The Financial Origins of the Rise and Fall of American Inflation

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The Great Inflation (1965–1982)

1. A very influential period for macro and monetary economics
   - inflation got out of control despite high interest rates
   - Keynesian toolbox stopped working: high inflation and high unemployment ("stagflation") $\rightarrow$ a crisis of understanding

2. Standard narrative blames the Fed
   - did not raise rates aggressively enough
     (Taylor coefficient < 1, shown by Clarida, Gali, & Gertler 2000)

   $\Rightarrow$ Fed lost credibility $\rightarrow$ self-fulfilling higher inflation expectations

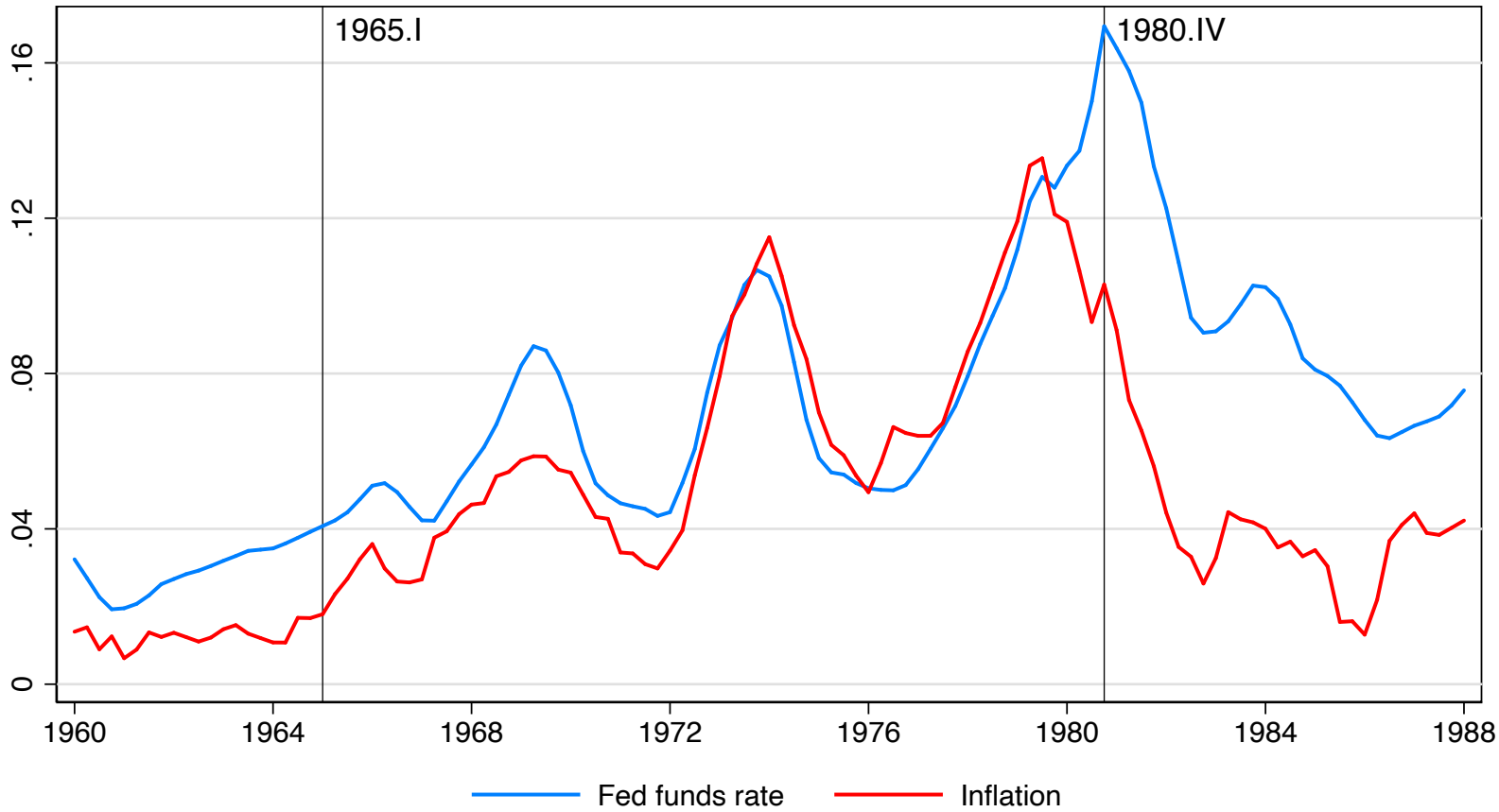
   - requires negative supply shocks to explain the "stag" part (e.g., oil)

3. Ended by Paul Volcker who restored Fed credibility
   - raised rates and kept them high despite severe 1981–82 recession
   - credited with lower inflation and longer expansions that followed ("Great Moderation")

   $\Rightarrow$ credibility view underlies monetary policy theory and practice today

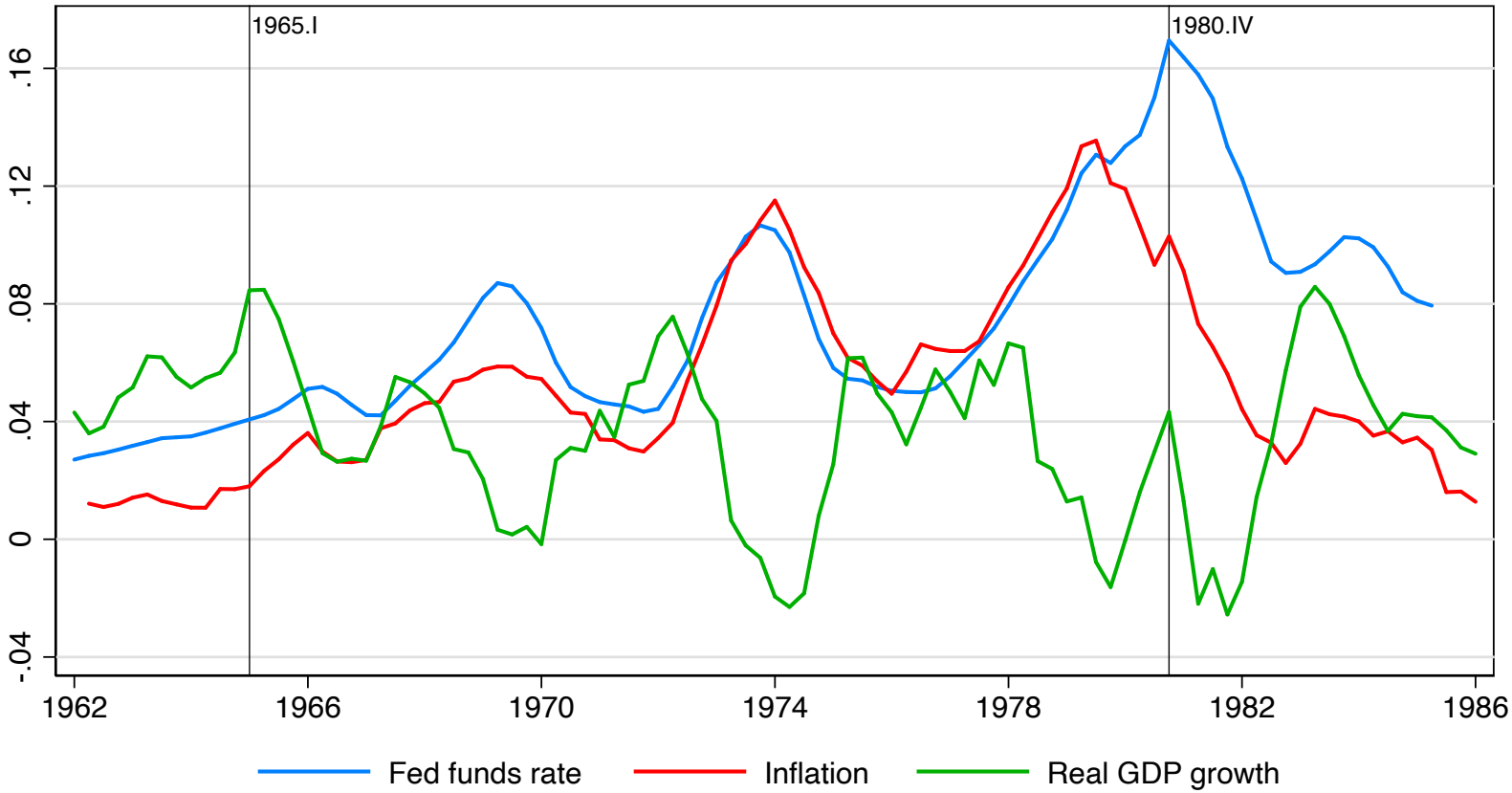
The Great Inflation

1. Fed funds rate and CPI inflation, annual over following year:



2. Inflation rose from 2% in 1965 to 14% in 1979
   - 1965.I: start of Great Inflation, sparked by hot economy and Vietnam buildup + Great Society
   - 1980.IV: Volcker's credibility-restoring rate hike

Stagflation



1. Real GDP growth is very *negatively* related to inflation

$\Rightarrow$ contradicts Phillips curve, which predicts inflation is high when GDP growth is high

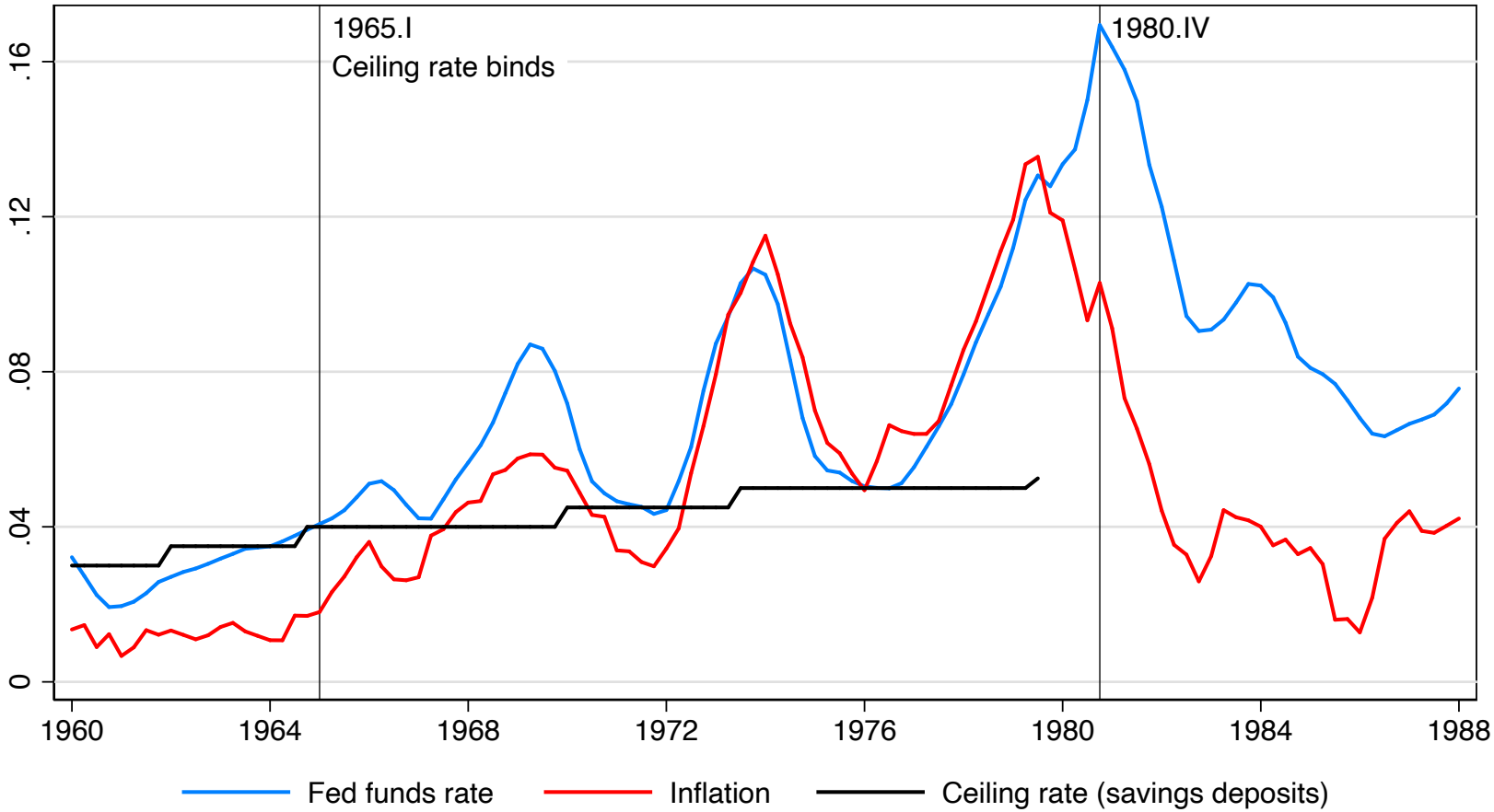
2. GDP is very volatile: four recessions over this time period

