

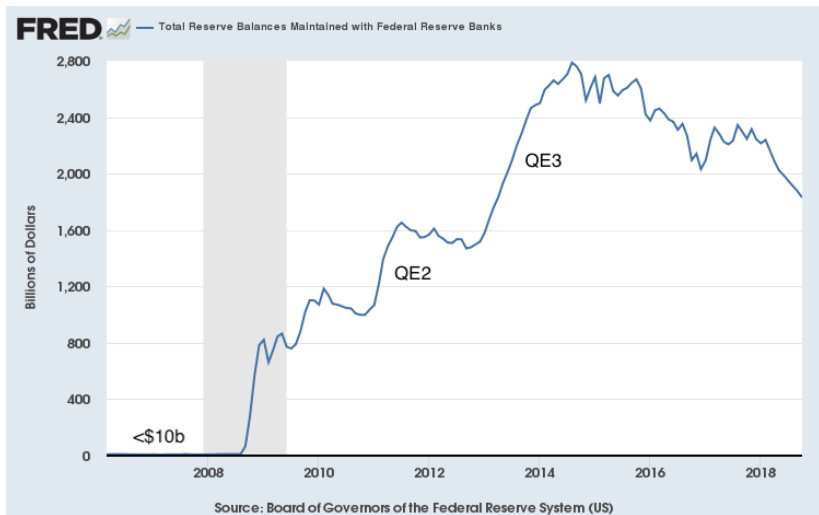
# QE and ZLB

## Decisive experiments for monetary economics

John H. Cochrane  
Hoover Institution, Stanford University

November 2018

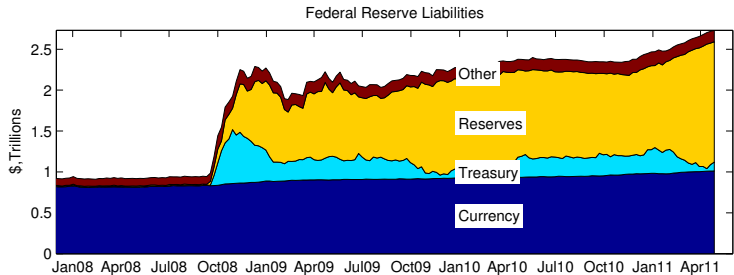
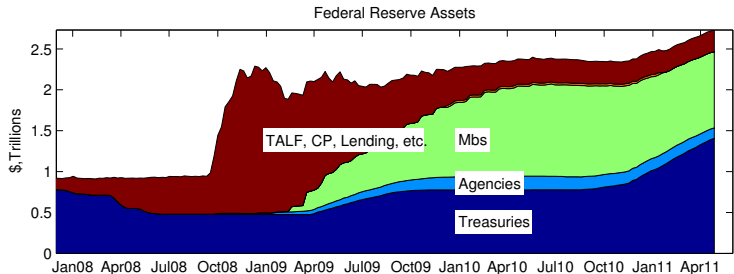
# Quantitative easing



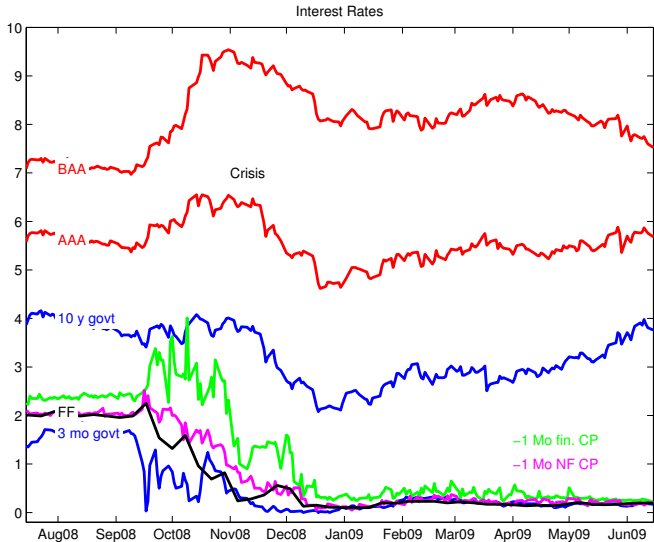
- ▶ Quantitative Easing = Large Scale Asset Purchases, issue reserves.

