Labor unemployment risk and corporate financing decisions

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Background

- **Workers bear significant costs during unemployment.**
  - Unemployment risk is a substantial concern for workers:
    - **Significant reductions in consumption** (Gruber, 1997)
    - **Long delays before reemployment** (Katz and Meyer, 1990)
    - **Significant wage cuts after returning to work** (Farber, 2005; Gibbons and Katz, 1991)
    - **Psychological and social costs** (Kalil and Ziol-Guest, 2008; Kalil and DeLeire, 2010)
    - Workers' concerns about becoming unemployed **reduce their labor supply** (Brown and Matsa, 2012) and **affect firms' policies on layoffs and wage setting**, even when they are far from bankruptcy (Topel, 1983, 1984; Li, 1986; Hamermesh and Wolfe, 1990)
  - Despite their magnitude, however, **workers' costs of unemployment are largely absent from theories in corporate finance**, which typically do not emphasize labor market frictions.

Research Question

- The impact of worker unemployment costs on corporate financing decisions
  - Firms choose **conservative financial policies** partly as **a means of mitigating worker exposure to unemployment risk.**
    - Building on theories by Titman (1984) and Berk, Stanton, and Zechner (2010)
    - Workers require that firms provide **a premium in wages or benefits as compensation for potential job loss** (Topel, 1984; Abowd and Ashenfelter,1981).
  - **Firms can choose financial policies** that decrease the risk of financial distress and costly layoffs, **which implicitly reduce the amount of compensation that workers require to offset unemployment risk.**

Main Findings

- Changes in state unemployment insurance(UI) benefit laws
  - US firms from 1950 to 2008
  - Increases in state UI benefit generosity are associated with greater state UI payouts and thus provide meaningful shocks to workers' exposure to unemployment risk.

- Increases in the generosity of state unemployment insurance benefits are associated with higher firm leverage and lower interest coverage ratios.

Contribution

- **Novel empirical evidence that worker unemployment risk significantly impacts firms' corporate financial policies**
  - Managers choose financial policy partly as a means of mitigating labor's exposure to unemployment risk.
  - More broadly, **frictions in labor markets affect corporate financial policies**.
    - a phenomenon of growing interest as human capital becomes an increasingly critical asset for firms (Zingales, 2000).

- **This paper adds to a growing literature that analyzes the interactions between labor economics and finance.** (Matsa, 2010; Benmelech, Bergman, and Enriquez, 2012; Chen, Kacperczyk, and Ortiz-Molina, 2011)
  - Whereas those papers examine leverage as a strategic input in the bargaining process between workers and firms, this paper examines **a unique channel through which financial policy is used to mitigate the costs borne by workers as the result of involuntary unemployment.**

Theoretical Framework

- **Workers bear significant costs when they become involuntarily unemployed.**
  - These costs could result from …
    - costly job search (Diamond, 1982; Mortensen, 1986; Mortensen and Pissarides,1994)
    - layoff discouragement effects (Jahoda, 1982)
    - a limited supply of match-specific job opportunities (Lazear, 2003)
    - imperfect information about worker productivity (Harris and Holmstrom,1982)
    - other labor market frictions
  - Given the high costs of unemployment, a number of theoretical and empirical papers find that **workers require compensation in the form of higher wages, additional benefits, and improved working conditions to compensate for unemployment risk.** → ***"compensating wage differentials"***
    - Abowd and Ashenfelter (1981), Topel (1984), Li (1986), Rosen (1986), Hamermesh and Wolfe (1990)

Theoretical Framework

- Compensating wage differentials for unemployment risk are likely to affect firms' financing policies.
  - Increasing leverage can raise the costs that are required to compensate workers for bearing greater exposure to the risk of financial distress and unemployment.
  - Trade-off theory (with an additional term)

$$NPV[Debt\ Issue] = \underbrace{NPV[Tax\ Shield] + NPV[Costs\ of\ Financial\ Distress]}_{\text{⟨The traditional trade-off theory of capital structure⟩}} + \Delta Labor\ Expense$$

    - The contribution of this paper is **to provide empirical support for the inclusion of an additional term** in the adjusted present value equation that typically characterizes the trade-off theory of capital structure.
      - Because debt financing increases the probability of layoffs in distress, **it raises the compensation that workers require today** to bear increased unemployment risk.
        → **Ex ante cost** (cf. costs of financial distress → ex post cost)
  - More generous UI benefits → less costly unemployment → lower compensating differential of layoff risk

Institutional Background

- The unemployment insurance system of the United States
  - provides **temporary income** to eligible workers who become involuntarily unemployed.
  - Three key features
    - **Eligibility**: all private sector workers who are involuntarily unemployed and actively seeking new employment are eligible for benefits.
    - **Wage benefit amounts**: set in accordance with formulas that are determined by state law.
    - **Duration**: states also vary in the duration of time for which the claimant is eligible to receive weekly payments.

