How Friedman & Schwartz Saved the World in 2008

Milton Friedman, Monetary Theory, and the History of Chicago Economics

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How Did Friedman & Schwartz Save the World in 2008?

I exaggerate, but only somewhat. There is truth in saying that Milton Friedman and Anna Schwartz, with *A Monetary History of the United States*, taught the Federal Reserve how to manage the 2008 financial crisis

I discuss three episodes, which teach us about money, banking, and liquidity crises:

- 1907-08: liquidity crisis, restricted convertibility, and depression
- 1930s: Fed failure, massive bank failures, and the Great Depression
- 2008: Quantitative Easing and how the Fed saved the financial system

Before turning to monetary history, let's review Milton Friedman & his contributions

Outline

1. Introduction to Friedman's Economics
2. Quick View: Permanent Income & Natural Rate
3. Monetary History and Three Financial Crises
   - Financial Crises are American as Apple Pie
   - Basics of Money and Banking
   - 1907: Liquidity Crisis, NY Banks Restrict Convertibility
   - 1913: Federal Reserve Founded
   - 1930s: Federal Reserve Fails
   - 1960s: Friedman & Schwartz Revise Monetary History, Educate the Fed
   - 2008: Federal Reserve (& Bernanke) Save the Financial System
4. Conclusion: Friedman & Monetary Theory

Find these notes (and Vignettes) at www.hilerun.org/econ

I will Focus on Milton Friedman's *Economics* – Not Politics

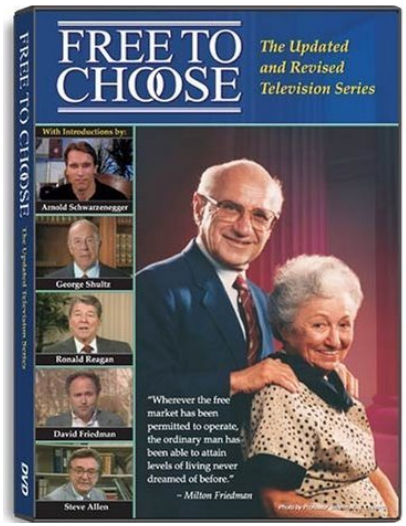
Many "Histories of Chicago Economics" discuss people, politics, ideology

- Particularly Friedman, widely remembered for his popular TV shows and political advocacy

But I want to focus on Friedman's economics: the *Ideas* and *Concepts* . Two Central Themes:

1. Taking economics seriously
2. Applying and testing economics empirically

> *In discussions of economic science, Chicago stands for an approach that takes seriously the use of economic theory as a tool for analyzing a startling wide range of concrete problems, . . . that insists on the empirical testing of theoretical generalizations, and that rejects alike facts without theory and theory without facts. [1974 address to the University of Chicago Trustees. cf UofC Magazine Jan-Feb 2007, volume 99, issue 3]*



Some of Friedman's Contributions to Economics

- Statistics: "Friedman test": non-parametric, repeated ranked treatments
  - Largely forgotten in recognizing Friedman's contributions
- Consumption Function and Permanent Income
  - Motivated by puzzles from Keynes's *General Theory* (Friedman 1957)
  - Concept of *Permanent Income* still used today
  - Central to question of fiscal stimulus – fiscal multiplier and marginal propensity to consume
- Methodology
  - How do we, as economists, make and test theories?
  - Fundamental and deep questions
- Phillips curve & Natural Rate of Unemployment
  - No inflation – unemployment trade-off
  - NAIRU or Non-Accelerating Inflation Rate of Unemployment
  - Basic microeconomics: people care about *real* wages, prices, etc.
  - I thought Friedman and Ned Phelps had killed the Phillips Curve in the 1960s
  - But still with us – like the Hydra it seems to always grow a new head
- Monetary History – maybe what Friedman is best remembered for

Price Theory (Microeconomics) Fundamental for Friedman

Friedman's contributions are concentrated in *Macro*

- But everything he did was built on *Micro*
- Chicago *Price Theory* – The application of microeconomics to real problems

Chicago has a long tradition of using and teaching Price Theory

- Jacob Viner taught Econ 301 – "Price and Distribution Theory" – from the 1920s through 1946
- Friedman taught it for many years after Viner
- Econ 301, "Price Theory", is still the core and central course for microeconomics for economics PhDs.
- Passed from one generation to the next: Viner taught Friedman; Friedman taught Becker; Becker taught Allen and myself. And we have taught some of you.

