

Economics 210c/236a
Fall 2016

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LECTURE 2

The Effects of Monetary Changes: Narrative Evidence and Natural Experiments



August 31, 2016

Announcement

For this week only, our office hours are Thursday 1–3, rather than the usual time of 2–4.

I. INTRODUCTION AND THE “ST. LOUIS EQUATION”

A Simple Model of the Determination of Some Macro Outcome

$$y_t = a + \sum_{i=0}^N b_i m_{t-i} + e_t,$$

where:

- y is some macroeconomic variable of interest;
- m is a measure of monetary developments;
- e is other influences on y ;
- N is the horizon over which m affects y .

Potential Problems with the St. Louis Equation?

- Endogenous policy causing correlation between e and the m 's.
- Developments in the private economy causing correlation between e and the m 's.

Two General Comments about Omitted-Variable Bias

- Think in terms of omitted-variable bias or correlation of right-hand side variables with the residual, not in terms of simultaneity or endogeneity.
- It's always good to think about what direction one expects bias in OLS to go.

II. MILTON FRIEDMAN AND ANNA SCHWARTZ, “A SUMMING UP”

Friedman and Schwartz on the Value of Historical or Narrative Evidence

“The ... relation between changes in the stock of money and changes in other economic variables, alone, tells nothing about the origin of either or the direction of influence. ... A great merit of the examination of a wide range of qualitative evidence is that it proves a basis for discrimination between ... possible explanations of the observed statistical covariance. We can go beyond the numbers alone and, at least on some occasions, discern the antecedent circumstances whence arose the particular movements that become so anonymous when we feed the statistics into the computer.” (P. 686)

Friedman and Schwartz's 4 Crucial Experiments – The First Three

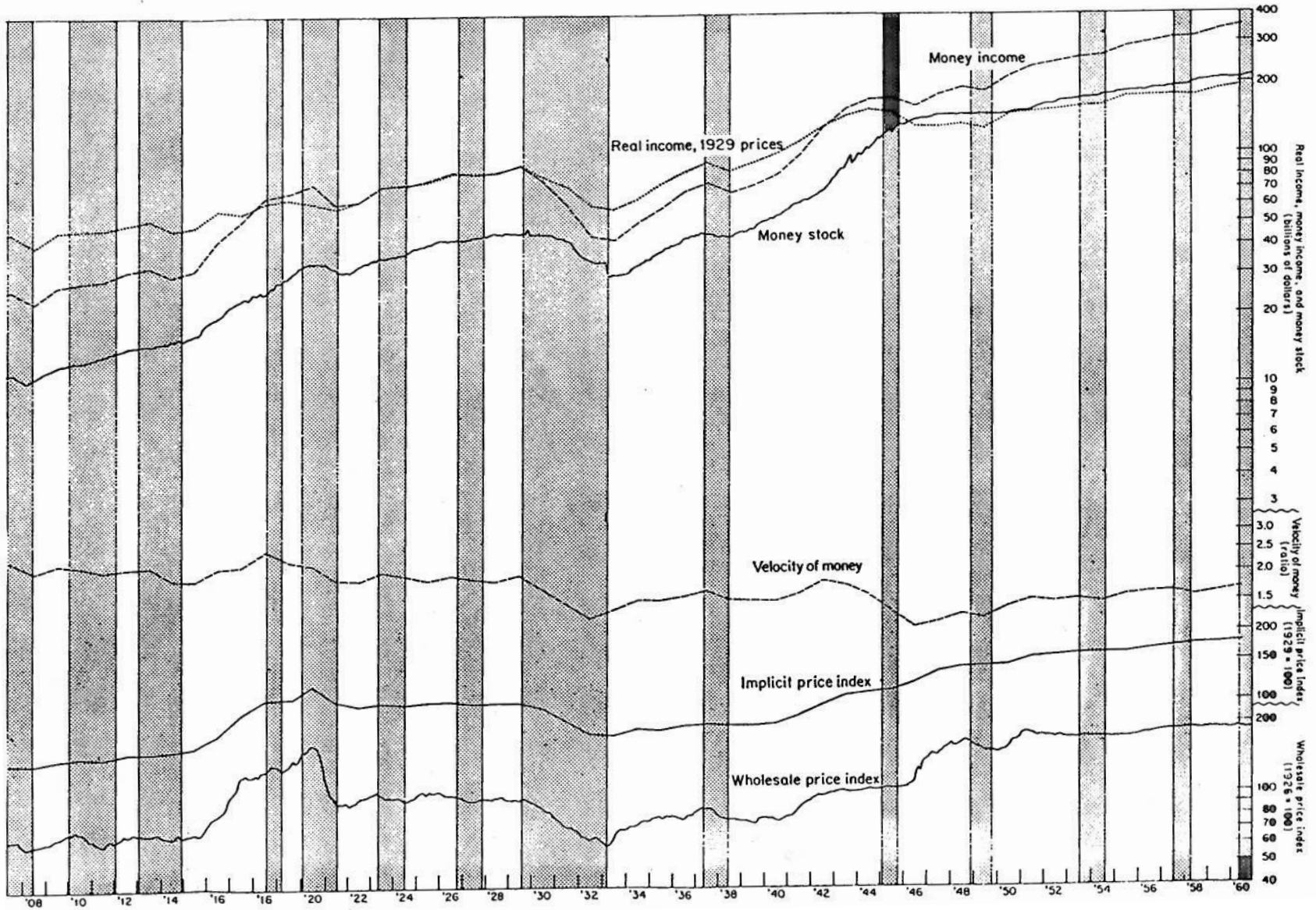
“Three counterparts of such crucial experiments stand out in the monetary record since the establishment of the Federal Reserve System. ... Like the crucial experiments of the physical scientist, the results are so consistent and sharp as to leave little doubt about their interpretation. The dates are **January–June 1920, October 1931, and July 1936–January 1937.**” (P. 688)

Freidman and Schwartz's Fourth Crucial Experiment

“[T]he actions of the Reserve System in 1929–33 ..., even during the early phase of the contraction, from 1929 to 1931, when the decline in the stock of money was not the result of explicit restrictive measures taken by the System ... can indeed be regarded as a fourth crucial experiment” (p. 694).

CHART 62

Money Stock, Income, Prices, and Velocity, in Reference Cycle Expansions and Contractions, 1867 – 1960



Friedman and Schwartz's Strengths

- Understood the identification problem.
- Proposed a brilliant solution.
- Outstanding use of narrative sources.

Friedman and Schwartz's Weaknesses

- Definition of a monetary shock is vague.
- Selectivity.
- The movements in m aren't completely independent.
- No statistical tests.
- No analytic framework.

III. ROMER AND ROMER, “DOES MONETARY POLICY
MATTER? A NEW TEST IN THE SPIRIT OF FRIEDMAN AND
SCHWARTZ”

Romer and Romer (1989)

- Looked for times when the Federal Reserve decided the current inflation rate was too high, and was willing to accept a recession to bring it down.
- Possible advantages and disadvantages of this focus?

Romer and Romer's Key Dates

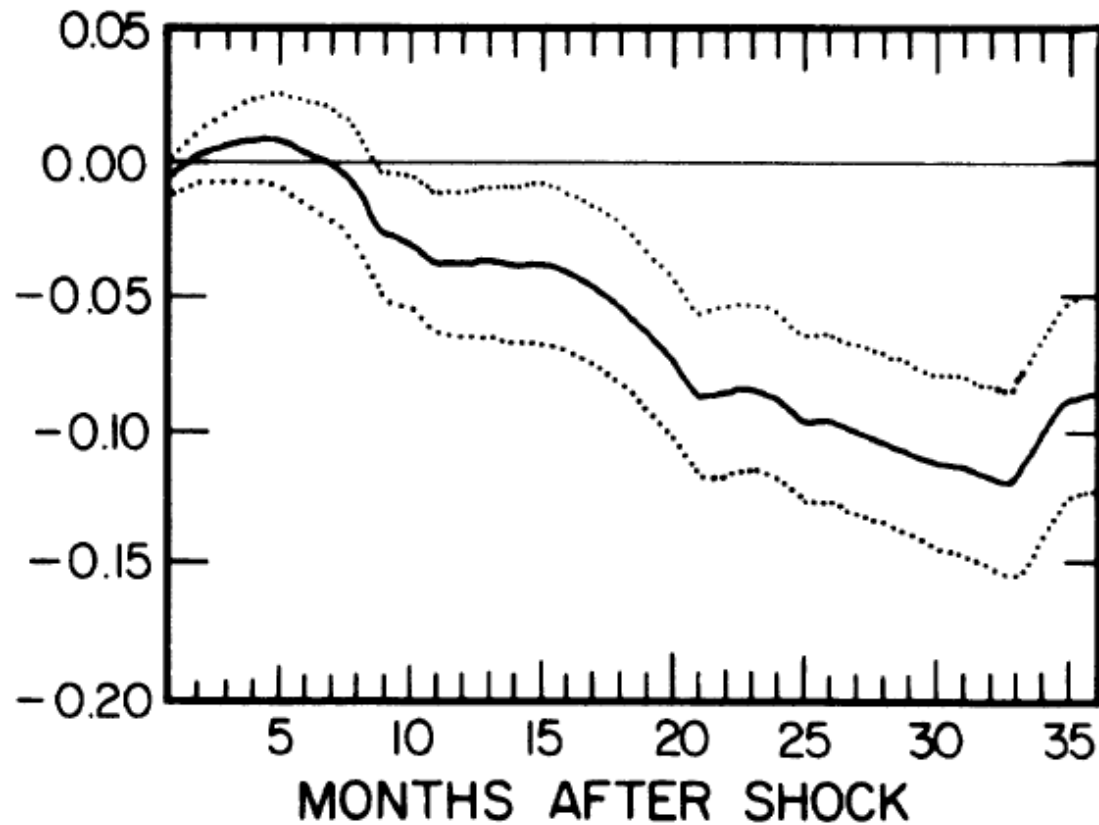
- October 1947
- September 1955
- December 1968
- April 1974
- August 1978
- October 1979
- (December 1988)

