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Does the deleveraging policy increase corporate labor outsourcing? —Evidence from China

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ABSTRACT

We examine how firms use labor outsourcing to reduce costs and enhance competitiveness under China's deleveraging policy. Using data on A-share listed firms from 2013 to 2019, our difference-in-differences estimates show the policy increased labor outsourcing levels by 61.5 %. Channel analysis indicates that highly leveraged firms face financing constraints and elevated default risks, prompting cost-reduction strategies through greater outsourcing. By adjusting both the scale and structure of outsourcing and internal employment, firms shift noncore activities to specialized providers while hiring more high-skilled labor internally. This reallocation channels resources toward core functions and high-value-added activities (capital investment with research and development), achieving cost savings and strengthening competitiveness.

1. Introduction

Leverage is a double-edged sword in economic development because it facilitates capital acquisition and investment and supports growth (Jermann and Quadrini, 2012). However, excessive leverage heightens macroeconomic vulnerabilities and financial instability (Mian and Sufi, 2014). After the 2008 global financial crisis, many economies adopted deleveraging policies to reduce systemic risk and promote sustainable growth. In developing countries, the leverage ratio of Chinese nonfinancial firms climbed from 93.1 % in 2008 to over 150 % by 2015, prompting the government to launch a formal deleveraging policy in 2016 to curb financial risk and excessive corporate debt.

By tightening lending standards or raising financing costs, deleveraging acts as an external financial shock that disproportionately limits credit for highly leveraged firms. Facing greater risks of financing difficulties and default (Chen et al., 2022; Qiu and Cheng, 2022), these firms are compelled to restructure operations to preserve liquidity and stability (Benmelech et al., 2021). An increasingly common response is labor outsourcing (Chen and Liu, 2025; Jiménez and Rendon, 2025). From a transaction cost economics perspective, financial stress erodes internal coordination efficiency, encouraging firms to outsource noncore activities to specialized providers to lower transaction costs (Chen and Liu, 2025; Coase, 1993; Williamson, 1981). Labor market rigidity theory further suggests that firms in regulated environments adopt outsourcing to circumvent restrictions on labor adjustments (Handwerker, 2023; Saint-Paul, 1996). Replacing fixed employment with outsourced labor reduces payroll burdens, avoids long-term contractual commitments, and increases flexibility in managing cost pressures (Benmelech et al., 2021; Giroud and Mueller, 2017). Outsourcing thus

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becomes a mechanism for financially constrained firms to reallocate resources, limit labor hoarding, and sustain productivity (Handwerker, 2023). This aligns with input substitutability theory (Arrow et al., 1961; Gechert et al., 2022) under financial frictions and with empirical evidence linking credit shocks to firm-level employment decisions (Falato and Liang, 2016). Yet no systematic study has examined how deleveraging affects firms' internal and external labor reallocation or the strategic intentions behind such adjustments. Empirical analysis is further complicated by the endogeneity between financial constraints and employment decisions.

To address this gap, we exploited China's 2016 deleveraging policy as a quasi-natural experiment and applied a difference-in-differences (DID) design, using variation in firms' leverage levels to identify how deleveraging influences outsourcing as a cost-reduction and competitiveness strategy.

This study contributes to several strands of literature. First, it expands research on determinants of firm-level outsourcing. While prior work emphasizes specialization demand (Berlingieri, 2014), dismissal costs (Espinosa, 2021), labor market regulations (Jiménez and Rendon, 2025), social security contributions (Pang and Zhou, 2024), and climate policy uncertainty (Li et al., 2025), we highlight financial constraints (i.e., deleveraging) as a critical but underexplored driver. Second, we contribute to literature on labor market effects of financial constraints, showing that changes in external financial conditions shape employment decisions. Since labor cannot serve as collateral, credit tightening often reduces labor demand (Benmelech et al., 2021; Bentolila et al., 2018; Yuan and Yu, 2025). We extend this analysis beyond internal employment to include external labor outsourcing. Finally, our findings inform debates on deleveraging's economic consequences in emerging markets. Although prior research focuses on investment efficiency, debt costs, default risk, and cost stickiness (Chen et al., 2022; Qiu and Cheng, 2022; Wang et al., 2025), we reveal broader labor market implications, particularly the unintended rise in outsourcing.

