Credit Crunches and the Great Stagflation

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The Great Stagflation (1965-1982)

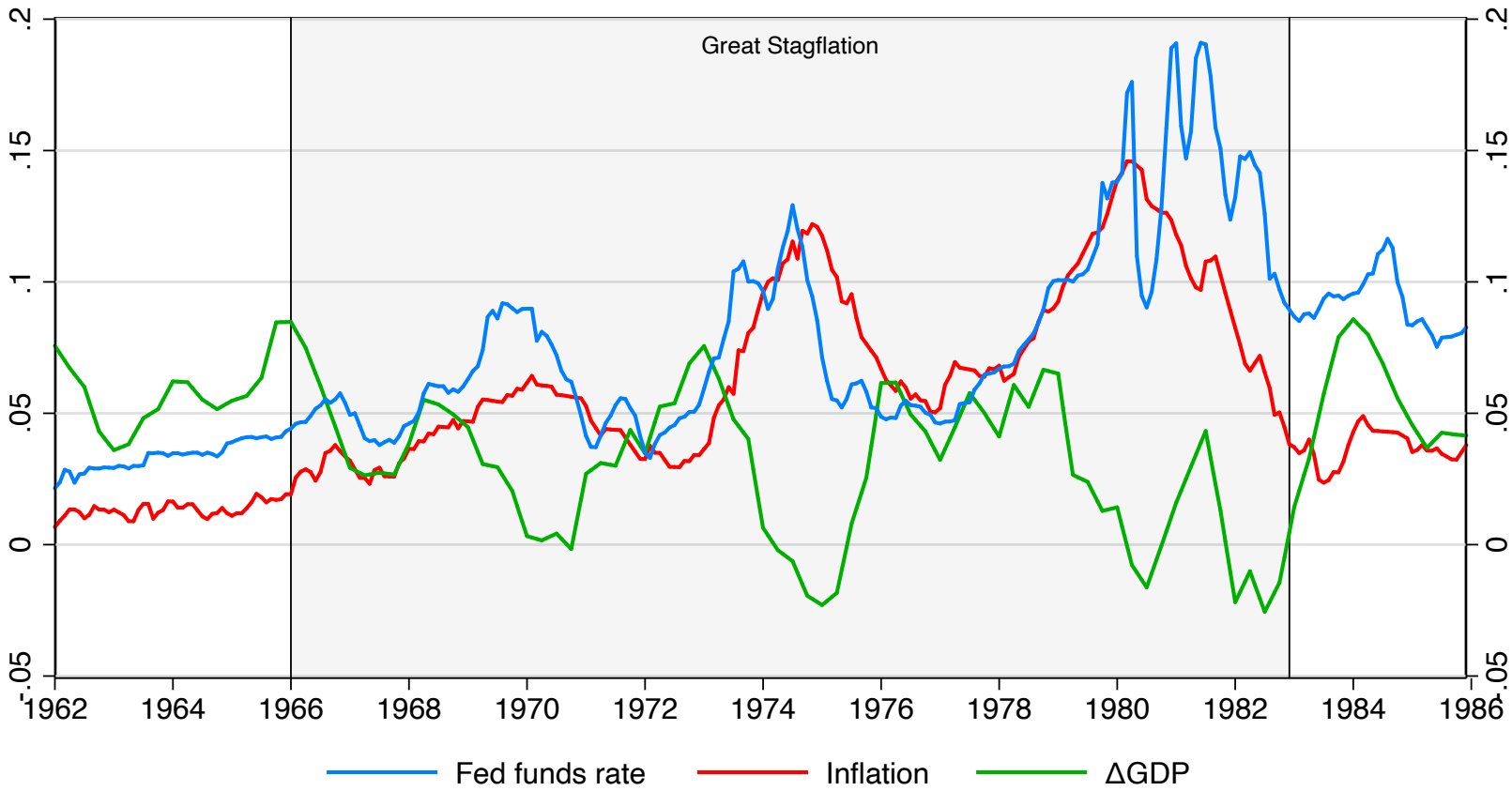
1. A defining period in macro
   - four recessions with high inflation and low growth $\rightarrow$ "stagflation"
   - led to a fundamental rethinking of economic theory and policy

2. Standard narrative blames the Fed's failure to control demand
   - not aggressive enough in fighting inflation (Taylor coefficient < 1)
   - lost credibility over time $\rightarrow$ unanchored inflation expectations

3. Less focus on "stag" part of stagflation
   - to explain it literature appeals to a series of exogenous negative supply shocks
   - oil shocks in 1973 and 1979, latent TFP shocks, "bad luck"

4. Supply side of Great Stagflation not seen as central to lessons drawn
   - over time, name shifted from Great Stagflation to Great Inflation (Goutsmedt 2020)

The Great Stagflation (1965-1982)



1. Real GDP and inflation were strongly *inversely* related over 4 cycles

⇒ Requires negative supply shocks ("inverted Phillips curve")

- demand shocks or unanchored inflation expectations can't explain the negative inflation-growth relation

This paper: credit crunches and stagflation

1. We argue that tight monetary policy caused severe credit crunches that disrupted firms' ability to produce and led to stagflation

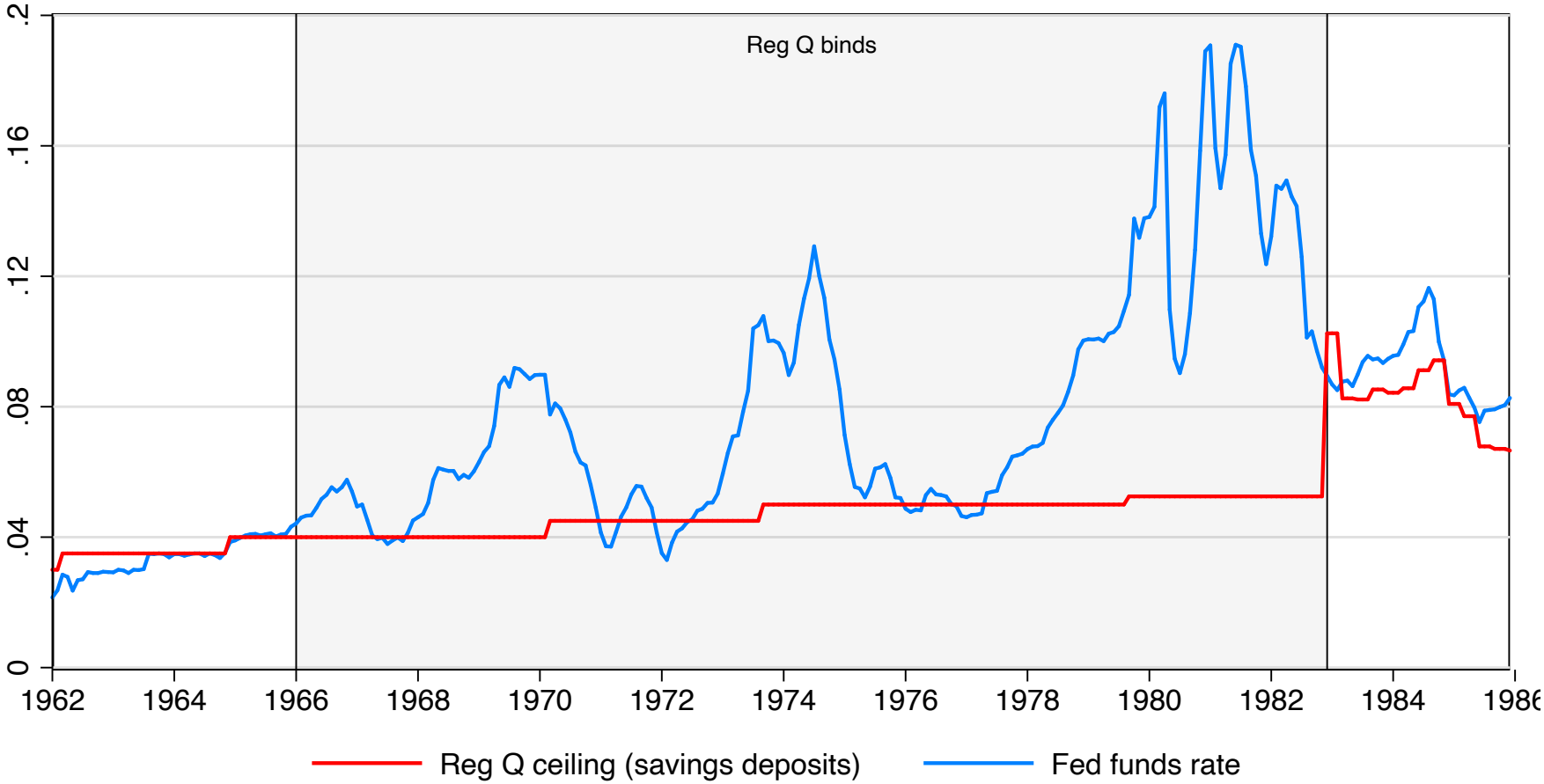
2. The credit crunches were due to the banking law Regulation Q
   - Reg Q imposed deposit rate ceilings that became binding whenever the Fed raised rates
   - this led to large deposit outflows that forced banks to cut lending