Romer and Romer's equation

$$y_t = a_0 + \sum_{i=1}^{11} a_i M_{it} + \sum_{j=1}^{24} b_j y_{t-j} + \sum_{k=0}^{36} c_k D_{t-k}$$

Romer and Romer (1989)

Figure 4 IMPULSE RESPONSE FUNCTION FOR BASIC INDUSTRIAL PRODUCTION REGRESSION



From: Romer and Romer, "Does Monetary Policy Matter?"

Evaluation and Discussion of Romer and Romer

Controlling for Oil Price Movements

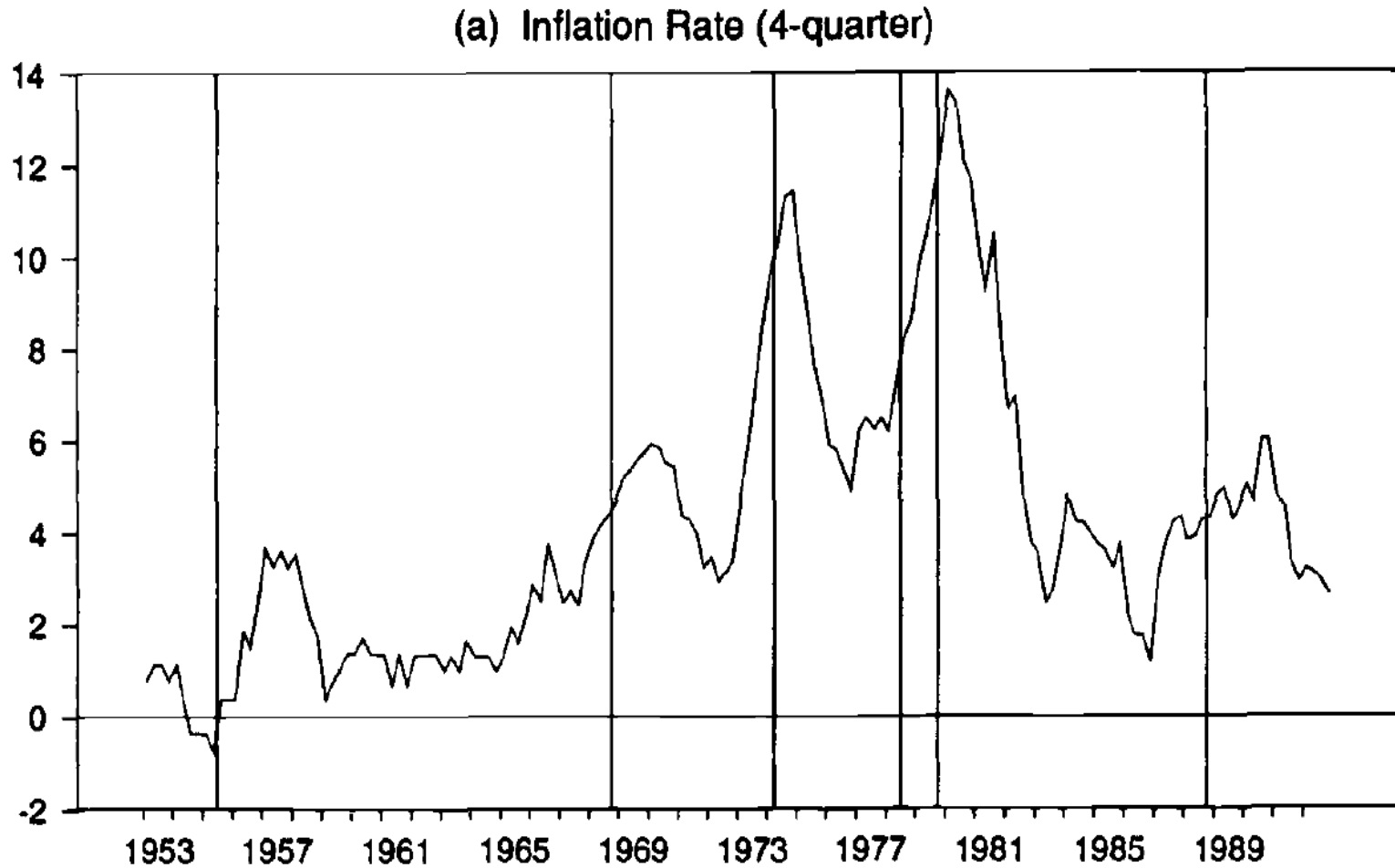
Table 2
Regressions through 1991

Oil shock measure	Estimated maximum impact of monetary shock	Standard error	<i>p</i> -value
None	– 11.4%	3.2%	0.0002
Hoover–Perez dummy variable	– 7.4	4.2	0.04
Calibrated Hoover–Perez dummy	– 10.0	3.6	0.003
% Δ (real price of oil)	– 10.5	4.2	0.006
% Δ (real price of oil) (+ and – entered separately)	– 9.6	4.3	0.01

The sample period is 1948:2 to 1991:12 for all regressions except those using oil prices, where the sample is 1950:2 to 1991:12 because of data limitations.

From: Romer and Romer, “Monetary Policy Matters”

Inflation after “Romer and Romer dates”



From: Matthew Shapiro, “Federal Reserve Policy: Cause and Effect”

IV. VELDE: “CHRONICLE OF A DEFLATION UNFORETOLD”

Monetary Framework in 18th Century France

Mint Price (MP)

- Price government pays for silver sold to the mint.
(Suppose it is 3 livre/oz.)

Mint Equivalent (ME)

- Declared value of a coin.
(Suppose it is 4 livre for a coin with 1 oz. of silver in it).

Seigniorage

- Difference between ME and MP.

Monetary Changes in 1724

TABLE 1
CHANGES IN THE LEGAL TENDER VALUE OF THE SILVER ECU, 1723–24

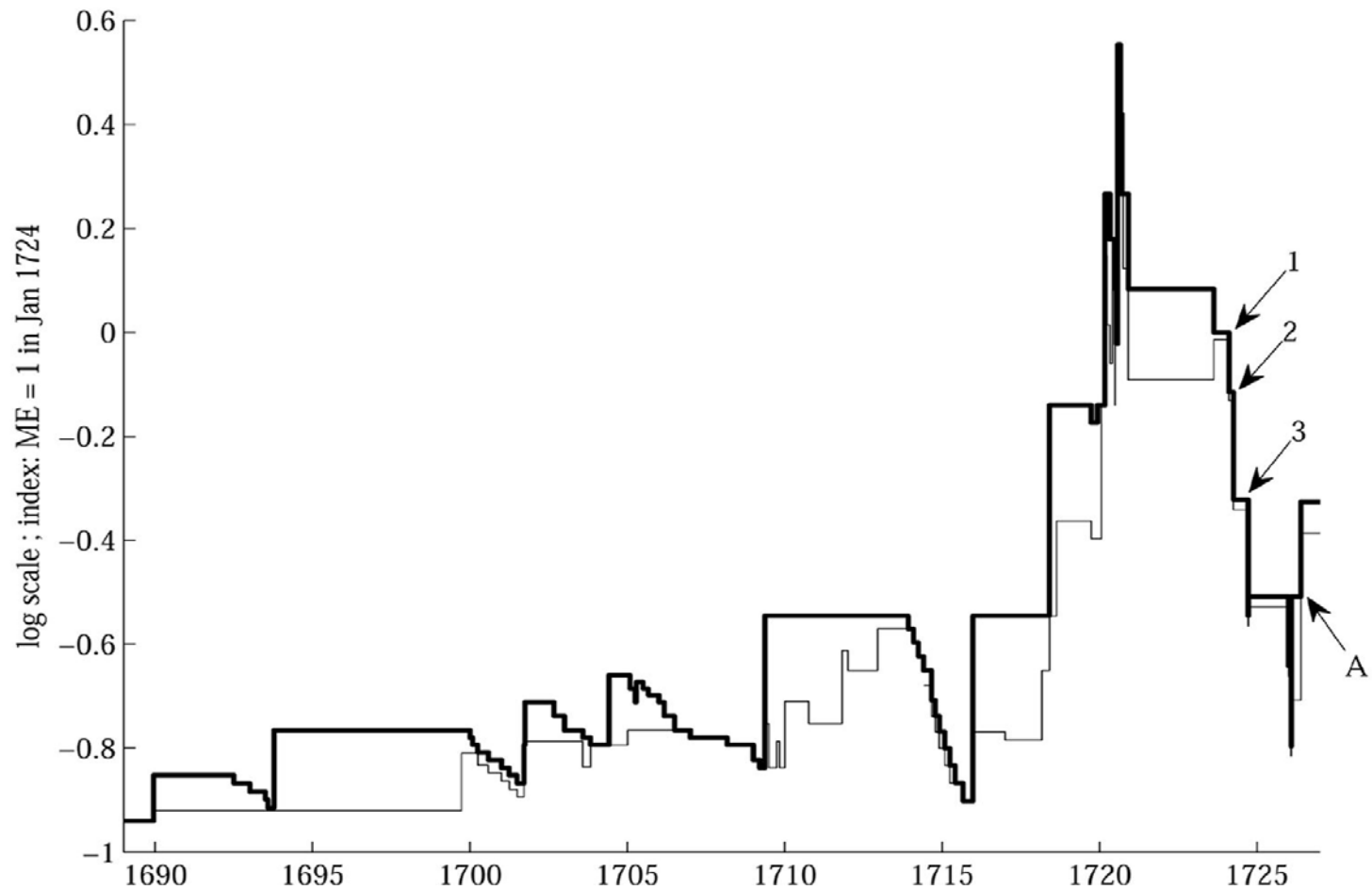
Date	Ecu's Value	Diminution (%)	Cumulative Diminution (%)
December 1720	7.5		
August 1723	6.9	–8.0	–8.0
February 1724 (1)	6.3	–8.7	–16.0
April 1724 (2)	5	–20.6	–33.3
September 1724 (3)	4	–20.0	–46.7
Recoinage			–44.7