Institutional Background

- UI benefits have a substantial impact
  - On unemployed workers
    - significant consumption smoothing benefits to workers (Gruber, 1997).
    - workers' personal savings and investment decisions (Gormley, Liu, and Zhou, 2010).
    - workers' searches for new employment and the durations of their unemployment spells (Topel and Welch, 1980; Moffitt, 1985; Meyer, 1990; Meyer, 1995; Meyer and Mok, 2007).
  - On firms
    - When benefits improve, workers face lower costs of unemployment and managers are more willing to lay off workers (Topel, 1983).
- Changes in the generosity of unemployment insurance benefits thus provide meaningful shocks to the cost to workers of being laid off.
  - a clean setting to examine the relation between financial policy and workers' exposure to unemployment risk

Data and Empirical Framework

- Raw data: worker unemployment costs affect firm financial policy.
  - The worker layoff separation rate
    - **The US Bureau of Labor Statistics**
  - Average market leverage
    - **Compustat**

  → **Negative relation**

  - The statistical relation might not reflect causal relations

    → **State UI benefit laws** to more precisely measure and identify the impact

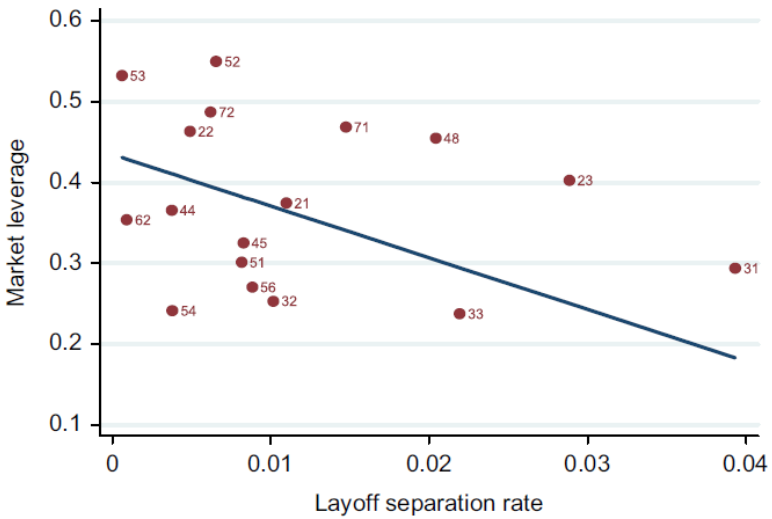

Fig. 1. Cross-industry correlation between the layoff separation rate and market leverage, 2008. This figure plots average market leverage in 2008 against the long-run average layoff separation rate at the two-digit North American Industry Classification System level. Market leverage is total debt divided by the market value of the firm (data from Compustat). The layoff separation rate is the ratio of workers affected by extended mass layoffs to total industry employment and is based on data from the US Bureau of Labor Statistics "Mass Layoff Statistics" and the US Bureau of Economic Analysis. The regression line shown is weighted based on the underlying number of firm observations. A 1 percentage point increase in the layoff separation rate is associated with a 6.4 percentage point decrease in market leverage.

Data and Empirical Framework

- **UI benefits:** the US Department of Labor
  - $(\boldsymbol{the\ maximum\ benefit\ amount}) \times (\boldsymbol{the\ maximum\ duration\ allowed})$
    - to measure the generosity of each state's UI system

Table 1
Summary statistics.
The sample consists of 127,233 firm-year observations from 1950 to 2008. The unemployment insurance (UI) benefit criteria are from annual issues of the US Department of Labor's "Significant Provisions of State UI Laws," the financial data are from Compustat, the state unemployment rates are calculated from the Current Population Survey (available with complete state indicators starting in 1977), and the state gross domestic product (GDP) growth rates are from the US Bureau of Economic Analysis. The sample includes all firms (excluding financials and utilities) with non-missing observations for the variables shown below. *Log interest coverage* is the natural log of one plus the ratio of operating earnings before depreciation to interest expense, where the variable is recoded to zero for observations with negative earnings. Compustat variables are winsorized at 1% tails.