   $\Rightarrow$ credit crunch

3. The credit crunches disrupted firms' ability to produce
   - firms use credit to pay for up-front costs of materials and labor (working capital)
   - lack of credit raises firms' cost of production $\rightarrow$ firms raise prices and contract output

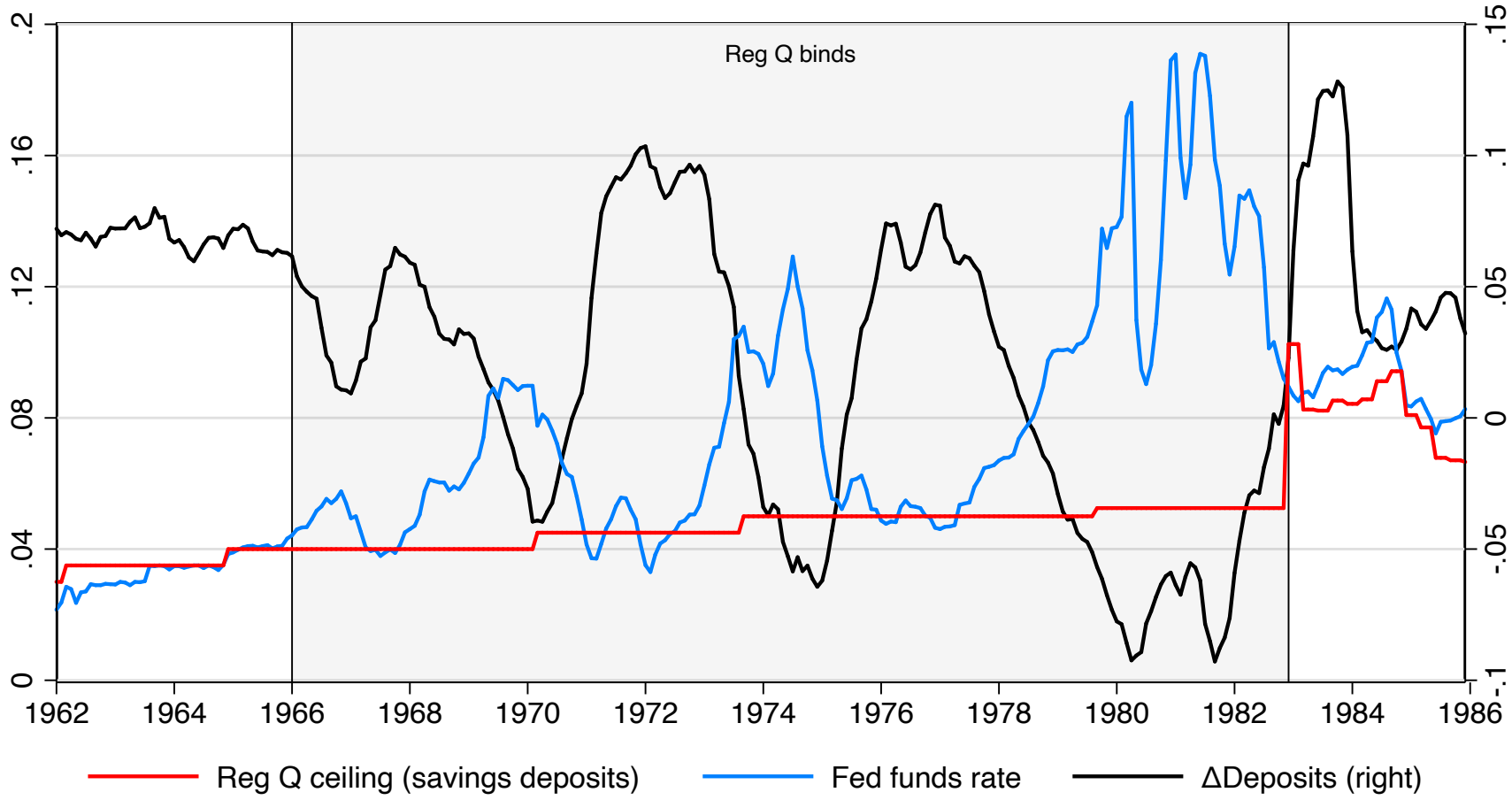
   $\Rightarrow$ endogenous negative supply shock (stagflation)

Regulation Q and deposit outflows



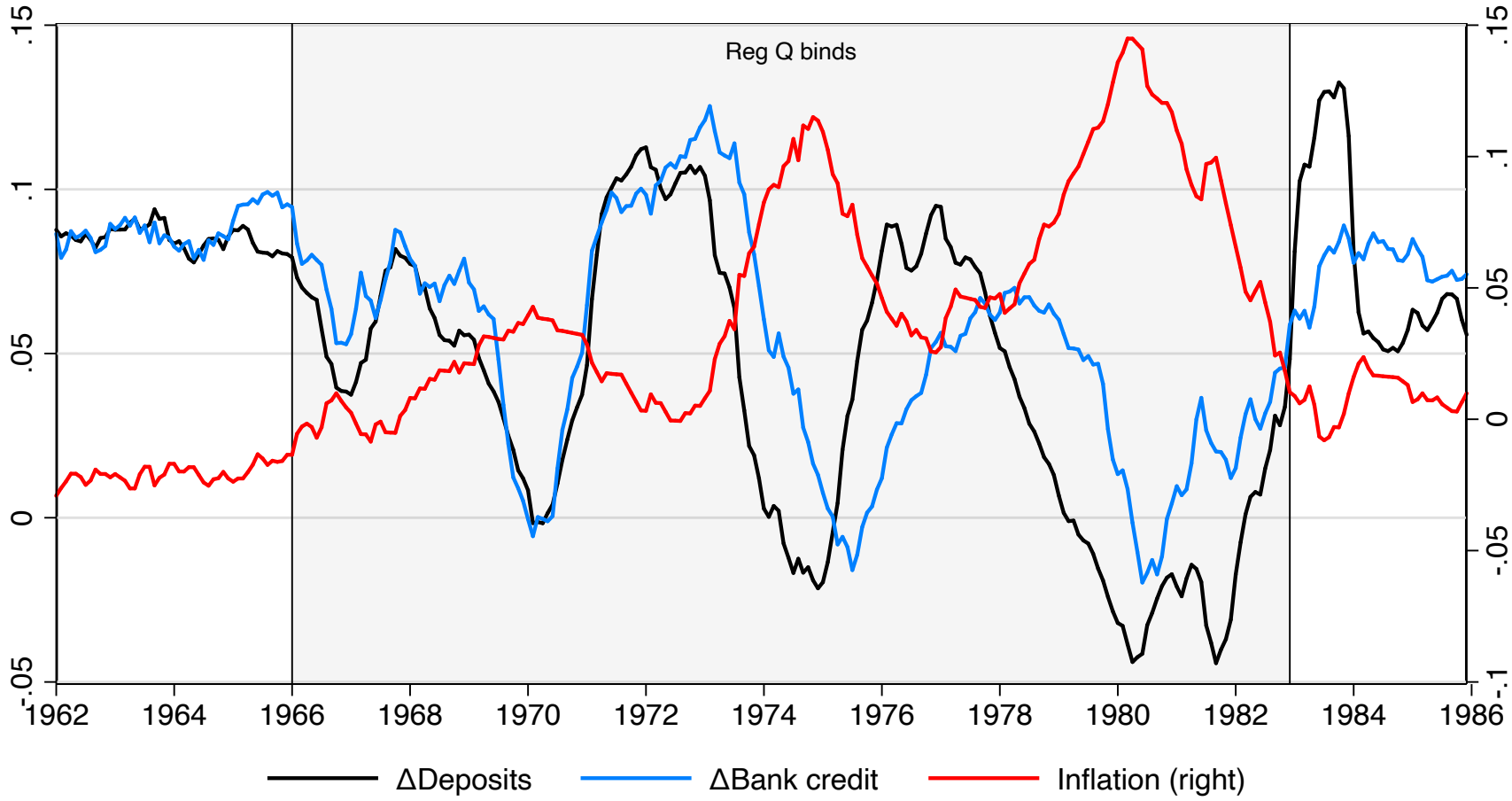
1. Reg *Q* ceiling first binds in late 1965, final repeal in 1982 (MMDAs)
   - large cost of holding deposits ("deposit spread")

