Rethinking the Lender of Last Resort: New Evidence on the Stabilization of Money Markets Before the Federal Reserve

Caroline Fohlin Emory University November 21, 2024

Introduction

The founding of the Federal Reserve System in 1914 stabilized US money markets

- Provided reliable, nationwide LOLR
- Created "elastic" currency
- Reduced volatility of money market interest rates
- Eliminated seasonal spikes in funding market interest rates

This Paper

Key Results:

- Funding market chaos stopped in January 1908, after Bank of France gold bailout
- New regime under Aldrich-Vreeland backstop facility
- Opening of the Federal Reserve System in 1914 had no immediate effect on rates, funding volume, or credit spreads
- Seasonality declined further after the end of World War I
- funding volume plummeted after 1929 crash

Take-away:

• Underscores cash hoarding, the reliance on foreign gold flows, and the apparent success of the LOLR facility embedded in Aldrich-Vreeland (like Friedman and Schwartz said)

- Historical background on funding markets + monetary policy regimes
- Debates and hypotheses
- New data
- Results
 - Dating funding market stabilization
 - Seasonality across three policy regimes
 - Trends in funding market volume + credit spreads
- Conclusions

Funding Markets + Monetary Policy Regimes

Structure and Function of the Call Money Market:

- Overnight loans to brokers
 - Finance stock purchases on margin
 - Facilitate overnight clearing of NYSE transactions
- Funds provided by NY banks, trust companies, and country banks
 - Investment for excess reserves
 - Considered liquid and low risk
 - Similar to repurchase agreements (repo) used in recent times
- Funds traded through money brokers on the New York Stock Exchange
- Key money market before the Great Depression

Four Regimes of the Call Money Market:

- Before WWI (1900 -Sept. 1917, excl. 1914 closure)
- During 1914 closure (July 31 December 12)
- WWI Money Committee (Sept. 5, 1917 Jan. 10, 1919)
- After WWI (Jan. 10, 1919 1933)

- Organized around a trading post
- Pairwise broker market (opaque information)
- Lenders could not select borrowers
- Supply and demand fluctuated a lot
- Collateral transfers required "daylight loans" (aka "overcertification")



Money Market Troubles before 1908

- Agricultural cycles
 - Country banks pushed/pulled funds
 - Seasonal fluctuations in money supply
 - Seasonality in call money rates
- No official LOLR
 - Frequent runs on call money
 - Runs on collateral
 - Volatility in call money rates
- Info opaqueness
 - Uncertainty over values
- Prime example: Panic of 1907



The New York Call Money Market During World War I

- Stock markets closed at outbreak
 - Fear of gold outflows to Europe
 - Collateral became illiquid
 - Loans frozen
- Money committee regulated market
 - Created fund pool from NYC banks
 - Capped supply b. September 1918
 - Capped borrowing by exchange firms
 - Increased required margins on loans
 - Shorter maturity on time loans
 - Centralized rate setting
 - Required brokers to report loan volumes and rates



The New York Call Money Market After World War I

- War ended November 1918
- Money Committee disbanded January 1919
 - Call money market retained wartime organizational structure
 - Eliminated price and volume controls
 - Rates allowed to float freely
 - Settlement and collateral transfers via new "day branch" of clearing house in 1921
 - eliminated need for day loans/ "overcertification"



• 1900 - May 1908: National Banking Era

- 1900 May 1908: National Banking Era
 - No central bank or official LOLR

- 1900 May 1908: National Banking Era
 - No central bank or official LOLR
- June 1908-November 1914: Aldrich-Vreeland era

- 1900 May 1908: National Banking Era
 - No central bank or official LOLR
- June 1908-November 1914: Aldrich-Vreeland era
 - LOLR but NO central bank/monetary policy

- 1900 May 1908: National Banking Era
 - No central bank or official LOLR
- June 1908-November 1914: Aldrich-Vreeland era
 - LOLR but NO central bank/monetary policy
- November 1914 1933: Federal Reserve

- 1900 May 1908: National Banking Era
 - No central bank or official LOLR
- June 1908-November 1914: Aldrich-Vreeland era
 - LOLR but NO central bank/monetary policy
- November 1914 1933: Federal Reserve
 - Central bank with LOLR facility

Debates and Hypotheses

Main Hypothesis:

- Opening of the Fed (1914)
 - Reduced seasonality
 - Lowered rates
 - Decreased volatility

Alternative Hypothesis:

- WWI fiscal policy & regulation
 - Lowered rates
 - Dampened volatility

- Data: Monthly average rates on 3 & 6 month loans
- Competing studies show different turning points
- Aldrich-Vreeland Act (LOLR) mostly overlooked (Except Angelini (1994))



Data

New Data: Daily Call Money Rates



Results

Estimated Structural Breaks in Daily Call Money Rates (1900-1933)

High							
Breaks	SupF	Dates					
1	6.22	1/14/1908					
2*	24.42	1/16/1908, 11/22/1916					
3*	24.33	3/16/1904, 3/10/1908, 11/22/1916					
Udmax*	24.42						
Wdmax*	35.05						
Obs	6668						
Low							
Breaks	SupF	Dates					
1*	65.97	4/18/1918					
2*	102.91	1/16/1908, 4/18/1918					
3*	84.48	1/16/1908, 4/18/1918, 12/07/1928					
Udmax*	102.91						
Wdmax*	122.30						
Obs	6282						

New Data: Daily Call Money Rates



Zeroing in on the Call Money Rate during the Panic of 1907

High Call Money Rate (October 1907 - January 1908)

The Montana Copper War: Precursor to the Panic of 1907

Net Imports and Exports of Gold (NYC, Weekly) • Event Study

Seasonality

Mean High Rate

Mean High-Low Spread

Seasonal factor

Seasonal factor-High-Low Spread

——High - Low Seasonal Factor

Call Money Volume 1917–26 (Weekly)

For own account For correspondents Correspondent/NY

Call Loan Volume 1926–35 (Weekly)

For Own Account For Out-of Town Banks ----- Out-of-town/Own Account

Credit Spreads

Credit Spreads

- Call money commanded a premium over Fed discounts following World War I until the 1929 crash.
 - Not during the initial few wartime years of the Feds operation, nor following the crash.
- Spread pattern supports the argument that the Fed was slow to elicit development of an attractive discount market.
- Stock market speculation in the late teens pushed demand for call money, increasing rates.
- Fed's sudden tightening at the end of the war and corresponding contraction in stock market speculation:
 - Decreased spread until the late 1920s bubble began.

Conclusion

- New daily data on call money rates + new empirical tests
- Funding market stabilized in January 1908 (further in 1918)
 - Jan 1908 culmination of large-scale gold imports (thanks, Bank of France)
 - Continued stability signals effectiveness of Aldrich-Vreeland LOLR
 - No structural break at founding of the Fed.
- LOLR capacity unused until 1914 to onset of WWI
 - Did its availability prevent behavior that would have led to its use?
- Significant organizational changes in the money market during and after WWI.
- Greater transparency + fewer frictions improved liquidity and competitiveness.

- Causal relationships between gold flows and interest rates?
- Collect more high-frequency data on other instruments to analyze
 - The term structure relationship
 - Credit spreads
- Longer-run analysis of the impact of gold shocks under monetary regimes

🕨 Sneak Peek

Thank you!

Questions?

Appendix Slides

Following the dummy variables in Rodgers and Payne (2014), we use the date ranges below.

- D1: July 24–31, 1907 Bank of France facilitates trans-Atlantic gold payments.
- D₂: Aug 15; Oct 28; Nov 4–7, 1907 Bank of England raises discount rate; France supplies gold.
- D₃: Oct 17–23, 1907 United Copper crash triggers trust runs.
- D₄: Oct 24–25, 1907 J.P. Morgan forms money pool.
- D₅: Oct 28–Nov 5, 1907 Clearinghouse loans issued; deposits suspended.
- D₆: Nov 14–21, 1907 Treasury certificates and bonds issued.
- D₇: Nov 22–Dec 7, 1907 France discounts US commercial paper.

Variable	OLS	GARCH
D_1	-1.0274(1.6385)	2.7060***(0.0036)
D_2	3.6836*(2.1975)	-2.7836***(0.0000)
D_3	40.0560***(1.7947)	130.2520*(70.9264)
D_4	83.3060***(2.8371)	-23.4736***(0.0063)
D_5	16.6836***(2.7406)	-12.2214***(0.0114)
D_6	9.5560***(2.0064)	5.9311***(0.0054)
D_7	5.4060***(1.2695)	7.7684(39.1031)
Q(15)	_	182.9570
ARCH(1)	_	7.0823

• Did unexpected gold flows really influence macro-aggregates back in the gold standard era?

• Did the establishment of the Fed ease the volatility and the relative importance of gold flows in explaining the variation of macro-aggregates?