	Mean	Standard deviation	25th percentile	Median	75th percentile
Panel A: Dependent variables					
Total debt/market value	0.304	0.254	0.085	0.247	0.475
Total debt/book value	0.285	0.251	0.114	0.245	0.388
Log interest coverage	1.891	1.415	0.936	1.821	2.639
Panel B: Unemployment insurance variables					
Log max total benefit$_{t-1}$	8.514	0.633	8.086	8.629	8.962
Log max weekly benefit$_{t-1}$	5.243	0.629	4.828	5.361	5.704
Log max duration$_{t-1}$	3.272	0.049	3.258	3.258	3.258
Panel C: Control variables					
Proportion of fixed assets	0.317	0.217	0.149	0.272	0.442
Log sales	4.620	2.218	3.201	4.624	6.121
Return on assets	0.020	0.323	0.023	0.087	0.139
Z-score	1.008	5.016	1.059	2.103	2.865
Market-to-book ratio	2.171	4.143	0.752	1.413	2.604
Unemployment rate	6.383	1.943	5.019	6.174	7.472
GDP growth	6.768	3.439	4.510	6.417	8.734

Data and Empirical Framework

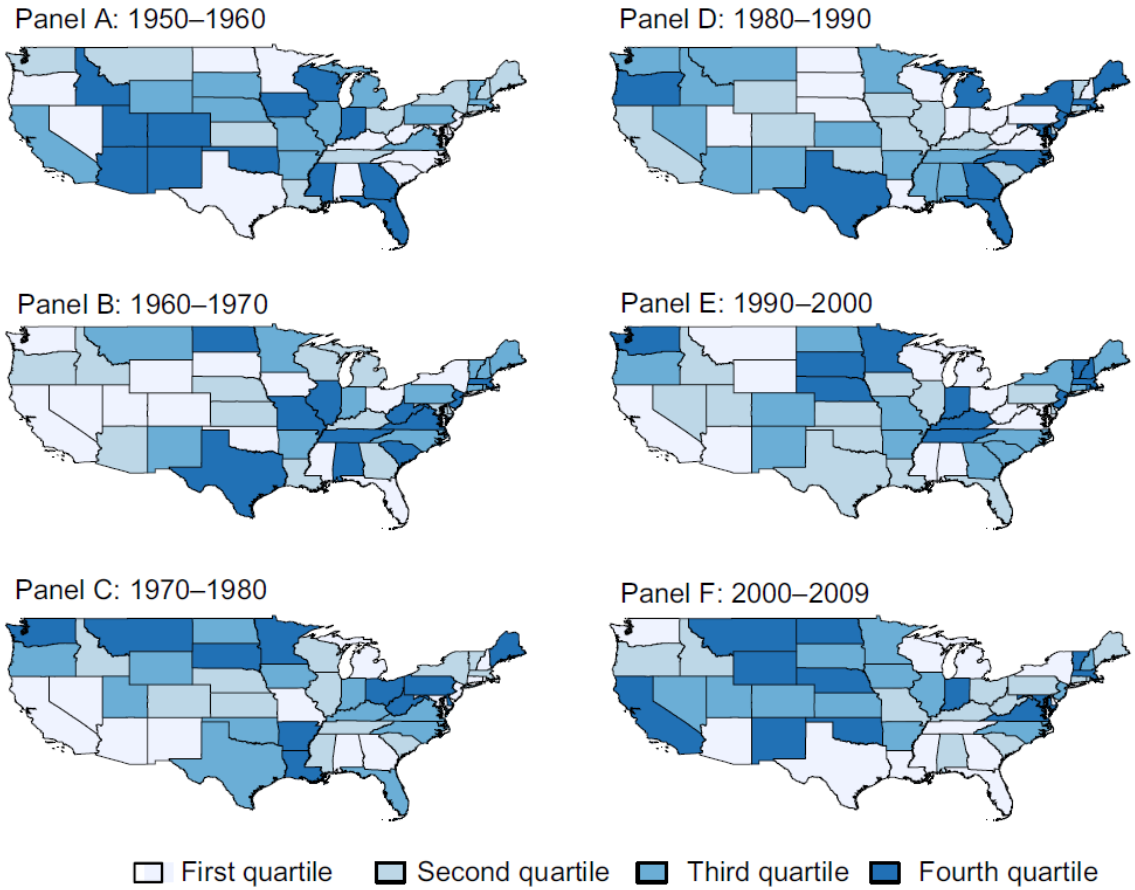

Fig. 2. Relative increases in state maximum unemployment insurance (UI) benefits by decade, 1950–2009. This figure displays the quartile of a state's increase in maximum