From: Velde, “Chronicle of a Deflation Unforetold”

Is this a useful natural experiment?

- Were the monetary changes exogenous?
- How good is Velde's narrative analysis?

FIG. 1.—ME (upper thick line) and MP (lower thin line), France, 1685–1730 (log scale).



From: Velde, "Chronicle of a Deflation Unforetold"

Data Sources and Treatment

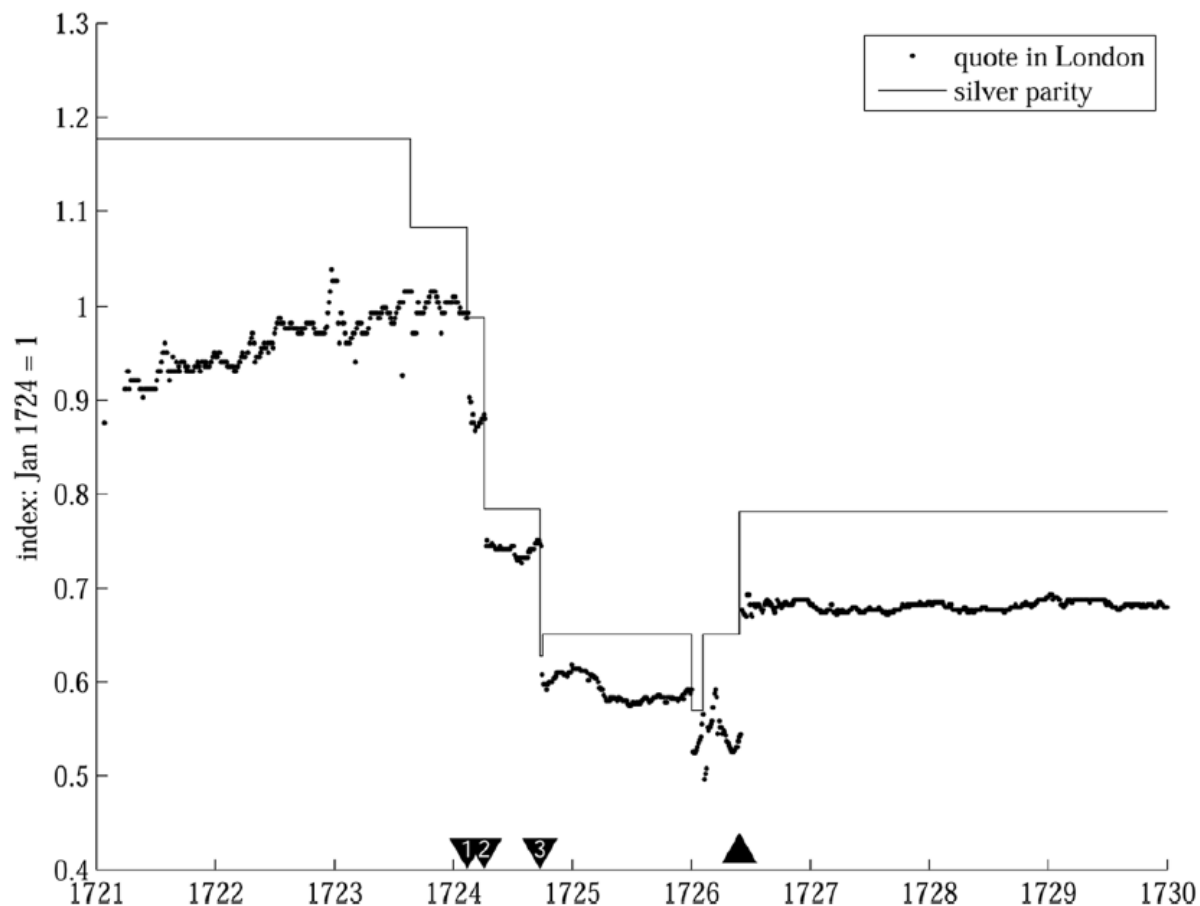
Many Individual Series

- Prices for a particular commodity in a particular market
- Amazing detective work

Aggregates and smooths the series

- Uses a state-space model to smooth and aggregate the series into an aggregate.
- Not enough discussion of how well the technique works.

FIG. 3.—Exchange rates on Paris in London, in French units of account per British unit of account, 1721–29. The line plots an index of the silver parity between the units of account. Source: *Course of the Exchange*.



From: Velde, "Chronicle of a Deflation Unforetold"

FIG. 5.—Annual exports and imports, 1716–40. Sources: Romano (1957), AN F/12/534A.



From: Velde, "Chronicle of a Deflation Unforetold"

TABLE 2
PRICES OF VARIOUS COMMODITIES AT THE HALLES MARKET, 1724

	WHEAT			BREAD		EGGS (Average)	PORK (Average)	CANDLES (Average)	BUTTER (Average)
	High	Low	Mode	High	Low				
February 1724:									
1	25.5			3.75		52.5	6.75	14.5	95
5	25.5			3.75		52	7.75	14.5	75
9	25			3.5		57.5	7.75	14.5	80
12*	24.25			3.5		65	7.75	14.5	85
16	24.5			3.5		70	6.75	14.5	85
April 1724:									
1	27.5			3.25				14.5	85
5*	23.5			3.25				14.5	85
8	25			3.25				14.5	92
12	24.5			3.25				14.5	90
September 1724:									
6	25			3		29	6.75	10.5	60
9	25.25			3		29.5	6.75	10.5	63
13	26.5			3.25		30	6.75	10.5	60
16	27.25			3.25		34	6.75	10.5	72
20	26.75			3.25		34	6.75	10.5	66
23*	25			3.25		35	6.75	10.5	65
27	25.75			3.25		32	6.75	10.5	63
30	26			3.25		36.5	6.75	10.5	65
May-June 1726:									
15	24.5	12	20	2.75	2.5	24	5.75	9.75	46
18	24	12.5	18.25	2.75	2.5	23	5.75	9.75	46
22	24	12	19	2.75	2.5	25	5.75	9.75	46
25	23.25	12	18.5	2.75	2.5	23.5	5.75	9.75	46
29*	23.25	12	20.5	2.75	2.5	23.5	5.75	9	43
1	23.25	12.5	19.9	2.75	2.5	23.5	6	9	42
5	23.25	13	21	2.75	2.5	25	6.25	9	
8	23.25	13	22	2.75	2.5	24.5	7.25	9	42
12	23	13	21	2.75	2.5	23.5	6.75	9	40

SOURCES.—Dutot ([1738] 1935, 76), Institut mss. 514.

NOTE.—The units are sous per pound for bread, pork, and candles and livres per bushel (*septier*) of wheat, per hundred pounds of butter, and per thousand eggs.

* The first market date after each diminution.