- Did unexpected gold flows really influence macro-aggregates back in the gold standard era?
 - Consensus view: Yes! \uparrow gold inflow \implies \uparrow output, \uparrow prices, \uparrow stock market index, \downarrow interest rates
- Did the establishment of the Fed ease the volatility and the relative importance of gold flows in explaining the variation of macro-aggregates?
 - **Consensus view:** To an extent, yes! The Fed was able to stabilize flows as being the prime intermediary.

- Did unexpected gold flows really influence macro-aggregates back in the gold standard era?
 - Consensus view: Yes! \uparrow gold inflow \implies \uparrow output, \uparrow prices, \uparrow stock market index, \downarrow interest rates
 - Preliminary Results: No! Responses are generally flat.
- Did the establishment of the Fed ease the volatility and the relative importance of gold flows in explaining the variation of macro-aggregates?
 - **Consensus view:** To an extent, yes! The Fed was able to stabilize flows as being the prime intermediary.
 - **Preliminary results**: Not! The relative importance of gold was not as high as we thought!

Model starts as a standard Bayesian Structural VAR following Arias et al. (2019)

- Use Hierarchical Priors as in Giannone, Lenza, and Primiceri (2015)
- Impose both Type 1 and 2 Narrative Sign Restrictions on key events revolving around gold inflows/outflows
- 6 Lags and 6 Variable Set Up: Log of Industrial Production, Call Money Rate, Log of Monetary Gold Stock, Log of DJIA, Log of Price Level, Log of Non Gold Stock.

Imposition of Narrative Restrictions • Back

- Impose NSRs on three events
- Responses are generally flat, with a slight uptick in the interest rate.

164

NATIONAL MONETARY COMMISSION.

TABLE No. 5.—AMOUNT OF EACH KIND OF MONEY IN CIRCULATION ON THE FIRST DAY OF EACH MONTH, 1880–1910—Continued.

the second se					the second se					
Month.	Gold coin.	Gold certificates.	Silver dollars.	Silver certificates.	Subsidiary silver coin.	Treasury notes.a	United States notes.	Currency certificates.	National bank notes.	Total.
1905—Jan	\$649, 548, 528	\$466, 739, 689	\$80,039,395	\$468,017,227	\$102, 891, 327	\$10,940,054	\$342, 287, 627		\$449, 157, 278	\$2, 569, 621, 125
Feb	649, 527, 502	490, 434, 369	76, 161, 750	460, 250, 046	101,079,480	10, 594, 793	334, 463, 020		446, 538, 205	2, 569, 049, 165
Mar	645, 751, 720	482, 556, 819	74, 329, 719	461, 761, 899	100, 214, 885	10, 283, 583	332, 619, 383		453,096,704	2,560,614,712
Apr	644, 726, 546	472, 316, 319	73, 831, 773	462, 430, 576	99, 755, 170	10,047,776	332, 064, 873		463, 819, 950	2, 558, 992, 983
May	. 644, 423, 211	487, 142, 219	73, 641, 755	462, 846, 513	100,067,645	9,822,134	331,672,662		468, 390, 547	2, 578, 006, 686
June	650, 979, 108	482, 910, 999	73, 617, 644	460, 462, 103	100, 473, 489	9, 583, 291	332, 284, 693		474, 359, 389	2, 584, 670, 716
July	651,063,589	485, 210, 749	73, 584, 336	454, 864, 708	101, 437, 707	9,272,018	332, 420, 697		480, 028, 849	2, 587, 882, 653
Aug	650, 616, 580	493, 437, 879	73, 586, 898	458, 518, 951	101, 437, 759	9, 123, 575	331, 431, 775		486, 748, 884	2,604,902,301
Sept	653,003,548	491, 335, 239	75, 581, 915	464, 339, 041	102, 820, 021	8,920,253	333, 539, 111		492, 119, 926	2,621,659,054
Oct	652, 330, 135	471, 595, 979	79, 436, 901	469, 973, 307	105, 539, 966	8,764,858	336, 338, 926		500, 250, 319	2,624,230,391
Nov	651, 644, 998	479, 965, 439	81, 822, 311	471, 625, 776	107, 157, 932	8, 594, 378	340, 107, 480		512, 213, 264	2,653,131,578
Dec	649, 040, 390	477, 154, 249	83, 326, 228	470, 964, 248	108, 776, 379	8, 435, 722	343, 196, 550		521, 240, 773	2,662,134,539
			and some other					1		

• Why the Flat Response? Probably because gold had a lot of substitutes