# QE questions

- ▶ Does QE “Work?”
  - ▶ To what end?
  - ▶ How? Bernanke “works in practice not in theory.” Works at all?
  - ▶ Broader lessons of the experience? Next time?
- ▶ QE0: Fighting crisis. Buy risky “impaired assets,” commercial paper. Raise price in “fire sale” markets, take on assets for last resort lending and bailouts.
- ▶ QE1-3: Generic economic stimulus when interest rates hit zero.

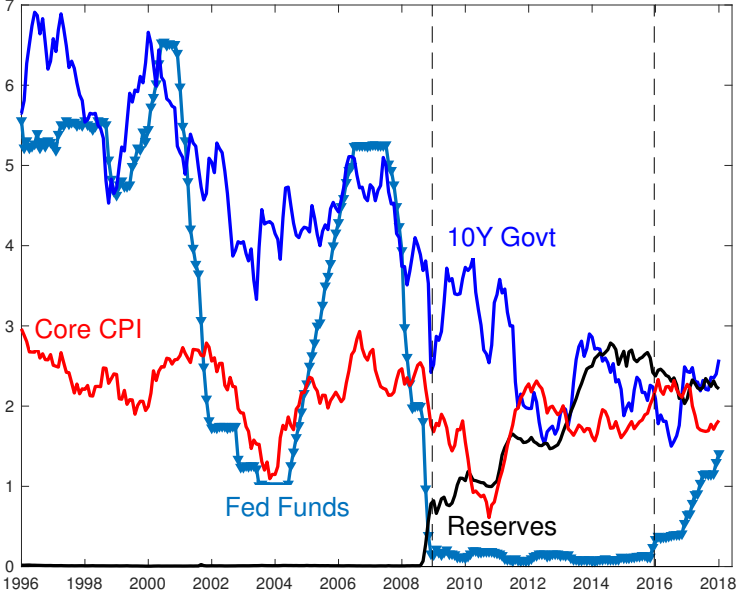


► QE0: fighting crisis

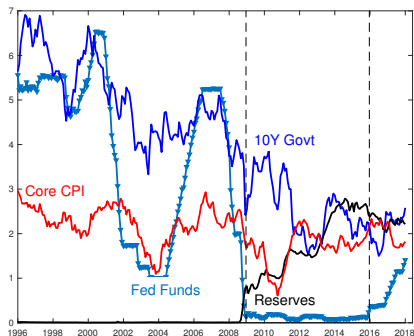


- ▶ QE0: fighting crisis, illiquid markets.
- ▶ Consensus: “worked” at least to raise asset prices (CP).
- ▶ Moral hazard?

# QE stimulus?

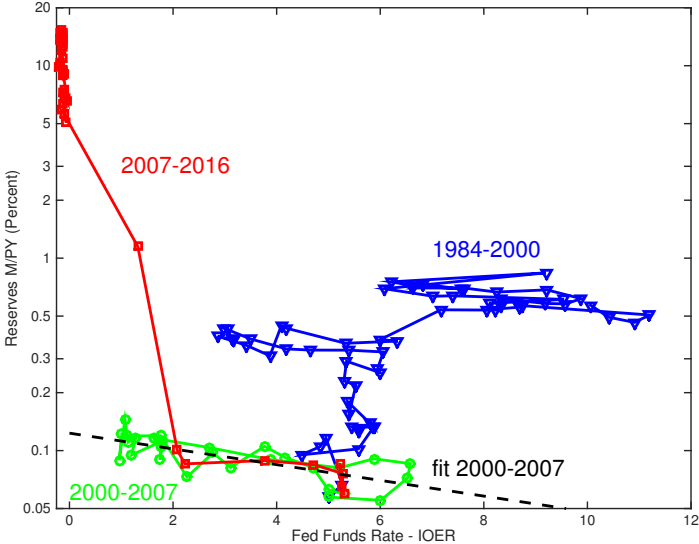


## QE monetary stimulus? (And how?)



- ▶ Monetary channel? Helicopter drops?  $MV = PY$  vs. liquidity trap.
- ▶ Reserves from \$9b to \$2,800b, 30,000% rise. No  $MV=PY$  hyperinflation
- ▶ Lesson *Arbitrary exchanges of government debt for interest paying reserves have no effect.*
- ▶ Immense size = decisive experiment.

