

Internet Appendix: Inflexibility and Leverage

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This Internet Appendix reports additional results on the relation between inflexibility and financial leverage. Figure IA.1 illustrates the relation between inflexibility and bank loan spreads. Figure IA.2 compares the credit line usage rates of flexible and inflexible firms.

Table IA.1 reports our baseline results using alternative leverage measures. Table IA.2 reports the baseline results using alternative inflexibility measures. Table IA.3 investigates the relation between inflexibility and financial leverage among firms with different levels of risk shifting. Table IA.4 examines the relationship between inflexibility and financial leverage among firms with stronger incentives to enhance their bargaining power. Table IA.5 presents the relation between inflexibility and default risk. Table IA.6 reports the results on the effect of bank deregulation on inflexibility. Table IA.7 presents the dynamic effects of bank deregulation on inflexibility. Table IA.8 reports the results on the effect of bank deregulation on leverage after eliminating potential impacts from other bank deregulatory events. Table IA.9 reports the results on the effect of bank deregulation on leverage with recent econometric methods. Table IA.10 reports the dynamic effects of bank deregulation on leverage. Table IA.11 reports our baseline results after accounting for potential measurement error, as well as results from regressions with additional control variables. Table IA.12 reports our baseline results after controlling for operating leverage and operating leverage volatility. Table IA.13 presents the timing of state-level laws used in our paper.

Internet Appendix

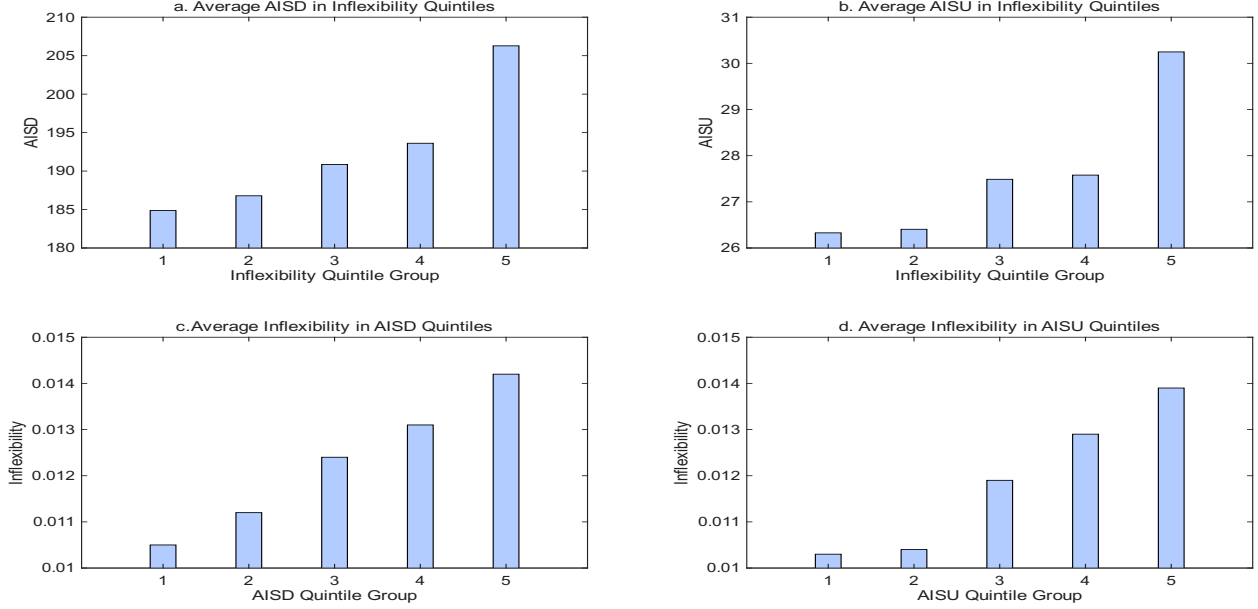


Figure IA.1

Inflexibility and Loan Spreads

This figure demonstrates the relation between inflexibility and bank loan spreads. The bank loan sample is from DealScan and consists of term loans and lines of credit. Loan facilities are sorted into quintile groups based on the one-year lagged inflexibility level of borrowing firms. Subfigures a and b plot the average all-in-drawn spread (AISD) and all-in-undrawn spread (AISU) of loan facilities in each inflexibility quintile, respectively. The differences in the average AISD and AISU between the top and bottom inflexibility quintiles are statistically significant at the 1% level ($t = 7.37$ and 7.80). Loan facilities are then sorted into quintile groups based on their all-in-drawn spread (AISD) and all-in-undrawn spread (AISU). Subfigure c and Subfigure d plot the average one-year lagged inflexibility of borrowing firms associated with loan facilities in each AISD and AISU quintile, respectively. The difference in the average inflexibility between the top and bottom AISD (AISU) quintiles is statistically significant at the 1% level ($t = 12.09$ and 10.09). The sample period is from 1981 to 2023, due to the availability of loan spread data.

