distribution for unconstrained firms listed in B3 stock exchange (*Brasil Bolsa Balcão*) aggregated in the 2-digit codes, excluding the intervals 4900-4999 and 6000-6999. Firms are characterized as high costs when they are above the median of the operating leverage distribution. All firm-level variables are winsorized in the 1st and 99th percentile. Firm-level covariates interact with the respective shock variable. Cluster-robust standard errors are estimated at the firm level unless otherwise listed and are reported in parenthesis. *, ** and *** indicate significance at the 10%, 5% and 1% level, respectively.

Degree of Cost Structure	High	Low	High	Low	High	Low
	(1)	(2)	(3)	(4)	(5)	(6)
LLR	0.006 (0.012)	0.007 (0.010)				
LLR \times Op. leverage	-0.245** (0.106)	-0.251 (0.171)	-0.265** (0.117)	-0.264 (0.177)	-0.266** (0.123)	-0.261 (0.168)
Operating leverage	-0.258*** (0.095)	-0.284 (0.198)	-0.275*** (0.103)	-0.293 (0.205)	-0.274** (0.110)	-0.263 (0.177)
Cash flow					-0.032 (0.112)	-0.070 (0.085)
Net working capital					0.005 (0.031)	0.024 (0.021)
Capital expenditures					0.277 (0.575)	0.131 (0.423)
Leverage					-0.033 (0.034)	0.063 (0.053)
Acquisitions					2.747*** (0.587)	0.635 (0.481)
Market-to-book					-0.001 (0.005)	0.009 (0.009)
Size					0.002 (0.003)	-0.004 (0.003)
Ind. CF volatility					0.167 (0.293)	0.171 (0.178)
Dividend dummy					0.003 (0.008)	-0.003 (0.006)
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Quarter-Year FE	No	No	Yes	Yes	Yes	Yes
Observations	459	482	459	482	459	482
Adjusted R ²	0.767	0.828	0.775	0.829	0.784	0.834

Table 8. Effects of the LLR on cash holdings: uses of cash

This table reports the results of OLS regressions of leverage, net leverage, market leverage, dividend to assets and capital expenditures on the interaction term LLR \times Operating leverage for a subsample of unconstrained firms listed in B3 stock exchange (*Brasil Bolsa Balcão*) aggregated in the 2-digit codes, excluding the intervals 4900-4999 and 6000-6999. Firms are characterized as unconstrained according to the synthetic indicator as of Section 3.5. All firm-level variables are winsorized in the 1st and 99th percentile. Firm-level covariates interact with the respective shock variable. Cluster-robust standard errors are estimated at the firm level unless otherwise listed and are reported in parenthesis. *, ** and *** indicate significance at the 10%, 5% and 1% level, respectively.

	Leverage	Net Leverage	Market Leverage	Dividends to Assets	CAPEX
	(1)	(2)	(3)	(4)	(5)
LLR \times Op. leverage	-0.261** (0.109)	-0.027 (0.109)	-0.180* (0.099)	-0.015 (0.014)	-0.012 (0.008)
Operating leverage	-0.246** (0.101)	-0.006 (0.094)	-0.160 (0.101)	-0.010 (0.015)	-0.010 (0.008)
Cash flow	-0.072 (0.078)	-0.026 (0.096)	0.159 (0.129)	0.146*** (0.035)	-0.010 (0.018)
Net working capital	0.064** (0.028)	0.050 (0.032)	0.076** (0.035)	-0.001 (0.005)	-0.001 (0.002)
Capital expenditures	-0.128 (0.476)	-0.403 (0.553)	-0.243 (0.733)	0.100 (0.075)	
Leverage				-0.000 (0.004)	0.000 (0.002)
Acquisitions	0.411 (0.616)	-0.943 (0.728)	-0.142 (0.389)	0.065 (0.063)	0.016 (0.073)
Market-to-book	-0.006 (0.005)	-0.008 (0.007)	-0.007 (0.006)	0.003* (0.002)	0.000 (0.000)
Size	0.002 (0.003)	0.003 (0.004)	0.007 (0.005)	-0.000 (0.000)	-0.000 (0.000)
Ind. CF volatility	0.385 (0.298)	0.218 (0.306)	0.679 (0.643)	0.001 (0.038)	-0.065*** (0.023)
Dividend dummy	0.005 (0.005)	0.006 (0.006)	0.007 (0.006)	-0.007*** (0.001)	-0.001 (0.000)
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes
Quarter-Year FE	Yes	Yes	Yes	Yes	Yes
Observations	941	941	941	941	941
Adjusted R ²	0.944	0.915	0.962	0.451x'	0.648

Table 9. Propensity Score Matching

This table reports the results of OLS regressions using the propensity score as weights of cash holdings on the continuous intensity treatment variable $LLR \times$ Operating leverage for firms listed in B3 stock exchange (*Brasil Bolsa Balcão*) aggregated in the 2-digit codes excluding the intervals 4900-4999 and 6000-6999. $LLR \times$ Operating leverage is the interaction term for the period of the enactment of the Brazilian labor law reform with operating leverage. A firm is considered ‘treated’ when they are positioned above the median of the cost structure distribution. Panel A presents the covariate balancing and Panel B presents the results of the shock on firms’ cash holdings for the whole sample and unconstrained firms. All firm-level variables are winsorized in the 1st and 99th percentile. In Panel B regressions are estimated first using unadjusted firm-level covariates, while covariates listed as adjusted interact with the respective shock. Cluster-robust standard errors are estimated at the firm level unless otherwise listed and are reported in parenthesis. *, ** and *** indicate significance at the 10%, 5% and 1% level, respectively.