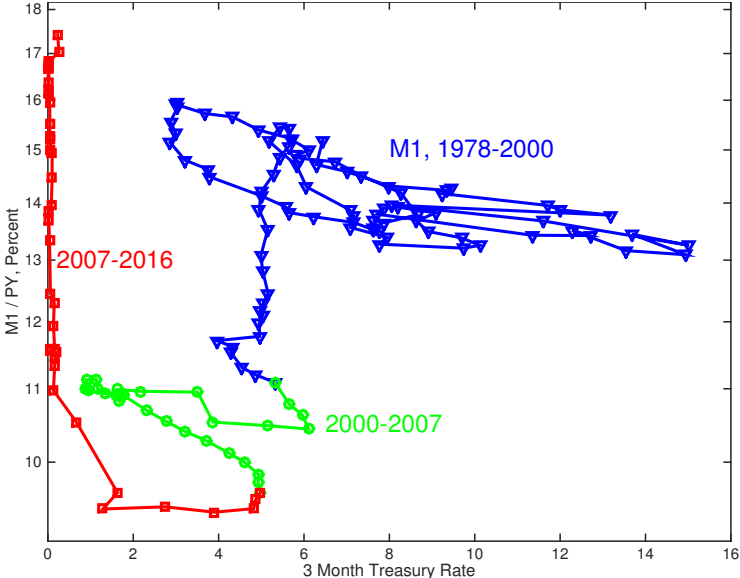
# Reserve demand



Note vertical scale! “Stable” velocity vs. liquidity trap.

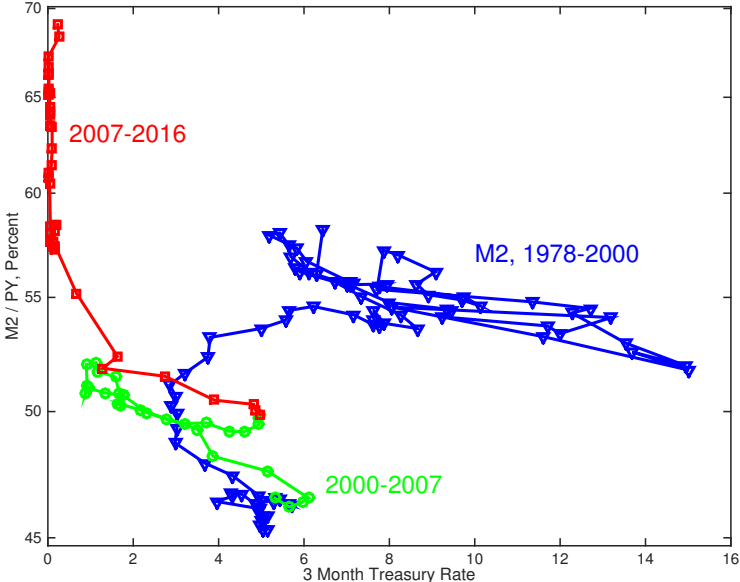


# M1 demand



Disclaimer: Reserve demand is the right question for QE.

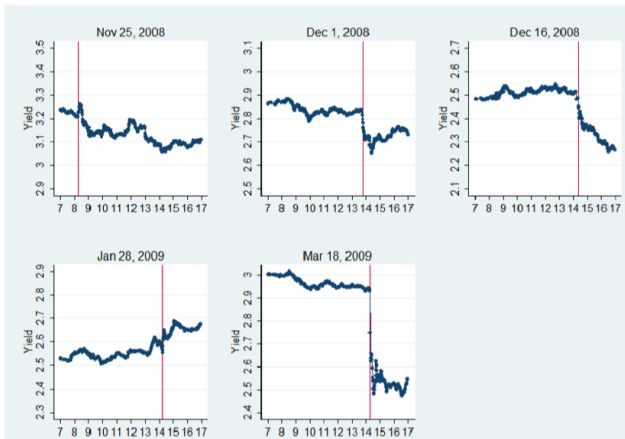
# M2 demand



Disclaimer: Reserve demand is the right question for QE.