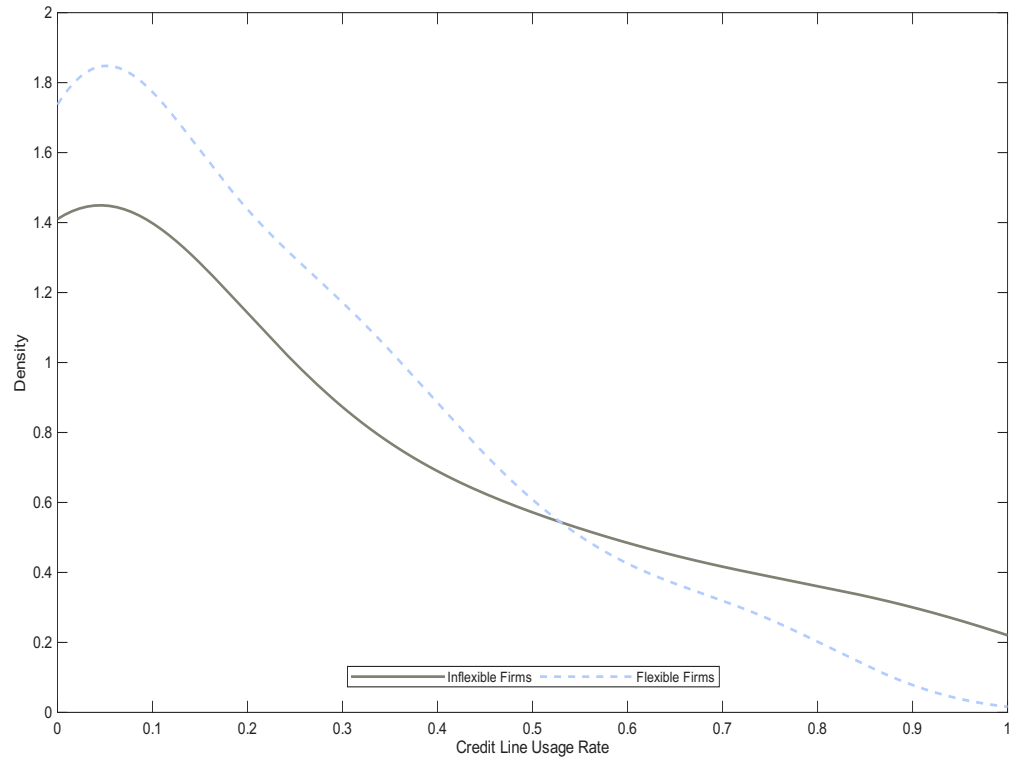


Figure IA.2

Credit Line Usage Rate: Flexible Firms vs. Inflexible Firms

This figure demonstrates the density of credit line usage rates for flexible firms (bottom decile) and inflexible firms (top decile). The sample period is from 1996 to 2003, due to the availability of [Sufi \(2009\)](#)'s credit line data.

Table IA.1

Alternative Leverage Definitions

This table reports the results from the following regression:

$$Leverage_{i,t} = \alpha + \beta Inflex_{i,t-1} + \gamma' X_{i,t-1} + \tau_{j,t} + \epsilon_{i,t},$$

where $Leverage_{i,t}$ is the leverage ratio of firm i in year t . $Inflex_{i,t-1}$ is the proxy for inflexibility. $X_{i,t-1}$ represents control variables, including profitability (*Profit*), firm size (*Size*), book-to-market ratio (*B/M*), asset tangibility (*Tangible*), dividend payer dummy (*Payer*), and stock return volatility (*Volatility*). Results for six alternative leverage ratios are presented. *LD1* (*TD1*) is the long-term (total) debt scaled by the sum of market value of equity, book value of total debt, and total preferred stock minus deferred taxes and investment tax credit. *LD2* (*TD2*) is the long-term (total) debt scaled by the sum of market value of equity and the difference between total assets and total common equity. *LDA* (*TDA*) is the long-term (total) debt scaled by book value of total assets. Detailed variable definitions are provided in Appendix Table A.1. Industry-year fixed effects are included in the regressions. Industries are defined at the three-digit SIC codes level. Constants are not reported. The sample period is from 1970 to 2023. t -statistics based on standard errors clustered at the firm level are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

	LD1	TD1	LD2	TD2	LDA	TDA
	(1)	(2)	(3)	(4)	(5)	(6)
Inflex	-0.555*** (-9.17)	-0.692*** (-10.18)	-0.380*** (-8.32)	-0.471*** (-9.13)	-0.426*** (-6.16)	-0.514*** (-6.44)
Profit	-0.113*** (-10.21)	-0.181*** (-13.70)	-0.061*** (-7.51)	-0.106*** (-11.01)	-0.088*** (-6.86)	-0.171*** (-11.16)
Size	0.031*** (28.04)	0.033*** (27.50)	0.021*** (25.73)	0.021*** (24.64)	0.027*** (26.84)	0.029*** (26.10)
B/M	0.174*** (29.86)	0.235*** (35.87)	0.105*** (25.43)	0.141*** (30.56)	-0.009* (-1.80)	-0.013** (-2.28)
Tangible	0.179*** (13.19)	0.166*** (10.87)	0.140*** (13.60)	0.134*** (11.54)	0.154*** (12.27)	0.152*** (10.84)
Payer	-0.053*** (-14.61)	-0.070*** (-17.21)	-0.040*** (-14.77)	-0.051*** (-16.83)	-0.046*** (-13.36)	-0.057*** (-14.83)
Volatility	1.625*** (15.15)	2.529*** (20.29)	1.140*** (14.60)	1.778*** (19.52)	1.403*** (14.86)	2.209*** (20.06)
Industry-year FE	Yes	Yes	Yes	Yes	Yes	Yes
Obs	82,929	82,929	86,577	86,544	86,632	86,597
Adjusted R ²	0.381	0.421	0.344	0.375	0.267	0.257