total benefits, relative to other states in each decade from 1950 to 2009. Larger increases in benefits are shown in darker shades. Maximum total benefits is the product of the statutory maximum weekly UI benefit and the maximum duration and is based on information from annual issues of the US Department of Labor's "Significant Provisions of State UI Laws."

Data and Empirical Framework

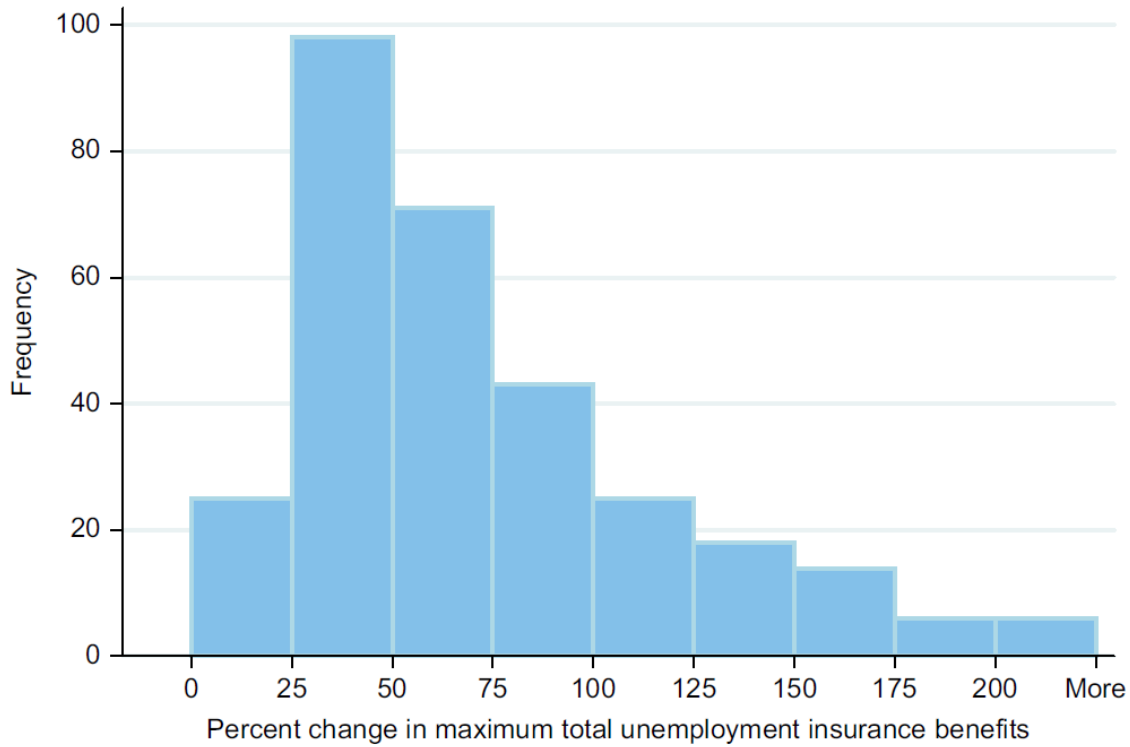

Fig. 3. Distribution of state increases in maximum unemployment insurance (UI) benefits over each decade, 1950–2009. This figure plots the distribution of state increases over each decade from 1950 to 2009 in the maximum total potential benefit available under the state's unemployment insurance system. The maximum potential benefit is calculated as the product of the statutory maximum weekly UI benefit and the maximum duration and is based on information from annual issues of the US Department of Labor's "Significant Provisions of State UI Laws." In all, there are 306 state-decade observations, including the District of Columbia.