This paper: financial origins

We propose and test a new explanation for the Great Inflation

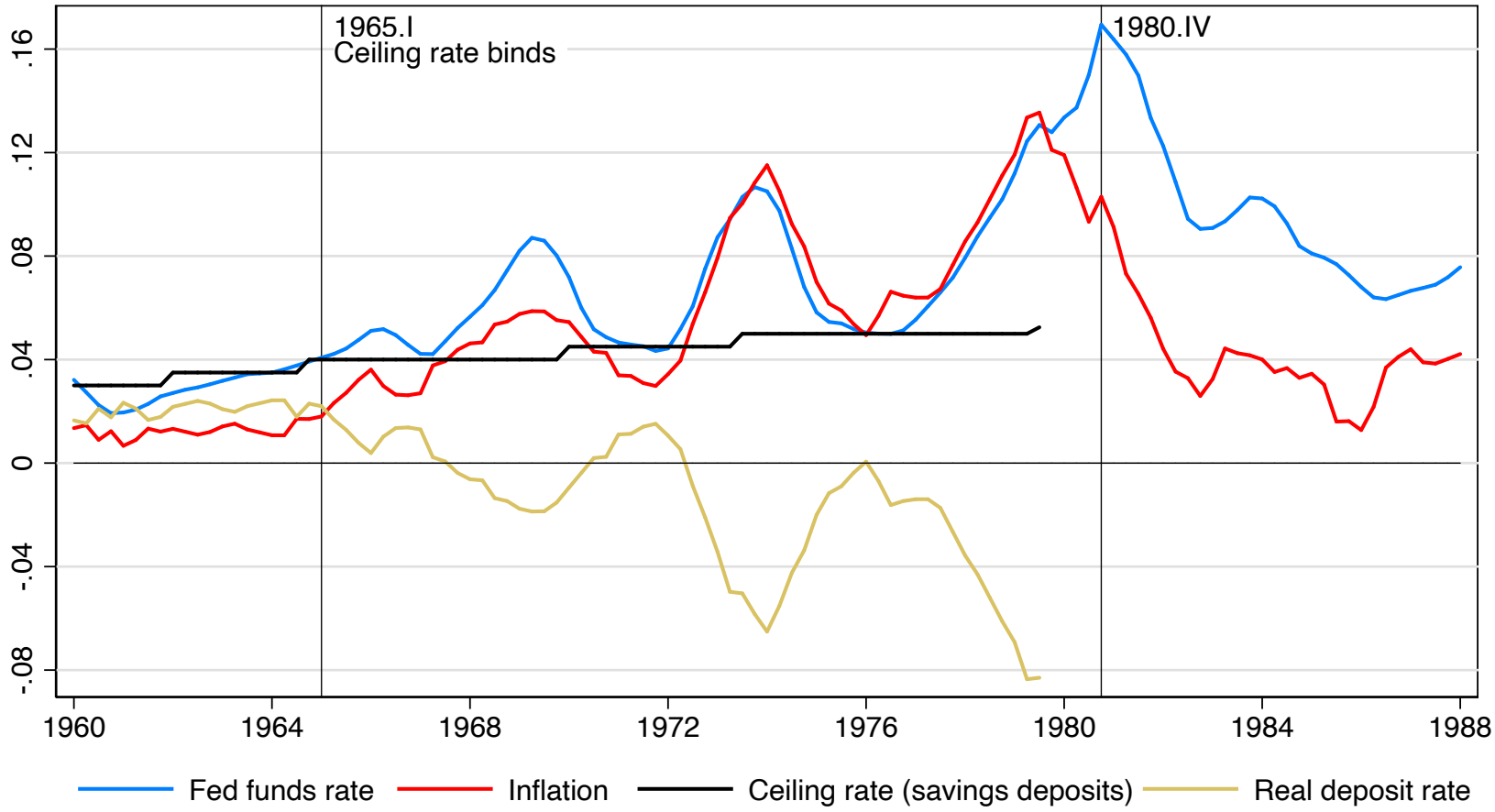
1. Due to imposition and repeal of Regulation Q
   - an important law that placed **hard ceilings on bank deposit rates**
   - deposits were the main form of saving for ordinary households
     $\rightarrow$ Reg Q suppressed the return to saving
   - disabled the transmission of monetary policy to households:
     $\rightarrow$ no passthrough of Fed funds rate to deposit rates

The Great Inflation and Regulation Q



1. 1965.I: Reg Q deposit rate ceiling becomes binding
   - previously, Fed had increased it to keep it from binding
2. No passthrough of Fed funds rate to deposit rates

The Great Inflation and Regulation Q



1. Real deposit rate increasingly negative:
   - from $+2\%$ in 1964 to -8% in 1979
   - in contrast, real Fed funds rate ~ 0

   $\Rightarrow$ Reg Q cost: real deposit rate $\times \dfrac{\text{deposits}}{\text{consumption}} \approx 4\%$ of consumption

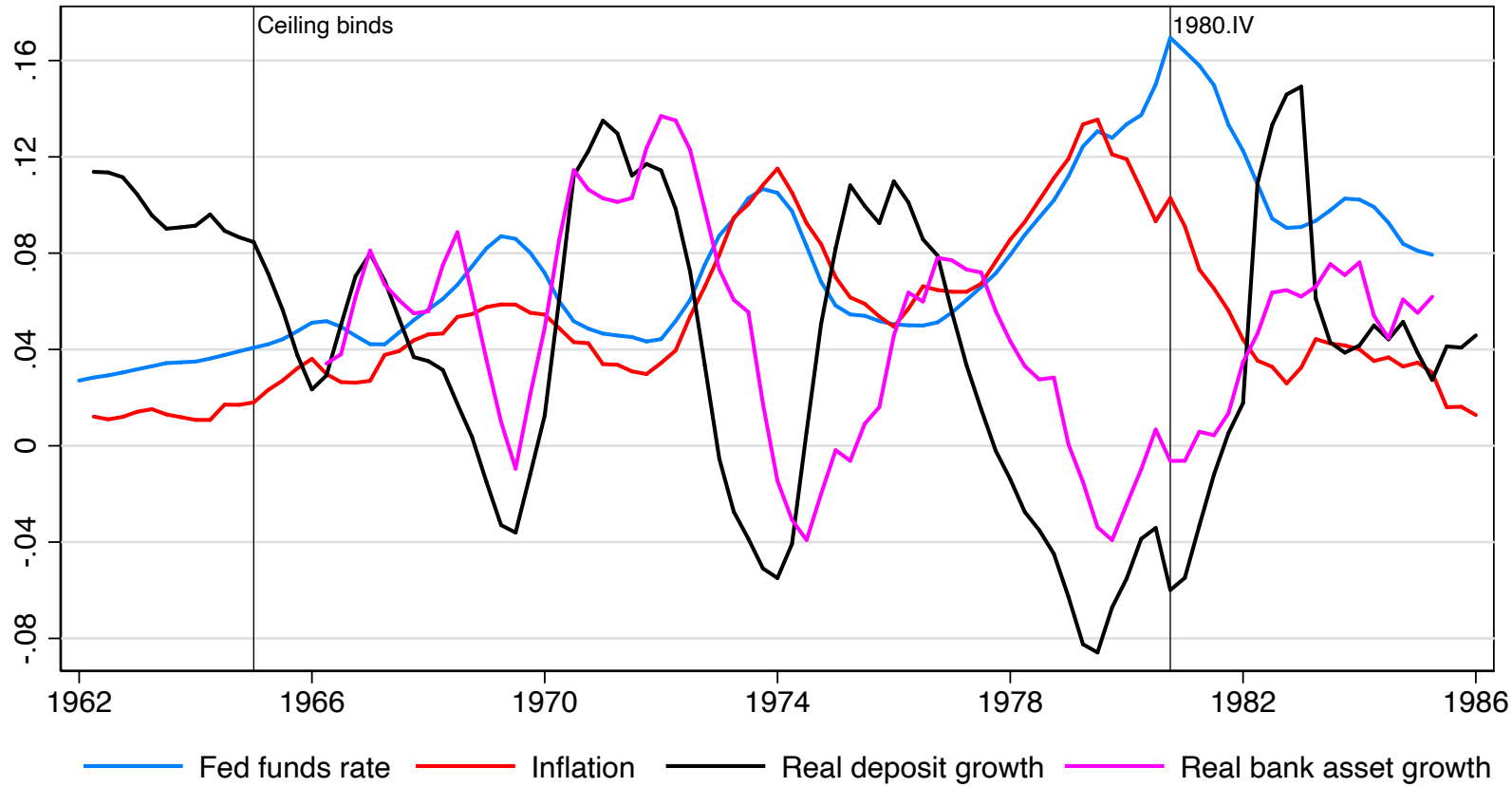
A new explanation for the Great Inflation

2. How does Reg Q raise inflation?
   - suppressed return to saving $\rightarrow$ greater incentive to spend (aggregate demand $\uparrow$) $\rightarrow$ upward pressure on prices $\rightarrow$ higher inflation
   - spiral: higher inflation $\rightarrow$ lower real deposit rate $\rightarrow$ demand increases further $\rightarrow$ inflation increases further ...
   - similar to nominal rate peg as in Friedman (1968), but with Reg Q as the relevant peg

3. How does Reg Q lead to the "stag" in stagflation?
   - low real deposit rate $\rightarrow$ deposit outflows (e.g., wealthier households) $\rightarrow$ bank "disintermediation"

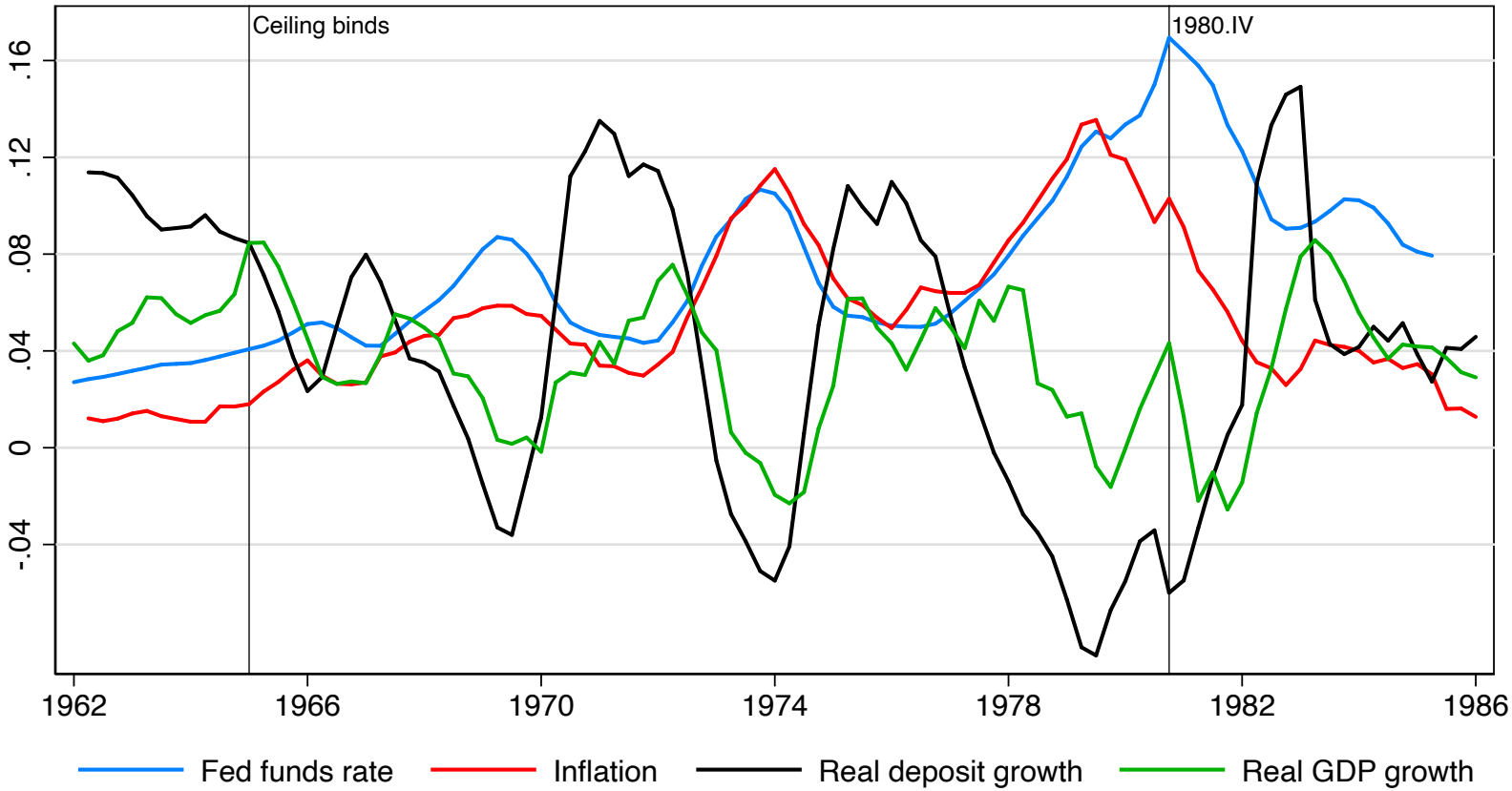
   $\Rightarrow$ credit crunch $\rightarrow$ firms can't finance operations, investment $\rightarrow$ output falls, unemployment rises
   - this negative supply shock exacerbates inflation (low supply + high demand)

Credit crunches and stagflation



1. High inflation $\rightarrow$ low real deposit rate $\rightarrow$ deposit outflows
2. Banks lose funding $\rightarrow$ credit crunch
   - "credit crunch" coined in 1966 to describe first such event right after imposition of Reg Q

Credit crunches and stagflation



1. High inflation $\rightarrow$ low real deposit rate $\rightarrow$ deposit outflows
2. Banks lose funding $\rightarrow$ credit crunch