Regulation Q and deposit outflows



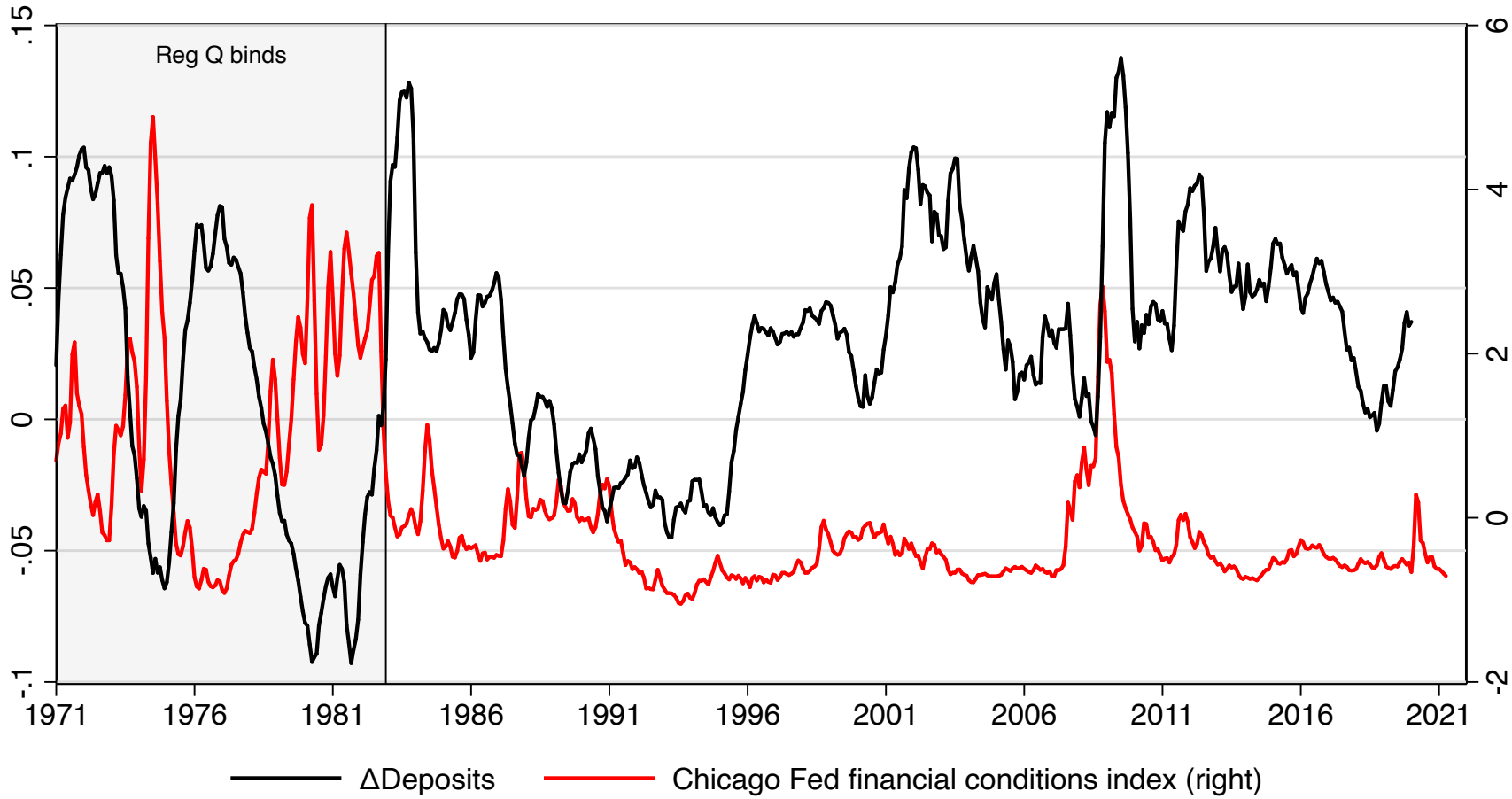
1. Reg Q ceiling first binds in late 1965, final repeal in 1982 (MMDAs)
   - large cost of holding deposits ("deposit spread")
2. Whenever Reg Q starts to bind it triggers massive deposit outflows
   - deposit growth drops from $+10\%$ to -10%

Regulation Q and credit crunches



1. Deposit outflows → banks cut lending → credit crunch
   - term "credit crunch" coined in 1966 to describe first episode (Burger, 1969)

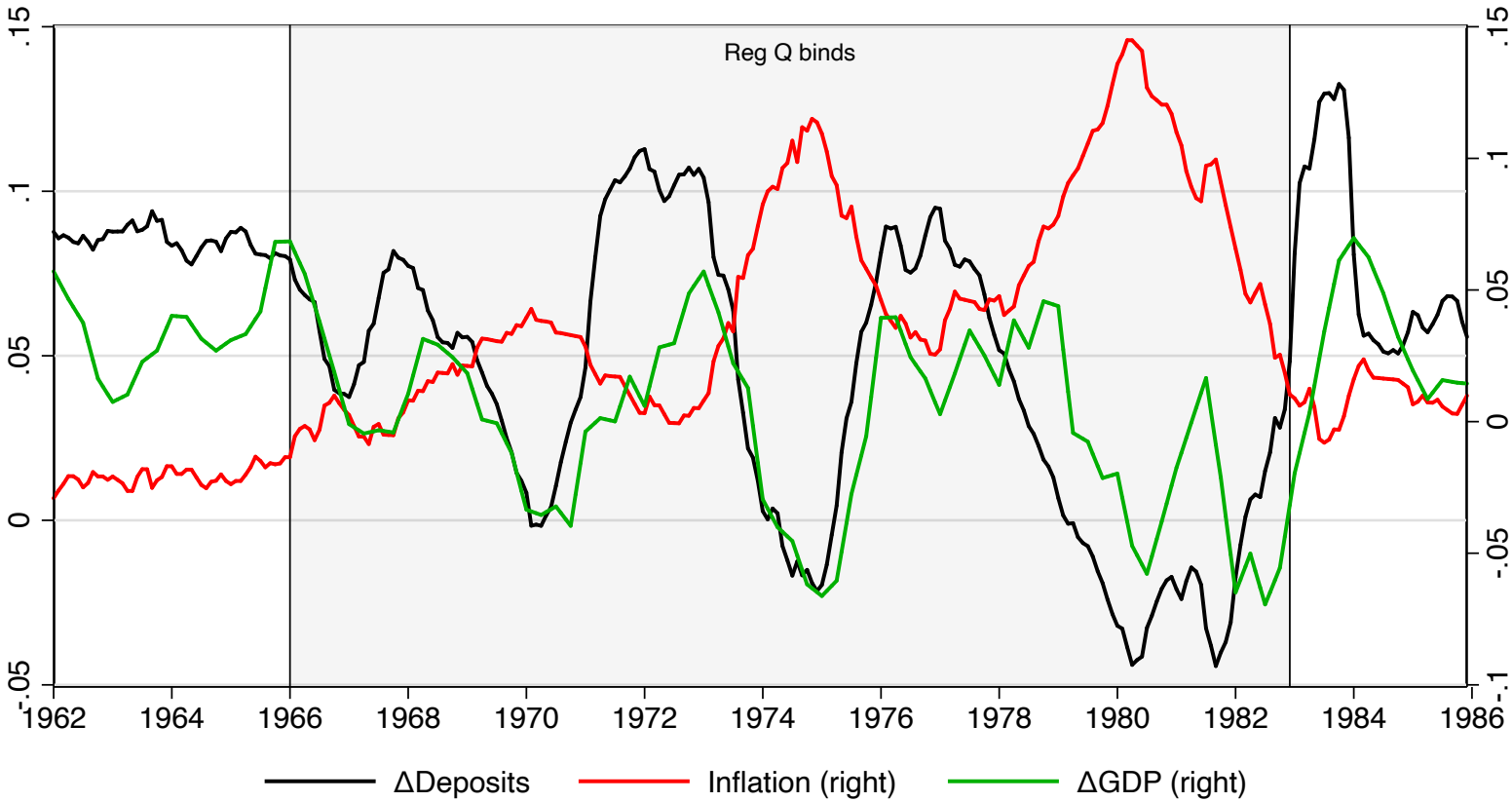
Credit crunches and financial conditions