Table IA.2

Alternative Inflexibility Measure

This table reports the results from the following regression:

$$Leverage_{i,t} = \alpha + \beta Inflex_{i,t-1} + \gamma' X_{i,t-1} + \tau_{j,t} + \epsilon_{i,t},$$

where $Leverage_{i,t}$ is either the long-term leverage ratio (LD) or the total leverage ratio (TD) of firm i in year t . $Inflex_{i,t-1}$ is an alternative inflexibility measure. In Columns (1) and (2), inflexibility is calculated based on Equation (1) but with a ten-year rolling window, where we require that at least five observations are available for a firm. In Columns (3) and (4), inflexibility is calculated as in Equation (1) with a firm's accounting data from its first appearance in Compustat to year $t - 1$. We require that at least 10 observations are available for a firm in the construction. $X_{i,t-1}$ represents control variables, including profitability ($Profit$), firm size ($Size$), book-to-market ratio (B/M), asset tangibility ($Tangible$), dividend payer dummy ($Payer$), and stock return volatility ($Volatility$). Detailed variable definitions are provided in Appendix Table A.1. Industry-year fixed effects are included in the regressions. Industries are defined at the three-digit SIC codes level. Constants are not reported. The sample period is from 1970 to 2023. t -statistics based on standard errors clustered at the firm level are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

	Ten-year Rolling Window		Expanding Window	
	LD (1)	TD (2)	LD (3)	TD (4)
Inflex	-0.664*** (-11.96)	-0.907*** (-14.00)	-0.346*** (-6.96)	-0.428*** (-7.56)
Profit	-0.103*** (-13.82)	-0.161*** (-17.78)	-0.106*** (-9.88)	-0.175*** (-13.49)
Size	0.032*** (34.46)	0.033*** (33.11)	0.031*** (29.73)	0.034*** (28.72)
B/M	0.156*** (35.55)	0.220*** (43.88)	0.169*** (29.95)	0.227*** (35.84)
Tangible	0.173*** (16.64)	0.157*** (13.34)	0.161*** (12.45)	0.144*** (9.93)
Payer	-0.060*** (-19.56)	-0.078*** (-22.73)	-0.057*** (-16.03)	-0.073*** (-18.38)
Volatility	1.463*** (18.77)	2.433*** (26.49)	1.820*** (17.16)	2.816*** (22.82)
Industry-year FE	Yes	Yes	Yes	Yes
Obs	119,724	119,724	87,601	87,601
Adjusted R ²	0.367	0.412	0.372	0.415

Table IA.3

Inflexibility and Financial Leverage: Risk-shifting Hypothesis

This table reports the results from the following regression:

$$Leverage_{i,t} = \alpha + \beta Inflex_{i,t-1} \times V_{i,t-1} + \theta_1 Inflex_{i,t-1} + \theta_2 V_{i,t-1} + \gamma' X_{i,t-1} + \tau_i + \tau_t + \epsilon_{i,t},$$

where $Leverage_{i,t}$ is either the long-term leverage ratio (LD) or the total leverage ratio (TD) of firm i in year t . $Inflex_{i,t-1}$ is the proxy for inflexibility. V represents an indicator variable for high secured debt, high convertible debt, low debt maturity, or low cash holdings. Secured debt is the ratio of secured debt to total debt. Convertible debt is the ratio of convertible debt to total debt. Debt maturity is the firm's average debt maturity estimated as in Eisdorfer (2008). It is the book value-weighted average of the maturities of short- and long-term debt, where the maturity of short- and long-term debt are assumed to be half a year and five years, respectively. Cash holdings are the ratio of cash and short-term investments to total assets. The indicator variables are defined based on the sample median of the corresponding variable in a given year. Firms with high secured debt, high convertible debt, low debt maturity, or low cash holdings are associated with a lower likelihood of risk-shifting behavior. $X_{i,t-1}$ represents control variables, including profitability ($Profit$), firm size ($Size$), book-to-market ratio (B/M), asset tangibility ($Tangible$), dividend payer dummy ($Payer$), and stock return volatility ($Volatility$). Detailed variable definitions are provided in Appendix Table A.1. Year fixed effects and firm fixed effects are included in the regressions. Industries are defined at the three-digit SIC codes level. Constants are not reported. The sample period is from 1970 to 2023. t -statistics based on standard errors clustered at the firm level are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

	LD				TD			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Inflex	-0.374*** (-3.54)	-0.425*** (-3.90)	-0.432*** (-3.63)	-0.263*** (-3.18)	-0.348*** (-3.15)	-0.382*** (-3.42)	-0.325*** (-2.76)	-0.262*** (-2.90)
Inflex $\times$ High Secured Debt	-0.145* (-1.94)				-0.118 (-1.46)			
High Secured Debt	0.013*** (4.83)				0.007** (2.51)			
Inflex $\times$ High Convertible Debt		-0.072 (-0.66)				-0.074 (-0.66)		
High Convertible Debt		0.048*** (12.30)				0.048*** (11.25)		
Inflex $\times$ Low Debt Maturity			0.060 (0.78)				-0.103 (-1.32)	
Low Debt Maturity			-0.050*** (-24.18)				-0.018*** (-8.08)	
Inflex $\times$ Low Cash Holdings				-0.155* (-1.84)				-0.058 (-0.64)
Low Cash Holdings				0.033*** (13.89)				0.051*** (19.04)
Profit	-0.178*** (-15.45)	-0.167*** (-14.87)	-0.181*** (-16.15)	-0.142*** (-14.26)	-0.284*** (-21.04)	-0.272*** (-20.33)	-0.285*** (-21.16)	-0.232*** (-19.61)
Size	0.045*** (16.64)	0.042*** (15.82)	0.043*** (16.27)	0.043*** (17.12)	0.051*** (16.75)	0.049*** (16.17)	0.050*** (16.51)	0.048*** (17.18)
B/M	0.130*** (24.26)	0.129*** (24.39)	0.131*** (25.14)	0.111*** (22.76)	0.172*** (28.47)	0.171*** (28.58)	0.172*** (28.67)	0.144*** (25.87)
Tangible	0.127*** (8.22)	0.130*** (8.53)	0.122*** (8.19)	0.116*** (7.91)	0.136*** (7.95)	0.138*** (8.21)	0.134*** (7.88)	0.120*** (7.37)
Payer	-0.030*** (-8.10)	-0.030*** (-7.95)	-0.030*** (-8.28)	-0.029*** (-8.51)	-0.033*** (-8.33)	-0.032*** (-8.12)	-0.033*** (-8.38)	-0.033*** (-8.80)
Volatility	1.026*** (11.48)	1.012*** (11.42)	1.051*** (12.04)	1.029*** (12.40)	1.553*** (15.54)	1.542*** (15.54)	1.563*** (15.63)	1.525*** (16.19)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs	78,064	77,382	78,064	86,542	78,064	77,382	78,064	86,542
Adjusted R ²	0.621	0.625	0.631	0.644	0.666	0.668	0.667	0.688