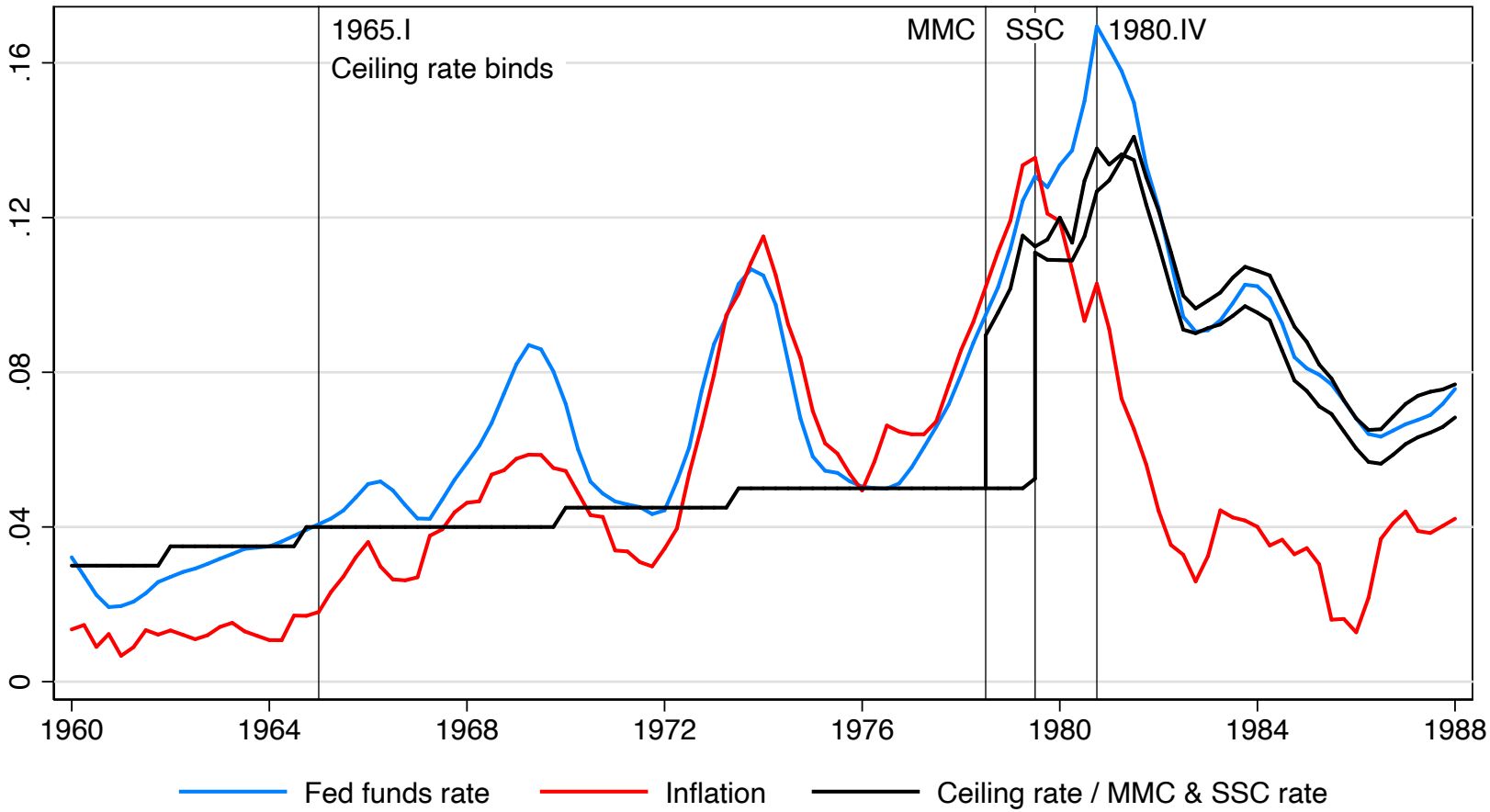
$\Rightarrow$ Output growth plummets

A new explanation for the Great Inflation

4. What ended the Great Inflation?

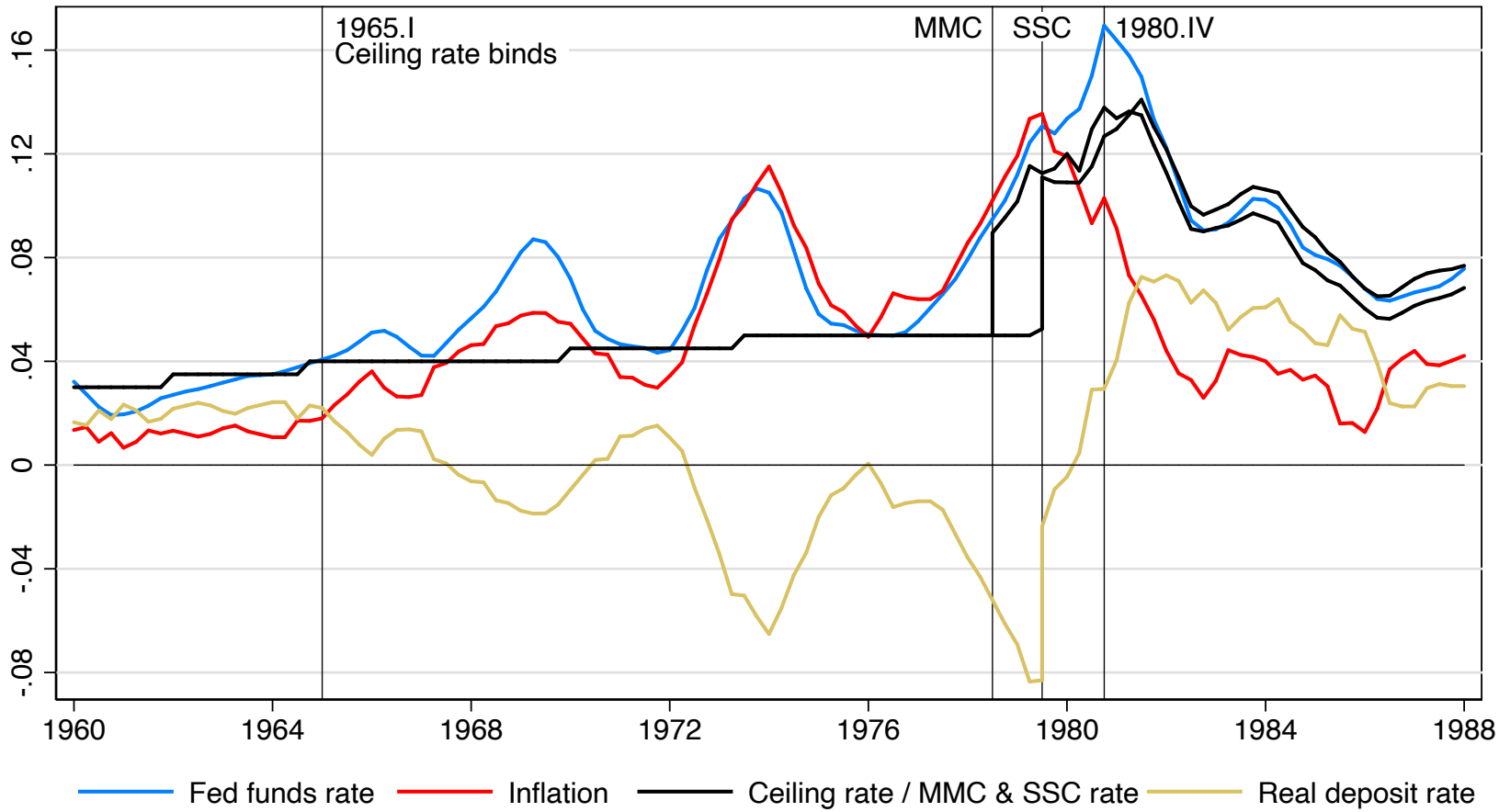
   - Reg Q effectively repealed in late 1978–79 with the introduction of new, deregulated deposit accounts
   - deposit rates immediately shot up far above the old ceilings ($+7\%$)
   - households poured vast sums into the new accounts:
     \$462 billion $= 16.2\%$ of GDP ($\sim$ \$3.5 trillion in 2019)
   - removed incentive to spend, no more upward pressure on prices

Repeal of Regulation *Q*



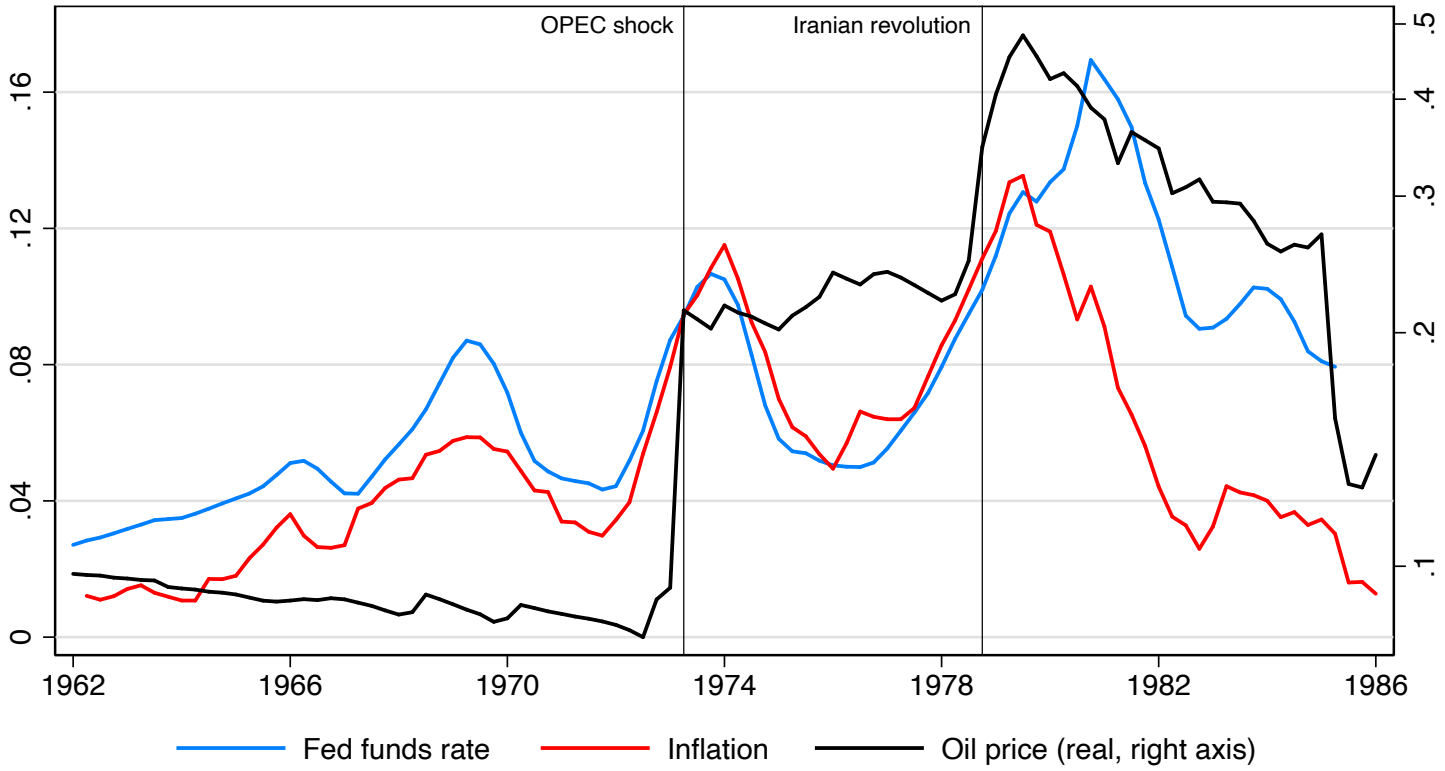
1. 1978.III & 1979.III: Effective repeal via MMCs & SSCs (Money Market Certificates & Small Saver Certificates)
2. Passthrough restored from near 0 to almost 1
3. Deposit rates immediately shot up far above the old ceilings

Repeal of Regulation Q



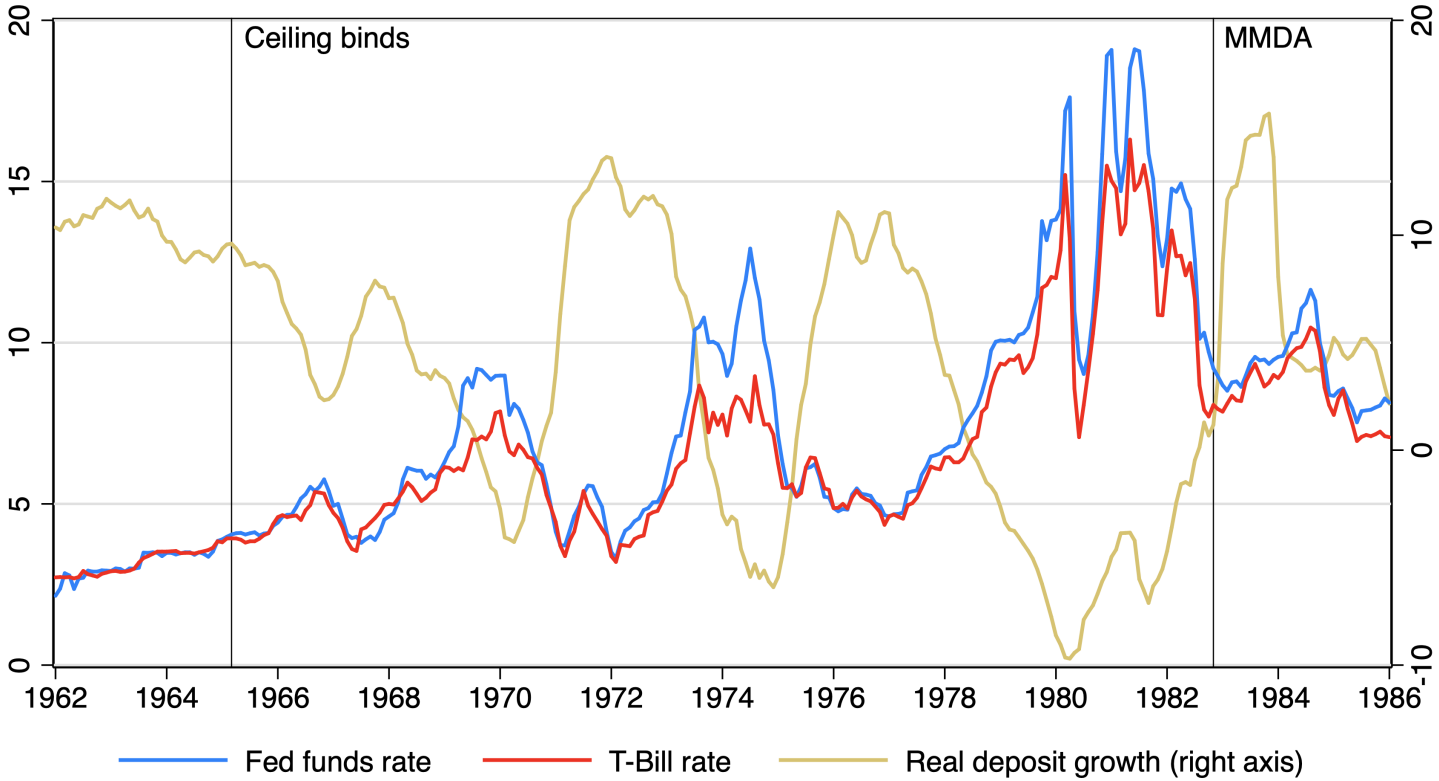
1. Real deposit rate shot up from -8% in 1979 to 0% in '80 and $+4\%$ in '81
2. Timing: Reg Q repealed right *before* inflation starts dropping
   - Volcker rate hike is 3 quarters *after*

What about Oil?