1. Measures financial tightness across across debt, equity, and loan markets

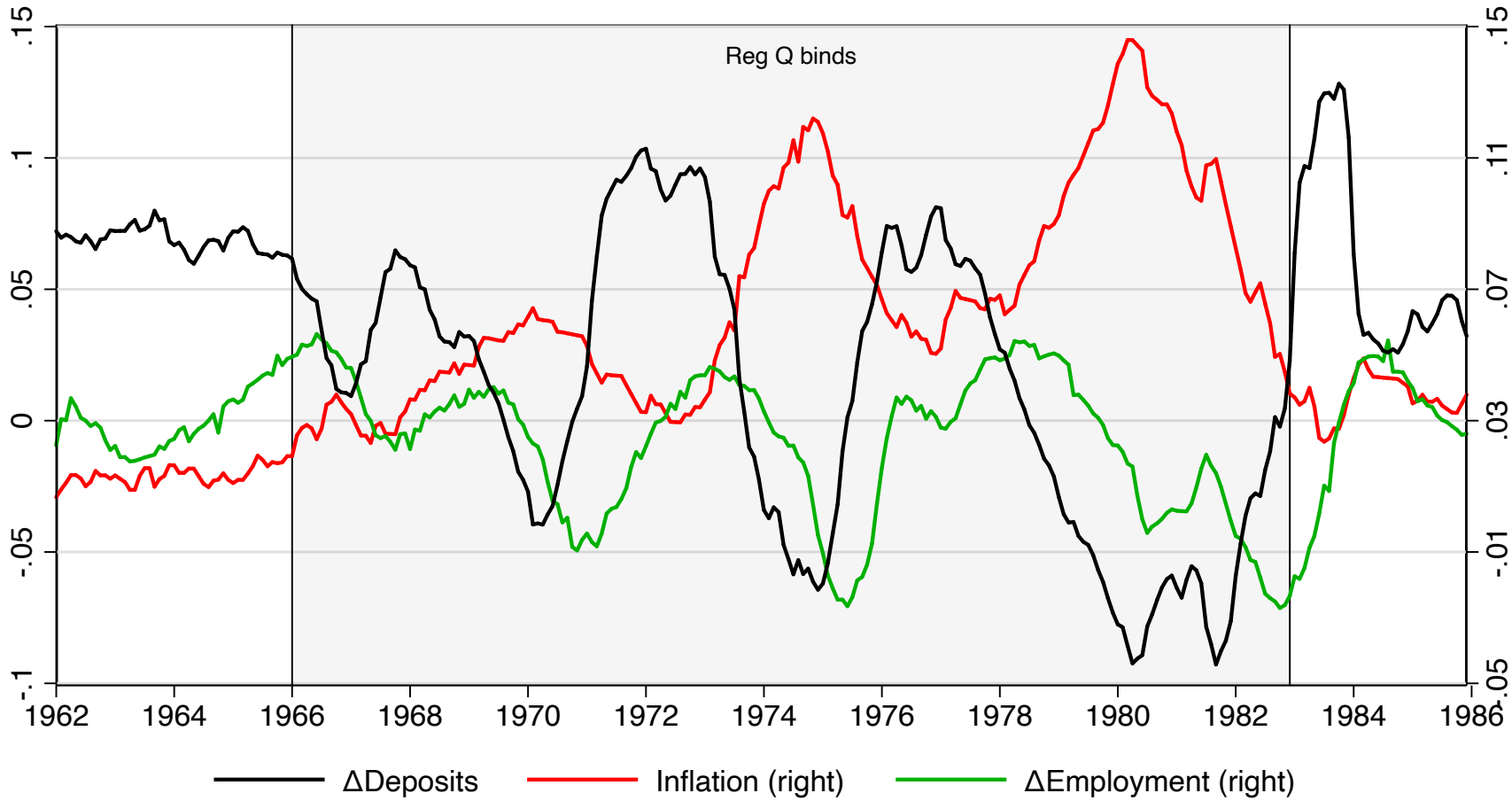
$\Rightarrow$ Financing is very tight when deposits flow out during Reg Q
   - index is higher than in 2008 and stays high for longer

Credit crunches, inflation, and output



1. Credit crunch → negative supply shock → firms raise prices, cut output (stagflation)
   - a higher cost of credit drives up firms' cost of working capital (up-front cost of materials and labor) → negative supply shock