Data and Empirical Framework

Table 2
Unemployment insurance laws and total state benefit payments.

This table summarizes the results from state-panel regressions of the natural log of total state unemployment insurance (UI) compensation payments on variables representing the generosity of state UI benefit criteria and a set of controls. Controls in all regressions include state and year fixed effects. Where shown, controls also include the state unemployment rate and the state gross domestic product (GDP) growth rate. Standard errors, adjusted for clustering at the state level, are reported in parentheses. ** and *** denote statistical significance at the 5%, and 1% level, respectively.

	Log state unemployment insurance payments					
	(1)	(2)	(3)	(4)	(5)	(6)
Log max total benefit	0.891***			0.896***		
	(0.128)			(0.107)		
Log max weekly benefit		1.009***			1.009***	
		(0.131)			(0.107)	
Log max duration			0.484**			0.645**
			(0.232)			(0.251)
Unemployment rate				0.064***	0.064***	0.068***
				(0.007)	(0.008)	(0.008)
GDP growth				−0.022***	−0.022***	−0.027***
				(0.005)	(0.005)	(0.006)
Number of observations	2,040	2,040	2,040	1,632	1,632	1,632
R^2	0.92	0.92	0.91	0.93	0.93	0.91
Fixed effects						
State	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes

Data and Empirical Framework

- **Firm's financial policy**: firms' balance sheet and income statement
  - Compustat
  - About 14,000 firms and 140,000 firm-years over the 1950–2008 period

Table 1
Summary statistics.

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Log interest coverage	1.891	1.415	0.936	1.821	2.639
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Z-score	1.008	5.016	1.059	2.103	2.865
Market-to-book ratio	2.171	4.143	0.752	1.413	2.604
Unemployment rate	6.383	1.943	5.019	6.174	7.472
GDP growth	6.768	3.439	4.510	6.417	8.734

- Firm-year level panel regression analysis:

$$\frac{DEBT_{ist}}{VALUE_{ist}} = \alpha_1 LN(MAX\ UI\ BENEFIT)_{st-1} + X_{ist}\beta + v_i + \omega_t + \varepsilon_{ist}$$