1. Until Oct. 1973 the real oil price is actually decreasing (De Long, 1997)
   - in 1973 and 79 inflation mostly rises *before* oil shocks hit
2. Oil shocks cannot explain persistent inflation (Clarida, Gali, Gertler, 2000)
   - large differences in inflation across oil-consuming countries (UK vs. Germany vs. Japan)

Reg Q and the Treasury premium



1. Substitution from deposits to Treasuries pushed yields down towards the Reg Q ceiling
2. Low deposit growth → record-high Treasury premium
   - July 1974: T-Bill rate is 5.37% (!) below the Fed funds rate
   - End of Reg Q → liquidity premium collapses, returns to normal

History of Regulation *Q*

1. Enacted in 1933 following Depression bank failures
2. In order to prevent "excess competition" for insured deposits by banks wanting to take risk
3. Until 1965: the Fed kept the ceiling rate above the Fed funds rate $\rightarrow$ non-binding
4. In 1965: Fed stopped raising ceiling, letting it bind to slow money and credit growth

$\Rightarrow$ Fed believed Reg *Q* was *reducing* inflation

- many countries imposed similar financial repression until 1980s deregulation (e.g., UK, France)
- imposed post-WW2 to help pay off war debt (Reinhart and Sbrancia, 2015)

Cross-sectional analysis

1. Aggregate time series supports the hypothesis that Reg Q led to the Great Inflation

2. To further test this hypothesis, we use cross-sectional variation in exposure to Reg Q and measure its impact on banks, inflation, and employment
   - controls for aggregate economic conditions and helps rule out alternative explanations, e.g., Fed credibility

3. Identification challenge: Exposure to Reg Q and inflation/employment may be responding to local economic conditions (omitted variable)

$\Rightarrow$ Three natural experiments covering rise and fall of Great Inflation:

   1. Reg Q first becomes binding (1965–66)
   2. NOW Account Experiment (1974–80)
   3. Reg Q repeal (1978–79)

Data

Deposits:

1. Bank Call Reports (Federal Reserve, 1959–75 & 1976–90)
2. S&L Financial Reports (Federal Home Loan Bank Board, 1966–90)

Inflation and employment:

1. CPI inflation and employment (BLS, 25 largest MSAs, 1965–90)
2. Wage inflation (nominal wage growth):
   - all private sector employees (BLS, 316 MSAs, 1975–90)
   - manufacturing employees (BLS, 169 MSAs, 1972–90)

Core deposits and Reg Q exposure

1. Banks fund themselves with core (retail) deposits and large time (wholesale) deposits
   - large time deposits ($> \$100,000$) were exempted from Reg Q in 1970
   - banks with access to large time deposits can use them to offset core deposit outflows

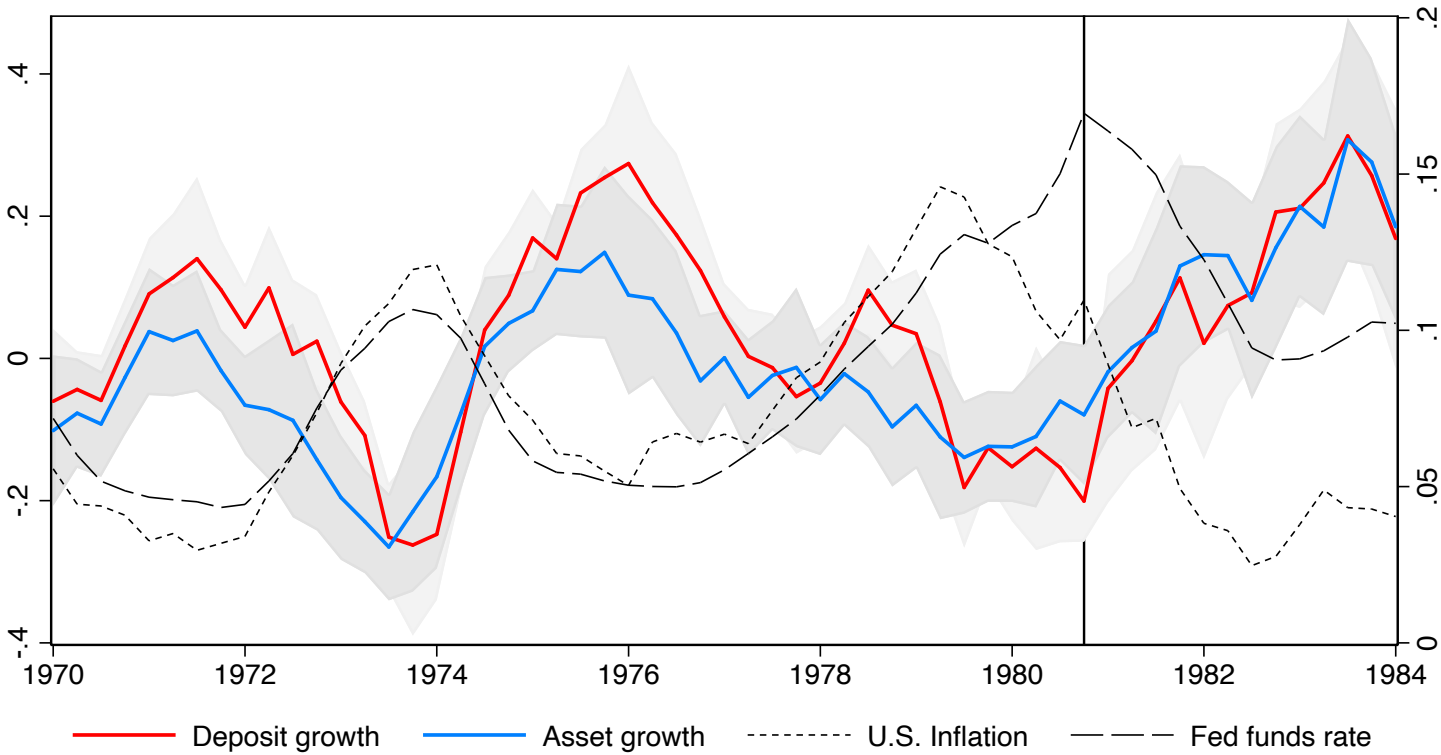
$\Rightarrow$ Core deposit share of total deposits captures exposure to Reg Q

2. Historically persistent geographic variation
   - Savings and Loans (S&Ls) made up close to half the banking system and had no access to large time deposits
   - many smaller banks also had no access to large time deposits

   $\Rightarrow$ some MSAs rely heavily on core deposits, others much less so (e.g. 88% core deposit share in San Diego and Baltimore vs. 52% in San Francisco and Boston)

Reg Q and credit crunches

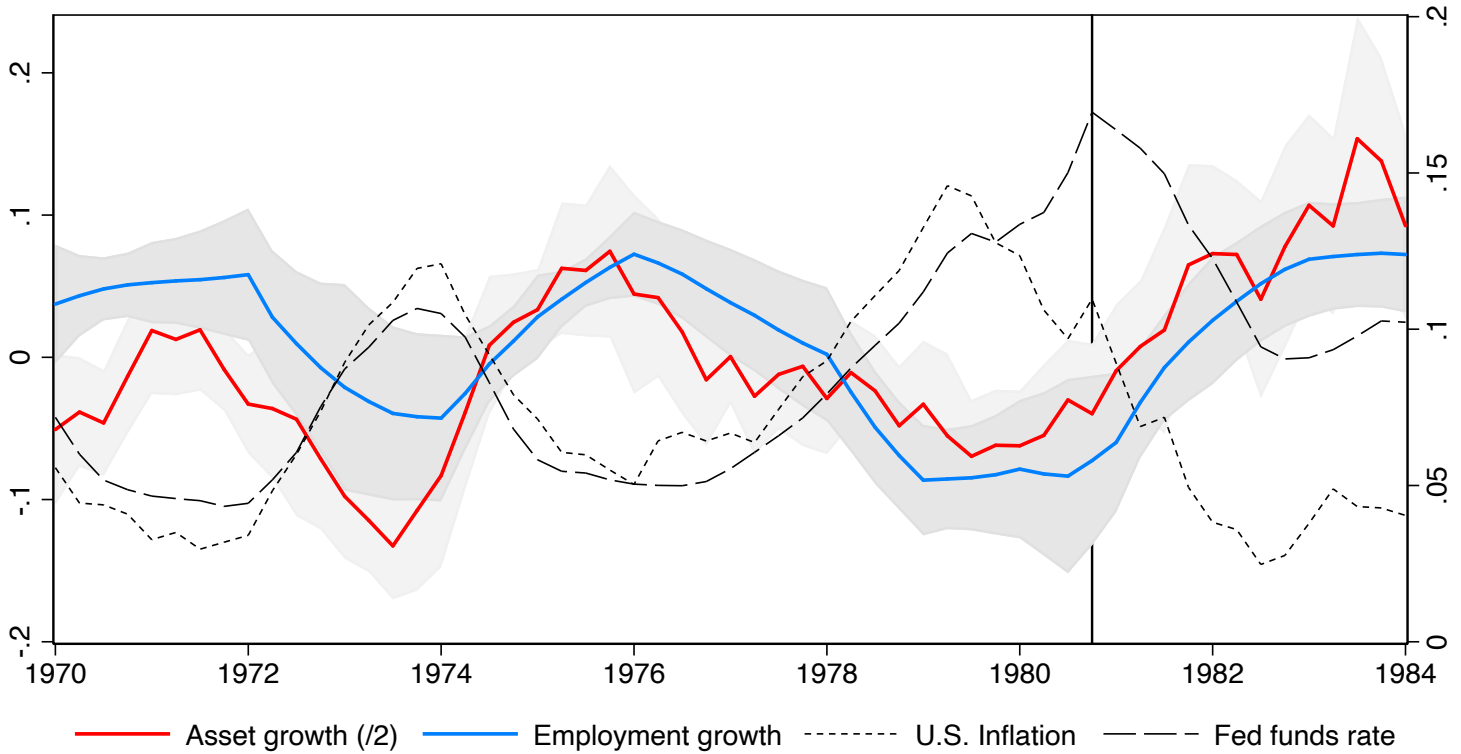
$$\text{Deposit growth}_t = \alpha_t + \beta_t \text{Core Deposit Share}_{i,1975.I} + \epsilon_{i,t}$$



1. When inflation/FF rate rises, deposit/asset growth drops $\approx$ 20% more in high Reg Q exposure MSAs
2. Consistent with 15% peak-to-trough decline in aggregate deposit/asset growth ($= -20\% \times 75\%$ core deposit share)

Credit crunches and employment

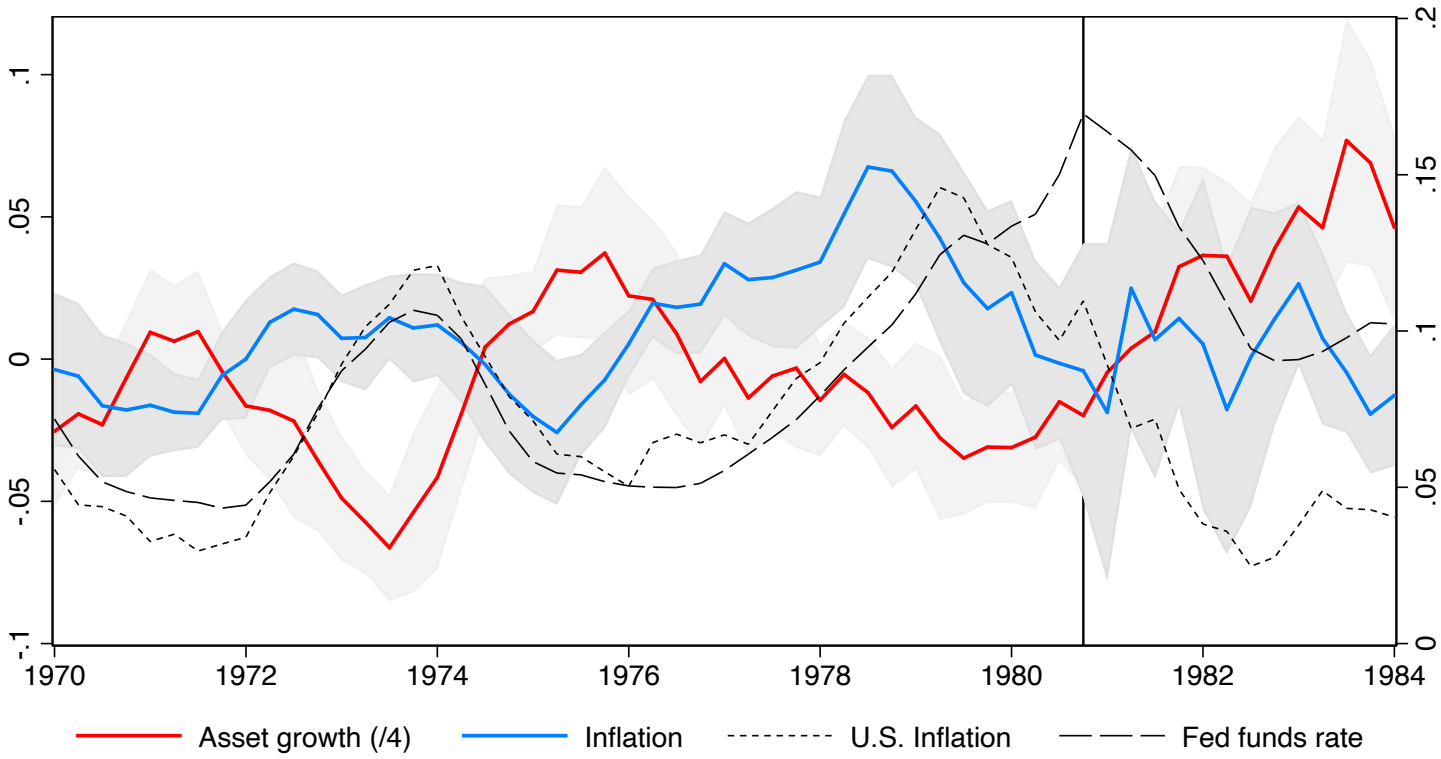
$$\text{Employment Growth}_{t+1} = \alpha_t + \beta_t \text{Core Deposit Share}_{i,1975.I} + \epsilon_{i,t}$$



1. Asset and employment growth co-move strongly in the cross section
   - when inflation/FF rate rises, employment growth drops by $\approx 7\%$ more in high Reg Q exposure MSAs
2. Consistent with credit crunches causing the "stag" in stagflation

Credit crunches and inflation

$$\text{Inflation}_t = \alpha_t + \beta_t \text{Core Deposit Share}_{i,1975.I} + \epsilon_{i,t}$$



1. MSAs with more severe credit crunches have greater inflation
   - from 1975 to 79, inflation rises by $\approx 10\%$ more in high Reg Q exposure MSAs
   - relationship ceases when Reg Q ends

Stagflation in the cross section

$$\Delta y_{it} = \alpha_i + \delta_t + \beta \text{Core Deposit Share}_{i,1975} \times \text{Fed Funds}_t + \epsilon_{i,t}$$