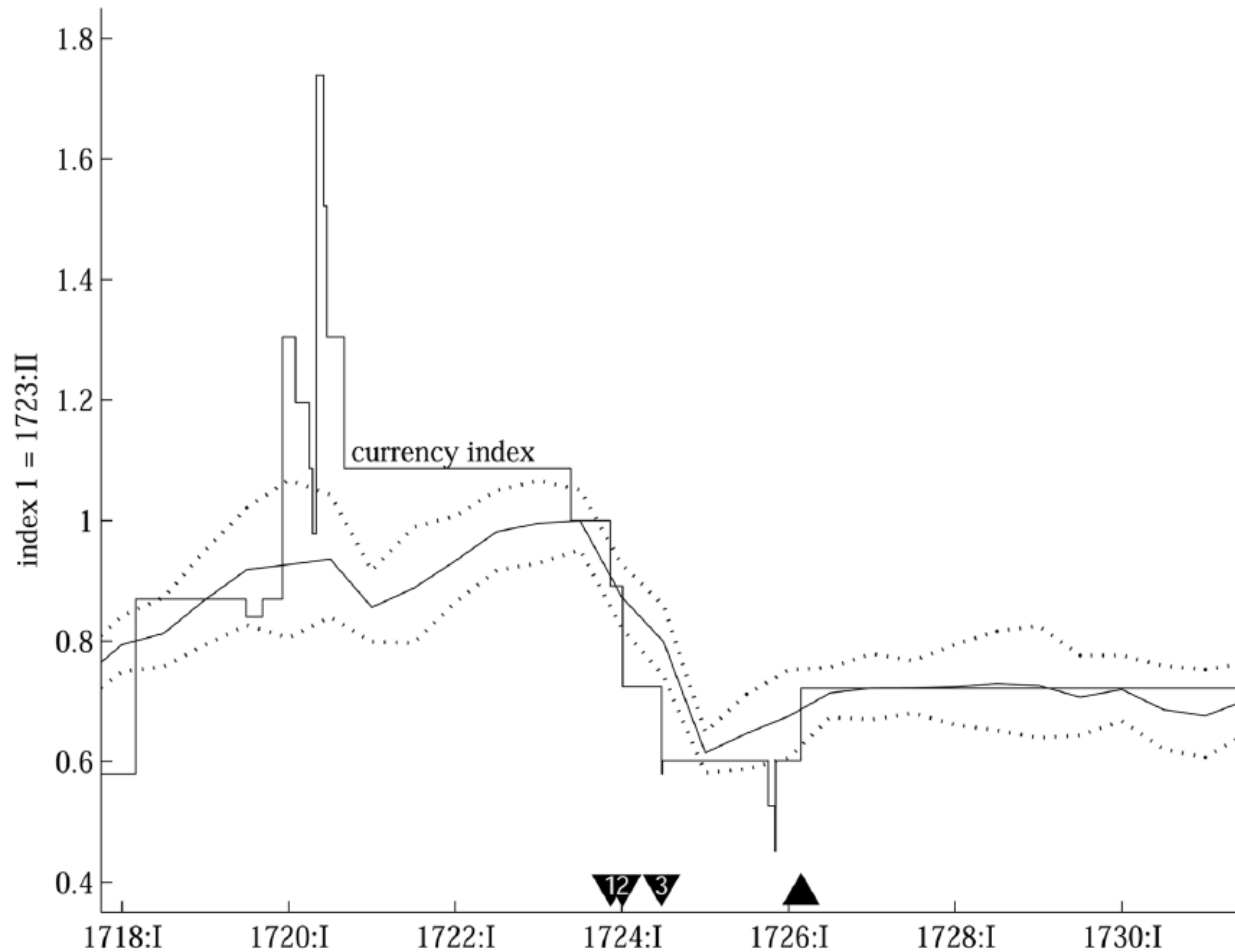
TABLE 3
PERCENTAGE CHANGES IN CLOTH PRICES

	ME	PRICE CHANGES (%)		
		Mean	Median	Standard Deviation
Amiens cloth hall (107 cloths), January 1724–October 1724	–40	–25	–25	6.5
Clermont fair (42 cloths), May 1724–August 1724	0	7	5	6.7
St. Germain fair (22 cloths), Feb- ruary 1724–February 1725	–40	–33	–33	6.0

SOURCES.—AN G/7/97, nn. 242–44 (Amiens); F/12/1376 (Clermont); F/12/1234B (Saint-Germain).

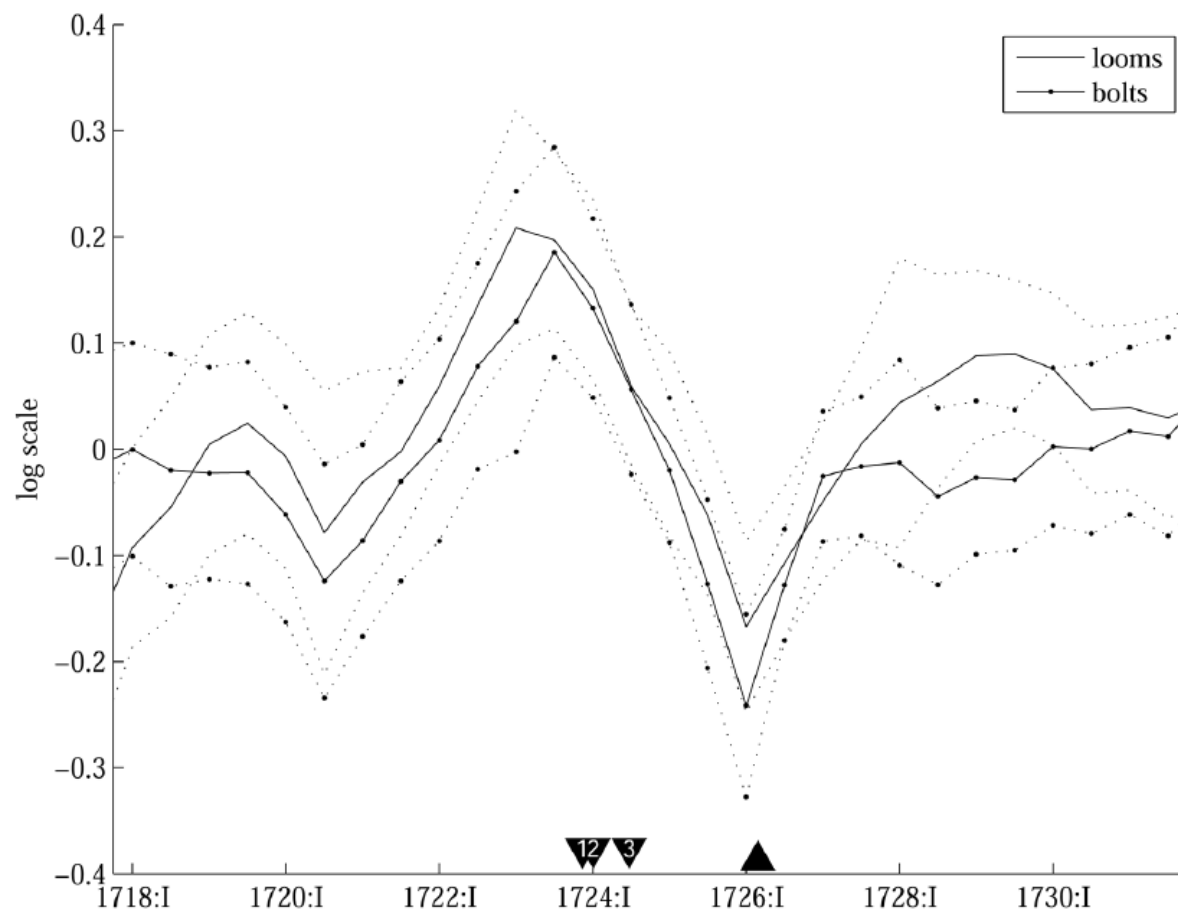
From: Velde, “Chronicle of a Deflation Unforetold”

FIG. 11.—Weighted price index of bolts for a subsample of districts, semiannual, 1716–31. Dotted lines are 95 percent confidence intervals.



From: Velde, "Chronicle of a Deflation Unforetold"

FIG. 9.—Index of working looms and index of bolts produced, semiannual, 1718–31 (log scale). Dotted lines are 95 percent confidence intervals.