UI generosity and Corporate Borrowing

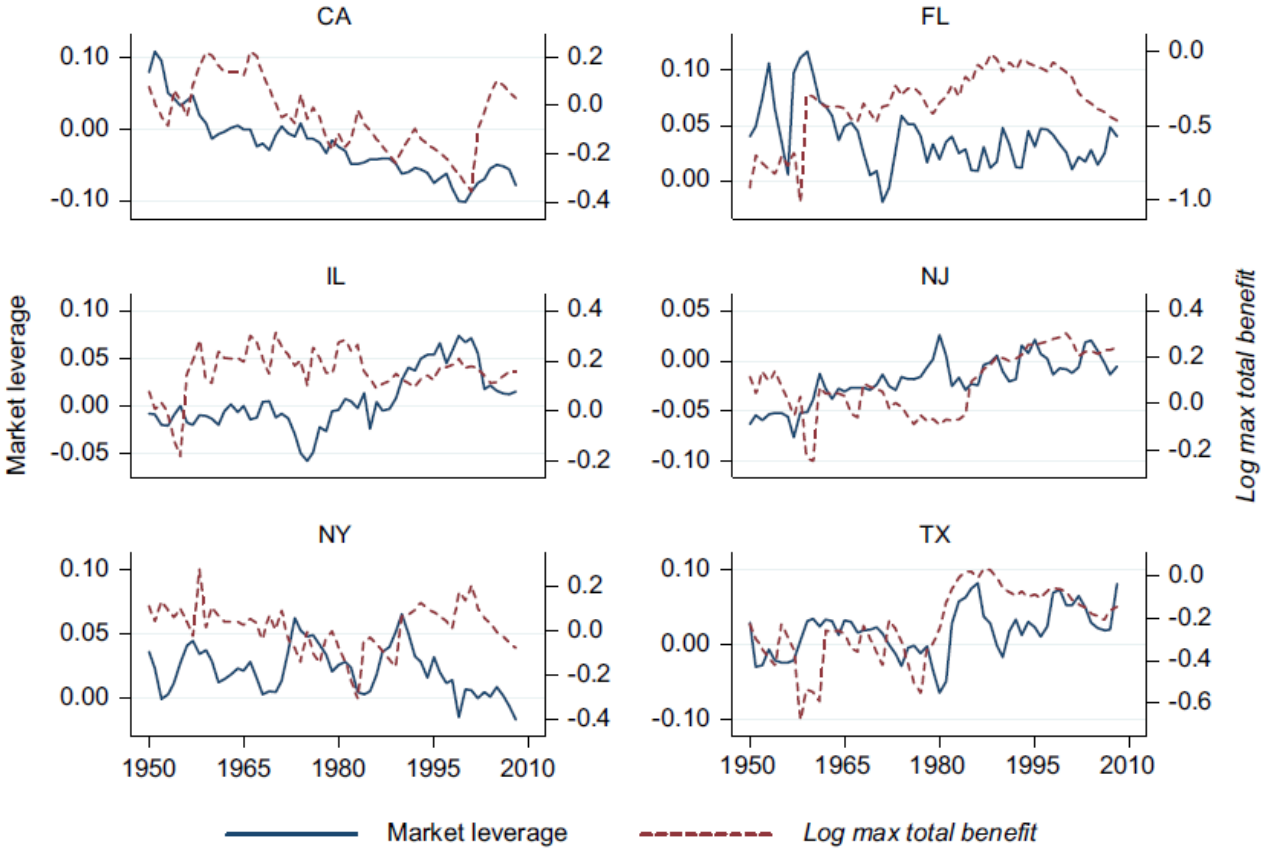

Fig. 4. Average market leverage and the log of maximum unemployment insurance (UI) benefits by state, 1950–2008. This figure plots average annual state residuals from regressions of market leverage and *log max total benefits* on year fixed effects from 1950 to 2008. Results for each of the six largest US states are reported. Market leverage is total debt divided by the market value of the firm (data from Compustat). *Log max total benefits* is the natural log of the product of the statutory maximum weekly UI benefit and the maximum duration and is based on information from annual issues of the US Department of Labor's "Significant Provisions of State UI Laws."

UI generosity and Corporate Borrowing

Table 3
Unemployment insurance laws and firms' capital structures.

This table summarizes the results from firm-panel regressions of total debt divided by assets (market value in Panel A, book value in Panel B) and *log interest coverage* (Panel C) on the natural log of the maximum total potential benefit available under the state's unemployment insurance system in the previous year, and a set of controls. Controls in all regressions include year fixed effects. Where shown, controls also include firm fixed effects, state economic indicators (state unemployment rate and state gross domestic product growth rate), and firm financial controls (proportion of fixed assets, market-to-book ratio, natural log of sales, modified Altman *Z*-score, and return on assets). Where indicated, industries are excluded in which a large percentage of the workforce is likely to be geographically dispersed, namely, retail, wholesale, and transport. Standard errors, adjusted for clustering at the state level, are reported in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% level, respectively. OLS = ordinary least squares.

	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Total debt/market value						
Log max total benefit$_{t-1}$	0.045***	0.046***	0.057***	0.048***	0.030**	0.045***
	(0.015)	(0.016)	(0.016)	(0.017)	(0.012)	(0.010)
Number of observations	127,233	106,059	87,160	87,160	77,446	1,588
R^2	0.61	0.63	0.62	0.65	0.11	0.64
Panel B: Total debt/book value						
Log max total benefit$_{t-1}$	0.024***	0.031***	0.040***	0.025***	0.012*	0.031***
	(0.009)	(0.011)	(0.010)	(0.009)	(0.006)	(0.007)
Number of observations	127,233	106,059	87,160	87,160	77,446	1,588
R^2	0.58	0.59	0.59	0.68	0.16	0.50
Panel C: Log interest coverage						
Log max total benefit$_{t-1}$	−0.154**	−0.124*	−0.150*	−0.131*	−0.042	−0.381***
	(0.060)	(0.067)	(0.085)	(0.068)	(0.068)	(0.052)
Number of observations	127,233	106,059	87,160	87,160	77,446	1,588
R^2	0.58	0.59	0.58	0.64	0.12	0.54
Sample						
Level of aggregation	Firm-year	Firm-year	Firm-year	Firm-year	Firm-year	State-year
Exclude dispersed industries	No	No	Yes	Yes	Yes	Yes
Control variables						
State economic indicators	No	Yes	Yes	Yes	Yes	Yes
Firm financial controls	No	No	No	Yes	Yes	No
Firm fixed effects	Yes	Yes	Yes	Yes	No	No
State fixed effects	No	No	No	No	No	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Estimation method	OLS	OLS	OLS	OLS	First-differences	Median regression

→ Firms appear to increase leverage and maintain lower interest coverage when workers are eligible to receive higher benefits from state governments during unemployment.