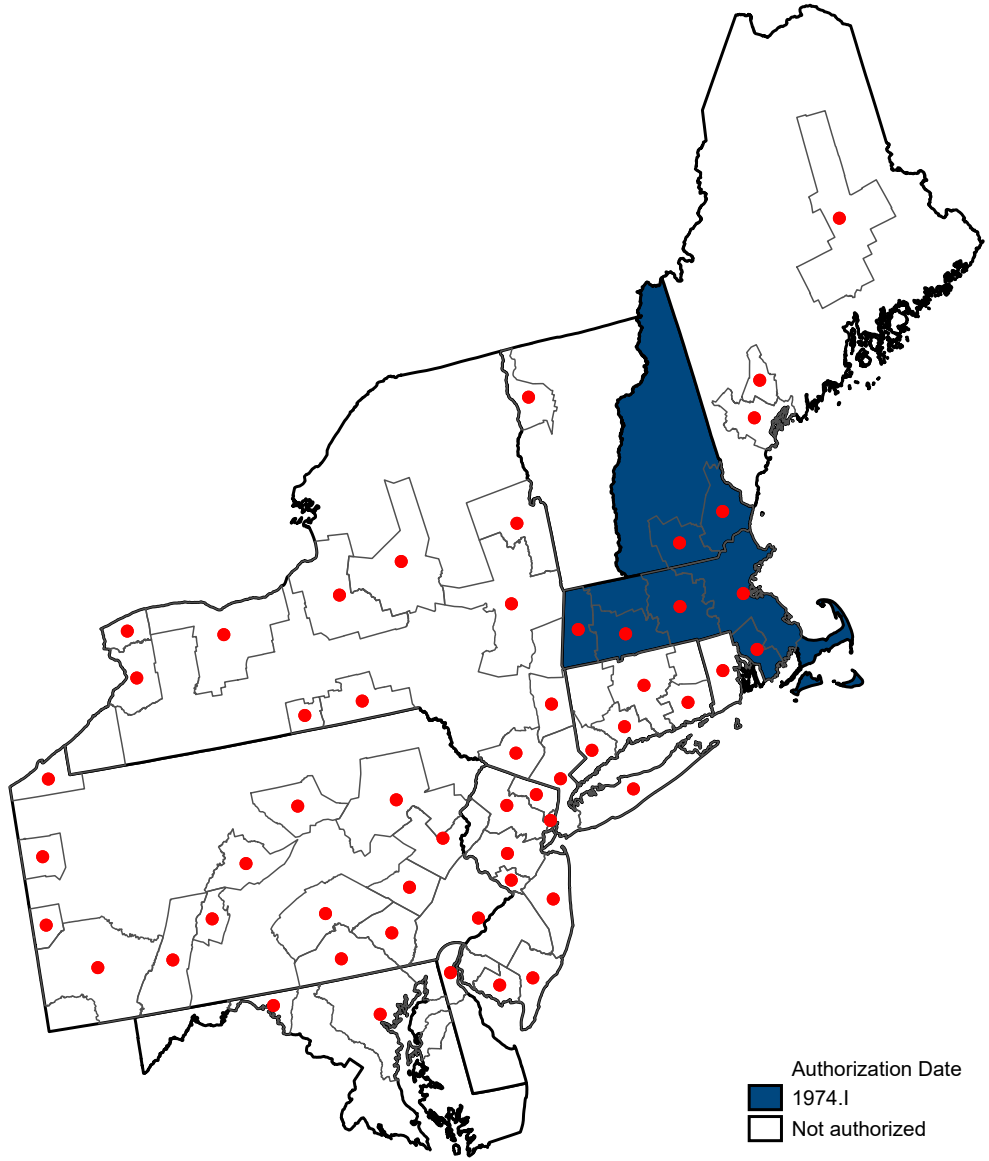
	Deposits	Bank Assets	Inflation	Employment (2 yr)	Construction Emp. (2 yr)
Core Share × FF	−3.943***	−3.275***	0.652***	−1.137***	−4.386***
	(0.608)	(0.625)	(0.199)	(0.272)	(1.005)
Time FE	Yes	Yes	Yes	Yes	Yes
MSA FE	Yes	Yes	Yes	Yes	Yes
Obs.	925	925	925	925	925
R^2	0.111	0.078	0.035	0.258	0.198

1. When Inflation/FF rises, high Reg Q exposure areas see lower deposit and bank asset growth (credit crunches), higher inflation, and lower 2-year employment growth
   - exposure to Reg Q induces "stagflation" in the cross section
   - stronger effect on the highly credit-dependent construction sector

NOW Account Experiment (middle of Great Inflation)

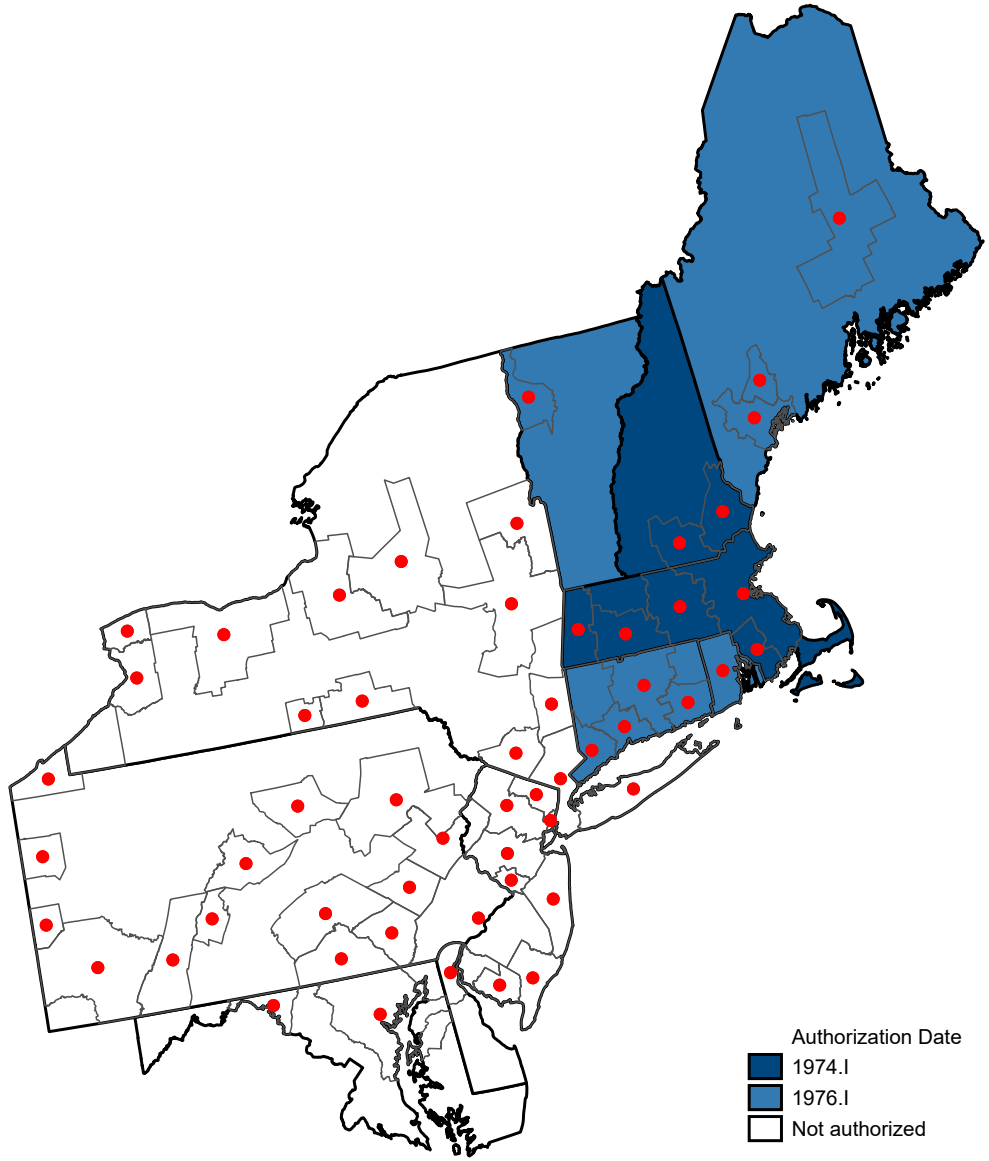
1. In 1972, a small bank in Worcester, MA, created the "NOW Account" (interest-paying checking account, $0 \rightarrow 5\%$)
2. Violated Reg $Q \rightarrow$ other banks sued for "unfair" competition
3. In surprise move, MA Supreme Court authorized NOW accounts for state-chartered banks
4. National banks now lobbied D.C. to allow NOW accounts $\rightarrow$ in 1974, Congress authorized NOW Accounts in MA and NH only
5. Hugely popular: 80% penetration rate in MA
6. Staggered roll-out to neighboring states by geographic proximity

Staggered roll-out in North East



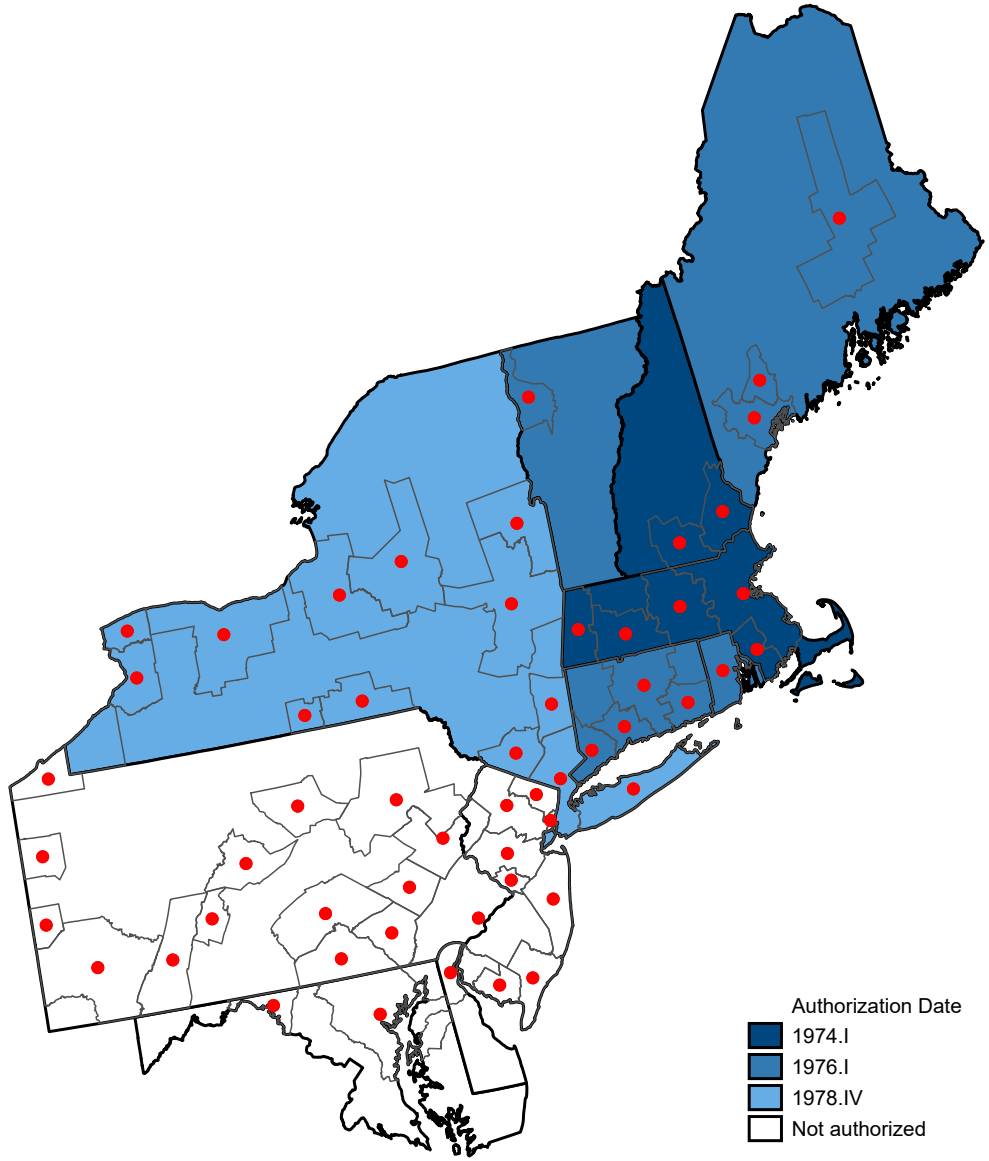
- NOW Account Experiment starts in MA and NH in 1974.I