Table IA.4

Inflexibility and Financial Leverage: Bargaining Hypothesis

This table reports the results from the following regression:

$$Leverage_{i,t} = \alpha + \beta Inflex_{i,t-1} \times M + \theta_1 Inflex_{i,t-1} + \theta_2 M + \gamma' X_{i,t-1} + \tau_i + \tau_t + \epsilon_{i,t},$$

where $Leverage_{i,t}$ is either the long-term leverage ratio (LD) or the total leverage ratio (TD) of firm i in year t . $Inflex_{i,t-1}$ is the proxy for inflexibility. M is an indicator variable for high union membership or high union coverage. *High union membership* is a dummy equal to one if the union membership rate in the firm's industry is above the sample median. *High union coverage* is a dummy equal to one if the firm's industry union coverage rate is above the sample median. Union membership and union coverage data are from [Hirsch, Macpherson, and Even \(2026\)](#). $X_{i,t-1}$ represents control variables, including profitability (*Profit*), firm size (*Size*), book-to-market ratio (B/M), asset tangibility (*Tangible*), dividend payer dummy (*Payer*), and stock return volatility (*Volatility*). Detailed variable definitions are provided in Appendix Table A.1. Year fixed effects and firm fixed effects are included in the regressions. Industries are defined at the three-digit SIC codes level. Constants are not reported. The sample period is from 1983 to 2023. t -statistics based on standard errors clustered at the firm level are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

	LD	TD	LD	TD
	(1)	(2)	(3)	(4)
Inflex	-0.268*** (-2.93)	-0.256** (-2.56)	-0.277*** (-3.02)	-0.263*** (-2.64)
High union membership	0.010** (2.26)	0.007 (1.62)		
Inflex $\times$ High union membership	-0.234 (-1.55)	-0.111 (-0.77)		
High union coverage			0.007* (1.77)	0.005 (1.09)
Inflex $\times$ High union coverage			-0.181 (-1.33)	-0.068 (-0.52)
Profit	-0.116*** (-11.14)	-0.194*** (-15.61)	-0.116*** (-11.15)	-0.194*** (-15.62)
Size	0.042*** (15.91)	0.049*** (15.81)	0.042*** (15.91)	0.049*** (15.80)
B/M	0.111*** (20.46)	0.146*** (22.85)	0.111*** (20.46)	0.146*** (22.84)
Tangible	0.124*** (8.04)	0.160*** (9.28)	0.124*** (8.03)	0.160*** (9.28)
Payer	-0.023*** (-6.06)	-0.025*** (-6.00)	-0.023*** (-6.05)	-0.025*** (-6.00)
Volatility	0.952*** (11.17)	1.400*** (14.26)	0.952*** (11.16)	1.399*** (14.25)
Year FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Obs	64,548	64,548	64,548	64,548
Adjusted R ²	0.636	0.675	0.635	0.675

Table IA.5

Inflexibility and Default Risk

This table reports the results from the following regression:

$$Default\ Risk_{i,t+k} = \alpha + \beta Inflex_{i,t} + \tau_{j,t+k} + \epsilon_{i,t+k}, \quad k = 1, 2, 3$$

where the $Default\ Risk_{i,t+k}$ is the default risk of firm i in year $t+k$, measured with the modified Altman's Z-score proposed by Mackie-Mason (1990) in Panel A and the failure probability proposed by Campbell, Hilscher, and Szilagyi (2008) in Panel B. Higher Z-score indicates lower default risk, whereas higher failure probability is associated with higher default risk. $Inflex_{i,t}$ is the proxy for inflexibility. In Panel A (Panel B), Columns (1) to (3) regress Z-score (failure probability) in year $t+1$, $t+2$, and $t+3$ on the inflexibility measure in year t , respectively. Columns (4) to (6) replace the continuous inflexibility measure with $Inflex_{High}$, an indicator that equals one if the inflexibility measure of firm i is above the sample median in year t , and zero otherwise. Detailed variable definitions are provided in Appendix Table A.1. Industry-year fixed effects are included in the regressions. Industries are defined at the three-digit SIC codes level. Constants are not reported. The sample period is from 1970 to 2023. t -statistics based on standard errors clustered at the firm level are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