2. Data and methodology

2.1. Empirical strategy and variables

We employ a DID model to assess the impact of the deleveraging policy shock on firm labor outsourcing, as shown in Eq. (1). Our identification strategy relies on prepolicy differences in firm leverage that influence outsourcing decisions exogenously. First, leverage levels before 2016 were stable, largely determined by historical investment, industry characteristics, and ownership, and bore little relation to outsourcing tendencies. Second, the deleveraging policy was highly exogenous: it targeted systemic financial risk prevention, was implemented nationwide, and was not systematically linked to firm-specific traits. Third, firms could not anticipate either the policy's implementation or its effects on financing, making it difficult to adjust outsourcing strategies in advance.

$$LaborOuts_{it} = \beta_0 + \beta_1 Leverage_{i,2015} \times Post_t + \lambda \mathbf{X}'_{i,t-1} + \mu_i + \eta_t + ProvTrend_{pt} + IndTrend_{jt} + \varepsilon_{it} \quad (1)$$

Subscript i denotes the firm, and t denotes the year. The dependent variable, $LaborOuts_{it}$, is the firm's level of labor outsourcing, calculated as the annual salary expenditure for outsourced labor divided by the firm's total salary expense, multiplied by 100.[2] The treatment variable, $Leverage_{i,2015}$, is the firm's leverage ratio (total liabilities to total assets) in 2015, prior to the shock. The policy shock variable, $Post_t$, equals one for 2016 and later years and zero otherwise. $\mathbf{X}'_{i,t-1}$ represents the set of control variables lagged one period. These include firm size *Size* (natural logarithm of total assets), firm age *Age* (natural logarithm of number of years listed), return on assets *Roa* (net profit divided by total assets), top shareholder shareholding ratio *Top*1, Tobin's Q *tobinQ* (market capitalization divided by total assets), nature of property rights *Soe* (dummy variable for state ownership), and operating profit margin*Profit* (operating revenue profit rate). The model also includes year fixed effects η_t, firm fixed effects μ_i, and provincial and industry time trends.

2.2. Data and sample

Our sample comprises Chinese A-share listed firms from 2013 to 2019. Labor outsourcing data were collected from listed companies' annual reports, and financial data were drawn from the CSMAR database. Table A.1 reports descriptive statistics for the main variables and the distribution of outsourcing wages among firms that use outsourced labor.

3. Main results

3.1. Baseline results

Table 1 shows that, on average, the deleveraging policy increased firm labor outsourcing by 61.5 % (0.972/1.58 × 100 %), a change of strong economic significance. Fig. A.1 presents the parallel trends test results for the baseline model.

[2] This measurement reflects the reliance on outsourcing labor well, but has limitations. On one hand, it only considers wage-related outsourcing costs, while nonwage outsourcing like project and technical service outsourcing is common. These aren't directly shown in wage costs but are key parts of labor outsourcing, possibly leading to underestimation of outsourcing levels. Conversely, differences in financial reporting standards and transparency across companies can cause inconsistencies in outsourcing cost allocation and disclosure, potentially affecting the indicator's accuracy. However, due to its relative objectivity and comparability, this indicator is widely used in related studies and can ensure research conclusion validity. Also, alternative indicator (*LaborOuts1*, the share of outsourcing expenses to operating revenues) is used for robustness tests in Table A.3.

Table 1
Baseline results.