Heckman's "Three Ground Rules for Chicago Economics"

Jim Heckman (who you heard a week or two ago) lays out some "Ground Rules" – rules that Friedman would no doubt endorse

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1. Faculty know and understand the corpus of economic theory and economic empirical knowledge – not just their specialty within the field. *Students and faculty speak a common language – the language of basic price theory and the economics of incentives – and that we can communicate these ideas clearly.*

Quoting from 2012 presentation at the Friedman Centenial Celebration

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2. Chicago views economics as a serious subject, tackling serious problems.
3. Chicago economics demands that scholars move beyond selective and self-serving appeals to "stylized facts" to "illustrate" theories and instead engages and promotes the serious scientific task of careful and creative analyses of data, linking theory and evidence. Chicago values the hard empirical work that produces convincing evidence and rigorous economic theorizing that produces lasting contributions to important problems.

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Permanent Income and *Theory of the Consumption Function*

Puzzle, related to Keynes's *General Theory*, Marginal Propensity to Consume, and fiscal multiplier

- MPC: How much does Cons ↑ when Inc ↑? How much spent vs saved?
- Cross-section (point-in-time): MPC low, most saved (savings ↑)
- Time-series & cross-country: MPC near one, savings rate constant

Friedman has wonderful, and wonderfully simple, explanation:

- Permanent vs Transitory Income: $\Delta Y = \Delta Y_{perm} + \Delta Y_{trans}$
- $MPC_{perm} \approx 1$, $MPC_{trans} \approx 0$
- We often mis-measure "income":
  - Measure across people, much income difference Y_{trans}
  - For aggregate (measure across time) Y_{trans} averages out, see ΔY_{perm}
- Friedman's 7-day week example: On Wed, 6 workers earn \$0, 1 earns \$100 and saves most (spends little, MPC low)

Hugely relevant for today's questions about government tax and spending stimulus

Phillips Curve and Natural Rate of Unemployment

Phillips Curve: Prices (Inflation) ↑ Unemployment ↓ (or growth ↑)

- Appealing: high employment ⇒ firms must pay workers more ⇒ wages ↑

But this confuses *nominal* versus *real*

- Inflation is nominal, money wages are nominal
- Firms and workers care about *real* or relative wages

Friedman explains puzzle this way (best in his 1976 Nobel lecture; also Phelps)

- "Natural Rate" set by real variables: preferences, production function, relative wages, etc.
- *Unexpected* inflation obscures real changes for firms and workers
  - Firms: price increase assumed to be *relative* (real) price, pushes down real wages, induces firm to raise nominal wages somewhat & hire more
  - Workers: rise in nominal wage assumed to be *real* wage increase, willing to work more
- Result: inflation ↑ induces firms to hire, workers to work more
- But firms & workers soon realize mistake, and go back to natural rate

Can't escape "Natural Rate" in long-run

My "History of Financial Crises" in 40 minutes

This is all based on my PPHA 42521 "History of Financial Crises" (Fall)

> *We will examine financial and economic history, using episodes of crisis to learn about government debt, money, and banking. We will try to understand some of the mechanisms and processes that seem to generate financial crises. We will read some of the classics as well as some of the newer texts in this area*

Better title "Money, Banking, and the History of Financial Crises". Examine a variety of episodes:

- South Sea Bubble (England) and Mississippi Bubble (Paris) from 1719-20
- Alexander Hamilton and the 1790s US Financial Revolution
- US Banking Crises (1893, 1907, 1930s)
- 2008 Financial Crisis

US Always Has Been Subject to Banking Crises

Look at US from 1840 to present: 12 crises

- US: C&H say 12 crises. R&R count 9 (not all the same)
  - Multiple bank failures (9,000 during 1930s, 3,000 during 1980s)
  - Happened regularly during 1800s, into 1900s
  - By 2008, we had just forgotten

Kindleberger	Calomiris&Haber	Reinhart&Rogoff Table A-3	Friedman&Schwartz
	1814-16	1814	
1819		1818-19	
UK, not US	1825	1825	
1837	1837-39	1836-38	
1857	1857	1857	
	1861		
1873	1873	1873	1873, suspend
	1884	1884	
UK, not US	1890		
1893	1893	1890, I think 1893 is what they mean	1893, suspend
	1896		"perhaps 1893-97"
1907	1907	1907	1907, suspend
		1914	
1920-21			1920-21
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1929	1930-33	1929-33	1930-33
1982-87	1980s	1984-91	
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- Interesting quiz – how many in Canada?
  - C&H count 0: No severe crises since 1840

Why? Fundamental difference US vs Canada is banking structure: US fragmented unit banking – read Calomiris & Haber

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Money & Banking: Checking Accounts and Money

We all use checking accounts (bank demand deposits)

- Convenient compliment to cash
- Treat them like money – transfer money, pay bills by check, etc.

But deposits are really a loan we make to a bank

- Like any promise, may be broken
- Like any loan, may not be repaid

But deposits are loans with two special characteristics:

- Bank promises to pay us back whenever we want
- When a bank defaults, first-in-line depositors get their money

These characteristics provide big incentive for customers to run on the bank, if there is even a hint of default

Why Were (US) Banks so Fragile, Subject to Runs?

Bank deposits are inherently unstable

- Most people argue this makes banks inherently unstable, subject to runs
- Cannot be true – look at US (12 systemic crises 1840-present) vs Canada (0)

There has to be something additional to make US uniquely unstable

- In the 1800s and up until 1990s, it was *Unit Banking*

Hard to imagine now how crazy stupid US banking was until 1990s

- No cross-state banking – couldn't open Chase account in Illinois
- Many states (Illinois included) had *no branching*

In 1914, US had 27,349 banks, 95% no branches (single building!)

- Population roughly 99mn $\Rightarrow$ 3,600 people per bank (and fewer customers)
- Not nearly enough to reap economies of scale or diversification

Canada completely different – 38 banks in 1890, 126,000 people per bank

- Each bank had many branches
- Actually more branches per person than US

US Banks Were Always on Edge of Disaster

US banking system was inherently fragile

- Any modest economic shock (an earthquake in San Francisco, a severe economic recession, the bursting of a speculative bubble in copper, the failure of a local bank) could make customers nervous and want to withdraw their money
- A small local unit bank cannot call on headquarters to ship out more cash
- If too many customers want to withdraw, the small local bank has to shut its doors, making surrounding customers even more nervous

  In a unit banking system with some 20,000 independent banks, the impact was bound to be uneven, to force some banks into suspension, and to threaten a chain reaction involving a cumulative increase in the desire on the part of the public to convert deposits into currency. Friedman & Schwartz p. 169

How to Break the Viscous Cycle of a Bank Run?