From: Velde, "Chronicle of a Deflation Unforetold"

Evaluation of Velde

V. RICHARDSON AND TROOST: “MONETARY
INTERVENTION MITIGATED BANKING PANICS DURING THE
GREAT DEPRESSION”

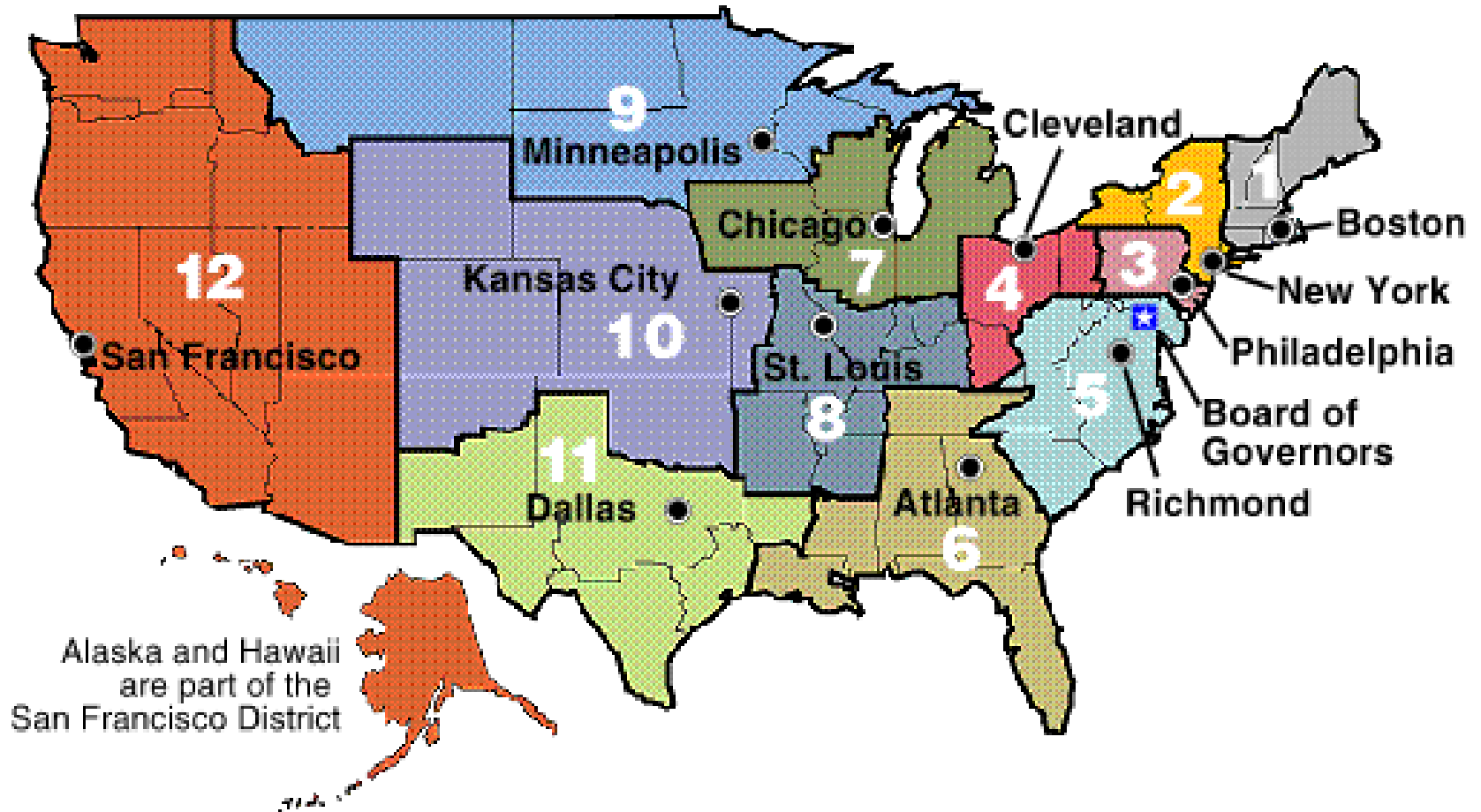
Historical Background

- Friedman and Schwartz's 4th crucial episode: 1929–1930. An act of omission.
- Waves of panic in the Great Depression: Fall 1930, Spring 1931, Fall 1931, Fall 1932/Winter 1933.
- Debate about whether liquidity provision would have stemmed the panics.
- Related issue: would monetary intervention have helped prevent the downturn in real output?

Richardson and Troost's Natural Experiment

- Mississippi (MS) was split between 2 Federal Reserve districts.
- Districts had very different approaches to panics *before* the Great Depression.
- In November 1930 there was a panic in Tennessee that was unrelated to MS banks, but nevertheless set off a panic in MS six weeks later.
- Can look for differences in bank failures in the two halves of MS.

Federal Reserve Districts



Is this a useful natural experiment?

- Were the two halves of MS otherwise similar?
- Did the St. Louis and Atlanta Federal Reserve Banks have different policies for exogenous reasons?

TABLE 3
CHARACTERISTICS OF COUNTIES IN MISSISSIPPI IN 1930

	6TH FEDERAL RESERVE DISTRICT (Atlanta)				8TH FEDERAL RESERVE DISTRICT (St. Louis)			
	All		Near Border		Near Border		All	
	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation
Population (1,000s)	22.4	14.4	28.2	17.7	30.4	17.2	26.8	14.2
Persons per square mile	37.4	19.7	41.5	20.3	51.4	21.5	49.3	18.6
Urban population share (%)	14.2	22.3	12.2	22.8	12.5	11.1	9.3	10.8
Black population share (%)	43.4	18.2	49.5	18.2	56.1	18.1	49.6	23.3
Number of manufacturing establishments	20.1	20.0	25.6	24.6	27.1	14.1	25.2	15.9
Average annual manufacturing wage (\$)	754.8	150.6	779.2	129.3	753.7	182.9	711.2	178.7
Net sales, retail stores, annual per capita (\$)	190.0	76.8	188.2	91.7	185.0	51.5	175.1	54.0
Fraction of population in labor force (%)	38.8	6.2	41.3	6.3	42.9	7.6	42.4	8.0
Unemployment rate (%)	1.8	2.0	1.0	1.1	.6	.4	.5	.4
Fraction of farm acres in cotton (%)	57.5	26.4	68.0	18.2	77.7	14.1	79.7	11.9
Fraction of farm acres with crop failures (%)	3.3	6.4	3.8	7.3	1.1	.5	1.1	.8
Farm mortgage debt as a percentage of farm value	33.2	5.3	35.3	4.2	41.2	7.2	41.6	6.1
Interest charges as a percentage of mortgage debt	7.0	.5	6.9	.4	6.9	.5	6.9	.4

SOURCE.—Historical, Demographic, Economic, and Social Data: The United States, 1790–1970 (<http://www.icps.umich.edu/icpsweb/ICPSR/>). For comparisons of additional characteristics, see Richardson and Troost (2006).

NOTE.—The near border columns contain statistics for counties for which at least 50 percent of the area lies within 1 degree latitude of the Federal Reserve district border.

From: Richardson and Troost, “Monetary Intervention Mitigated Banking Panics”

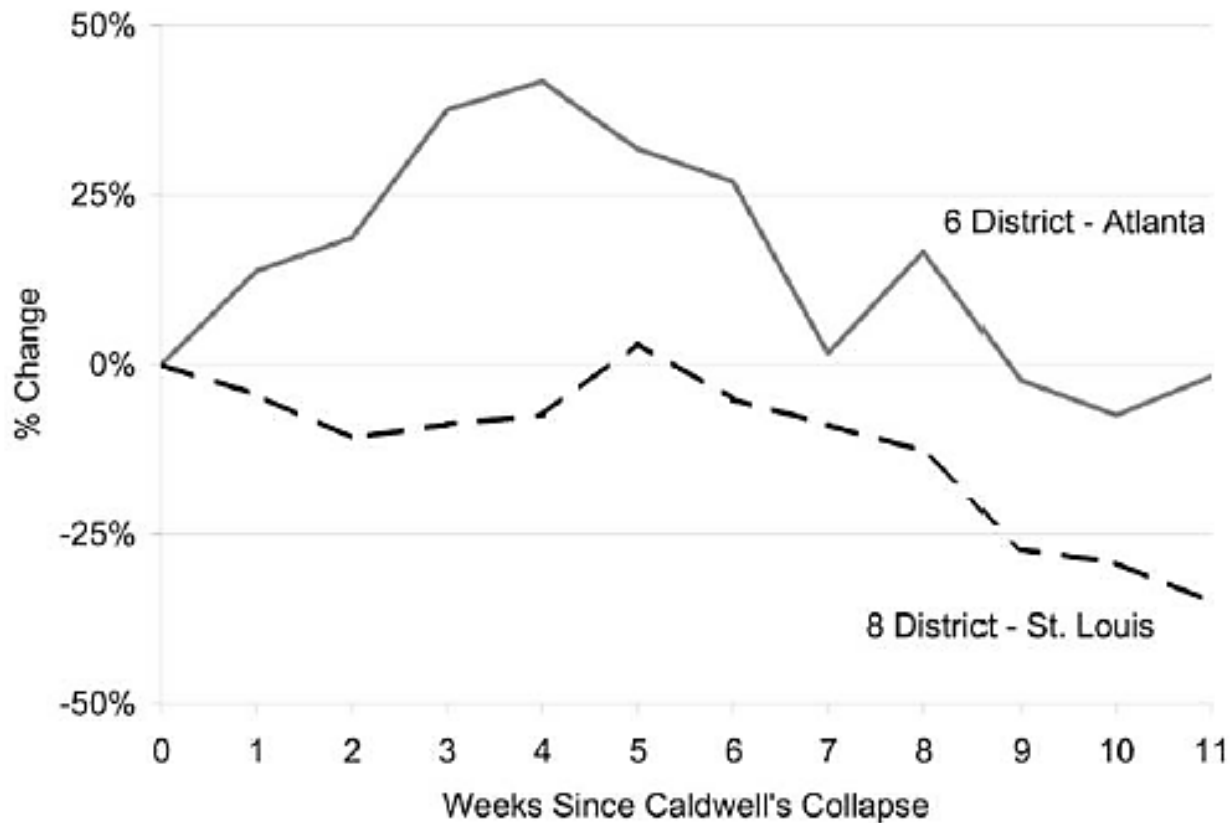


FIG. 2.—Discount response after the collapse of Caldwell, aggregate discounts each week as a percentage of initial level. Source: See Section II.