	(1) *LaborOuts*	(2) *LaborOuts*	(3) *LaborOuts*	(4) *LaborOuts*	(5) *LaborOuts*	(6) *LaborOuts*
$Leverage_{2015} \times Post$	1.622***	0.997**	0.991**	0.972**	0.972**	0.972***
	(0.182)	(0.419)	(0.404)	(0.404)	(0.404)	(0.259)
Controls		YES				
Lagged Controls			YES	YES	YES	YES
Industry-year trend				YES	YES	YES
Province-year trend					YES	YES
Firm FE	YES	YES	YES	YES	YES	YES
Year FE		YES	YES	YES	YES	YES
Mean of *LaborOuts*	1.580	1.580	1.580	1.580	1.580	1.580
N	15,196	14,728	15,196	15,196	15,196	15,196
Adj. R^2	0.678	0.684	0.680	0.681	0.681	0.681

Note: Standard errors are clustered at the firm level (parentheses) in Columns (1)–(5); heteroskedasticity robust standard errors (parentheses) are in Column (6); ***, **, and * indicate significance at the 1 %, 5 %, and 10 % statistical levels, respectively.

3.2. Placebo test and robustness analysis

We conducted two placebo tests to validate our identification strategy. First, we generated 500 random samples to construct pseudo-policy dummy variables by randomly assigning leverage levels to sample firms, then re-estimated the model as shown in Fig. A.2. Second, we assumed the deleveraging policy shock occurred one year earlier and run a placebo test at that implementation point, as reported in Table A.2. Both tests support the robustness of the baseline findings.

To further ensure robustness, we conducted additional checks. First, we applied alternative measures for the dependent and treatment variables, as in Table A.3. Second, we added controls and introduced broader fixed effects to address potential omitted variable bias, including city-level economic indicators, industry fixed effects, and industry-, province-, and city-year fixed effects. Third, we relaxed the clustering assumption for standard errors, adjusting the clustering level from the firm to the industry, province, and city, as reported in Table A.3. We also accounted for possible interference from other policy shocks in Table A.4. These include the accelerated depreciation of fixed assets policy, which may encourage capital investment and reduce labor demand, value-added tax (VAT) reform, which reduces tax burdens and could affect demand for external services, the "Four Trillion Economic Stimulus Plan," which may raise labor demand in targeted industries and regions, the "2018 Reform of Social Insurance Collection," which increases formal labor costs; and the "2016 Labor Contract Law," which heightens employment rigidity and affects flexible employment strategies. These checks collectively validate the baseline results.

3.3. Heterogeneity analysis

We next examined how the policy's impact on labor outsourcing varies across firm types in Table A.5. First, owing to distortions in credit allocation, state-owned enterprises (SOEs) generally carry higher debt burdens and more rigid labor structures than non-SOEs. Second, firms heavily reliant on external financing are more sensitive to credit contraction and less able to sustain capital-intensive operations, prompting substitution of capital with flexible labor. Third, labor-intensive firms often face higher costs and risks in altering employment structures, making outsourcing less appealing under financial stress. Fourth, high-growth firms typically possess greater internal financing capacity and operational flexibility, allowing more proactive cost structure adjustments via outsourcing. Lastly, firms with weaker bargaining power—often reflected in high customer concentration—are less able to pass rising costs to buyers, creating stronger incentives to outsource labor as a cost-control measure.

3.4. Exploring channels

We examined three potential channels through which the deleveraging policy increased firms' labor outsourcing and facilitated resource reallocation to enhance competitiveness. First, the financing dilemma channel in Table A.6 indicates that highly leveraged firms experience rising interest costs, restricted credit access, and deteriorating cash flows, all of which heighten default risk. In response, they adopted cost-reduction strategies, with financing constraints forcing adjustments to cost structures.

Second, we examined the factor demand structure. As shown in Table A.6, under financing pressure, firms reallocate resources from labor and intermediate inputs toward capital investments that promise long-term productivity gains, such as automation and fixed assets. This reflects an efficiency-driven response that preserves operational capacity and aligns with factor input substitutability theory (Arrow et al., 1961).