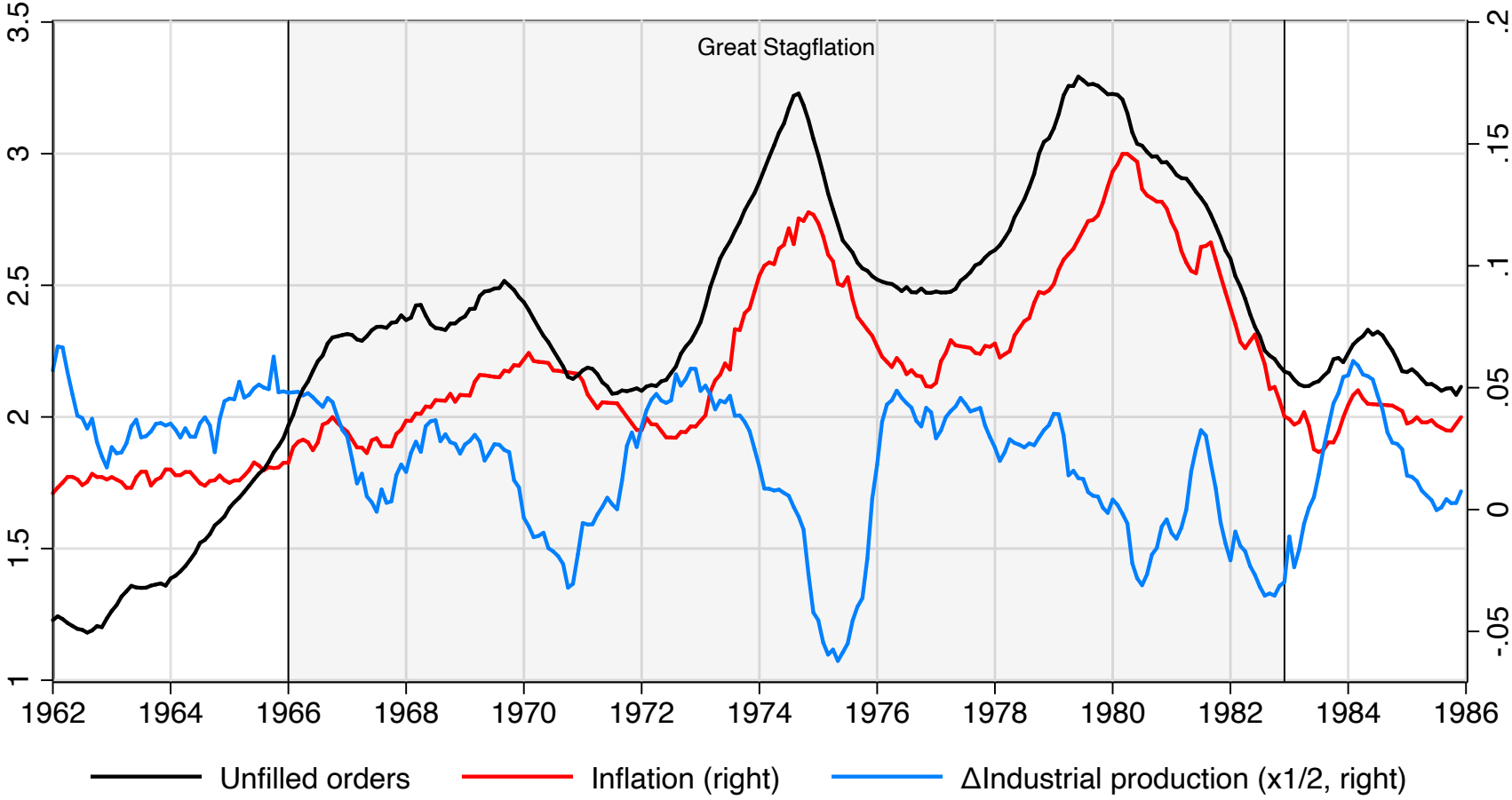
Credit crunches, inflation, employment



1. Credit crunch → firms cut production → reduce employment

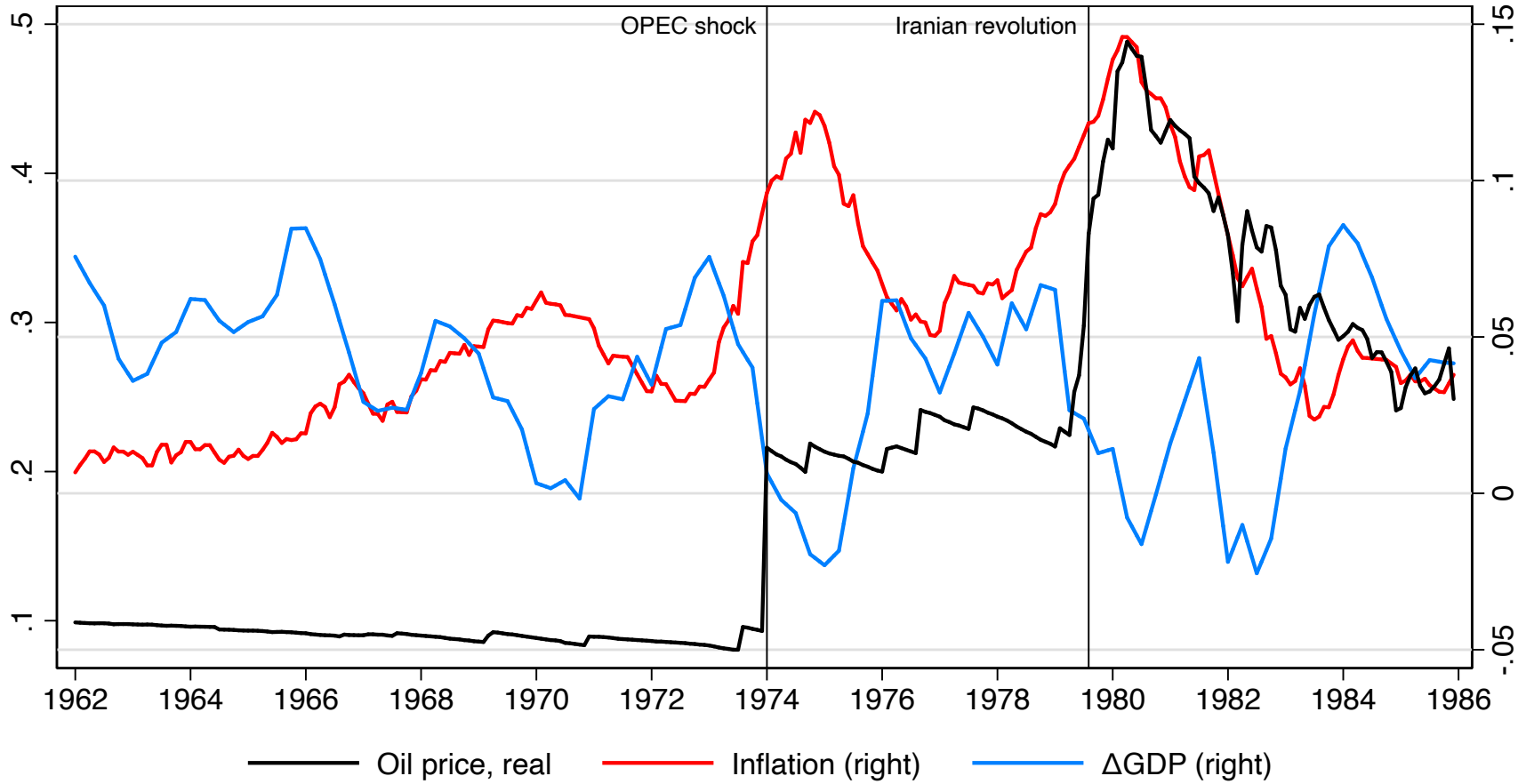
Unfilled orders, inflation, and output

1. Firms' inability to produce reflected in unfilled orders in manufacturing:



2. Unfilled orders highest when growth is lowest → firms cannot produce → lower output, raise prices → negative supply shock
3. Unfilled orders are highly correlated with and predict inflation

Oil is not the main explanation



1. Until December 1973 the real oil price is decreasing
   - cannot explain 1966 and 1970 cycles
2. Timing: in 1973 and 1979 inflation was already high and output dropping *before* the oil shocks

Related literature

1. **The Great Inflation/Stagflation:** Sargent (1999); Clarida, Gali, & Gertler (1999); Romer & Romer (2002); Orphanides (2003); Meltzer (2005); Goodfriend & King (2005); Primiceri (2006); Drechsler, Savov & Schnabl (2020)

2. **Monetary policy and aggregate supply:** Blinder (1987); Gertler & Gilchrist (1994); Barth & Ramey (2002); Christiano, Eichenbaum, & Trabandt (2015); Gilchrist & Egon Zakrajšek (2016); Gilchrist, Schoenle, Sim, & Zakrajšek (2017)

3. **Cross-sectional tests of monetary policy:** Beraja, Hurst, & Ospina (2019); Hooper, Mishkin, & Sufi (2019); McLeay & Tenreyro (2019); Hazell, Herreño, Nakamura, & Steinsson (2020)

4. **Bank lending/deposits channel of monetary policy:** Bernanke (1983); Bernanke & Blinder (1988); Bernanke & Gertler (1995); Kashyap & Stein (1994, 2000); Drechsler, Savov & Schnabl (2017)

5. **Impact of Regulation Q:** Friedman (1970); Tobin (1970); Wojnilower (1980); Gilbert (1986); Mertens (2008); Bordo & Haubrich (2010); Koch (2015)

Cross-sectional analysis

1. Did the Reg Q credit crunches lead to stagflation?
   - aggregate time series supports this view: credit crunches and stagflation align closely during Reg Q period
2. Identification challenge: credit crunches coincided with other negative supply shocks (e.g., oil, TFP, food)
3. Use cross-sectional variation in exposure to the credit crunches to explain differences in prices, output, and employment
   - controls for other supply shocks
4. Two sources of variation (industry, geography):

   #1 industries located in areas where banks are more exposed to Reg Q

   #2 industries that are more versus less dependent on credit

Data

1. Industry-level data from the NBER-CES Manufacturing Database[1]
   - 459 manufacturing industries at the 4-digit SIC level, 1958–1990
   - contains production variables like sales, material costs, and labor
   - also contains price deflators for sales and materials

   $\Rightarrow$ allows us to separate prices and quantities to test for stagflation in the cross section of industries

2. Bank Call Reports and S&L Financial Reports, 1959–1990
   - balance sheet information on banks and S&Ls (big in the 1970s)

   $\Rightarrow$ allows us to measure exposure to Reg Q credit crunches based on deposit composition

[1] Underlying source is the Census Bureau's Annual Survey of Manufactures

Finance dependence

1. Some industries require more external financing to produce output than others
   - their internal cash flows are small relative to the up-front costs of production (materials and labor)
   - same as Rajan and Zingales (1998) but for production not investment

2. Following Rajan and Zingales, we measure the finance dependence (for production) of industry i as follows:

$$\text{Finance Dependence}_i \;=\; 1 - \frac{\text{Sales}_i - \text{Production costs}_i}{\text{Production costs}_i}$$

   - production costs = materials + production labor
   - measured over 1958–1965, before Reg Q binds
   - range: 0.4 (tobacco, chemicals) to 0.8 (transport., primary metals)

3. Identification assumption: Finance Dependence is uncorrelated with unobserved industry-level supply shocks that coincide with credit crunches
   - add controls for energy intensity, initial TFP, volatility, wage growth

Finance dependence and balance sheet characteristics

1. To validate our measure, we match industries at the two-digit SIC level to the Quarterly Financial Reports (QFR) data
   - QFR measure of costs includes SG&A, which makes measure higher on average
   - Leverage is debt/equity
   - debt service ratio is operating income divided by debt due in one year

			Finance dependence			
	All		Low		High	
	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.
Finance dependence	0.91	(0.04)	0.88	(0.02)	0.94	(0.02)
Leverage	0.31	(0.09)	0.26	(0.06)	0.37	(0.08)
Short-term share of debt	0.23	(0.12)	0.18	(0.11)	0.28	(0.11)
Bank share of debt	0.38	(0.11)	0.31	(0.10)	0.45	(0.09)
Cash ratio	0.36	(0.13)	0.41	(0.15)	0.30	(0.09)
Debt service ratio	3.39	(2.03)	4.76	(1.85)	1.87	(0.67)
# Sectors	19		10		9	