Panel A: Inflexibility and Z-score						
	Z _{t+1}	Z _{t+2}	Z _{t+3}	Z _{t+1}	Z _{t+2}	Z _{t+3}
	(1)	(2)	(3)	(4)	(5)	(6)
Inflex	-24.462*** (-13.47)	-23.274*** (-12.13)	-21.960*** (-10.95)			
Inflex _{High}				-0.552*** (-14.04)	-0.510*** (-12.63)	-0.473*** (-11.36)
Industry-year FE	Yes	Yes	Yes	Yes	Yes	Yes
Obs	80,070	73,713	67,895	80,070	73,713	67,895
Adjusted R ²	0.307	0.298	0.290	0.249	0.246	0.243
Panel B: Inflexibility and failure probability						
	FP _{t+1}	FP _{t+2}	FP _{t+3}	FP _{t+1}	FP _{t+2}	FP _{t+3}
	(1)	(2)	(3)	(4)	(5)	(6)
Inflex	1.325*** (9.02)	1.196*** (8.09)	1.101*** (7.49)			
Inflex _{High}				0.028*** (7.92)	0.023*** (6.42)	0.021*** (5.58)
Industry-year FE	Yes	Yes	Yes	Yes	Yes	Yes
Obs	77,577	72,304	66,894	77,577	72,304	66,894
Adjusted R ²	0.097	0.094	0.092	0.089	0.087	0.086

Table IA.6

Credit Supply Shock: Effect of Deregulation on Inflexibility

This table reports the results from the following regression:

$$Inflex_{i,t} = \alpha + \beta Dereg_{s,t} + \gamma' X_{i,t-1} + \tau_{j,t} + \tau_i + \epsilon_{i,t},$$

where $Inflex_{i,t}$ is the proxy for inflexibility. $Dereg_{s,t}$ is an indicator that equals one if the headquarter state of firm i had implemented the interstate bank branching deregulation in or before year t , and zero otherwise. $High\ Inflex$ is a dummy variable equal to one if the firm's inflexibility in the year prior to bank deregulation is in the top half of the distribution, and zero if it is in the bottom half. $X_{i,t-1}$ represents control variables, including profitability (*Profit*), firm size (*Size*), book-to-market ratio (*B/M*), asset tangibility (*Tangible*), dividend payer dummy (*Payer*), and stock return volatility (*Volatility*). Detailed variable definitions are provided in Appendix Table A.1. Industry-year fixed effects and firm fixed effects are also included. Industries are defined at the three-digit SIC code level. In Panel A, we estimate the model using two-way fixed effects. In Panel B, Column (1) reports the estimates from a stacked difference-in-differences design using a twenty-year window around deregulation events, while Column (2) reports the estimates using the method of Callaway and Sant'Anna (2021). Constants are not reported. The sample period is from 1970 to 2023. t -statistics based on standard errors clustered at the headquarter state level are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

Panel A: Two-way Fixed Effects Approach		
	(1)	(2)
Dereg	-0.001 (-1.08)	-0.000 (-0.74)
Dereg $\times$ High Inflex		-0.000 (-0.08)
Controls	Yes	Yes
Industry-year FE	Yes	Yes
Firm FE	Yes	Yes
Obs	85,779	45,864
Adjusted R ²	0.815	0.696
Panel B: Recent Econometric Methods		
	Stacked DID Design (1)	Callaway and Sant'Anna (2021) (2)
Dereg	-0.001 (-1.38)	0.001 (0.45)
Controls	Yes	Yes
Industry-year FE	Yes	Yes
Firm FE	Yes	Yes
Obs	63,750	51,770
Adjusted R ²	0.830	

Table IA.7

Credit Supply Shock: Dynamic Effects of Deregulation on Inflexibility

This table reports the results from estimating the dynamic effects of bank deregulation on inflexibility. *Inflex* is the proxy for inflexibility. *Before4*, *Before3*, *Before2*, and *Before1* are indicator variables equal to one in the fourth, third, second, and first years prior to deregulation, respectively. *Current0* is an indicator variable equal to one in the deregulation year. *After3*, *After2*, and *After1* are indicator variables equal to one in the third, second, and first years after deregulation, respectively. *After4* is an indicator variable equal to one in the fourth and all subsequent years following deregulation, and zero otherwise. The deregulation year for each state is defined as the year in which deregulation was implemented in that state. $X_{i,t-1}$ represents control variables, including profitability (*Profit*), firm size (*Size*), book-to-market ratio (*B/M*), asset tangibility (*Tangible*), dividend payer dummy (*Payer*), and stock return volatility (*Volatility*). Detailed variable definitions are provided in Appendix Table A.1. Industry-year fixed effects and firm fixed effects are also included. Industries are defined at the three-digit SIC code level. Constants are not reported. The sample period is from 1970 to 2023. *t*-statistics based on standard errors clustered at the headquarter state level are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

	Inflex
	(1)
Before 4	-0.000 (-0.88)
Before 3	-0.001 (-1.02)
Before 2	-0.001 (-0.75)
Before 1	-0.001 (-0.75)
Current 0	-0.001 (-0.97)
After 1	-0.001 (-0.93)
After 2	-0.002 (-1.11)
After 3	-0.002 (-1.05)
After 4	-0.001 (-0.76)
Controls	Yes
Industry-year FE	Yes
Firm FE	Yes
Obs	85,779
Adjusted R ²	0.815