Third, we checked labor allocation within and outside the firm. Table 2 shows that firms scale back high-end outsourcing tied to core business functions while retaining low-end outsourcing for peripheral tasks. This restructuring is shaped by China's institutional rigidities. The Labor Contract Law imposes high dismissal costs for formal employees (Cui et al., 2018), increasing outsourcing incentives under deleveraging. SOEs, tasked with greater social responsibilities during deleveraging, maintain employment stability by outsourcing rather than laying off workers, consistent with the heterogeneity results in Table A.5. This finding also aligns with Ding et al. (1997) and Chu (2016) on institutional influences in Chinese human resource management. Under the policy, firms adjust human

Table 2
Mechanism analysis: Outsourcing structure.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Core (High-end) outsourcing				*Noncore (low-end) outsourcing*			
	≥50	≥75	≥90	≥95	≤5	≤10	≤25	≤50
$Leverage_{2015} \times Post$	−0.0422	−0.0471	−0.0709**	−0.0690**	0.00299	0.00363	0.0121	−0.00301
	(0.0366)	(0.0351)	(0.0341)	(0.0332)	(0.00798)	(0.0105)	(0.0180)	(0.0250)
Lagged Controls	YES	YES	YES	YES	YES	YES	YES	YES
Industry-year trend	YES	YES	YES	YES	YES	YES	YES	YES
Province-year trend	YES	YES	YES	YES	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES
N	14,016	13,423	13,071	12,950	11,989	12,109	12,472	13,065
Adj. R^2	0.578	0.556	0.520	0.517	0.630	0.662	0.671	0.671

Note: Robust standard errors are clustered at the firm level are (parentheses); ***, **, and * indicate significance at the 1 %, 5 %, and 10 % statistical levels, respectively. Based on the distribution of outsourcing wages of sample firms, those with wage levels higher than the 50th, 75th, 90th, and 95th percentiles are defined as "high-end" outsourcing firms in Columns (1)–(4); those with wage levels lower than the 5th, 10th, 25th, and 50th percentiles are defined as "low-end" outsourcing firms in Columns (5)–(8).

Table 3
Mechanism analysis: Labor structure and competitiveness.

	(1)	(2)	(3)	(4)
	High_SkillRate	*Low_SkillRate*	lnR&D	*TFP*
$Leverage_{2015} \times Post$	0.00666**	−0.0400*	0.412**	0.115***
	(0.00323)	(0.0230)	(0.199)	(0.0229)
Lagged Controls	YES	YES	YES	YES
Industry-year trend	YES	YES	YES	YES
Province-year trend	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
N	11,049	15,196	15,196	14,844
Adj. R^2	0.871	0.688	0.844	0.586

Note: Robust standard errors are clustered at the firm level (parentheses); ***, **, and * indicate significance at the 1 %, 5 %, and 10 % statistical levels, respectively. Skill rate is the proportion of employees with postgraduate education or above, shown in Column (1); production workers and auxiliary staff are classified as "low-skilled," and technology research and development (R&D), sales and marketing, and financial management personnel are classified as "high-skilled," shown in Column (2). Total factor productivity (TFP) is calculated using the Olley–Pakes estimation method.

resource strategies by reducing the share of low-skilled production workers and increasing skilled employees in research and development, management, and technical roles, as shown in Table 3.

These findings indicate that, although deleveraging constrains external financing, it prompts firms to restructure both cost bases and employment configurations in ways that improve efficiency and strengthen competitiveness.

5. Conclusions

China's deleveraging policy increases financing pressure by raising borrowing costs, restricting credit access, and worsening internal cash flows. Firms respond by adjusting the scale and structure of labor outsourcing, reallocating resources to reduce costs and enhance competitiveness. Policymakers should mitigate labor market frictions during deleveraging through targeted interventions aligned with firms' outsourcing responses. First, short-term liquidity support should focus on nonstate-owned firms facing severe financing constraints to limit distress-induced outsourcing. Second, incentives to retain high-skilled workers when outsourcing noncore functions are essential to capture documented productivity gains. Third, regulatory frameworks must protect outsourced workers' rights, recognizing firms' strategic reliance on flexible labor arrangements.