⇒ Firms in high finance-dependence industries have higher leverage, short-term debt and bank debt, lower debt service ratio

Finance dependence and balance sheet characteristics

1. Regress each balance sheet characteristic on finance dependence

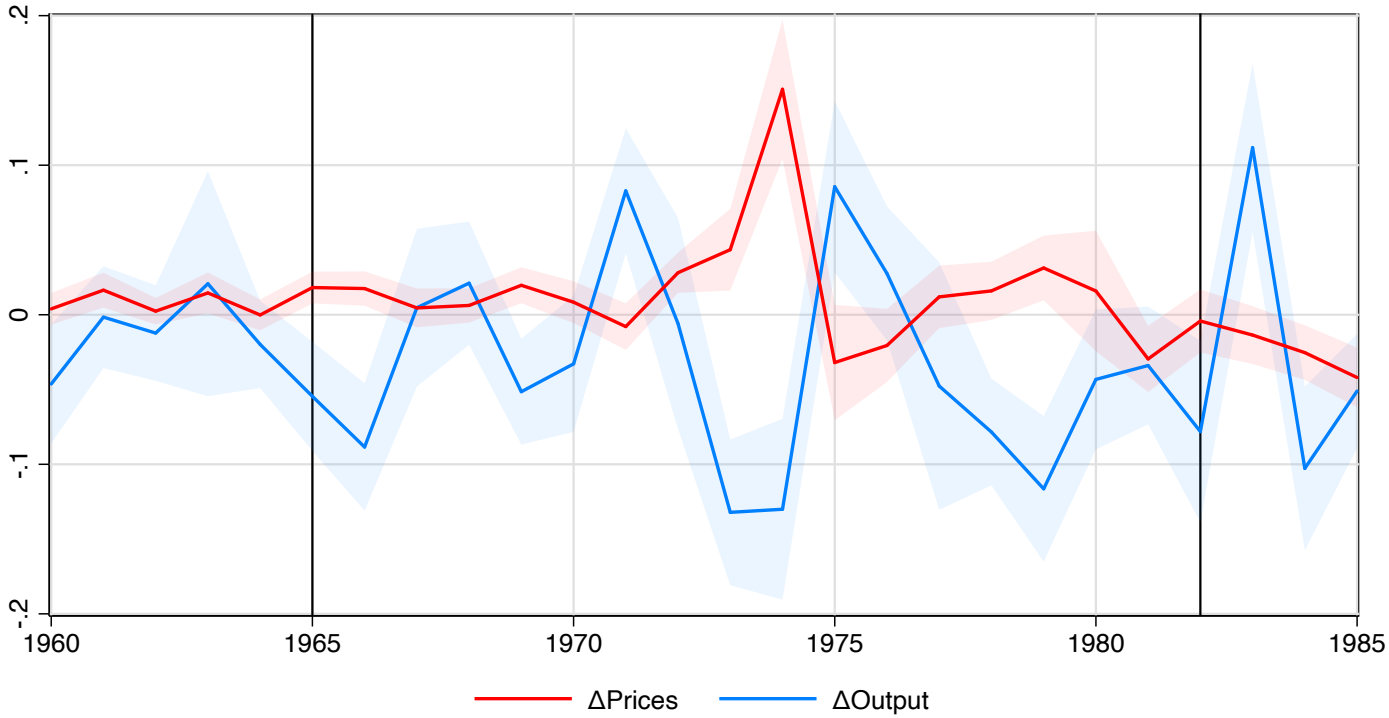
	Leverage	Short-term share of debt	Bank share of debt	Cash ratio	Debt service ratio
	(1)	(2)	(3)	(4)	(5)
Finance dependence	1.450***	1.625**	2.008***	−1.753**	−41.440***
	(0.460)	(0.726)	(0.598)	(0.790)	(9.362)
Constant	−1.012**	−1.255*	−1.451**	1.957**	41.169***
	(0.419)	(0.662)	(0.546)	(0.721)	(8.541)
Obs.	19	19	19	19	19
R^2	0.369	0.228	0.399	0.225	0.535

$\Rightarrow$ Firms in high finance-dependence industries have higher leverage, short-term debt and bank debt, lower debt service ratio

Finance dependence and stagflation

1. Regress prices and output on Finance Dependence year by year:

$$\Delta Y_{i,t} = \alpha_t + \beta_t \times \text{FinanceDependence}_{i,1965} + \epsilon_{i,t}$$



2. During Reg Q period, finance dependent industries raise prices and cut output relative to non-finance dependent industries
   - finance dependence $\rightarrow$ stagflation in the cross section

Finance dependence and stagflation

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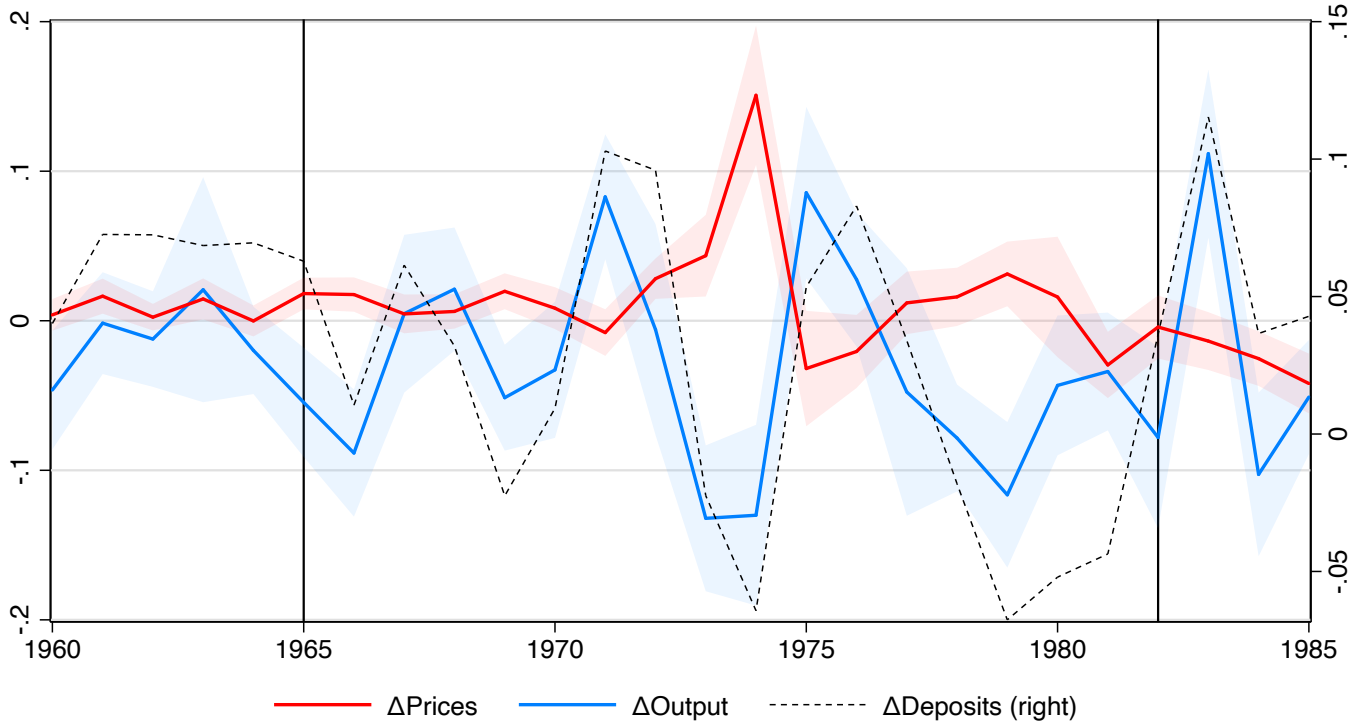


2. During Reg Q period, finance dependent industries raise prices and cut output relative to non-finance dependent industries
   - finance dependence $\rightarrow$ stagflation in the cross section
3. Effect aligns closely with credit crunches and aggregate stagflation

   $\Rightarrow$ supports view that credit crunches induced stagflation

Finance dependence and prices

$$\Delta \text{Prices}_{i,t} = \alpha_t + \gamma_i + \beta \Delta \text{Deposits}_t \times \text{FinDep}_{i,1965} + X_{i,t} + \epsilon_{i,t}$$