Essentially 3 (4) ways to break the viscous cycle

1. Make banks big enough to withstand economic shocks and scares (able to ship cash around the country, to a branch in trouble)
2. Restrict conversion: Tell customers they cannot convert deposits into cash
3. Have someone lend cash (short-term) to banks in trouble
4. *Deposit Insurance*

The US in the 1800s and most of 1900s said "No" to (1). In 1907 nobody to do (3) effectively. (4) didn't exist (and anyway is more a subsidy for small inefficient banks than a solution – another story). So only choice was (2)

Set the Scene in 1907: Fragile Banks, Economic Shocks

Fragile Banks:

- 27,349 US banks in 1914, 95% no branches (single building)
- Small, fragile banks: roughly 3,600 *people* per bank
  - No economies of scale, no way to diversify

Economic Shocks

- April 1906, San Francisco earthquake – reduced GNP by 1.5-1.8 percentage points
- August 1907, severe recession started
- October 16, two speculators (F. Augustus Heinze and Charles W. Morse) lost big on copper company stock market speculation, had borrowed from banks

Bank Runs – NY Clearing House Restricts Convertibility

Bank Runs

- Starting Oct 16, banks associated with Heinz & Morse suffered runs
- Oct 18 Knickerbocker Trust run started, Oct 22 Knickerbocker failed

Bank Responses

- Strong banks and NY Clearing House: loans to "run banks" (trying to do (3) above)
- Oct 26 (Saturday) NY CH banks restricted convertibility of deposits to cash
  - Naturally, premium on cash and gold
  - Pulled gold in from overseas, increased cash & gold

Restriction on Convertibility

- Extraordinary – today: shutting all ATMs, not allowing credit cards
- Effective way to forestall a run
- Lifted restriction in January 1908

Money Demand ↑ Money ↓ Output & Prices ↓: Ideas

Friedman & Schwartz thought carefully about money
What was happening during a bank run (liquidity crisis)?

- Customers and banks both start to worry about liquidity
- Want more of the most liquid asset they can find – cash
- Demand for "cash" spikes up
  - Customers (public) worried about deposits, switch to cash
  - Banks need more cash ("reserves") to reassure customers, to pay out when needed

Importantly Friedman & Schwartz collected and analyzed a mass of data
Three definitions:

1. "Cash" held by banks called "reserves"
2. High Powered Money = cash held by public + "cash" held by banks (reserves)
3. Money = public cash + deposits

Money Demand ↑ Money ↓ Output & Prices ↓: Data

Three definitions:

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Liquidity crisis:

- Demand for HPM ↑ – public & banks want liquidity
- If HPM supply not up enough, can have M ↓
  - Customers switch Depo to cash → Depo ↓
  - Banks cut back on Depo because not enough reserves ("cash") → Depo ↓

During liquidity crisis, if HPM Demand ↑ but Supply not up, Two things

1. Prices ↓ (must happen to equilibrate money demand & supply – price level is the "price of money" – ask Allen to explain)
2. Economy into recession, particularly if banking system stressed (as in 1907)

Examine F&S Data: Money, Prices, Output ↓

Date	NBER Pk/Tr	%Ch Mon Stock	Due to HPM	Due to BRes	Due to PCurr	% P	% Y
1873-79	10/73 - 3/79	-3.1%	-6.3%	4.2%	-1.0%	-3.8%	2.5%
1893-94	1/93 - 6/94	-5.7%	2.6%	-8.0%	-0.3%	-6.3%	-7.9%
1907-08	3/07 - 6/08	-3.8%	8.1%	-10.0%	-2.2%	-0.2%	-12.5%
1920-21	1/20 - 721	-5.3%	-6.6%	1.6%	-0.3%	-6.1%	-5.6%
1929-33	8//29 - 3/33	-43.4%	16.2%	-22.4%	-46.5%	-7.5%	-11.1%
1929-31	8/29-1/31	-5.8%	0.0%	-4.2%	-1.7%	-8.3%	-10.6%
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2007-09	12/07 - 6/09	18.6%	69.9%	-51.1%	6.1%	1.1%	-2.1%

Use decomposition (in notes) to examine these "depressions"

$$\Delta \ln M = \Delta \ln H + BRes + PCurr$$

Decompose into the three parts:

- H: changes due to gold or Fed policy (producing more or less HPM)
- PCurr or D/C: as public panics, wants more currency, D/C↓, pushes down money
- BRes or D/R: as reserves leave & banks panic, D/R ↓ which pushes down money

data are from *Monetary History* and other Friedman & Schwartz books

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During liquidity crisis everyone becomes risk averse

- Public switches to Currency (cash) from Deposits
- Banks pay out Reserves: Deposits ↓ because R ↓ & D/R ↓ (risk aversion)

Unless HPM created, banks under stress – run out of reserves ↔ suspend

- Banks under stress → economy under stress

ALL of these (except 2007-09) saw $M \downarrow$ as $^{D}/_{R} \downarrow$ & $^{D}/_{C} \downarrow$

data are from *Monetary History* and other Friedman & Schwartz books

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1893 & 1907

- Fall in money
- Due to banks' risk aversion: $^{D}/_{R} \downarrow$ (BRes) even though $HPM \uparrow$
- No mechanism to increase HPM – not by enough, not quickly enough
- $HPM \uparrow$ as gold came in – but slow and not enough
- Banks under stress, recession very bad

Liquidity & financial crises turned recession into depression
data are from *Monetary History* and other Friedman & Schwartz books

Recessions Bad After 19th & 20th c Liquidity Crises

Post-crises recessions (1873-79, 1893-94, 1907-08, 1920-21)

- Financial crises produce recessions – "depressions".

Average Recessions – Crisis vs. Non-Crisis Episodes, 1870-1928

	Numb	Ch Prc	Ch Inc	Ch M
Average recessions following financial crisis	4	-6.3%	-6.0%	-1.5%
Average non-crisis recessions	11	0.2%	-0.9%	5.6%

Length and Depth of Recessions after Speculative Episodes

Date	NBER peak/trough	Length	Ch Prc	Ch Inc	Ch Mon	Recovery Ch Inc
1873-79	Oct 1873 - Mar 1879	5.4yr	-3.8%	2.5%	0.4%	4.3%
1893-94	Jan 1893 - Jun 1894	1.4yr	-6.3%	-7.9%	0.5%	9.4%
1907-08	may 1907 - Jun 1908	1.1yr	-0.2%	-12.5%	-1.4%	5.4%
1920-21	Jan 1920 - Jul 1921	1.5yr	-14.8%	-6.1%	-5.6%	9.3%
1929-33	Aug 1929 - Mar 1933	4.2yr	-7.5%	-11.1%	-8.8%	11.6%

data are from *Monetary History* and other Friedman & Schwartz books

1913: Federal Reserve as Solution to Liquidity Crises

Recognition that money (HPM) needed to be "elastic" in the sense of expanding during liquidity crisis.

- Dec 1913, Federal Reserve founded
- One explicit purpose: to issue notes by "discounting bank assets" (lending to a bank based on assets – collateral – provided by the bank)

Goes back to Bagehot's rules for central banking (and developed earlier, 1790s, by Alexander Hamilton)

- First: lend freely and vigorously, but at a very high rate of interest (to discourage those who do not have liquidity problems)
- Second: lend on all good securities (securities used as collateral) to everyone who is solvent

Fast Forward to next Financial Crisis: 1929-30

October 1929, stock market crash

- Recession started earlier – August 1929
- Up through autumn 1930 bad but not horrendous

October 1930 – banks started failing

- 256 in November 1930 and 352 in December

  A contagion of fear spread among depositors, starting from the agricultural areas (F&S p 308)

Now, banks had neither the incentive nor the authority to restrict payments

- The Fed had been founded to solve this problem

But the Fed failed to act to increase HPM in response to spike in liquidity demand

- Bank failures cascaded – by 1933 1/3 of banks gone

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1929-33

- 1929-31 like 1893 & 1907
  - $^{D}/_{R} \downarrow$, $^{D}/_{C} \downarrow$, *HPM* flat, *M* down somewhat
- 1931-33 things go *really* bad
  - $M \downarrow$ massively as public wants C ($^{D}/_{C} \downarrow$) & banks panic, want liquidity ($^{D}/_{R} \downarrow$)
- Big fall in money overall
- Fed had power to create HPM in 1929-31 (before things got bad) *but did not*
- Banking system collapsed, economy down by 1/3, unemployment up to 25%

Why Did Fed Fail to Act?