CRediT authorship contribution statement

Yanlong Chen: Writing – review & editing, Writing – original draft, Resources, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Bencheng Wang:** Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Resources, Project administration, Methodology, Investigation.

Declaration of competing interest

The authors declare that they have no known competing interests or personal liabilities that would have influenced this work.

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Data availability

Data will be made available on request.

Author Statement

We declare that this manuscript is original, has not been published before and is not currently being considered for publication elsewhere.

We confirm that the manuscript has been read and approved by all named authors and that there are no other persons who satisfied the criteria for authorship but are not listed. We further confirm that the order of authors listed in the manuscript has been approved by all of us.

We understand that the Corresponding Author is the sole contact for the Editorial process. They are responsible for communicating with the other authors about progress, submissions of revisions and final approval of proofs.

Appendix

Appendix

Table A.1
Descriptive statistics.

Panel A: Descriptive statistics of Main variables

Variable	Observation	Mean	Std	Min	Max
LaborOuts	15,196	1.58	5.22	0	32.5
$Leverage_{2015} \times Post$	15,196	0.25	0.27	0	0.9
L.*SOE*	15,196	0.42	0.49	0	1
L.*Size*	15,196	22.29	1.29	19.13	26.38
L.*ROA*	15,196	0.03	0.06	−0.62	0.21
L.*Top1*	15,196	0.35	0.15	0.08	0.76
L.*Age*	15,196	2.29	0.68	0.69	3.37
L.*tobinQ*	15,196	2.11	1.47	0.8	15.21
L.*Profit*	15,196	0.08	0.19	−1.99	0.76
RetainEarn	15,128	0.15	0.2	−1.09	0.62
DebtCost1	14,917	0.02	0.02	−0.07	0.07
DebtCost2	15,087	0.07	0.09	0	0.77
DebtSize1	15,128	0.65	0.37	−1.34	1
DebtSize2	13,660	0.77	0.16	0.25	0.99
Overdue	15,196	0	0	0	0
LaborExp	15,196	19.4	1.24	16.73	22.63
Intermediate	15,190	12.16	1.51	8.73	16.07
Capital	15,137	11.04	1.7	5.53	15.45
High_SkillRate	11,092	0.04	0.06	0	0.56
Low_SkillRate	15,196	0.69	0.28	0	1
lnR&D	15,196	7.13	3.65	0	13.13
TFP	14,844	0.06	0.27	−2.65	2.13

Panel B: Distribution of labor sourcing wages

	Percentile	level
Wage of labor outsourcing	1 %	7.22
	5 %	10.80
	10 %	13.49
	25 %	17.36
	50 %	22.79
	75 %	32.12
	90 %	55.14
	95 %	130.31
	99 %	419.05

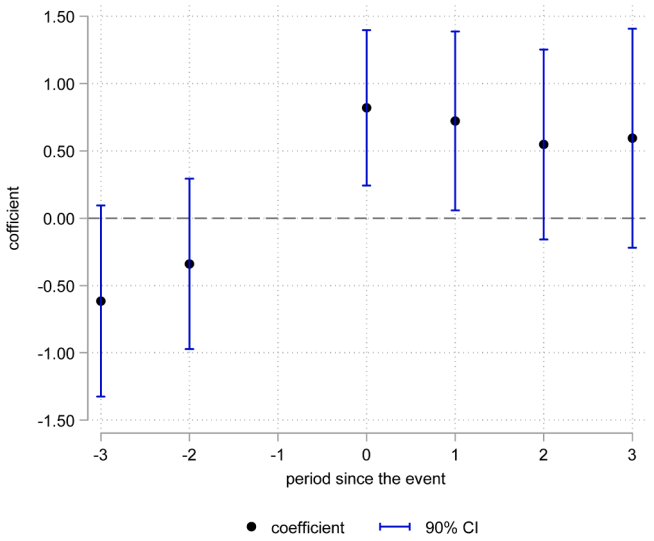

Fig. A.1. Parallel trend test results
Note: Regression coefficients obtained from the event study method are plotted against the results of 90 % confidence intervals, calculated based on clustering to robust standard errors at the firm level.