Table IA.8

Credit Supply Shock: Eliminating Impacts of Other Deregulation Events

This table reports the results from the following regression:

$$Leverage_{i,t} = \alpha + \beta Inflex_{i,t-1} \times Dereg_{s,t} + \theta Inflex_{i,t-1} + \gamma' X_{i,t-1} + \tau_{s,t} + \tau_{j,t} + \tau_i + \epsilon_{i,t},$$

where $Leverage_{i,t}$ is either the long-term leverage ratio (LD) or the total leverage ratio (TD) of firm i in year t . $Inflex_{i,t-1}$ is the proxy for inflexibility. $Dereg_{s,t}$ is an indicator that equals one if the headquarter state of firm i had implemented the interstate bank branching deregulation in or before year t , and zero otherwise. $X_{i,t-1}$ represents control variables, including profitability ($Profit$), firm size ($Size$), book-to-market ratio (B/M), asset tangibility ($Tangible$), dividend payer dummy ($Payer$), and stock return volatility ($Volatility$). Detailed variable definitions are provided in Appendix Table A.1. The sample excludes years before 1992, during which period the intrastate branching deregulation were implemented. Headquarter state-by-year fixed effects are included in Columns (1) and (3). State-by-year fixed effects, industry-year fixed effects, and firm fixed effects are included in Columns (2) and (4). Industries are defined at the three-digit SIC codes level. Constants are not reported. t -statistics based on standard errors clustered at the headquarter state level are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

	LD		TD	
	(1)	(2)	(3)	(4)
Inflex $\times$ Dereg	0.523*** (3.01)	0.324*** (2.62)	0.586*** (3.17)	0.343*** (3.06)
Inflex	-0.803*** (-5.37)	-0.491*** (-4.20)	-0.984*** (-5.96)	-0.447*** (-3.65)
Profit	-0.040*** (-4.55)	-0.098*** (-6.80)	-0.072*** (-5.40)	-0.157*** (-8.83)
Size	0.035*** (15.62)	0.047*** (15.36)	0.037*** (14.05)	0.052*** (13.86)
B/M	0.190*** (18.16)	0.083*** (13.09)	0.250*** (21.75)	0.114*** (15.75)
Tangible	0.195*** (18.87)	0.116*** (6.52)	0.193*** (15.07)	0.157*** (7.39)
Payer	-0.046*** (-6.16)	-0.017*** (-3.94)	-0.052*** (-7.00)	-0.021*** (-5.11)
Volatility	1.670*** (10.66)	0.891*** (10.22)	2.610*** (13.35)	1.328*** (11.15)
State-year FE	Yes	Yes	Yes	Yes
Industry-year FE	No	Yes	No	Yes
Firm FE	No	Yes	No	Yes
Obs	53,398	53,398	53,398	53,398
Adjusted R ²	0.300	0.693	0.330	0.716

Table IA. 9

Credit Supply Shock: Recent Econometric Methods

This table reports the results from the following regression:

$$Leverage_{i,t} = \alpha + \beta High\ Inflex_i \times Dereg_{s,t} + \theta High\ Inflex_i + \gamma' X_{i,t-1} + \tau_{s,t} + \tau_{j,t} + \tau_i + \epsilon_{i,t},$$

where $Leverage_{i,t}$ is either the long-term leverage ratio (LD) or the total leverage ratio (TD) of firm i in year t . $Dereg_{s,t}$ is an indicator that equals one if the headquarter state of firm i had implemented the interstate bank branching deregulation in or before year t , and zero otherwise. $High\ Inflex_i$ is a dummy variable equal to one if the firm's inflexibility in the year prior to bank deregulation is in the top half of the distribution, and zero if it is in the bottom half. $X_{i,t-1}$ represents control variables, including profitability ($Profit$), firm size ($Size$), book-to-market ratio (B/M), asset tangibility ($Tangible$), dividend payer dummy ($Payer$), and stock return volatility ($Volatility$). Detailed variable definitions are provided in Appendix Table A.1. State-by-year fixed effects, industry-year fixed effects, and firm fixed effects are also included. Industries are defined at the three-digit SIC code level. Columns (1) and (2) report the estimates from a stacked difference-in-differences design using a twenty-year window around deregulation events, while Columns (3) and (4) report the estimates using the method of Callaway and Sant'Anna (2021). Constants are not reported. t -statistics based on standard errors clustered at the headquarter state level are reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	Stacked DID Design		Callaway and Sant'Anna (2021)	
	(1)	(2)	(3)	(4)
Dereg $\times$ High Inflex	0.022*** (2.79)	0.019** (2.31)	0.020*** (3.50)	0.018*** (2.90)
Controls	Yes	Yes	Yes	Yes
State-year FE	Yes	Yes	Yes	Yes
Industry-year FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Obs	36,722	36,722	41,691	41,691
Adjusted R ²	0.614	0.659		