Critical question, and no perfect answers

> *The explanation ... is the shift of power within the System and the lack of understanding and experience of the individuals to whom the power shifted. (F&S p. 411)*

Benjamin Strong, president of NY Fed, died October 1928 (tuberculosis)

- He had the knowledge, experience, strength of character to lead the system
- With Strong gone, power vacuum led to shift of power to DC and Board of Governors
- At that time neither skilled nor knowledgeable leaders at the Board
- Possibly one of the most unfortunate deaths of the early 20th c

> *It is also true that small events at times have large consequences, that there are such things as chain reactions and cumulative forces. It happens that a liquidity crisis in a unit fraction reserve banking system [and one like the US that is fragile to begin with] is precisely the kind of event that can trigger ... a chain reaction. (F&S p. 419)*

1963, *Monetary History of the US* Re-writes History

Following the Great Depression, received wisdom was that monetary policy had been passive or ineffective

- Friedman & Schwartz re-wrote history
- Argued, persuasively, that money matters, and matters dramatically during a liquidity crisis

> *Milton Friedman and Anna Schwartz's* ***A Monetary History of the United States 1867–1960*** *is perhaps the most influential work in economic history of the 20th century. The book, a perfect combination of historical narrative, empirical work, and theoretical analysis, was the major force in refocusing the economics profession's thinking about the importance of money in generating cyclical fluctuations. It also showed how the severity of the Great Depression was in large part due to the mistakes of the Federal Reserve.*

2002, Fed has Learned the Lessons of Friedman & Schwartz

November 2002, conference in Ida Noyes to celebrate Friedman's 90th birthday

- Friedman & Schwartz both attended, both strong and feisty
- Ben Bernanke gave one of the papers, discussing Friedman & Schwartz's analysis of the Great Contraction (as they termed it)

The end was an electrifying moment (at least as far as academic conferences go)

- Remember that Bernanke was a member of the Board of Governors, later to become Chairman

  Let me end my talk by abusing slightly my status as an official representative of the Federal Reserve. I would like to say to Milton and Anna: Regarding the Great Depression. You're right, we did it. We're very sorry. But thanks to you, we won't do it again.
  Best wishes for your next ninety years.

2008, Fed Injected Liquidity, Saved the World

Date	NBER Pk/Tr	%Ch Mon Stock	Due to HPM	Due to BRes	Due to PCurr	% P	% Y
1873-79	10/73 - 3/79	-3.1%	-6.3%	4.2%	-1.0%	-3.8%	2.5%
1893-94	1/93 - 6/94	-5.7%	2.6%	-8.0%	-0.3%	-6.3%	-7.9%
1907-08	3/07 - 6/08	-3.8%	8.1%	-10.0%	-2.2%	-0.2%	-12.5%
1920-21	1/20 - 721	-5.3%	-6.6%	1.6%	-0.3%	-6.1%	-5.6%
1929-33	8//29 - 3/33	-43.4%	16.2%	-22.4%	-46.5%	-7.5%	-11.1%
1929-31	8/29-1/31	-5.8%	0.0%	-4.2%	-1.7%	-8.3%	-10.6%
1931-33	1/31-3/33	-37.6%	16.3%	-17.8%	-43.1%	-6.6%	-11.6%
2007-09	12/07 - 6/09	18.6%	69.9%	-51.1%	6.1%	1.1%	-2.1%