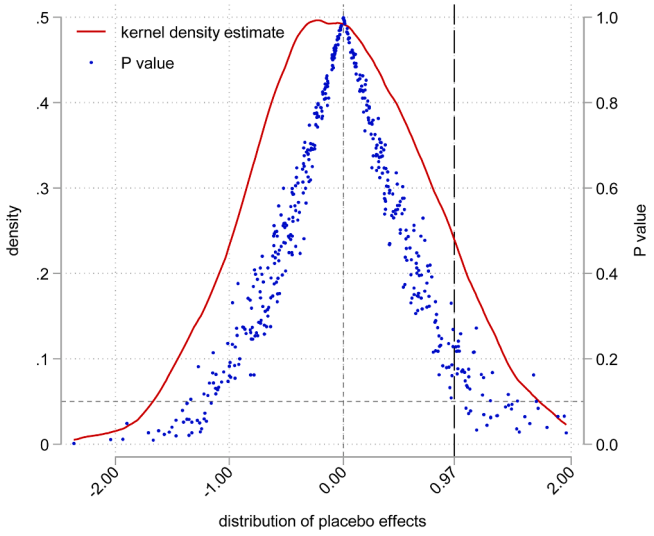

Fig. A.2. Treatment group placebo test results
Note: The horizontal axis displays estimation results, and the vertical axis shows kernel densities (left) and *p*-values (right). Absolute values of estimated coefficients are centrally distributed around 0; the kernel density distribution is largely consistent with the normal distribution, and most of *p*-values are greater than 0.1, suggesting that deleveraging policy has no significant effect on the level of labor outsourcing in the pseudo-treatment group. However, the estimated coefficient of the interaction term in the benchmark regression was 0.972, passing the placebo test.

Table A.2
Policy implementation date placebo test results.

	(1) *LaborOuts*
$Leverage_{2015} \times Post$	1.144**
	(0.476)
$Leverage_{2015} \times Preceding$	0.473
	(0.365)
Lagged Controls	YES
Industry-year trend	YES
Province-year trend	YES
Firm FE	YES
Year FE	YES

(*continued on next page*)

Table A.2 (*continued*)

	(1) *LaborOuts*
N	15,196
Adj. R^2	0.681

Note: Robust standard errors are clustered at the firm level (parentheses); ***, **, and * indicate significance at the 1 %, 5 %, and 10 % statistical levels, respectively. *Preceding* and $Leverage_{i,2015}$ are the placebo means of the policy implementation dates, where *Preceding* = 1 reflects 2015; 0 in the other years. Column (1) shows that the estimated coefficients of the interaction term are not significant, neither in terms of statistical significance nor economic significance, providing robustness to our findings.

Table A.3
Alternative measurement, additional controls, and clustering level change robustness test results.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
	Alternative measurement for variable			Additional Controls					Adjust the clustering level		
	LaborOuts1	*LaborOuts*	*LaborOuts*	*LaborOuts*	*LaborOuts*	*LaborOuts*	*LaborOuts*	*LaborOuts*	*LaborOuts*	*LaborOuts*	*LaborOuts*
$Leverage_{2015} \times Post$	0.148**			0.972**	1.033***	0.776*	0.977**	1.005**	0.972**	0.972**	0.972***
	(0.0674)			(0.410)	(0.385)	(0.424)	(0.412)	(0.459)	(0.404)	(0.401)	(0.300)
$Leverage_{Average} \times Post$		1.019**									
		(0.415)									
$Leverage\_dum_{2015} \times Post$			0.311*								
			(0.180)								
Lagged Controls	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
City Controls				YES							
Industry-year trend	YES	YES	YES	YES	YES		YES	YES	YES	YES	YES
Province-year trend	YES	YES	YES	YES	YES	YES		YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year FE					YES						
Industry FE					YES						
Industry-year FE						YES					
Province-year FE							YES				
City-year FE								YES			
N	15,194	15,196	13,613	15,032	15,196	15,192	15,196	14,630	15,196	15,196	15,196
Adj. R^2	0.684	0.681	0.687	0.681	0.684	0.687	0.679	0.690	0.681	0.681	0.681