From: Richardson and Troost, “Monetary Intervention Mitigated Banking Panics”

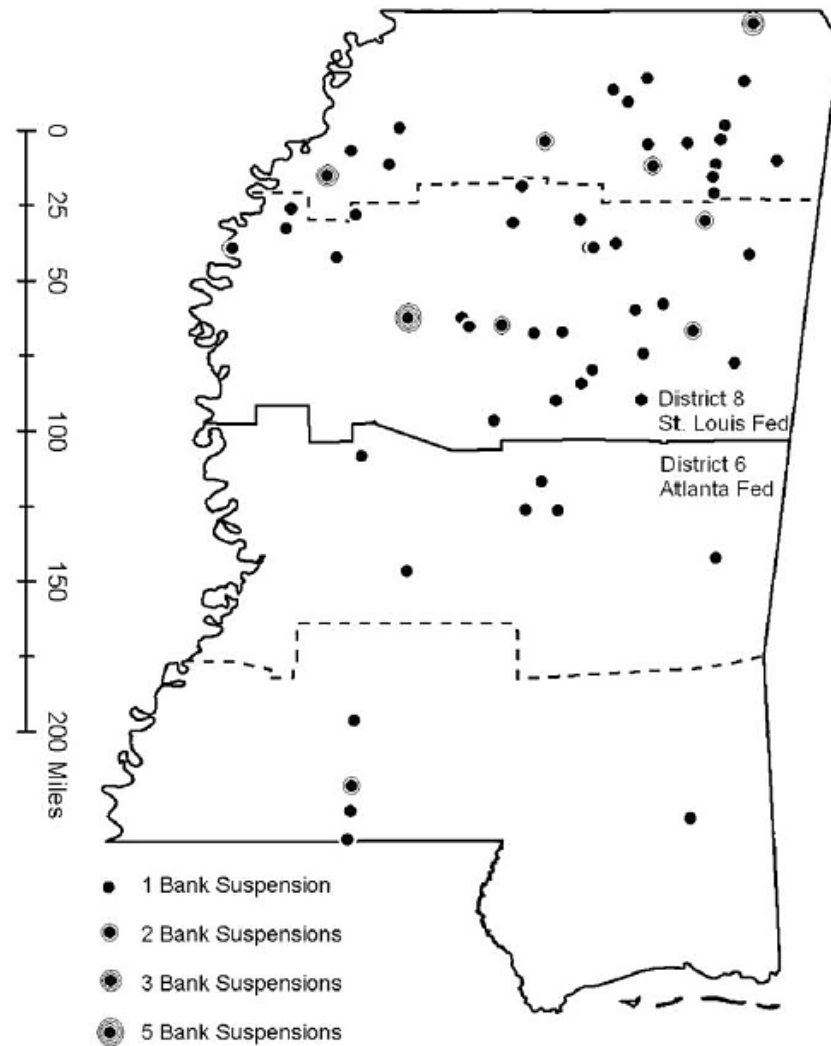


FIG. 1.—Mississippi's division into Federal Reserve districts and bank suspensions between October 1930 and March 1931. Source: See Section II. The solid line represents the Federal Reserve district border. The dotted lines enclose the counties for which at least half the area lies within 1 degree latitude of the district border.

TABLE 4
BANK SUSPENSIONS AND LIQUIDATIONS

		PERCENTAGE OF BANKS SUSPENDING				PERCENTAGE OF BANKS LIQUIDATING			
		Federal Reserve District				Federal Reserve District			
Begin July 1	End June 30	All (1)	6th Atlanta (2)	8th St. Louis (3)	All (4)	6th Atlanta (5)	8th St. Louis (6)		
1929	to 1930	4.8	7.1	3.0	4.5	7.1	2.4		
1930	to 1931	28.9	14.2	39.5	13.6	7.1	18.6		
1931	to 1932	13.2	14.9	11.8	8.0	7.9	8.1		
1932	to 1933	7.7	7.5	7.9	7.3	6.5	7.9		
1933	to 1934	.9	.0	1.7	.9	.0	1.7		
1929	to 1934 ^a	49.8	38.7	59.2	30.9	26.8	34.4		

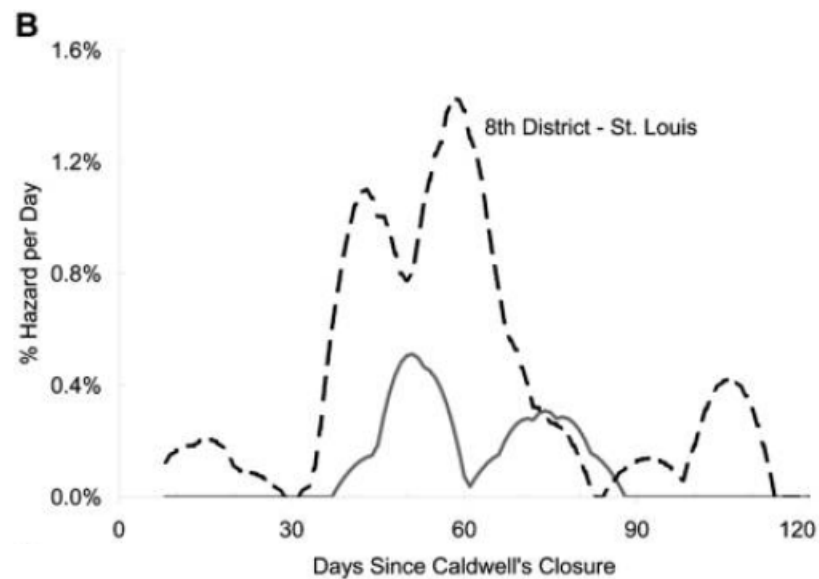
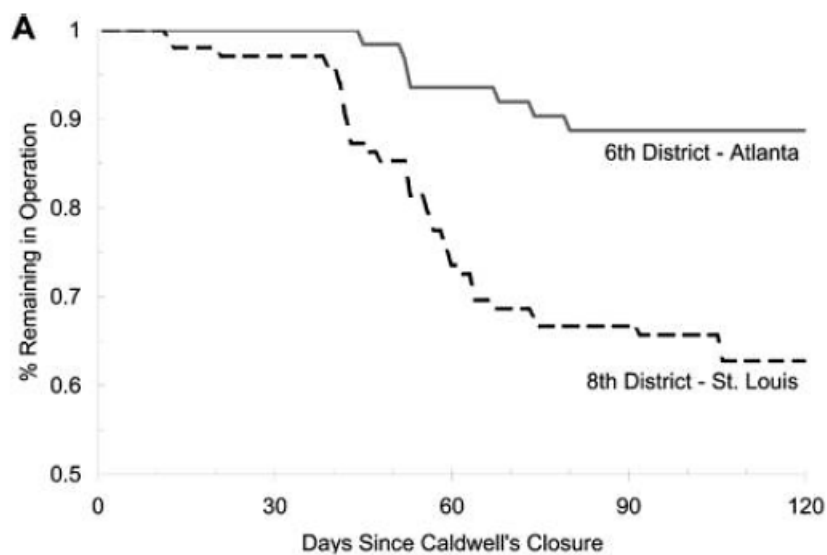
SOURCE.—*Rand McNally Bankers Directory* and National Archives and Records Administration Record Group 82. See Section II and Richardson (2006, 2007a, 2007b, 2008) for details.

^a The last row indicates the percentage of banks operating on July 1, 1929, that either suspended or liquidated by June 30, 1933.

From: Richardson and Troost, “Monetary Intervention Mitigated Banking Panics”

FIG. 4.—Survival and hazard during the post-Caldwell panic, principle nonparametric controls.