Panel A: Matched Sample Means			
	Control (Obs.541)	Treatment (Obs.523)	t-statistic difference in means
Cash flow	0.013	0.008	2.80***
Net working capital	0.179	0.161	-1.50
Capital Expenditures	-0.007	-0.007	-1.35
Leverage	0.173	0.174	-0.11
Acquisitions	-0.001	-0.001	-2.02**
Market-to-book	1.696	1.675	0.27
Size	7.664	7.683	-0.18
Ind. CF volatility	0.023	0.022	1.49
Dividend dummy	0.421	0.363	1.90*

(Continued)

Table 9. Continued

	Whole Sample		Unconstrained Sample	
LLR × Op. leverage	-0.125 (0.081)	-0.145* (0.079)	-0.254*** (0.080)	-0.262*** (0.095)
Operating leverage	-0.126 (0.077)	-0.145* (0.077)	-0.248*** (0.072)	-0.260*** (0.087)
Firm Covariates	Yes	Yes, adj.	Yes	Yes, adj.
Firm Fixed Effects	Yes	Yes	Yes	Yes
Quarter-Year FE	Yes	Yes	Yes	Yes
Observations	787	787	688	688
Adjusted R ²	0.813	0.803	0.838	0.828

Table 10. Cash Holdings and the Labor Law Reform: seasonality effects

This table reports the results of OLS regressions of cash holdings on the continuous intensity treatment variable $LLR \times$ Operating leverage for firms listed in B3 stock exchange (*Brasil Bolsa Balcão*) aggregated in the 2-digit codes excluding the intervals 4900-4999 and 6000-6999, expanding the time frame under analysis by including the 4th quarter of 2016 and the 4th quarter of 2018. $LLR \times$ Operating leverage is the interaction term for the period of the enactment of the Brazilian labor law reform with operating leverage. All firm-level variables are winsorized in the 1st and 99th. Column 3 provides estimates where the covariates are unadjusted, whereas Column 4 provides estimates where covariates interact with the respective shock. Cluster-robust standard errors are estimated at the firm level unless otherwise listed and are reported in parenthesis. *, ** and *** indicate significance at the 10%, 5% and 1% level, respectively.

	(1)	(2)	(3)	(4)
LLR	0.001 (0.005)			
LLR \times Op. leverage	-0.128*** (0.038)	-0.143*** (0.042)	-0.135*** (0.040)	-0.149*** (0.043)
Operating leverage	-0.141*** (0.0382)	-0.154*** (0.041)	-0.153*** (0.038)	-0.158*** (0.042)
Cash flow			-0.064 (0.039)	-0.089 (0.072)
Net working capital			0.137*** (0.040)	0.108** (0.045)
Capital expenditures			0.036 (0.252)	0.254 (0.300)
Leverage			-0.038 (0.032)	-0.076 (0.063)
Acquisitions			0.607** (0.282)	0.803* (0.467)
Market-to-book			0.031* (0.016)	0.022 (0.027)
Size			0.041 (0.028)	0.053 (0.067)
Ind. CF volatility			0.091 (0.133)	0.111 (0.305)
Dividend dummy			0.003 (0.003)	-0.004 (0.006)
Firm Fixed Effects	Yes	Yes	Yes	Yes
Quarter-Year Fixed Effects	No	Yes	Yes	Yes
Observations	1,362	1,362	1,362	1,361
Adjusted R ²	0.767	0.772	0.787	0.777

A1. Definition of Variables

All firm-quarter variables are extracted from Standard & Poor's Capital IQ database. Variables are winsorized in the 1st and 99th percentile.

Variable	Description
Cash Holdings	Cash and cash equivalents to total assets
Net Working Capital	Current assets minus current liabilities to total assets
Cashflow	Earnings after interest, taxes, and dividends, but before depreciation to total assets
Leverage	Sum of short- and long-term debt to total assets
Acquisitions	Acquisitions to total assets
Market-to-book	Book value of assets plus market capitalization less book value of equity to total assets
Size	Natural logarithm of total assets
CAPEX to total assets	Capital expenditures to total assets
Industry Cashflow	Rolling standard deviation for each firm-quarter over the previous 4 quarters averaged by industry
Dividend dummy	Indicator variable set to 1 when a firm pays dividends. Financial constraint proxy
Operating leverage	Sum of Costs of Goods Sold (COGS) and Selling, General and Administrative (SG&A) to total assets
LLR	Labor law reform indicator variable which is set to 1 for the period after the 4 th quarter of 2017
$\Delta \text{ Log SG\&A}$	Natural logarithm of SG\&A_t over SG\&A_{t-1}
$\Delta \text{ Log Sales}$	Natural logarithm of Sales_t over Sales_{t-1}
KZ index	$= -1.002 \times \text{Cashflow} + 0.283 \times \text{Market-to-book} + 3.319 \times \text{Leverage} + 39.368 \times \text{Dividends to assets} - 1.315 \times \text{Cash holdings}$
SA index	$= -0.737 \times \text{Size} + 0.043 \times \text{Size}^2 - 0.04 \times \text{Age}$

(Continued)

A1. Continued

WW index	$= -0.091 \times \text{Cashflow} - 0.62 \times \text{Dividend}$ $\text{dummy} + 0.021 \times \text{Long-term debt}$ $0.44 \times \text{Size} + 0.102 \times \text{Industry growth} -$ $0.035 \times \text{Sales growth}$
Degree of Operating Leverage (DOPL)	Indicator variable set to 1 when a firm is above the median of the operating leverage distribution
Market leverage	Sum of short- and long-term debt to the market value of assets (total assets plus market capitalization minus total equity)
Net Leverage	Total debt (sum of short- and long-term debt) minus cash and equivalents to total assets
Dividends to assets	Sum of total dividends paid (including repurchases) to total assets