Identification Analysis

- **Possible alternate explanations**: unobservable, local economic conditions
  - Such as poor investment opportunities or a high risk of unemployment
  - Those conditions might lead states to adopt more generous UI laws and also lead firms to increase their borrowing. → spurious relation

1. **Local macro economic conditions**

Table 3
Unemployment insurance laws and firms' capital structures.

	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Total debt/market value						
Log max total benefit$_{t-1}$	0.045***	0.046***	0.057***	0.048***	0.030**	0.045***
	(0.015)	(0.016)	(0.016)	(0.017)	(0.012)	(0.010)
Number of observations	127,233	106,059	87,160	87,160	77,446	1,588
R^2	0.61	0.63	0.62	0.65	0.11	0.64
Sample						
Level of aggregation	Firm-year	Firm-year	Firm-year	Firm-year	Firm-year	State-year
Exclude dispersed industries	No	No	Yes	Yes	Yes	Yes
Control variables						
State economic indicators	No	Yes	Yes	Yes	Yes	Yes
Firm financial controls	No	No	No	Yes	Yes	No
Firm fixed effects	Yes	Yes	Yes	Yes	No	No
State fixed effects	No	No	No	No	No	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Estimation method	OLS	OLS	OLS	OLS	First-differences	Median regression

Identification Analysis

2. The timing of the relation
3. The UI systems in neighboring states (unobserved heterogeneity in regional economic conditions)

Table 4
Falsification tests: timing of capital structure changes and unemployment insurance (UI) laws in bordering states.

	(1)	(2)	(3)	(4)
Log max total benefit$_{t-1}$	0.048***	0.040***	0.047***	
	(0.017)	(0.013)	(0.016)	
Log max total benefit$_t$		0.009		
		(0.019)		
Log max total benefit$_{t+1}$		0.005		
		(0.019)		
Log max total benefit$_{t-1}$, bordering states median			0.020	0.025
			(0.027)	(0.028)
Number of observations	87,160	75,445	87,039	87,039
R^2	0.65	0.66	0.65	0.65
Control variables				
State economic indicators	Yes	Yes	Yes	Yes
Firm financial controls	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes

Identification Analysis

4. Firms with *national* product markets
   - Unobservable idiosyncratic changes in the economic conditions of the *local* areas in which they produce are unlikely to have much effect on their borrowing

Table 5
Impact of unemployment insurance laws by geography of sales, national versus local.

This table summarizes the results from firm-panel regressions of firms' financial leverage (total debt divided by the market value of the firm) on the natural log of the maximum total potential benefit available under the state's unemployment insurance system in the previous year, and a set of controls. Each column corresponds to different sample restrictions based on the geographic breakdown of sales in the firms' industry, specifically the percent of the value of product shipments in the firm's three-digit North American Industry Classification System industry sent to destinations in a different US state and is based on the 2007 Commodity Flow Survey. Controls in all regressions include firm and year fixed effects, state economic indicators (state unemployment rate and state gross domestic product growth rate), and firm financial controls (proportion of fixed assets, market-to-book ratio, natural log of sales, modified Altman *Z*-score, and return on assets). Industries are excluded in which a large percentage of the workforce is likely to be geographically dispersed, namely, retail, wholesale, and transport. Standard errors, adjusted for clustering at the state level, are reported in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% level, respectively.

	Full sample (1)	Sales data not missing (2)	Interstate sales > 70% (3)	Interstate sales > 75% (4)	Interstate sales > 80% (5)	Interstate sales > 85% (6)
Log max total benefit$_{t-1}$	0.048***	0.041*	0.046*	0.048*	0.047*	0.060***
	(0.017)	(0.024)	(0.024)	(0.024)	(0.023)	(0.021)
Number of observations	87,160	61,503	58,913	57,774	51,851	30,840
R^2	0.65	0.64	0.64	0.64	0.64	0.63
Control variables						
State economic indicators	Yes	Yes	Yes	Yes	Yes	Yes
Firm financial controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes

Identification Analysis

5. Poor ROA as an unobserved economic conditions

Table 6
Unemployment insurance laws and firms' operating performance.