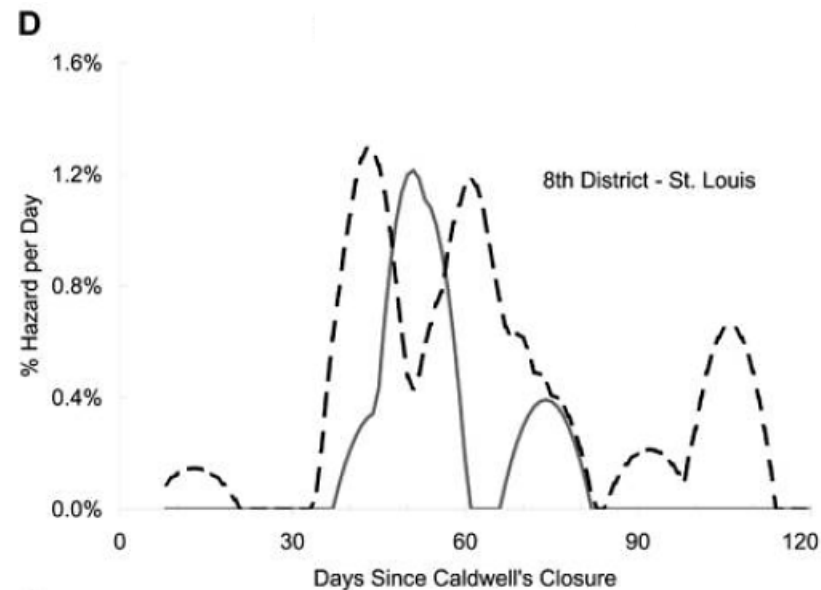
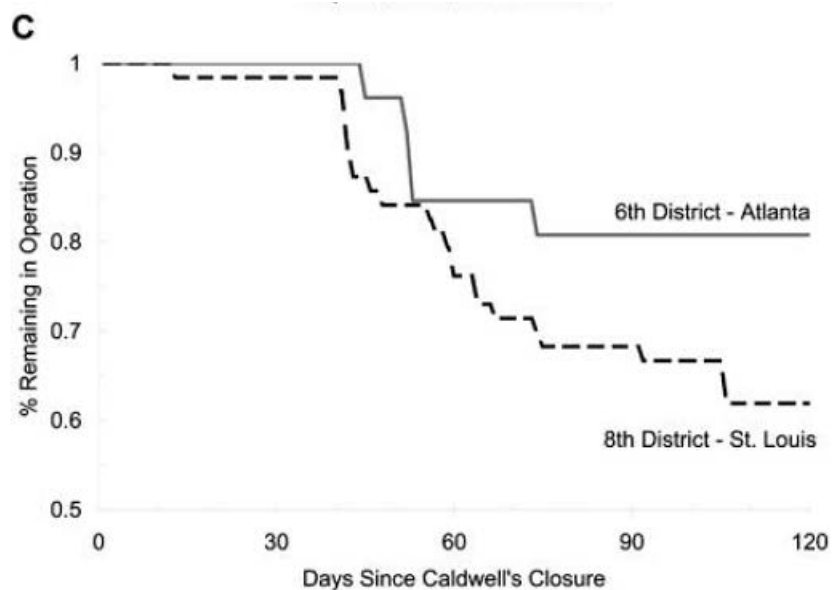
All Banks



From: Richardson and Troost, "Monetary Intervention Mitigated Banking Panics"

FIG. 4.—Survival and hazard during the post-Caldwell panic, principle nonparametric controls.

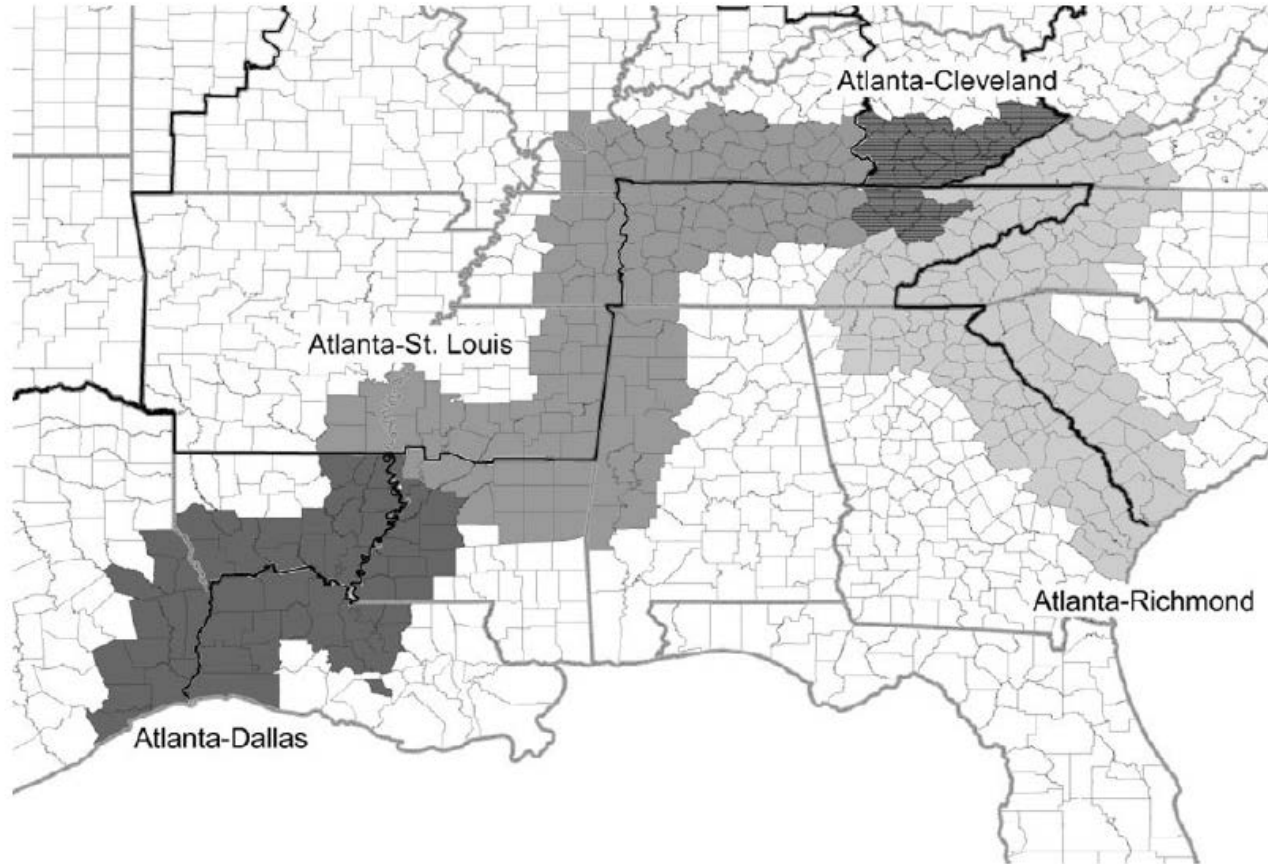
Within 1° Latitude of District Border



From: Richardson and Troost, "Monetary Intervention Mitigated Banking Panics"

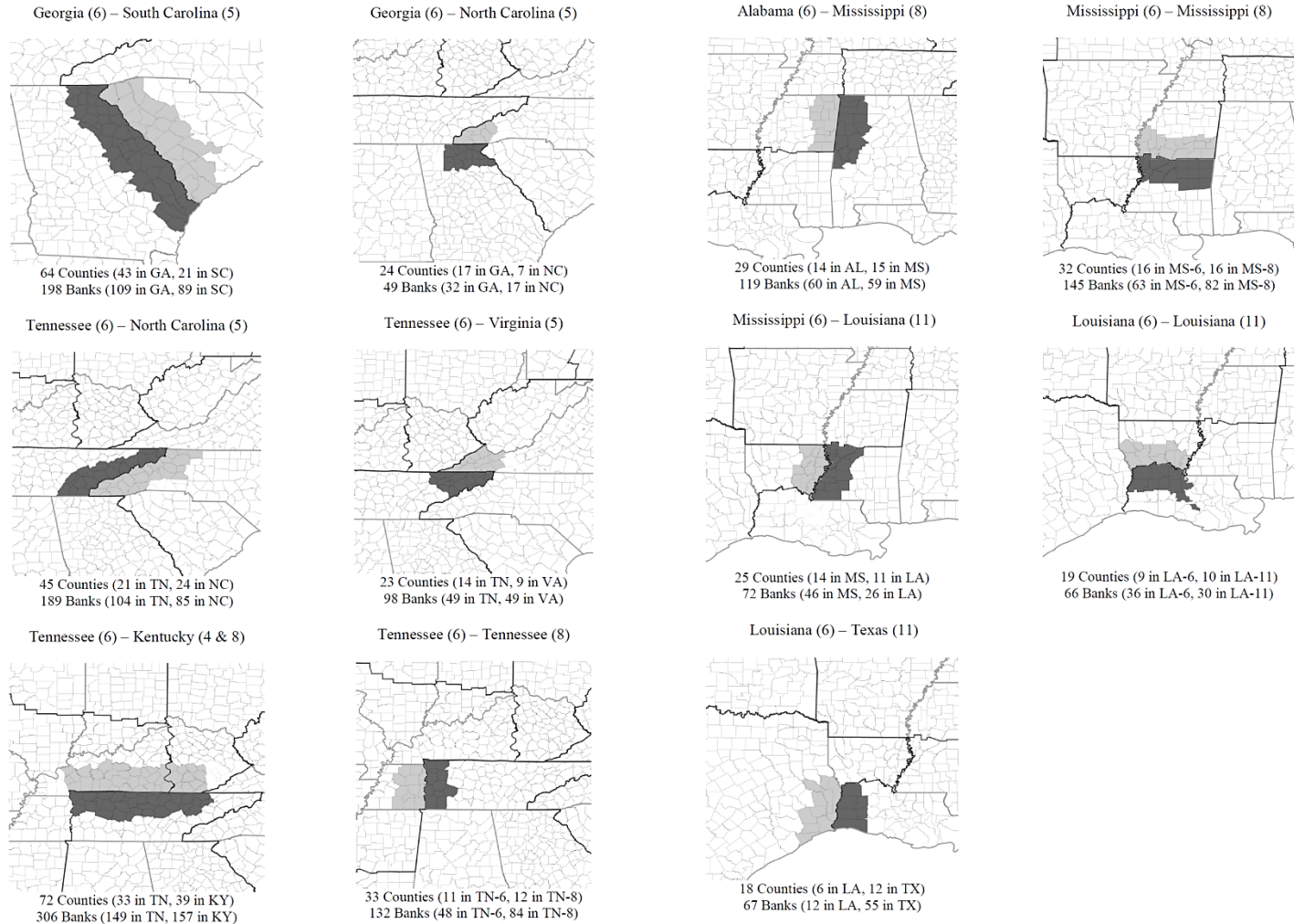
Evaluation of Richardson and Troost

FIGURE 1
COUNTIES WITHIN FIFTY MILES OF ATLANTA FED DISTRICT BORDER



From: Andrew Jalil, “ Monetary Intervention Really Did Mitigate Banking Panics during the Great Depression”