Staggered roll-out in North East



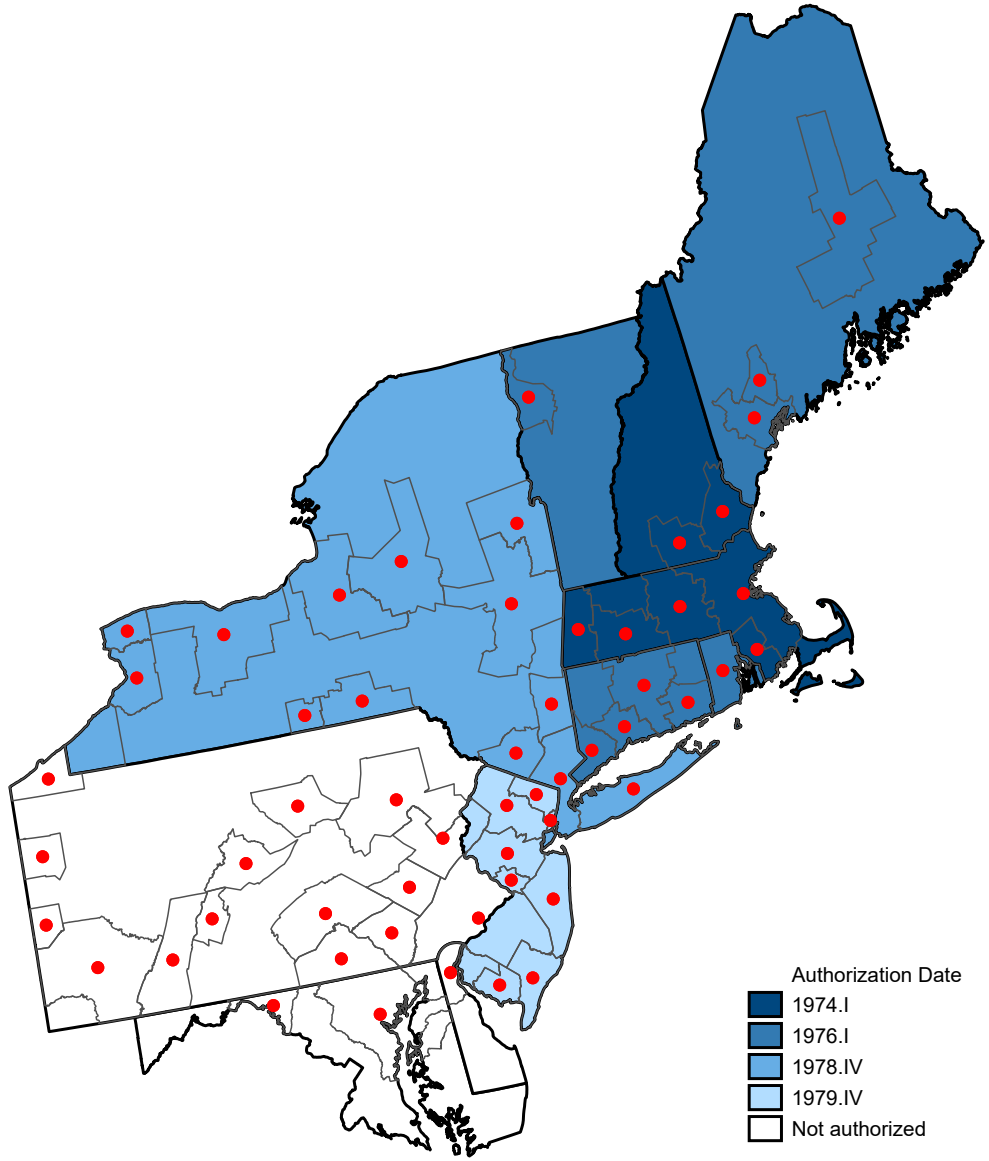
- Expands to rest of New England in 1976.I

Staggered roll-out in North East



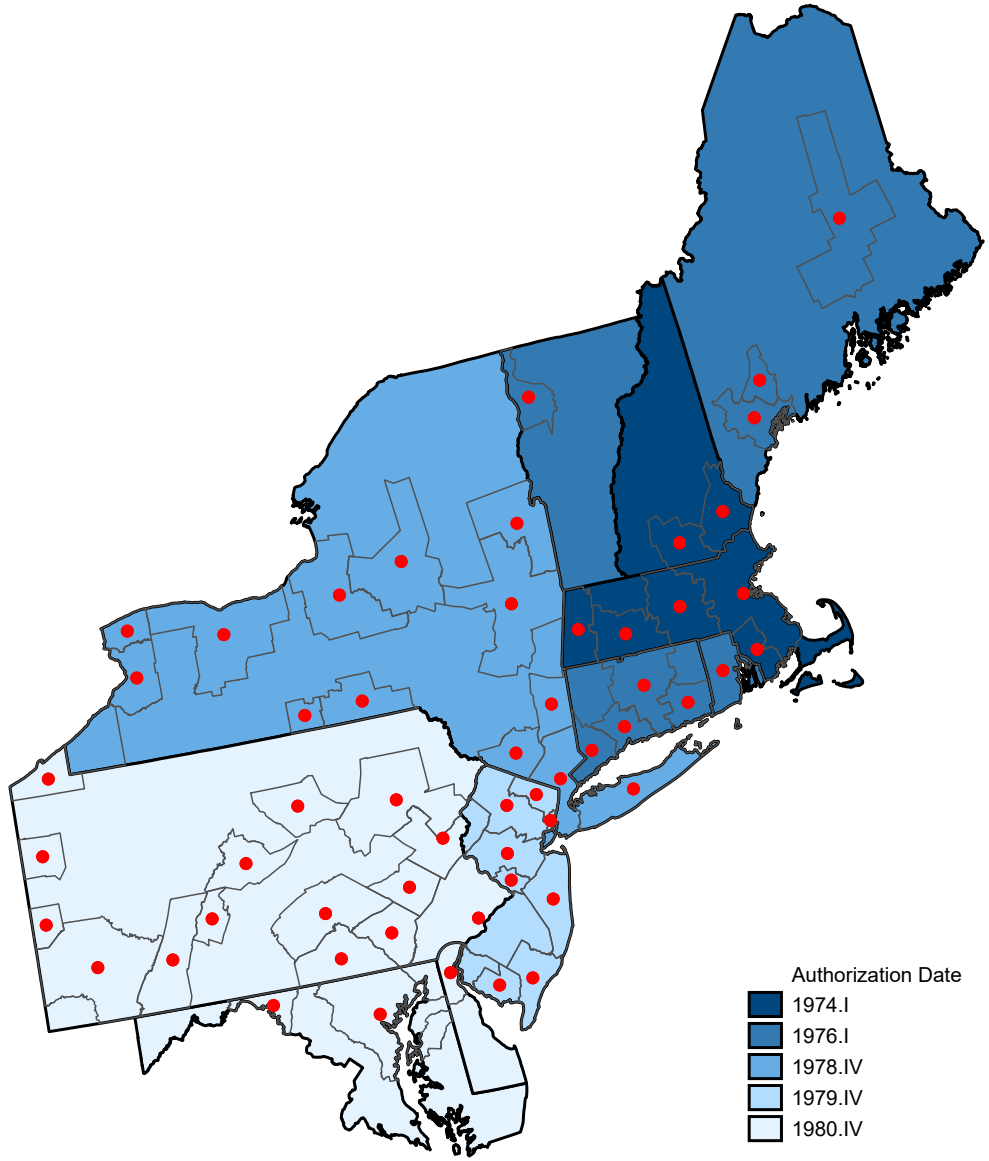
- Expands to New York in 1978.I

Staggered roll-out in North East



- Expands to New Jersey in 1979.I

Staggered roll-out in North East



- Expands to all of U.S. in 1980.IV

Empirical strategy: NOW Account Experiment

1. A partial repeal of Reg Q
2. Exploit staggered roll-out for identification:

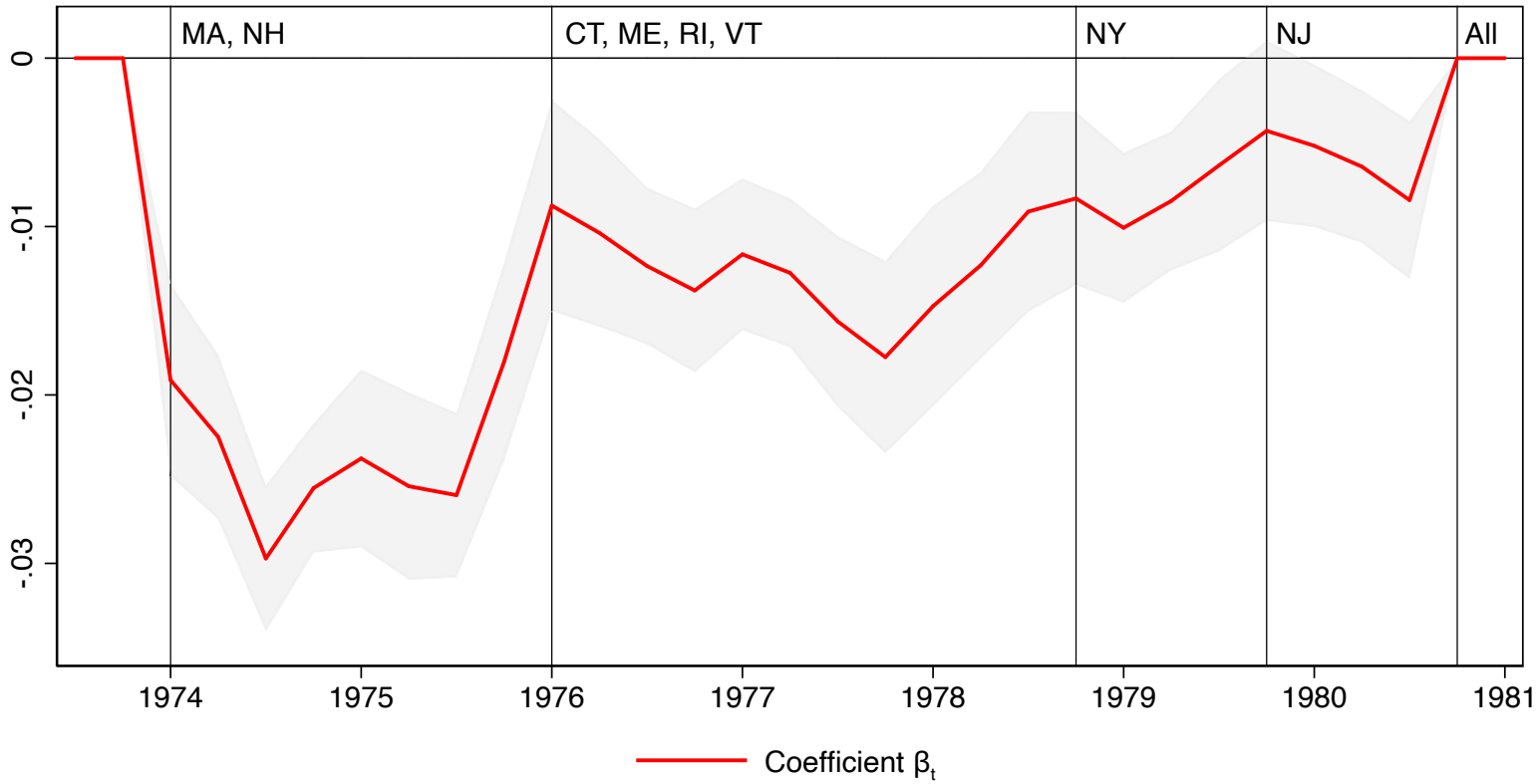
$$\text{Inflation}_{it} \quad = \quad \alpha_i + \gamma_t + \beta \text{Deregulated}_{it} + \varepsilon_{it}$$

   Deregulated_{it} = Indicator variable if MSA_{it} allows NOW accounts

3. Identification assumption: Roll-out driven by geographic proximity, not local inflation or economic activity

Results: NOW Account Experiment

$$\text{Inflation}_{it} = \alpha_i + \gamma_t + \beta_t \text{Deregulated}_{it} + \varepsilon_{it}$$



1. Introduction of NOW Accounts lowers inflation rate
   - effect is largest in earlier states, where NOW account penetration was highest

Results: NOW Account Experiment

$$\text{Inflation}_{it} = \alpha_i + \delta_t + \beta \text{Deregulated}_{it} + \varepsilon_{it}$$

	Inflation		Wage inflation (all)		Wage inflation (manuf.)	
	(1)	(2)	(3)	(4)	(5)	(6)
Deregulated	−1.203***	−1.228***	−1.400***	−1.312***	−1.071***	−1.096***
	(0.426)	(0.406)	(0.358)	(0.249)	(0.397)	(0.362)
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
MSA FE	No	Yes	No	Yes	No	Yes
State FE	Yes	No	Yes	No	Yes	No
Obs.	1,300	1,300	10,021	10,021	6,833	6,833
MSAs	25	25	315	315	173	173
R^2	0.903	0.910	0.603	0.665	0.502	0.511

$\Rightarrow$ Introduction of NOW Accounts lowers inflation rate by $\sim 2.4\%$

The Repeal of Reg Q (the end of the Great Inflation)

1. Congress effectively repealed Reg Q by introducing two deregulated small-time deposits (CDs): MMCs and SSCs in 1978.III and 1979.III

$\Rightarrow$ Examine impact of local take-up of deregulated deposits on inflation

2. Identification challenge: take-up may be responding to local economic conditions

$\Rightarrow$ Instrument take-up with 1975 share of small time deposits:

- checking, savings and time deposits differ in their maturity and liquidity (imperfect subsitutes)
- take-up should be larger in areas that had more small-time deposits in the past
- 1975 economic conditions were very different than in 1978 (trough vs. peak of inflation cycle)

OLS: inflation

$$\text{Inflation}_{it} = \alpha_i + \delta_t + \beta \text{MMC Share}_{it} + \varepsilon_{it}$$

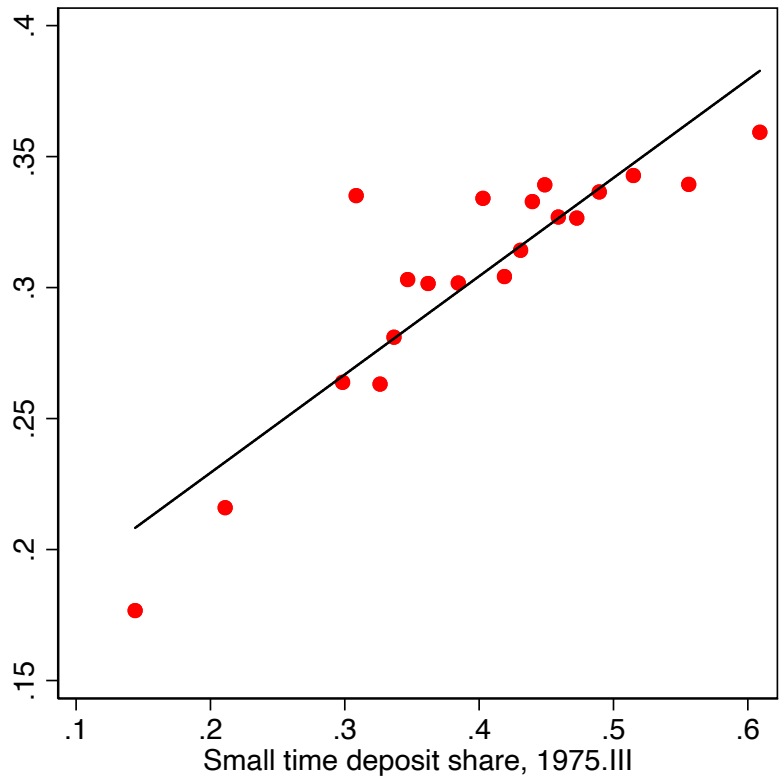
	Inflation (1978.III = 0)			
	(1)	(2)	(3)	(4)
MMC share	−0.240***	−0.273***	−0.259***	−0.268***
	(0.064)	(0.067)	(0.076)	(0.078)
Inflation, pre-period		0.200		
		(0.140)		
Time FE	Yes	Yes	Yes	Yes
MSA FE	No	No	Yes	Yes
Controls	No	No	No	Yes
Obs.	300	300	300	300
R^2	0.577	0.588	0.835	0.836