# QE affects interest rates? Announcement effect studies

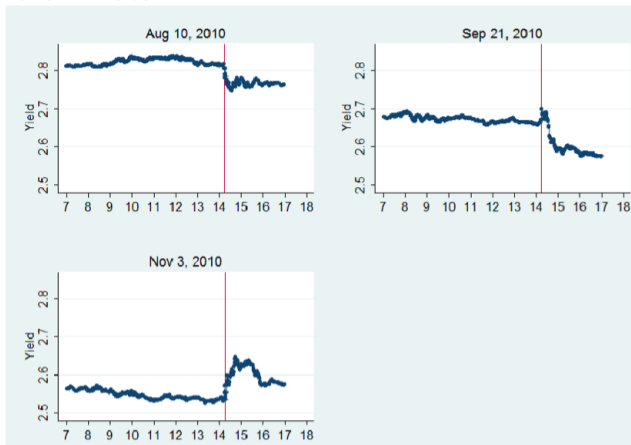
**Figure 2. Intra-day Yields and Trading Volume on QE1 Event Days**  
**Panel A. Yields**



Source: Krishnamurthy and Vissing-Jorgensen BPEA 2011

# QE affects interest rates? Announcement effect studies

**Figure 4. Intra-day Yields and Trading Volume on QE2 Event Days**  
**Panel A. Yields**



Source: Krishnamurthy and Vissing-Jorgensen BPEA 2011

Table 2

## Estimated Event-Study Interest Rate Effects

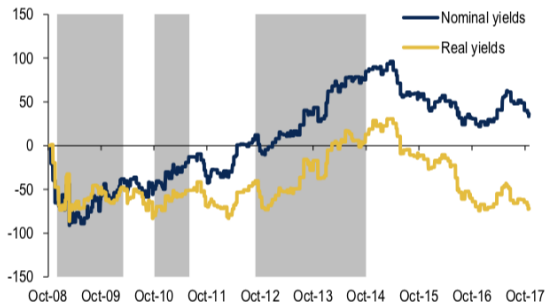
<i>Study</i>	<i>Window (days)</i>	<i>Yield on:</i>	<i>QE1 (basis points)</i>	<i>QE2 (basis points)</i>	<i>MEP (basis points)</i>	<i>QE3 (basis points)</i>
Gagnon, Raskin, Remache, and Sack (2011)	1	T10 Agency MBS	-91*** -156*** -113***			
Krishnamurthy and Vissing-Jorgenson (2011)	2	T10 Agency MBS	-107* -200*** -88	-30*** -29*** -13**		
Ehlers (2012)	1 2	T10 T10		-14 -40***	-27*** -46***	
Bauer and Neely (2014)	1	T10	-123**	-23		-14

Source: Kuttner 2018 JEP

- ▶ Rough consensus: Yes for “impaired markets.” Tiny in normal times.
- ▶ Bernanke: Overall 1% lower. Permanent.
- ▶ But...cherry picked? How long really? (Finance: price pressure lasts days.) Signaling rates or portfolio? – QE or QE announcements? Leans hard on rational expectations. Measures bond trader model? Lasts now that they’ve seen the outcome? In any case...

# Latest research on announcements

**Exhibit 4.2.** Cumulative change in yields on all “Fed Days” ( meeting, minutes, chair speech)



“We use a larger than usual population of possible events... We find that Fed actions and announcements were not a dominant determinant of 10-year yields and that whatever the initial impact of some Fed actions or announcements, the effects tended not to persist. ”

– Greenlaw, Hamilton, Harris, West 2018

## Latest research

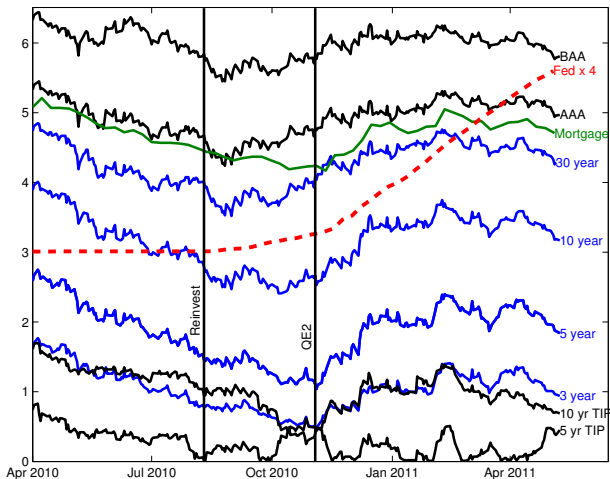
“Although initial announcements of these policies were associated with dramatic market reactions, these responses were soon reversed .... It is hard to disentangle the effects of the purchases themselves from new information about economic fundamentals... ”

“although the Fed began the transition to a smaller balance sheet sooner than the market had expected, the announcements and implementation of the balance-sheet reduction do not seem to have affected rates much.”