Table IA.10

Credit Supply Shock: Dynamic Effects of Deregulation on Leverage

This table reports the results from estimating the dynamic effects of bank deregulation on leverage. The dependent variable is long-term leverage ratio (*LD*) or the total leverage ratio (*TD*). *Before4*, *Before3*, *Before2*, and *Before1* are indicator variables equal to one in the fourth, third, second, and first years prior to deregulation, respectively. *Current0* is an indicator variable equal to one in the deregulation year. *After3*, *After2*, and *After1* are indicator variables equal to one in the third, second, and first years after deregulation, respectively. *After4* is an indicator variable equal to one in the fourth and all subsequent years following deregulation, and zero otherwise. The deregulation year for each state is defined as the year in which deregulation was implemented in that state. *High Inflex* is a dummy variable equal to one if the firm's inflexibility in the year prior to bank deregulation is in the top half of the distribution, and zero if it is in the bottom half. Control variables include profitability (*Profit*), firm size (*Size*), book-to-market ratio (*B/M*), asset tangibility (*Tangible*), dividend payer dummy (*Payer*), and stock return volatility (*Volatility*). Detailed variable definitions are provided in Appendix Table A.1. State-by-year fixed effects, industry-year fixed effects, and firm fixed effects are included in the regressions. Industries are defined at the three-digit SIC codes level. Constants are not reported. The sample period is from 1970 to 2023. *t*-statistics based on standard errors clustered at the headquarter state level are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	LD	TD
	(1)	(2)
Before 4 × High Inflex	0.002 (0.26)	0.005 (0.62)
Before 3 × High Inflex	0.012 (1.35)	0.016* (1.74)
Before 2 × High Inflex	0.002 (0.20)	0.009 (0.79)
Before 1 × High Inflex	-0.009 (-1.17)	-0.004 (-0.48)
Current 0 × High Inflex	0.009 (1.08)	0.012 (1.10)
After 1 × High Inflex	0.017*** (2.77)	0.022*** (2.73)
After 2 × High Inflex	0.017* (1.89)	0.021* (1.86)
After 3 × High Inflex	0.028*** (3.84)	0.032*** (3.28)
After 4 × High Inflex	0.039*** (5.29)	0.044*** (4.60)
Controls	Yes	Yes
State-year FE	Yes	Yes
Industry-year FE	Yes	Yes
Firm FE	Yes	Yes
Obs	45,750	45,750
Adjusted R ²	0.608	0.652

Table IA.11

Measurement Error and Additional Control Variables

This table reports the results from robustness tests. Panel A presents results from regressions of the long-term leverage ratio (*LD*) and the total leverage ratio (*TD*) on inflexibility using the linear cumulant equations. For each leverage ratio, we report the results with the fourth and fifth cumulants. The variables are demeaned before the estimation to incorporate industry-year fixed effects. We assume book-to-market ratio (*B/M*), asset tangibility (*Tangible*), and inflexibility (*Inflex*) are measured with error. Columns (1) and (4) shows the OLS results from Table 2. Panel B reports the results from OLS regressions of leverage ratios on inflexibility with additional control variables, including price-to-cost margin (*Price-Cost Margin*), Compustat-based Herfindahl index (*HHI*), the Hoberg-Phillips Herfindahl index (*HP HHI*), firm age (*log(Age)*), and cash-flow volatility (*CF Vol*). Baseline control variables specified in Table 2 are included but the coefficients are not reported. Detailed variable definitions are provided in Appendix Table A.1. The sample period is from 1970 to 2023 except for Columns (1) and (5) in Panel B, where the sample starts from 1975 due to the availability of the Hoberg-Phillips data. Constants are not reported. *t*-statistics based on standard errors clustered at the firm level are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

Panel A: Measurement Error						
	LD			TD		
	(1) OLS	(2) Fourth	(3) Fifth	(4) OLS	(5) Fourth	(6) Fifth
Inflex	-0.531*** (-9.57)	-0.867*** (-6.71)	-0.633*** (-7.30)	-0.667*** (-10.61)	-1.229*** (-6.61)	-0.800*** (-6.82)
Profit	-0.114*** (-11.23)	-0.354*** (-14.49)	-0.284*** (-16.25)	-0.187*** (-15.18)	-0.573*** (-18.36)	-0.454*** (-19.55)
Size	0.031*** (30.94)	0.026*** (20.20)	0.027*** (23.41)	0.033*** (30.25)	0.025*** (15.14)	0.027*** (19.38)
B/M	0.166*** (31.22)	-0.116*** (-5.66)	-0.032** (-2.42)	0.224*** (37.36)	-0.204*** (-8.17)	-0.080*** (-4.72)
Tangible	0.160*** (13.04)	0.394*** (7.86)	0.377*** (12.56)	0.144*** (10.49)	0.667*** (10.98)	0.535*** (12.93)
Payer	-0.057*** (-16.99)	-0.068*** (-17.15)	-0.065*** (-17.44)	-0.073*** (-19.67)	-0.092*** (-18.82)	-0.086*** (-19.59)
Volatility	1.802*** (18.00)	1.829*** (16.56)	1.789*** (17.17)	2.794*** (23.93)	2.768*** (19.80)	2.748*** (21.53)
Obs	86,546	86,546	86,546	86,546	86,546	86,546

Panel B: Additional Control Variables								
	LD				TD			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Inflex	-0.315*** (-3.29)	-0.500*** (-8.52)	-0.501*** (-8.58)	-0.600*** (-5.97)	-0.309*** (-3.07)	-0.609*** (-9.22)	-0.610*** (-9.26)	-0.742*** (-6.90)
HHI	0.001 (0.06)				0.003 (0.15)			
HP HHI	-0.068 (-0.42)				-0.223 (-1.28)			
Price-Cost Margin	0.000 (0.02)	-0.037*** (-3.40)	-0.039*** (-3.55)	-0.032** (-2.14)	-0.018 (-1.21)	-0.072*** (-5.72)	-0.073*** (-5.79)	-0.049*** (-2.82)
log(Age)			-0.008** (-2.02)	0.000 (0.05)			-0.006 (-1.32)	0.012 (1.38)
CF Vol				-0.001 (-1.64)				-0.002*** (-2.79)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	No	No	No	Yes	No	No	No
Firm FE	Yes	No	No	No	Yes	No	No	No
Industry-year FE	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Obs	72,290	86,433	86,433	48,344	72,290	86,433	86,433	48,344
Adjusted R ²	0.638	0.371	0.372	0.386	0.678	0.417	0.417	0.431