1. Large, very significant relation between MMC take-up and inflation
   - robust to controlling for pre-period inflation
   - coefficient magnitude can explain full drop in aggregate inflation

IV: first stage

1. Binscatter plot, 316 MSAs

MMC take-up vs. 1975 small-time deposit share



2. Large variation in small-time deposit share and in MMC take-up

$\Rightarrow$ 1975 small-time share strongly predicts MMC take-up

IV: inflation

$$\text{Inflation}_{it} = \alpha + \delta_t + \beta \widehat{\text{MMC Share}}_{it} + \varepsilon_{it}$$

	Inflation			
	(1)	(2)	(3)	(4)
$\widehat{\text{MMC share}}$	−0.243***	−0.312***	−0.286***	−0.354***
	(0.086)	(0.095)	(0.100)	(0.108)
Past inflation		0.227		0.215
		(0.148)		(0.147)
Time FE	Yes	Yes	Yes	Yes
Controls	No	No	Yes	Yes
Obs.	300	300	300	300
Weak IV *p*-val	0.00	0.00	0.00	0.00

1. IV coefficients are very similar to OLS
   - robust, economically large, and highly significant
   - coefficient magnitude can explain full drop in aggregate inflation

IV: wage inflation

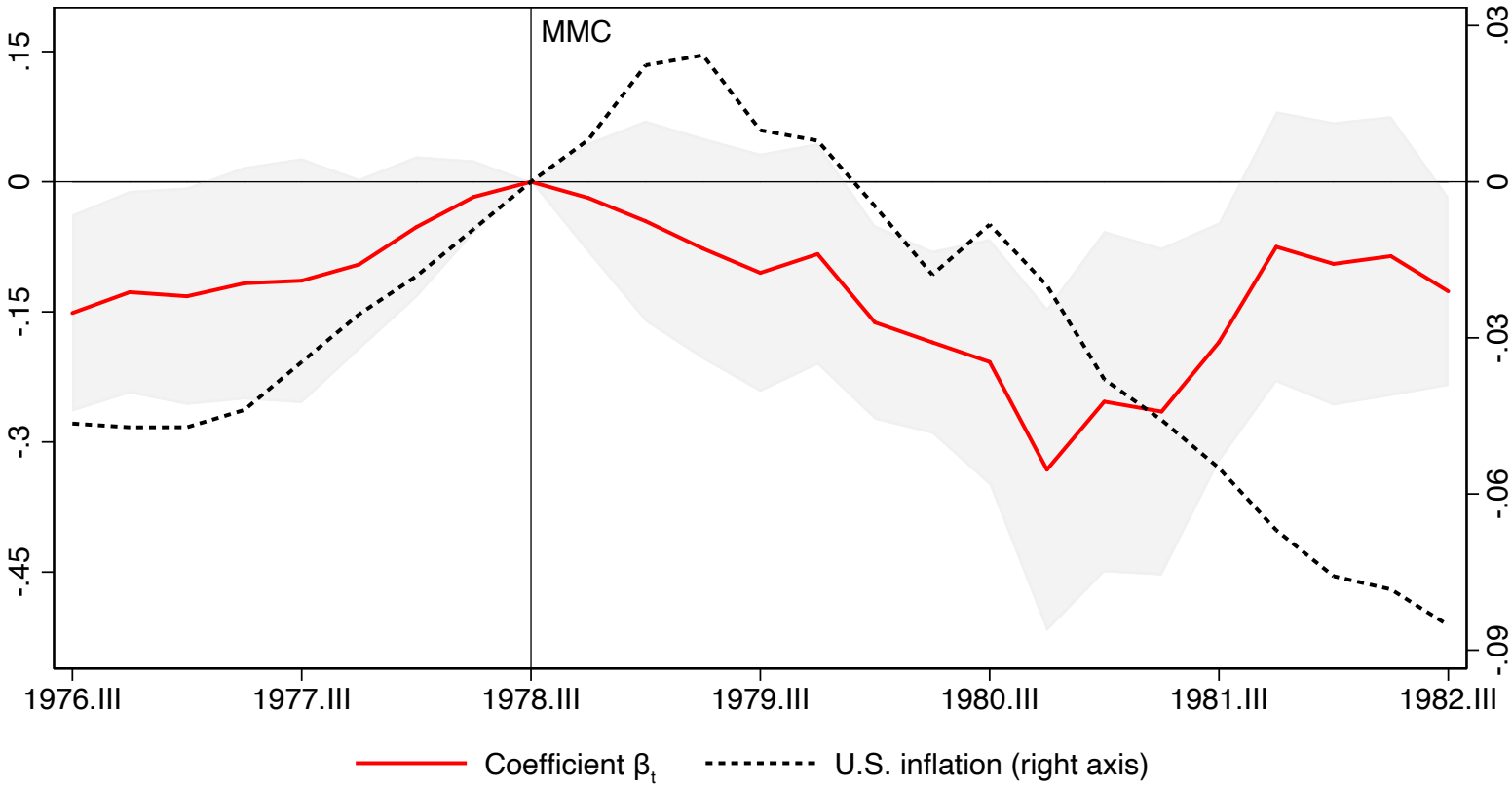
$$\text{Wage inflation}_{it} = \alpha_i + \delta_t + \beta \widehat{\text{MMC Share}}_{it} + \varepsilon_{it}$$

	Wage inflation			
	(1)	(2)	(3)	(4)
$\widehat{\text{MMC Share}}$	−0.159***	−0.157***	−0.144***	−0.143***
	(0.026)	(0.027)	(0.026)	(0.028)
Past wage infl.		−0.015		−0.008
		(0.048)		(0.045)
Time FE	Yes	Yes	Yes	Yes
Controls	No	No	Yes	Yes
Obs.	3,615	3,555	3,615	3,555
Weak IV *p*-val	0.009	0.005	0.004	0.002

1. Large, highly significant impact of MMC take-up on wage inflation
   - 100% increase in MMC take-up → reduces wage inflation by 16%
   - can explain the aggregate decline in wage inflation

Inflation: timing

$$\Delta \text{Inflation}_{i,78.\text{III}\to t} = \alpha_t + \beta_t \text{MMC Share}_{i,1981.\text{III}} + \epsilon_{i,t}$$



1. Cross-sectional effect of take-up occurs right at time of deregulation
   - leads aggregate by 3 quarters $\rightarrow$ inflation declined earlier in high take-up areas; followed soon by rest of US

Takeaways

1. Propose and test a new explanation for the Great Inflation
   - due to Reg Q, which disabled monetary policy passthrough and created credit crunches

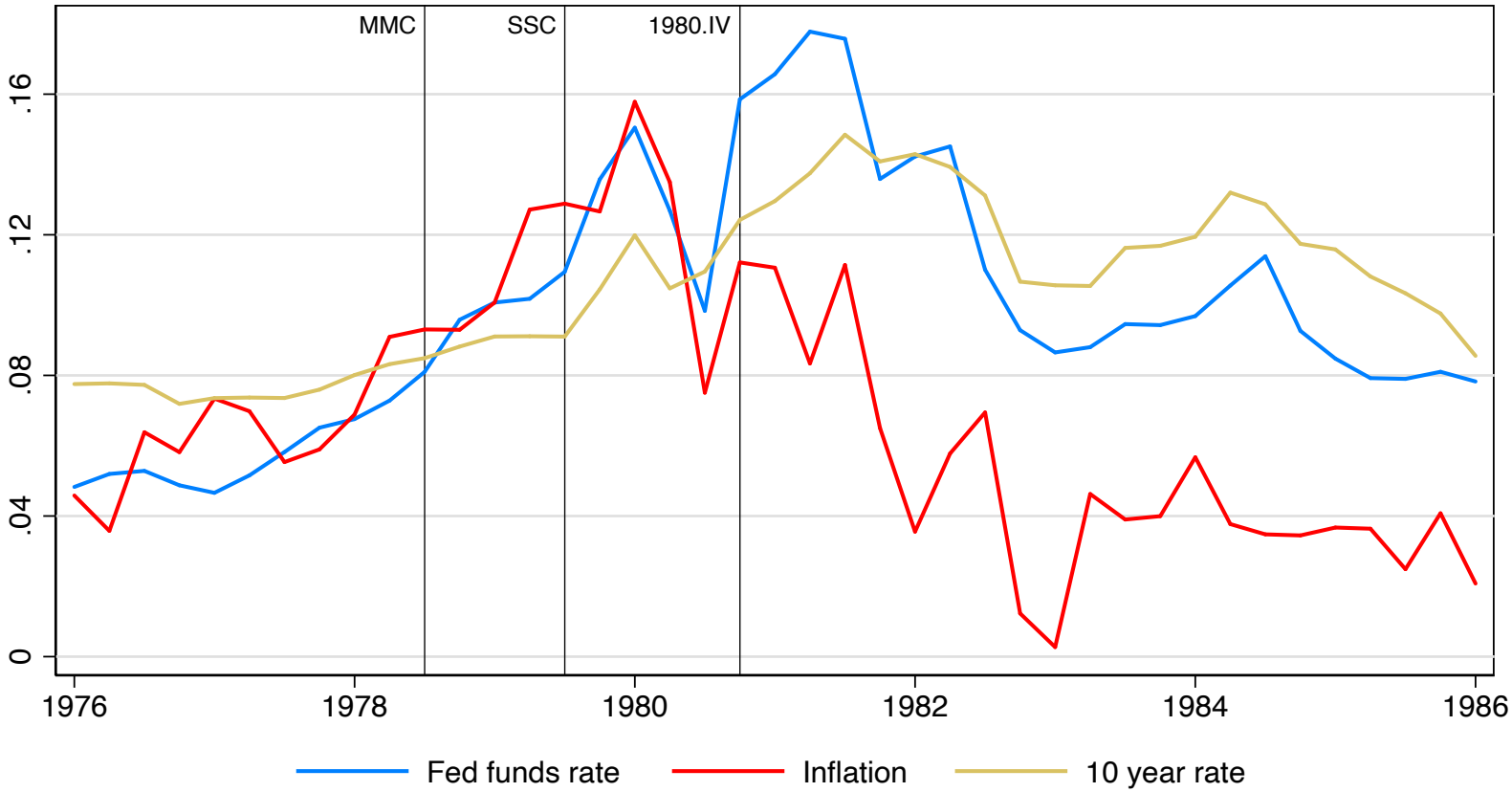
2. We present evidence that the Great Inflation was due to a large financial friction, not the Fed's policy rule
   - once the friction was removed, inflation returned to low levels (as in most of history) and macro volatility declined
   - explains the "stagflation," which was unexplained

$\Rightarrow$ Explains why high inflation has not been "just around the corner"
   - e.g., 2015

$\Rightarrow$ Reconciles eras: Great Inflation and post-2008 low inflation
   - Reg Q: deposit-rate ceiling $\rightarrow$ high inflation
     ZLB: deposit-rate floor $\rightarrow$ low inflation

Appendix

Timing: Quarterly inflation



1. Inflation drops soon after deregulation, but 3 quarters before Volcker's hike in 1980.IV
   - by 1980.III inflation already was less than 8%
2. Inflation expectations stayed high: 10-year rate at pre-Volcker levels until 1985!

   $\Rightarrow$ investors expected inflation to return, goes against credibility view

Spot the Anomaly

Source: Homer and Sylla (2005), Global Financial Data

1. Inflation was low before and after the Great Inflation
2. The Great Inflation is a historical anomaly

S&Ls and inflation, 1965–66 (onset of the Great Inflation)

1. Reg Q became binding for banks in 1965.I
2. S&Ls were exempt from Reg Q until September 1966
   - due to being regulated by FHLBB, not Fed

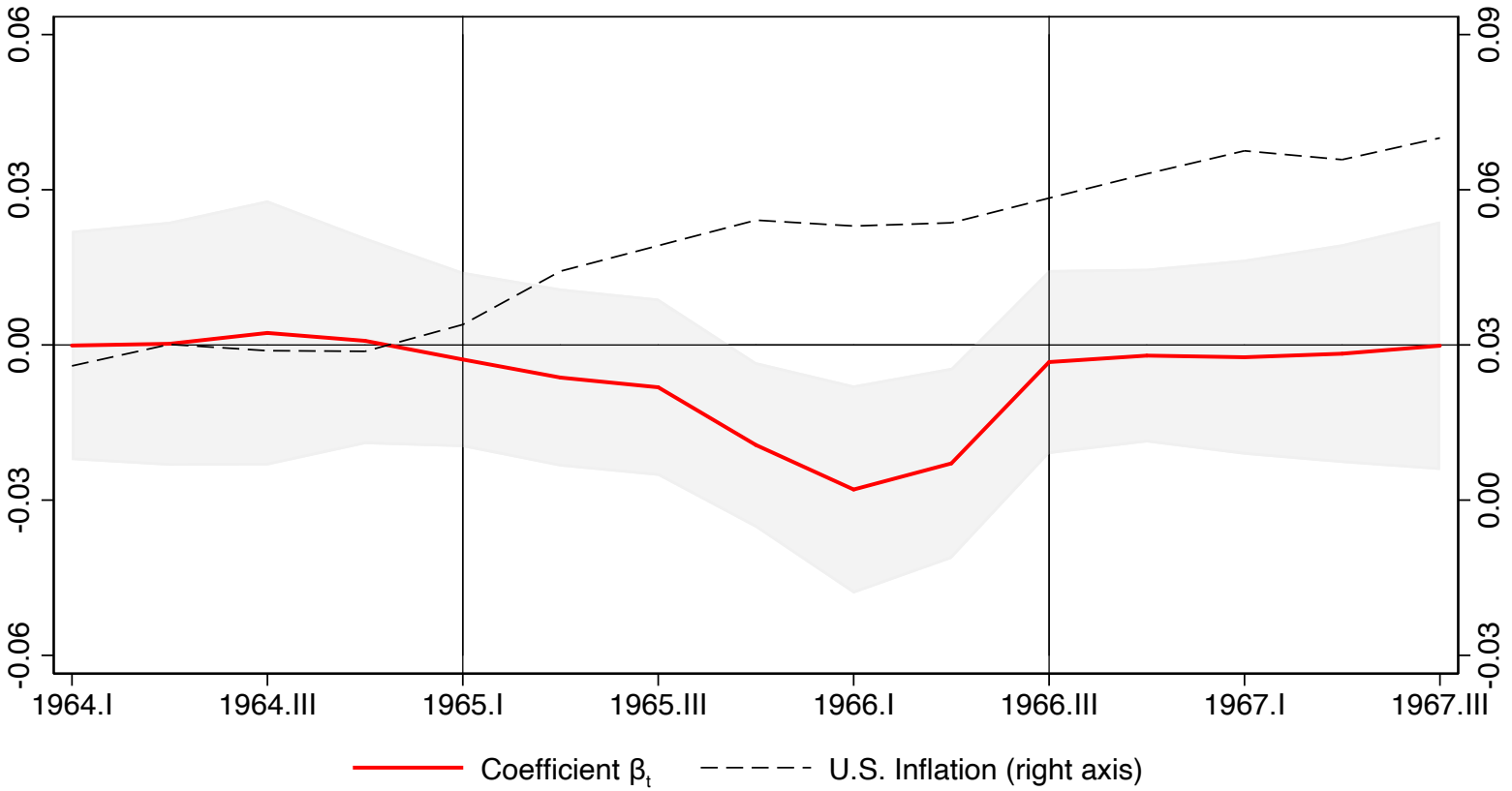
$\Rightarrow$ Reg Q less binding in S&L dominated areas over 1965.I–66.III