	(1)	(2)	(3)	(4)	(5)
ΔDep. × Fin. dep.	−0.353***	−0.362***	−0.289***	−0.353***	−0.303***
	(0.072)	(0.076)	(0.068)	(0.072)	(0.071)
ΔDep. × Energy intensity		−0.006			−0.006
		(0.006)			(0.006)
ΔDep. × TFP		−0.180***			−0.157**
		(0.069)			(0.069)
ΔDep. × σ(ΔPrices)			−3.485***		−3.091**
			(1.308)		(1.289)
ΔDep. × σ(Output)			0.179		0.114
			(0.307)		(0.306)
ΔWage				0.018	0.017
				(0.015)	(0.016)
ΔMaterials price	0.855***	0.853***	0.849***	0.854***	0.848***
	(0.069)	(0.068)	(0.068)	(0.069)	(0.068)
Time & industry FE	Yes	Yes	Yes	Yes	Yes
N	8,262	8,262	8,262	8,262	8,262
R^2	0.587	0.588	0.588	0.587	0.589

⇒ When deposits flow out (credit crunch) → finance-dependent industries raise prices by more

- robust w.r.t materials, energy, TFP, volatility, wages

Finance dependence and output

$$\Delta \text{Output}_{i,t} = \alpha_t + \gamma_i + \beta \Delta \text{Deposits}_t \times \text{FinDep}_{i,1965} + X_{i,t} + \epsilon_{i,t}$$

	(1)	(2)	(3)	(4)	(5)
ΔDep. × Fin. dep.	0.845***	0.753***	0.875***	0.833***	0.773***
	(0.167)	(0.169)	(0.177)	(0.169)	(0.181)
ΔDep. × Energy intensity		−0.041**			−0.043***
		(0.017)			(0.016)
ΔDep. × TFP		−0.353**			−0.412***
		(0.155)			(0.147)
ΔDep. × σ(ΔPrices)			0.278		−0.545
			(2.659)		(2.562)
ΔDep. × σ(Output)			−1.060		−0.816
			(0.918)		(0.818)
ΔWage				0.147***	0.146***
				(0.043)	(0.043)
ΔMaterials price				−0.290***	−0.297***
				(0.048)	(0.048)
Time & industry FE	Yes	Yes	Yes	Yes	Yes
N	8,262	8,262	8,262	8,262	8,262
R^2	0.250	0.252	0.250	0.261	0.265

⇒ Credit crunch → finance-dependent industries cut output by more
- prices rise, output falls → stagflation in the cross section
- impact on output bigger than on prices → profits fall

Finance dependence and inventories

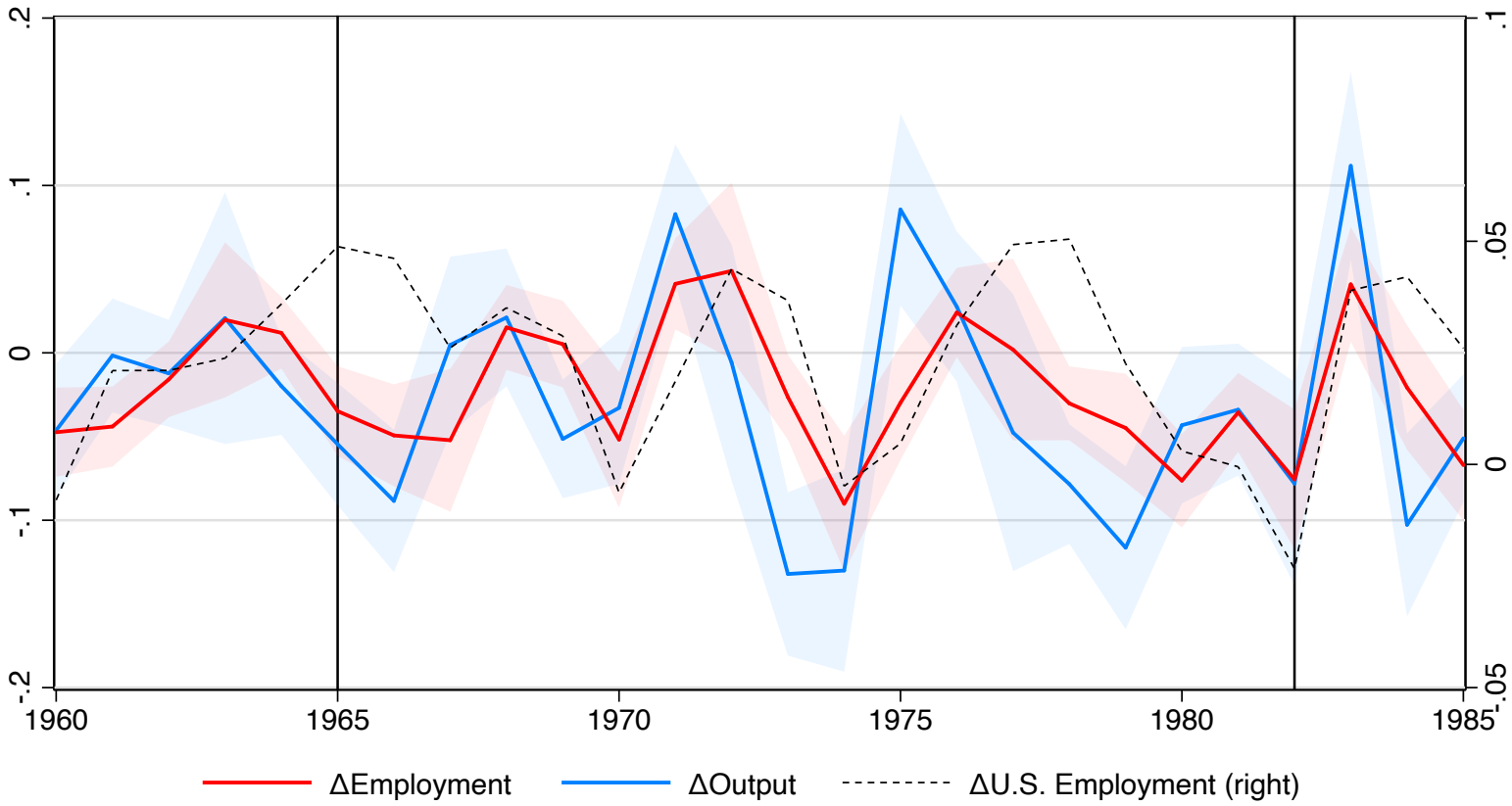
$$\Delta \text{Inventory}_{i,t} = \alpha_t + \gamma_i + \beta \Delta \text{Deposits}_t \times \text{FinDep}_{i,1965} + X_{i,t} + \epsilon_{i,t}$$

	(1)	(2)	(3)	(4)	(5)
ΔDep. × Fin. dep.	1.189***	1.125***	1.064***	1.177***	0.997***
	(0.199)	(0.204)	(0.190)	(0.193)	(0.188)
ΔDep. × Energy intensity		−0.029			−0.034*
		(0.022)			(0.020)
ΔDep. × TFP		−0.315			−0.447**
		(0.191)			(0.195)
ΔDep. × σ(ΔPrices)			8.987**		7.823*
			(4.325)		(4.264)
ΔDep. × σ(Output)			−1.686		−1.504
			(1.253)		(1.218)
ΔWage				0.006	0.009
				(0.058)	(0.057)
ΔMaterials price				−0.335***	−0.326***
				(0.072)	(0.071)
Time & industry FE	Yes	Yes	Yes	Yes	Yes
N	8,262	8,262	8,262	8,262	8,262
R^2	0.106	0.106	0.107	0.110	0.112

⇒ Credit crunch → finance-dependent industries cut their inventories
- inability to finance inventories
- inconsistent with a drop in demand for their output

Finance dependence and employment

$$\Delta \text{Employment}_{i,t} = \alpha_t + \beta_t \times \text{FinanceDependence}_{i,1965} + \epsilon_{i,t}$$



1. Finance dependent industries cut employment when they cut output
   - effect aligns with credit crunches and aggregate employment

   $\Rightarrow$ credit crunches reduced employment

Regulation Q exposure

1. Banks finance themselves with core (retail) deposits and large time (wholesale) deposits
   - large time deposits ($> \$100k$) were exempted from Reg Q in 1970
   - some small time deposits (MMCs, $> \$10k$) were also exempted in '78

   $\Rightarrow$ banks with more exempted deposits less exposed to credit crunches

2. Construct a county's Reg Q exposure as share of non-exempted deposits of local banks:

$$\text{Reg}Q\text{Share}_{c,t} = \frac{\text{Deposits}_{c,t} - \text{Exempted deposits}_{c,t}}{\text{Deposits}_{c,t}}$$