“the magnitude of the effect is likely smaller than commonly believed.”

-Hamilton 2018; Greenlaw, Hamilton, Harris, West 2018

## Rates rise when the Fed actually buys bonds!

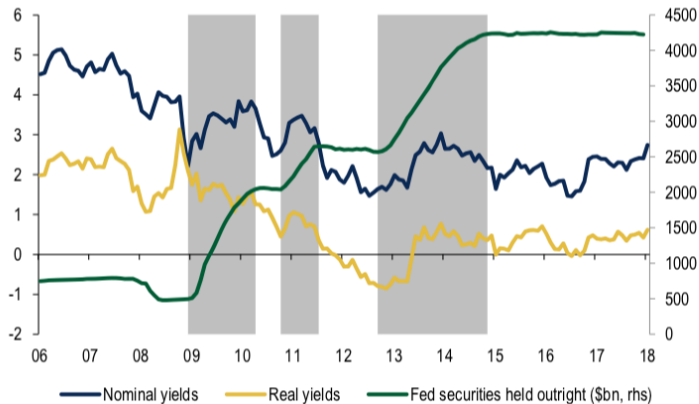


“Yields on 5- to 10-year nominal Treasury securities initially declined markedly as markets priced in prospective Fed purchases; these yields subsequently rose, however, as investors became more optimistic about economic growth and as traders scaled back their expectations of future securities purchases.” (Ben Bernanke, March 1 2011 ). Yellen: 25 bp. 700,000 jobs.



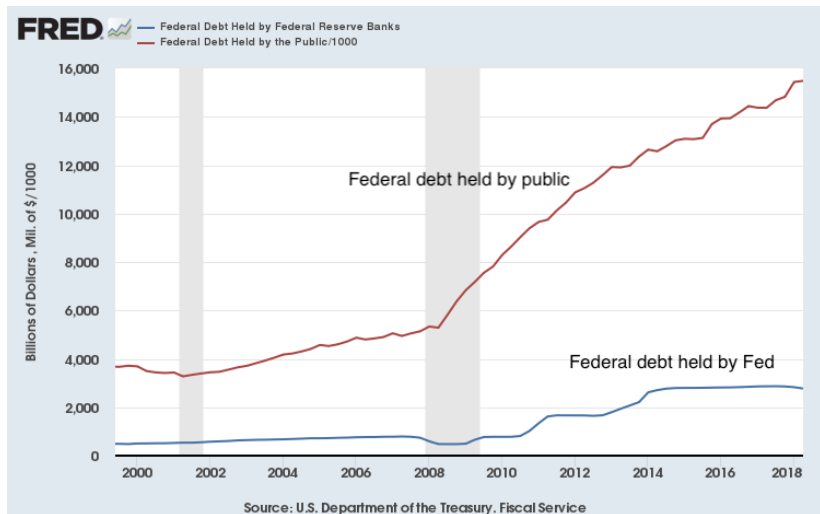
# Rates rise when the Fed actually buy bonds.