   - these areas should see less inflation increase

3. Identification assumption: S&L share is predetermined, not picking up other factors driving inflation in 1965–66
   - historically determined and highly persistent

S&Ls and inflation, 1965–66

$$\pi_{i,t-1\to t+1} = \alpha_t + \beta_t \,(\text{S\&L Share})_{i,1966.\text{III}} + \epsilon_{i,t}$$



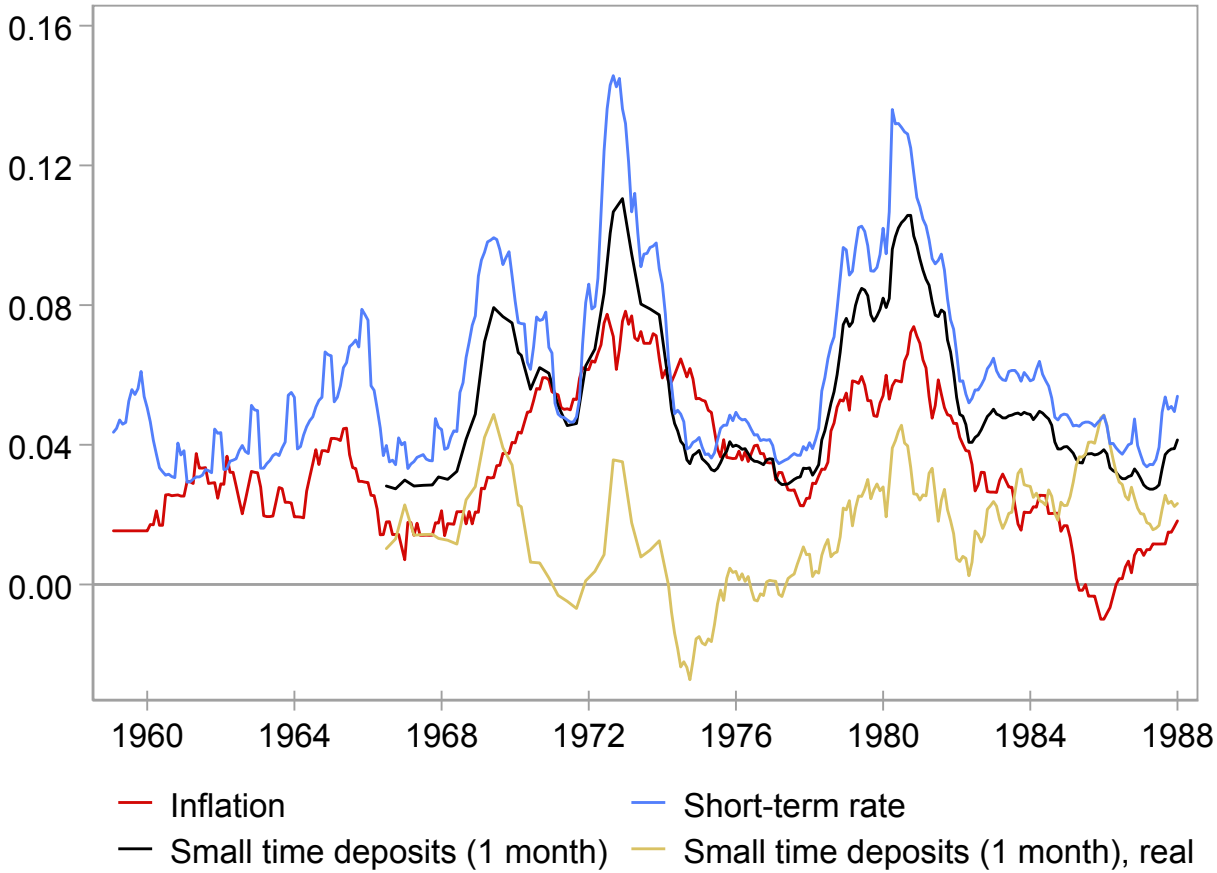
1. Shows inflation increases less in S&L-dominated areas once Reg Q becomes binding for banks in 1965.I
   - gap disappears once S&Ls become subject to Reg Q in 1966.III
2. Coefficient large enough to explain aggregate inflation increase ($\sim 3\%$)

S&Ls and inflation, 1965–66

	Inflation (1966.I)		
	(1)	(2)	(3)
S&L share	−0.028**	−0.029**	−0.027**
	(0.012)	(0.012)	(0.012)
Deposit growth		0.035	
		(0.092)	
Asset growth			0.136
			(0.102)
Constant	0.063***	0.061***	0.054***
	(0.005)	(0.007)	(0.008)
Obs.	25	25	25
R^2	0.198	0.203	0.257

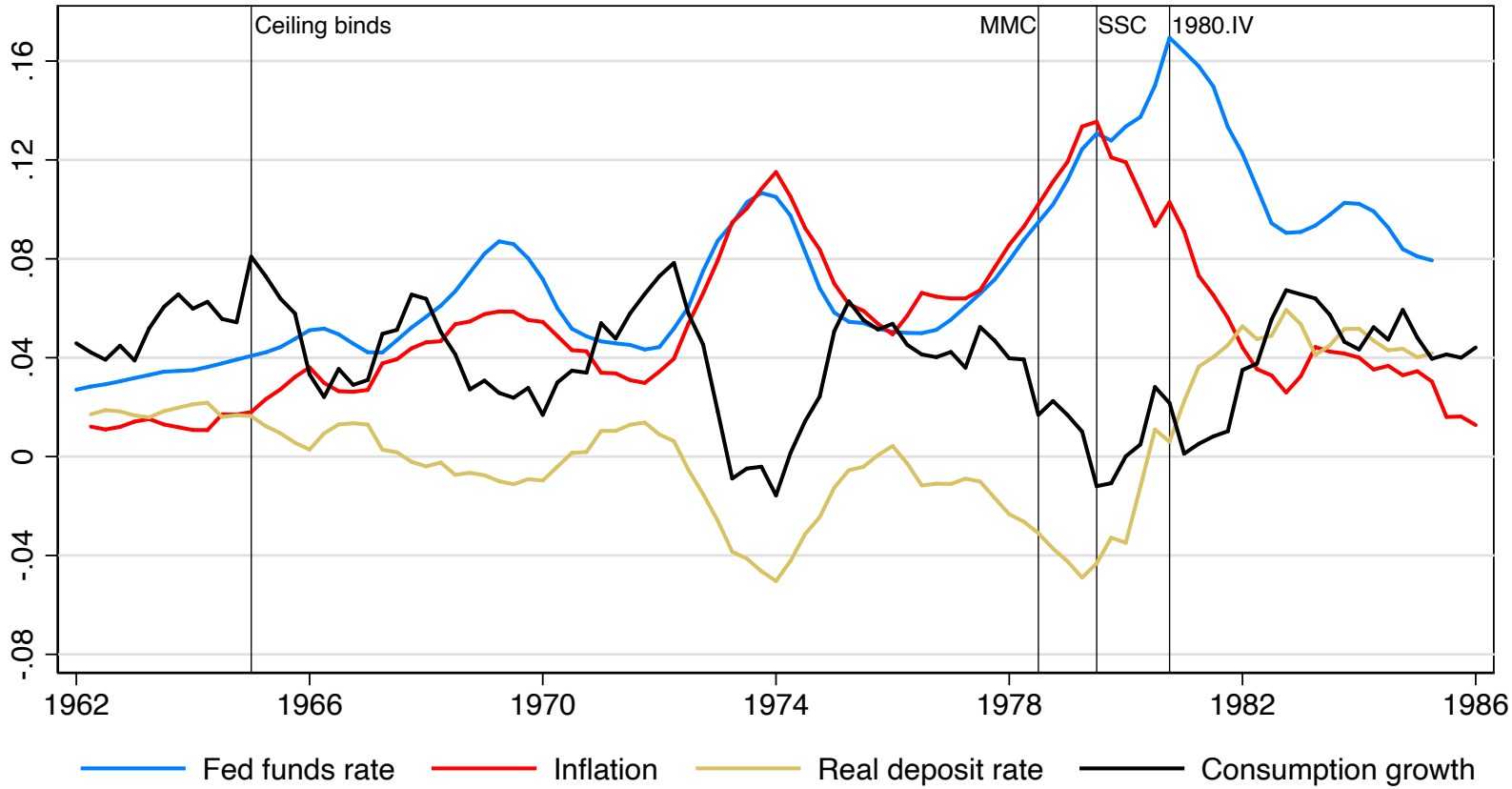
1. Shows inflation was 2.7% lower in 1966.I in S&L-dominated areas
2. National inflation rose by ∼2.7% between 1965.I and 1966.III, when Reg Q became binding everywhere
   → Reg Q can explain the increase in aggregate inflation

International Evidence: Germany



1. German inflation was substantially lower than other developed countries
2. Germany eliminated deposit-rate caps in 1967 $\Rightarrow$ German savings deposit rates were very sensitive to the short-term rate
   - German real deposit rate remains positive for much of this period

The Real Deposit Rate and Consumption Growth



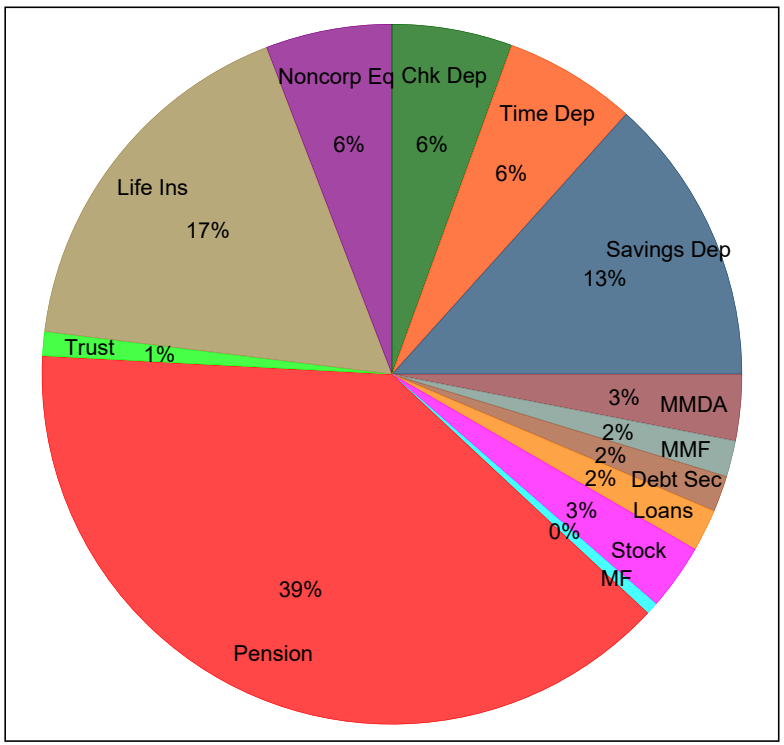
1. Consumption growth is highly correlated with the real deposit rate (74% correlation)

$\Rightarrow$ Euler equation holds using actual rate households get (implied EIS ~ 1)
   - does not hold for real Fed funds rate

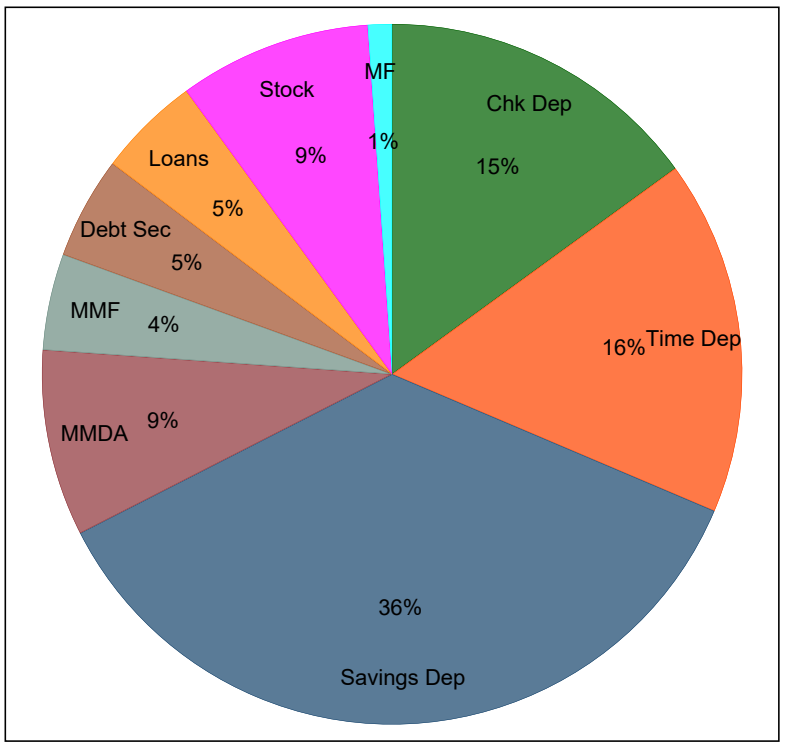
Median household asset allocation

1. Data from first Survey of Consumer Finances (1983):
   - 94% of 5th decile households had deposits vs 15% stocks, 4% MMF

Total financial assets



Liquid assets



2. Median household had 28% of total assets in deposits
3. 76% of liquid assets $\rightarrow$ important for marginal savings