Note: Robust standard errors are clustered at the firm level (parentheses) in Columns (1)–(8). Those clustered at industry, provincial, and city levels are listed in Columns (9)–(11), respectively. ***, **, and * indicate significance at the 1 %, 5 %, and 10 % statistical levels, respectively. In Column (1) the dependent variable is replaced with the share of outsourcing expenses divided by operating revenues. In Columns (2) and (3), the treatment variable is replaced with the average leverage ratio during 2013–2015 and the dummy median leverage ratio in 2015, respectively. Column (4) adds city-level variables, including the logarithm of city gross domestic product (GDP), GDP per capita, the share of the secondary sector.

Table A.4
Policy interference elimination robustness check results.

	(1) *LaborOuts*	(2) *LaborOuts*	(3) *LaborOuts*	(4) *LaborOuts*	(5) *LaborOuts*
$Leverage_{2015} \times Post$	0.938**	0.850**	0.977**	0.955**	0.896**
	(0.405)	(0.433)	(0.404)	(0.404)	(0.416)
$ADFA \times Post_{2014}$	−0.323**				
	(0.164)				
VAT		0.333			
		(0.257)			
Stimulus × *Post*			−0.0719		
			(0.190)		
Reform × $Post_{2018}$				−1.318***	
				(0.500)	
Law × *Post*					−0.157
					(0.176)
Lagged Controls	YES	YES	YES	YES	YES
Industry-year trend	YES	YES	YES	YES	YES
Province-year trend	YES	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES

(*continued on next page*)

Table A.4 (*continued*)

	(1) *LaborOuts*	(2) *LaborOuts*	(3) *LaborOuts*	(4) *LaborOuts*	(5) *LaborOuts*
N	15,196	15,196	15,196	15,196	13,837
Adj. R^2	0.681	0.681	0.680	0.681	0.688

Note: Robust standard errors are clustered at the firm level (parentheses); ***, **, and * indicate significance at the 1 %, 5 %, and 10 % statistical levels, respectively. *ADFA* is a dummy variable equal to one if the firm belongs to one of the six major industries eligible for the accelerated depreciation of fixed assets policy introduced in 2014; 0 otherwise. $Post_{2014} = 1$ if year is 2014 or later. *VAT* is based on timing and scope of VAT reform implementation across different industries and regions, capturing the differential exposure to VAT reform. *Stimulus* is a dummy equal to one if the firm operates in key industries or regions targeted by the "2008 Four Trillion Economic Stimulus Plan;" 0 otherwise. *Post* = 1 if year is 2008 or later. *Reform* × $Post_{2018}$ is an interaction term indicating firms affected by 2019 social insurance reform. *Exposure* reflects firm ownership type, industry, and whether the year was 2019 or later. *Law* is a dummy indicating whether the firm is labor-intensive, defined by whether its labor expense divided total cost is above the median level of the sample.

Table A.5
Heterogeneity analysis results.