**Exhibit 4.1.** Bond yields tended to rise during the implementation of QE1, 2 and 3

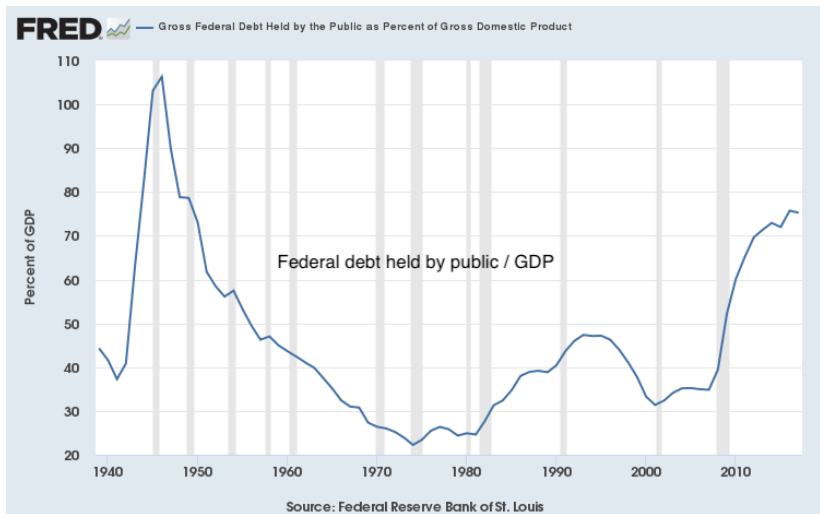


Source: Greenlaw, Hamilton, Harris, West 2018

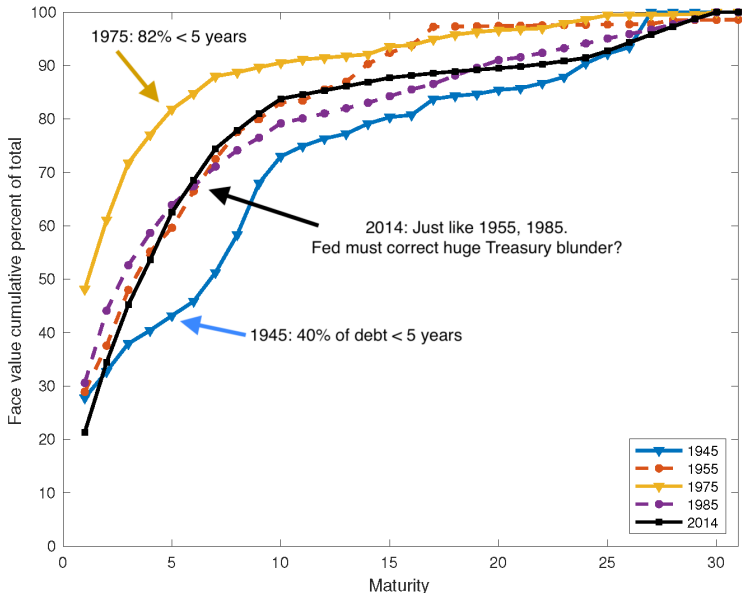
While Fed bought, Treasury sold. "Portfolio" holds more.



“Portfolio” has held vastly different amounts of debt...

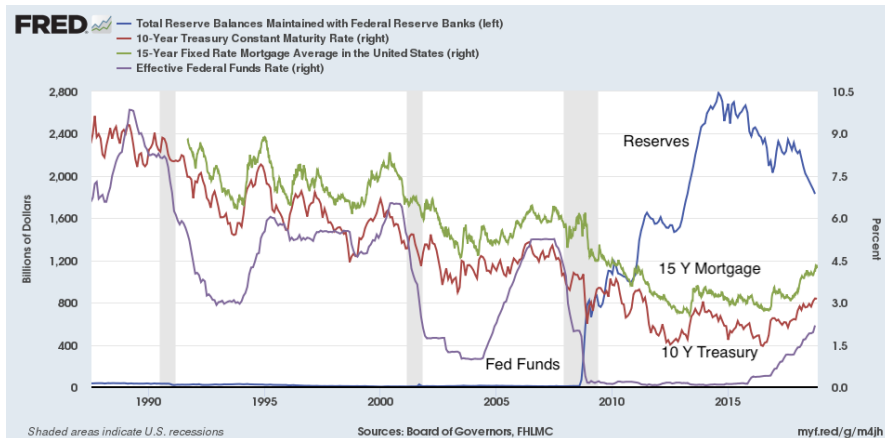


## And vastly different maturity structure...



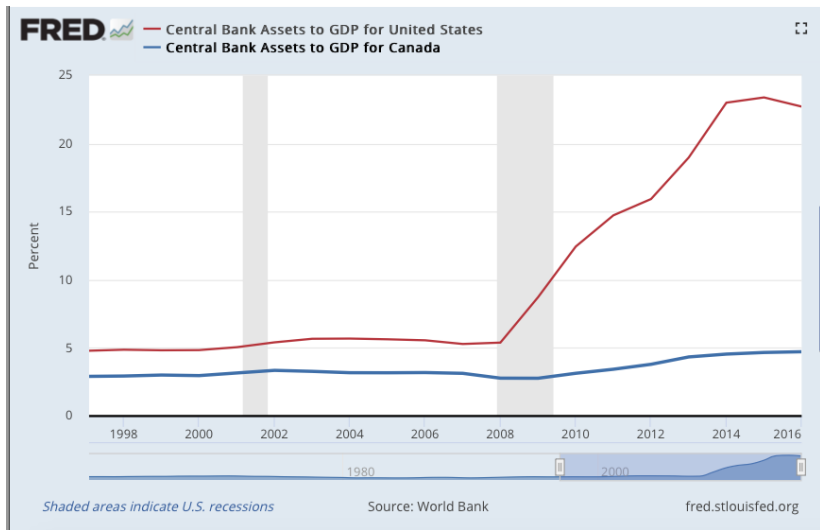
With no visible effect on interest rates. Portfolio effect?