2007-09

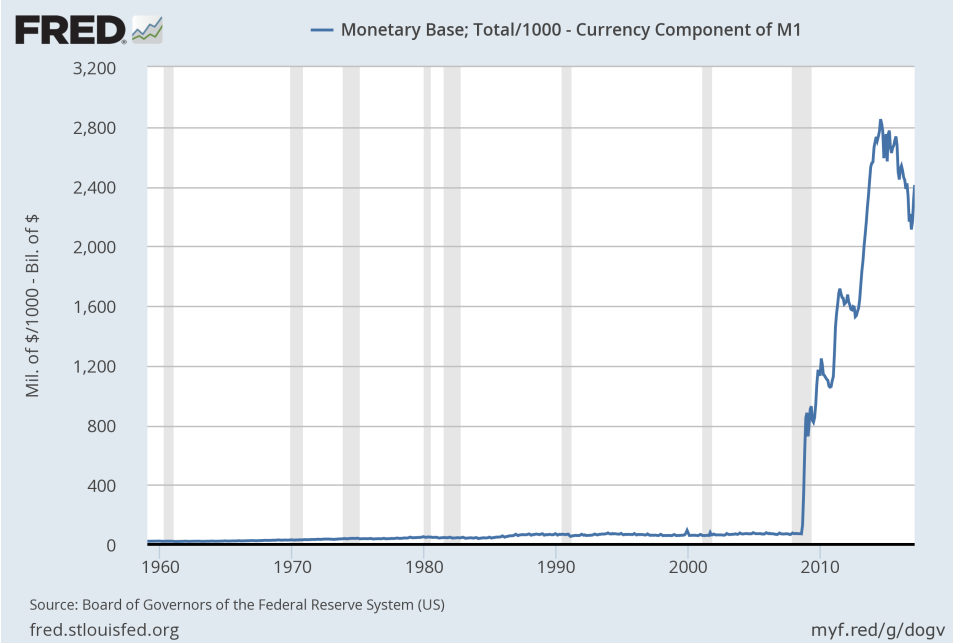
- Fed did learn, did the right thing
- Massively increased HPM – Quantitative Easing (QE1)
  - Mainly went to bank reserves
- Banks were panicked, increased reserves ($D/R \downarrow$)

Can't say for sure what would have happened, but 1907 and 1930s give us a pretty good idea

- If the Fed hadn't done QE1, the financial system would probably have collapsed
- NB: prices for 2008:Q3 - 2009:Q1 fell by 4.1% (ann). Extraordinary

Reserves – The Fed Did Indeed Learn

And the Fed did learn. They increased reserves in 2008. By just a little!



Monetary Base – Currency (BOGMBASE/1000 – CURRSL)

At the time, concern about inflation (from MV=PY). Reasons not:

- Increased *demand* for money
- Fed pays interest on reserves

Some Things I've Ignored – But Main Story Correct

I've ignored and glossed over some things:

- Since 1990s, US banking system has become national
  - Can now open Chase account in Illinois, not just NY
- Reasons for 2008 crisis not quite the same as 1907 & 1930s (fragile & fragmented banking system)
  - New story of political / banking coalition that led to mis-pricing and over-consumption of mortgage risk
- Fall 2008 Fed started paying interest on reserves – another big reason for "no inflation" with big increase in reserves

Monetary History One Part of Friedman's Contribution

I've talked today about Friedman & Schwartz's *Monetary History of the US*

- The data, theory, and analysis – the history of 1907 and the 1930s – teaches us about 2008. And possibly the next crisis

But only one part of Friedman's contributions to monetary theory

- Quantity Theory & Velocity: $MV = PY$
- Understanding of the sources and cures for inflation: "Inflation is always and everywhere a monetary phenomenon"
- Monetary policy and central bank bank policy

I'm not saying Friedman's monetary theory is always correct

- In fact I think the recent work of Eric Leeper, John Cochrane, others on "Fiscal Theory of the Price Level" updates Friedman's quantity theory

But Friedman & Schwartz's work has endured and has immense current relevance