FIGURE 1
ELEVEN REGIONS: ATLANTA VS NON-ATLANTA



From: Andrew Jalil, “ Monetary Intervention Really Did Mitigate Banking Panics during the Great Depression”

FIGURE 3
BANK SUSPENSION RATES, 1930

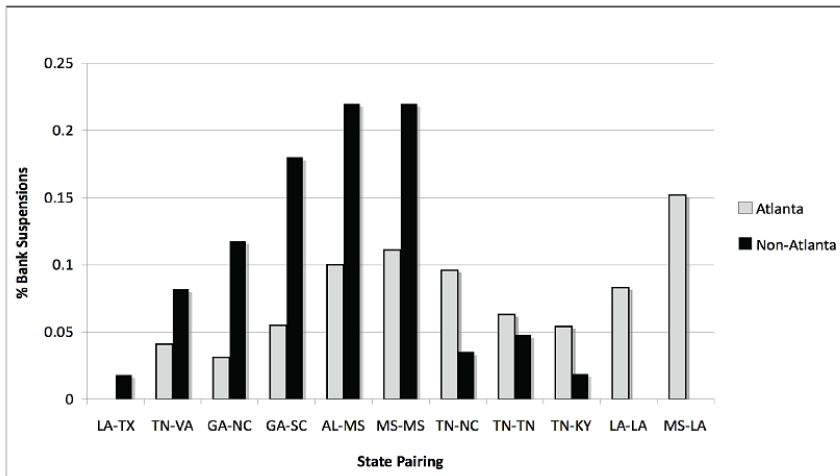
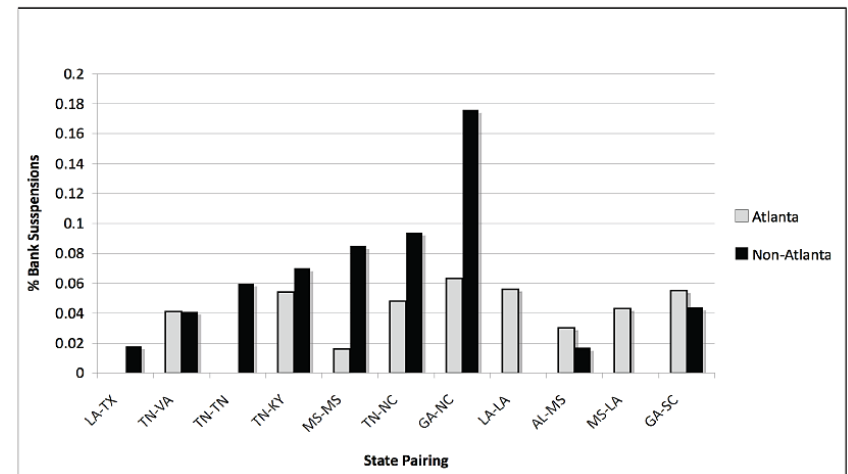


FIGURE 4
BANK SUSPENSION RATES, 1931



From: Andrew Jalil, “ Monetary Intervention Really Did Mitigate Banking Panics during the Great Depression”

TABLE 8
DECLINE IN WHOLESALE TRADE

	FEDERAL RESERVE DISTRICT	
	6th Atlanta	8th St. Louis
Wholesale firms:		
Number in 1929	783	930
Number in 1933	641	607
$\Delta\%$	-18.1	-34.7
Net sales:		
\$1,000s in 1929	140,776	245,486
\$1,000s in 1933	59,513	83,727
$\Delta\%$	-57.7	-65.9

SOURCE.— *Census of American Business*, 1929 and 1933.

From: Richardson and Troost, "Monetary Intervention Mitigated Banking Panics"

TABLE 2—EFFECTS ON OUTPUT VARIABLES

	Revenue				Physical output		
	Within (1)	Balanced (2)	Unbalanced (3)	County (4)	Within (5)	Balanced (6)	Unbalanced (7)
St. Louis Fed 1931	−0.24*** (0.06)	−0.21*** (0.08)	−0.18** (0.09)	−0.28* (0.16)	−0.37*** (0.11)	−0.53** (0.19)	−0.43** (0.17)
St. Louis Fed	—	−0.12 (0.11)	−0.15* (0.08)	—	—	−0.18 (0.20)	0.20 (0.28)
Observations	1,226	635	1,224	148	479	282	479
Adjusted R^2	0.57	0.61	0.56	0.94	0.64	0.81	0.79

Notes: All dependent variables are in logs. The within specification includes plant fixed effects. All the regressions include industry-specific time trends though the coefficients are excluded for clarity. The price and quantity effects are only for plants producing one good. Plant-clustered standard errors are reported in parentheses. County-level regressions include full set of county fixed effects with standard errors clustered at the county level and observations weighted by number of plants in a given county. Note there is no St. Louis Fed coefficient for the county estimates because I estimate a full set of county fixed effects.

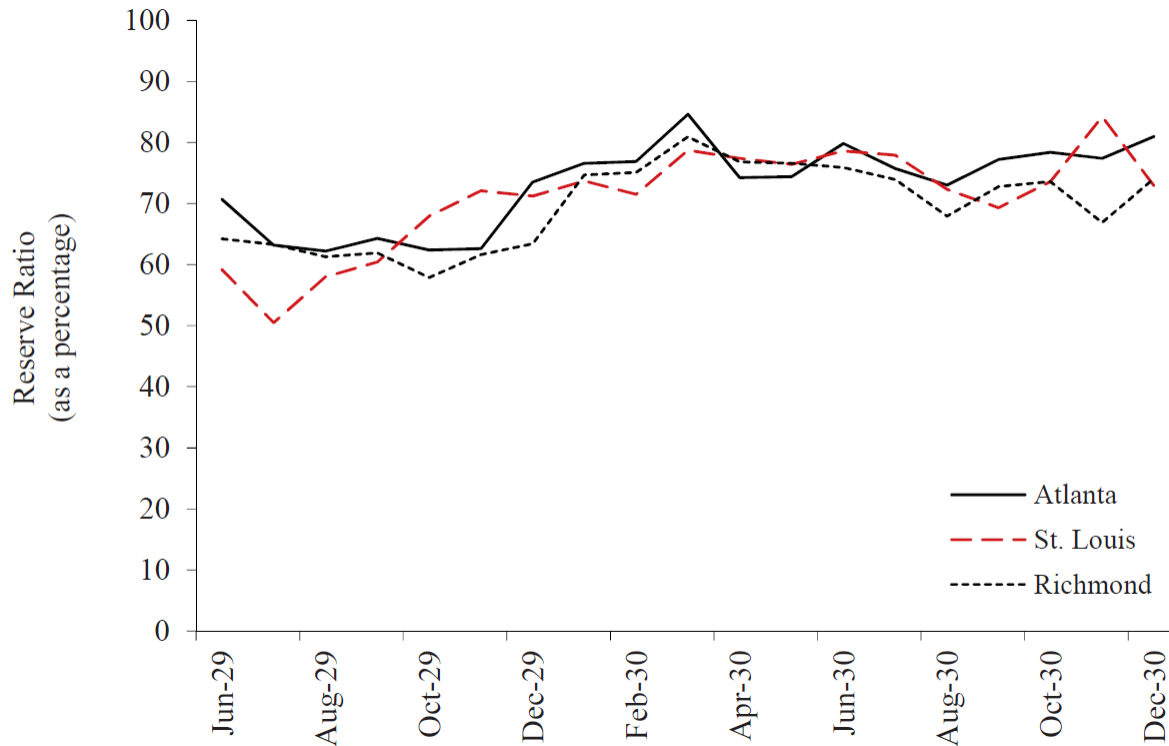
*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

From: Nicholas Ziebarth, “Identifying the Effects of Bank Failures from a Natural Experiment in Mississippi during the Great Depression.”

FIGURE 2
RESERVE POSITION OF ATLANTA, ST. LOUIS, AND RICHMOND FEDERAL RESERVE BANKS



Note: The reserve ratio data come from the monthly Federal Reserve *Bulletin*. The reserve ratio measures the ratio of total reserves against note and deposit liabilities.

From: Andrew Jalil, "Monetary Intervention Really Did Mitigate Banking Panics during the Great Depression"