# The big picture again



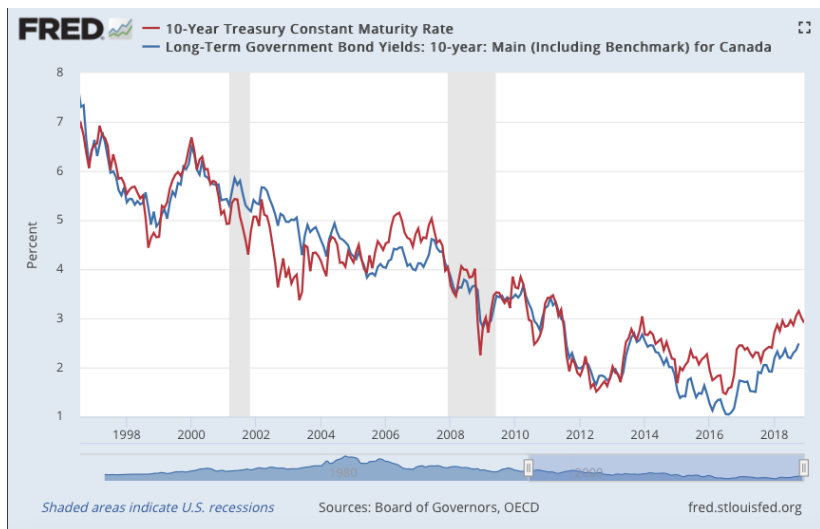
- ▶ 10Y, mortgage unperturbed by QE.
- ▶ Bernanke's 1%?

# US vs. Canada



- ▶ Canada did not QE.

# US vs. Canada



- ▶ Yet QE rates are nearly the same.

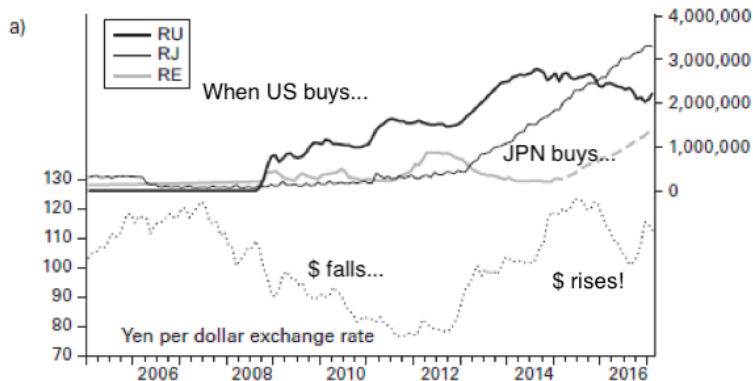
## QE summary

*How* might it “work”? (Policy should not rely on magic.)

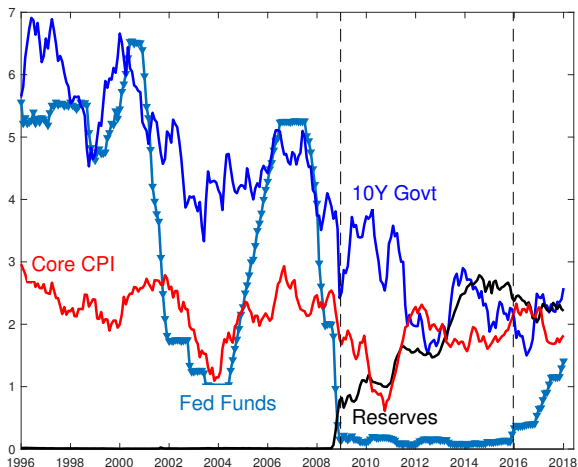
- ▶  $MV=PY$ ? Should have been Venezuela.
- ▶ Portfolio balance effect?
  - ▶ No theory for long-lasting effect.
  - ▶ Recession because idiots at Treasury sold too much long term debt?
  - ▶ Catch 22: If segmented, then segmented
- ▶ If so great why not more? Why not peg rates at 1%? Why is it just small enough to argue about?
- ▶ Latest: QE stokes “reach for yield” in asset markets?
  - ▶ No visible difference in risk premia this vs. previous expansions.
  - ▶ No sensible mechanism. (Banks don't buy stocks).
- ▶ QE Summary: In normal markets, a small short lived announcement effect – “the Fed is worried, might keep rates low for longer.”
- ▶ Great marketing: “Fed boldly took action to save the economy.” Vs. “Rates are zero. We're on vacation. Tell John Taylor to call us when we're needed.”
- ▶ Alas, the Fed is now stuck with marketing.