This table summarizes the results from firm-panel regressions of return on assets on the natural log of the maximum total potential benefit available under the state's unemployment insurance system in the previous year, and a set of controls. Controls in all regressions include firm and year fixed effects. Where shown, controls also include state economic indicators (state unemployment rate and state gross domestic product growth rate), and firm financial controls (proportion of fixed assets, market-to-book ratio, natural log of sales, modified Altman Z-score, and return on assets). Where indicated, industries are excluded in which a large percentage of the workforce is likely to be geographically dispersed, namely, retail, wholesale, and transport. Standard errors, adjusted for clustering at the state level, are reported in parentheses. None of the reported estimates are statistically significant at the 10% level.

	(1)	(2)	(3)	(4)
Log max total benefit$_{t-1}$	−0.013	−0.004	0.000	0.013
	(0.016)	(0.019)	(0.023)	(0.025)
Number of observations	127,233	106,059	87,160	87,160
R^2	0.67	0.67	0.67	0.74
Exclude dispersed industries	No	No	Yes	Yes
Control variables				
State economic indicators	No	Yes	Yes	Yes
Firm financial controls	No	No	No	Yes
Firm fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes

Labor Market and Worker Characteristics

- Stronger relation in industries in which unemployment risk is more relevant

Table 7
Impact of unemployment insurance (UI) laws by importance of unemployment risk.

Panel A: Industries with greater expected worker unemployment costs					
	More labor intensive (1)	High UI payment rates (2)	High layoff separation rates (3)	More low-wage workers (4)	Low employee home ownership (5)
Log max total benefit$_{t-1}$	0.047***	0.055***	0.046**	0.056***	0.062***
	(0.017)	(0.020)	(0.020)	(0.019)	(0.015)
Panel B: Industries with lower expected worker unemployment costs					
	Less labor intensive (6)	Low UI payment rates (7)	Low layoff separation rates (8)	Fewer low-wage workers (9)	High employee home ownership (10)
Log max total benefit$_{t-1}$	0.028	0.023	0.037*	0.032	0.016
	(0.022)	(0.020)	(0.022)	(0.026)	(0.022)
Control variables					
State economic indicators	Yes	Yes	Yes	Yes	Yes
Firm financial controls	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes

→ Corporate leverage increases when unemployment risk becomes less costly for workers

Firm Financial Constraints

- Stronger relation in financially constrained firms
  - Increased unemployment risk due to financing friction → higher wage premiums → string pressure on firms to maintain conservative financial policies

    ➔ UI benefits can ease this pressure by reducing workers' expected costs of unemployment

Table 8
Impact of unemployment insurance laws by importance of financial constraints.

Panel A: Firms that face greater financial constraints			
	Zero dividends (1)	Low cash flows (2)	Small firms (3)
Log max total benefit$_{t-1}$	0.061***	0.061**	0.047**
	(0.022)	(0.026)	(0.022)
Panel B: Firms that face weaker financial constraints			
	Positive dividends (4)	High cash flows (5)	Large firms (6)
Log max total benefit$_{t-1}$	0.022*	0.035***	0.029
	(0.011)	(0.013)	(0.020)
Control variables			
State economic indicators	Yes	Yes	Yes
Firm financial controls	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes

→ Firms that face tighter financial constraints are more likely to take into account worker unemployment costs when setting financial policy.

Conclusion

- **The impact of workers' unemployment risk on corporate financing decisions**
  - Exploiting **variation in unemployment insurance benefit levels** as shocks to worker unemployment costs
    - **Reductions in labor unemployment risk** are associated with **increases in corporate leverage.**
    - The impact of unemployment risk is **particularly strong for firms**
      - in industries in which layoffs occur with high frequency
      - that operate with greater labor intensity
      - that face tight financial constraints
    - Companies choose **conservative financial policies** partly as **a means of mitigating workers' exposure to unemployment risk**, supporting models such as Titman (1984) and Berk, Stanton, and Zechner (2010).
- **Labor market frictions as an important feature of the corporate environment**
  - Exploring the implications of unemployment risk on additional corporate policies is an important area for future research.

Thank you