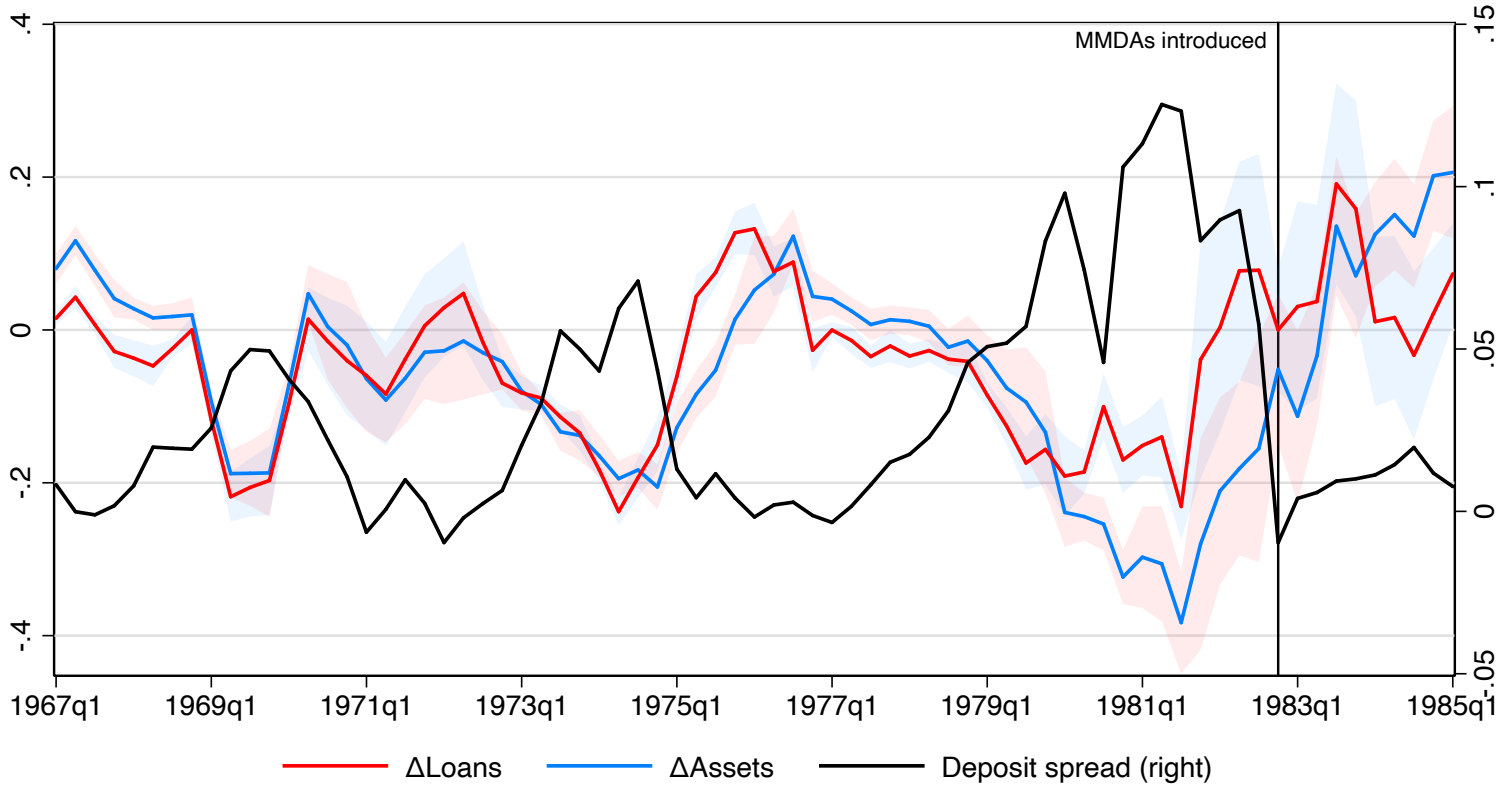
   - exempted deposits = large time deposits + MMCs after 1978
   - persistent variation as some banks and S&Ls have essentially no access to wholesale markets

3. Construct industry $\text{Reg}Q\text{Share}_{i,t} = \sum w_{i,c,t}\text{Reg}Q\text{Share}_{c,t}$
   - $w_{i,c,t}$ = share of industry i's employment in county c
   - idea is that firms are more likely to borrow locally (sample pre-dates interstate banking de-regulation)

First stage: Reg Q exposure and lending

1. Regress bank assets and loans on Reg Q exposure at the county level (asset-weighted):

$$\Delta \text{Loans}_{c,t} = \alpha_t + \beta_t \times \text{Reg}Q\text{Share}_{c,t} + \epsilon_{i,t}$$



2. When Deposit Spread $\uparrow \rightarrow$ lending falls more in high Reg$Q$Share counties

   $\Rightarrow$ Reg$Q$Share predicts credit crunches in the cross section

Reg Q exposure and prices

$$\Delta \text{Prices}_{i,t} = \alpha_t + \gamma_i + \beta \text{DepositSpread}_t \times \text{Reg}Q\text{Share}_{i,t-1} + \delta X_{i,t} + \epsilon_{i,t}$$

	(1)	(2)	(3)	(4)	(5)
Dep. spread × Reg Q share	1.823**	1.801**	1.823**	1.803**	1.782**
	(0.864)	(0.849)	(0.877)	(0.866)	(0.864)
Dep. spread × Energy intensity		−0.000			0.000
		(0.009)			(0.010)
Dep. spread × TFP		0.077			0.082
		(0.113)			(0.114)
Dep. spread × σ(ΔPrices)			0.829		0.684
			(2.325)		(2.310)
Dep. spread × σ(Output)			0.397		0.427
			(0.500)		(0.516)
ΔWage				0.023	0.023
				(0.018)	(0.018)
ΔMaterials price	0.849***	0.849***	0.849***	0.849***	0.849***
	(0.078)	(0.078)	(0.078)	(0.078)	(0.078)
Time & industry FE	Yes	Yes	Yes	Yes	Yes
Obs.	6,354	6,354	6,354	6,354	6,354
R^2	0.578	0.578	0.578	0.578	0.578

1. High Reg$Q$ exposure industries raise prices when Deposit Spread is high
   $\Rightarrow$ Reg Q binds tighter $\rightarrow$ credit crunch $\rightarrow$ higher prices

Reg Q exposure and output

$$\Delta \text{Output}_{i,t} = \alpha_t + \gamma_i + \beta \text{DepositSpread}_t \times \text{Reg}Q\text{Share}_{i,t-1} + \delta X_{i,t} + \epsilon_{i,t}.$$

	(1)	(2)	(3)	(4)	(5)
Dep. spread × Reg Q share	−5.235**	−5.570**	−5.324**	−5.282**	−5.727**
	(2.375)	(2.321)	(2.433)	(2.318)	(2.285)
Dep. spread × Energy intensity		0.033*			0.042**
		(0.019)			(0.018)
Dep. spread × TFP		0.668***			0.638***
		(0.241)			(0.240)
Dep. spread × σ(ΔPrices)			2.783		2.572
			(4.001)		(4.026)
Dep. spread × σ(Output)			−2.593**		−2.475**
			(1.287)		(1.249)
ΔWage				0.136***	0.137***
				(0.049)	(0.050)
ΔMaterials price				−0.256***	−0.263***
				(0.051)	(0.051)
Time and Industry FE	Yes	Yes	Yes	Yes	Yes
Obs.	6,354	6,354	6,354	6,354	6,354
R^2	0.227	0.229	0.228	0.237	0.239

1. High Reg$Q$ exposure industries cut output when FF rate is high
   $\Rightarrow$ Reg Q exposure $\rightarrow$ stagflation in the cross section

Reg Q exposure and employment

$$\Delta \text{Employment}_{i,t} = \alpha_t + \beta_t \times \text{Reg}Q\text{Share}_{i,t} + \epsilon_{i,t}$$

2. Reg Q exposure predicts employment and output
   $\Rightarrow$ aligns with credit crunches and aggregate employment

Takeaways

1. The Great Stagflation was marked by severe credit crunches
   - credit crunches align closely with inflation and output
   - caused by tight monetary policy under Reg Q

2. The credit crunches led to stagflation
   - lack of credit increased firms' production costs
   - forced firms to raise prices, cut output and employment
   - endogenous negative supply shock, not "bad luck"

3. Implications beyond the Great Stagflation
   - no credit crunches $\rightarrow$ less costly for Fed to control inflation
   - standard view ignores effect of monetary policy on supply side