# Doubt: Taylor on exchange rates

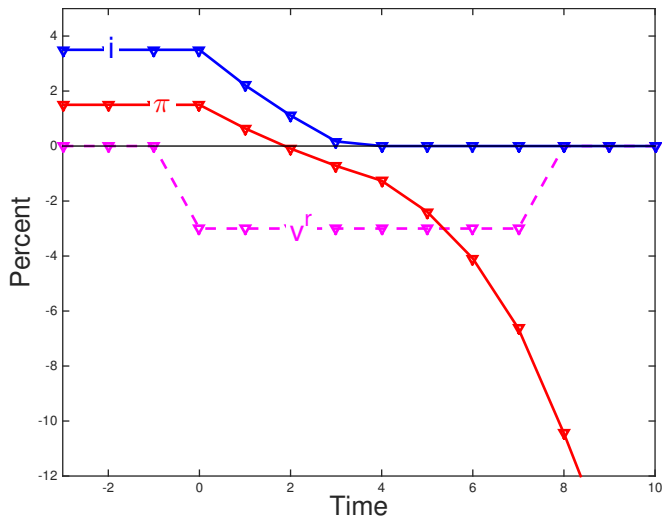


# The rise and fall of ZLB Macroeconomics



- ▶ 8 years at ZLB (10 in Europe, 25 in Japan)
- ▶ Inflation is unaffected!
- ▶ → ZLB, IOER, are not unstable, nor indeterminate (sunspots).
- ▶ → Along with  $MV=PY$ , 3 classic doctrines overturned!

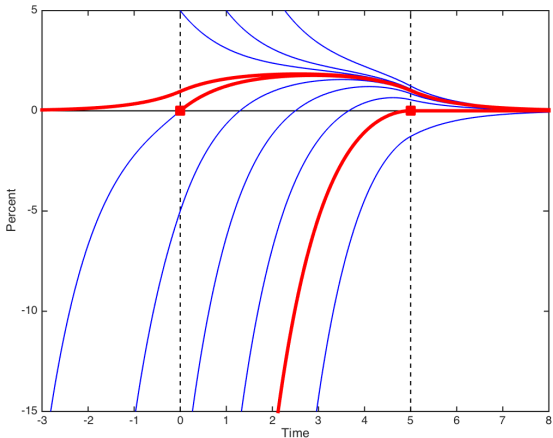
# The deflation spiral



- ▶ Widely predicted and feared throughout
- ▶ It did not happen. This theory is wrong.

# Magical multipliers and forward guidance

- ▶ Standard models (New Keynesian) discovered to predict immense fiscal multipliers, Bastiat multipliers, and immense effects of Odyssean forward guidance. (Eggertsson & Krugman; Woodford at Jackson Hole; Many others.)
- ▶ Effects are stronger for promises further in the future, and as price stickiness vanishes!



### Inflation at the ZLB in the new-Keynesian model

- ▶ New-Keynesian model, “IS” shock  $t=0$  to  $t=5$ ,  $i = 0$  (like spiral).
- ▶ Small change in inflation at  $t = 5$  produces a huge change at  $t = 0$ .
- ▶ But. No deflation jump. No sunspot. Once understood, zany.
- ▶ (My work: FTPL solves this problem, picks the upper red line)

## Bottom line

- ▶ Massive QE and ZLB are huge and informative monetary policy experiments
- ▶ We learned a lot from their outcomes.
- ▶  $MV=PY$  fails at zero bound, or reserves pay market interest. Arbitrary interest-paying reserves are not inflationary.
- ▶ Portfolio QE effects are at best tiny in functional markets. Announcements of huge never-before-tried policies do roil markets. (As MM said)
- ▶ ZLB and no movement of inflation teaches us that the “spiral” and “sunspot” theories that dominated pre 2008 macro are wrong.
- ▶ Magical multipliers and huge forward guidance came and went.
- ▶ Lessons: Don't base policy on latest clever theory research! Don't base policy on empirical observations that make no sense.