Table IA.12

Inflexibility, Operating Leverage, and Operating Leverage Variability

This table presents the results that distinguish the effects of inflexibility, operating leverage, and operating leverage variability. Panel A reports the results from regressions of financial leverage on inflexibility, operating leverage, and operating leverage volatility. The regression specification is similar to that in Table 2. The dependent variable is either long-term leverage ratio (*LD*) or total leverage ratio (*TD*). *Inflex* is the proxy for inflexibility. *OL* is operating leverage. *OL Vol* is operating leverage volatility. Baseline control variables specified in Table 2 are included, but the coefficients are not reported. Detailed variable definitions are provided in Appendix Table A.1. Industry-year fixed effects are included in the regressions. Industries are defined at the three-digit SIC codes level. Constants are not reported. Panel B reports the results from the regression of financial leverage on residual inflexibility *Residual Inflex*, which is residuals from a regression of the inflexibility measure on operating leverage. The sample period is from 1970 to 2023. *t*-statistics based on standard errors clustered at the firm level are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

Panel A: Effects of Operating Leverage and Operating Leverage Variability								
	LD				TD			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Inflex	-0.425*** (-6.91)			-0.358*** (-5.62)	-0.511*** (-7.54)			-0.367*** (-5.21)
OL		-0.062*** (-10.65)		-0.060*** (-10.02)		-0.090*** (-13.11)		-0.084*** (-11.86)
OL Vol			-0.038*** (-4.19)	0.020** (1.97)			-0.066*** (-6.49)	0.007 (0.59)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs	68,026	68,026	68,026	68,026	68,026	68,026	68,026	68,026
Adjusted R ²	0.363	0.365	0.361	0.366	0.400	0.405	0.400	0.406

Panel B: Decomposition of Inflexibility by Operating Leverage						
	LD			TD		
	(1)	(2)	(3)	(4)	(5)	(6)
Residual Inflex	-0.573*** (-7.52)	-0.386*** (-6.54)	-0.241*** (-4.22)	-0.650*** (-7.72)	-0.473*** (-7.05)	-0.250*** (-3.96)
Controls	No	Yes	Yes	No	Yes	Yes
Industry-year FE	No	No	Yes	No	No	Yes
Obs	74,037	73,042	73,042	74,037	73,042	73,042
Adjusted R ²	0.004	0.252	0.363	0.004	0.270	0.402

Table IA.13

Timing of State-level Laws

This table presents the timing of state-level laws used in our paper. Panel A reports the branching restrictiveness index constructed by [Rice and Strahan \(2010\)](#) for each state and the corresponding effective year. Panel B shows the adoption year of the business combination law for each state ([Bertrand and Mullainathan, 2003](#)). Panel C reports the adoption year of the wrongful discharge law (i.e., the good-faith exception) for each state ([Serfling, 2016](#)).

Panel A: Interstate Branching Law					
State	Branching Restrictiveness Index (Effective Year)	State	Branching Restrictiveness Index (Effective Year)	State	Branching Restrictiveness Index (Effective Year)
AL	3 (1997)	KY	3 (2000)	OK	4 (1997)
AK	2 (1994)	LA	3 (1997)	OK	1 (2000)
AZ	3 (1996)	ME	0 (1997)	OR	3 (1997)
AZ	2 (2001)	MD	0 (1995)	PA	0 (1995)
AR	4 (1997)	MA	1 (1996)	RI	0 (1995)
CA	3 (1995)	MI	0 (1995)	SC	3 (1996)
CO	4 (1997)	MN	3 (1997)	SD	3 (1996)
CT	1 (1995)	MS	4 (1997)	TN	3 (1997)
DE	3 (1995)	MO	4 (1995)	TN	2 (1998)
DC	0 (1996)	MT	4 (1995)	TN	1 (2001)
FL	3 (1997)	NE	4 (1997)	TX	4 (1995)
GA	3 (1997)	NV	3 (1995)	TX	2 (1999)
HI	3 (1997)	NH	4 (1997)	UT	2 (1995)
HI	0 (2001)	NH	1 (2000)	UT	1 (2001)
ID	3 (1995)	NH	0 (2002)	VT	2 (1996)
IL	3 (1997)	NJ	1 (1996)	VT	0 (2001)
IL	0 (2004)	NM	3 (1996)	VA	0 (1995)
IN	0 (1997)	NY	2 (1997)	WA	3 (1996)
IN	1 (1998)	NC	0 (1995)	WA	1 (2005)
IA	4 (1996)	ND	3 (1997)	WV	1 (1997)
KS	4 (1995)	ND	1 (2003)	WI	3 (1996)
KY	4 (1997)	OH	0 (1997)	WY	3 (1997)
Panel B: Business Combination Law					
State	Adoption Year	State	Adoption Year	State	Adoption Year
AZ	1987	MD	1989	OK	1991
CT	1989	MA	1989	PA	1989
DE	1988	MI	1989	RI	1990
GA	1988	MN	1987	SC	1988
ID	1988	MO	1986	SD	1990
IL	1989	NE	1988	TN	1988
IN	1986	NV	1991	VA	1988
KS	1989	NJ	1986	WA	1987
KY	1987	NY	1985	WI	1987
ME	1988	OH	1990	WY	1989
Panel C: Wrongful Discharge Law					
State	Adoption Year	State	Adoption Year	State	Adoption Year
AK	1983	ID	1989	NH	1974 (Rev. 1980)
AZ	1985	LA	1998	OK	1985 (Rev. 1989)
CA	1980	MA	1977	UT	1989
CT	1980	MT	1982	WY	1994
DE	1992	NV	1987		