	(1) *Ownership*	*(2)*	*(3)* *External Financing Dependence*	*(4)*	*(5)* *Labor Intensity*	*(6)*	*(7)* *Firm Maturity*	*(8)*	*(9)* *Product Market Position*	*(10)*
	SOE	*Non-SOE*	*High EFD*	*Low EFD*	*High Labor*	*Low Labor*	*Matured*	*Immatured*	*High position*	*Low position*
$Leverage_{2015} \times Post$	1.283**	0.679	1.439**	0.471	0.518	1.472**	1.953***	−0.0790	0.985*	0.772
	(0.652)	(0.513)	(0.637)	(0.570)	(0.617)	(0.592)	(0.648)	(0.516)	(0.567)	(0.758)
Lagged Controls	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Industry-year trend	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Province-year trend	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
N	6296	8884	6723	6793	6677	6599	6761	6738	5399	5237
Adj.R^2	0.721	0.635	0.690	0.695	0.679	0.704	0.699	0.690	0.736	0.667

Note: Robust standard errors are clustered at the firm level (parentheses); ***, **, and * indicate significance at the 1 %, 5 %, and 10 % statistical levels, respectively.
Firm-level heterogeneity is explored along five dimensions: Ownership—registered ownership type, with firms classified as SOEs or non-SOEs in Columns (1) and (2); External financing dependence (EFD)—following Rajan and Zingales (1998), grouped at the 2015 median value in Columns (3) and (4); Labor intensity—ratio of number of employees to revenue, with firms split by the 2015 median in Columns (5) and (6); Firm maturity—proxied by growth rate of operating income, grouped at the sample median value in Columns (7)–(8); and Product market position—proxied by customer concentration, which is the share of total sales accounted for by the top five customers, with firms above the 2015 median classified as having lower product market power (Columns 9–10).

Table A.6
Mechanism analysis: Financing dilemma and labor demand structure.

	(1) *DebtCost1*	(2) *DebtCost2*	(3) *DebtSize1*	(4) *DebtSize2*	(5) *RetainEarn*	(6) *Overdue*	(7) *LaborExp*	(8) *Intermediate*	(9) *Capital*
$Leverage_{2015} \times Post$	0.366***	0.308***	−0.117***	−0.0727***	−0.0468***	0.0000293**	−0.0748*	−0.120**	0.291***
	(0.112)	(0.0738)	(0.0357)	(0.0168)	(0.0145)	(0.0000134)	(0.0422)	(0.0524)	(0.0755)
Lagged Controls	YES	YES	YES	YES	YES	YES	YES	YES	YES
Industry-year trend	YES	YES	YES	YES	YES	YES	YES	YES	YES
Province-year trend	YES	YES	YES	YES	YES	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
N	13,120	14,966	14,141	13,658	15,128	15,196	15,196	15,190	15,137
Adj. R^2	0.598	0.579	0.688	0.739	0.800	0.0524	0.951	0.945	0.919

Note: Robust standard errors are clustered at the firm level (parentheses); ***, **, and * indicate significance at the 1 %, 5 %, and 10 % statistical levels, respectively. Explained variables in Columns (1) and (2) reflect debt financing costs, where *DebtCost1* is the natural logarithm of the ratio of the total financial costs of the firm to total liabilities, and *DebtCost2* is the natural logarithm of the ratio of the cash distributed by the firm or interest payments to total liabilities. Explained variables in Columns (3) and (4) reflect debt financing scale, where *DebtSize1* is the natural logarithm of the ratio the total liabilities minus net accounts receivable to the total liabilities of the firm, and *DebtSize2* is the natural logarithm of the ratio of total liabilities minus accounts payable to total liabilities. *RetainEarn* in Column (5) is the ratio of retained earnings to total assets. *Overdue* in Column (6) is the ratio of overdue amount in the current year to total assets. *LaborExp* is the labor expenditure of the firm, expressed as the logarithm of the cash paid to employees. *Intermediate* is the logarithm of intermediate input expenditure, expressed as the sum of the total operating cost and financial expenses minus depreciation, amortization, and labor expenditure. *Capital* is the logarithm of net investments in fixed assets.

Data availability

Data will be made available on request.

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