

Federal Reserve Policy During and After the Crisis

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Balance Sheets and Policy Uncertainty

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“Whereas deeds never done before are what occupy my mind.”

Wotan

Die Walküre, Act Two, Scene One



Outline of Presentation

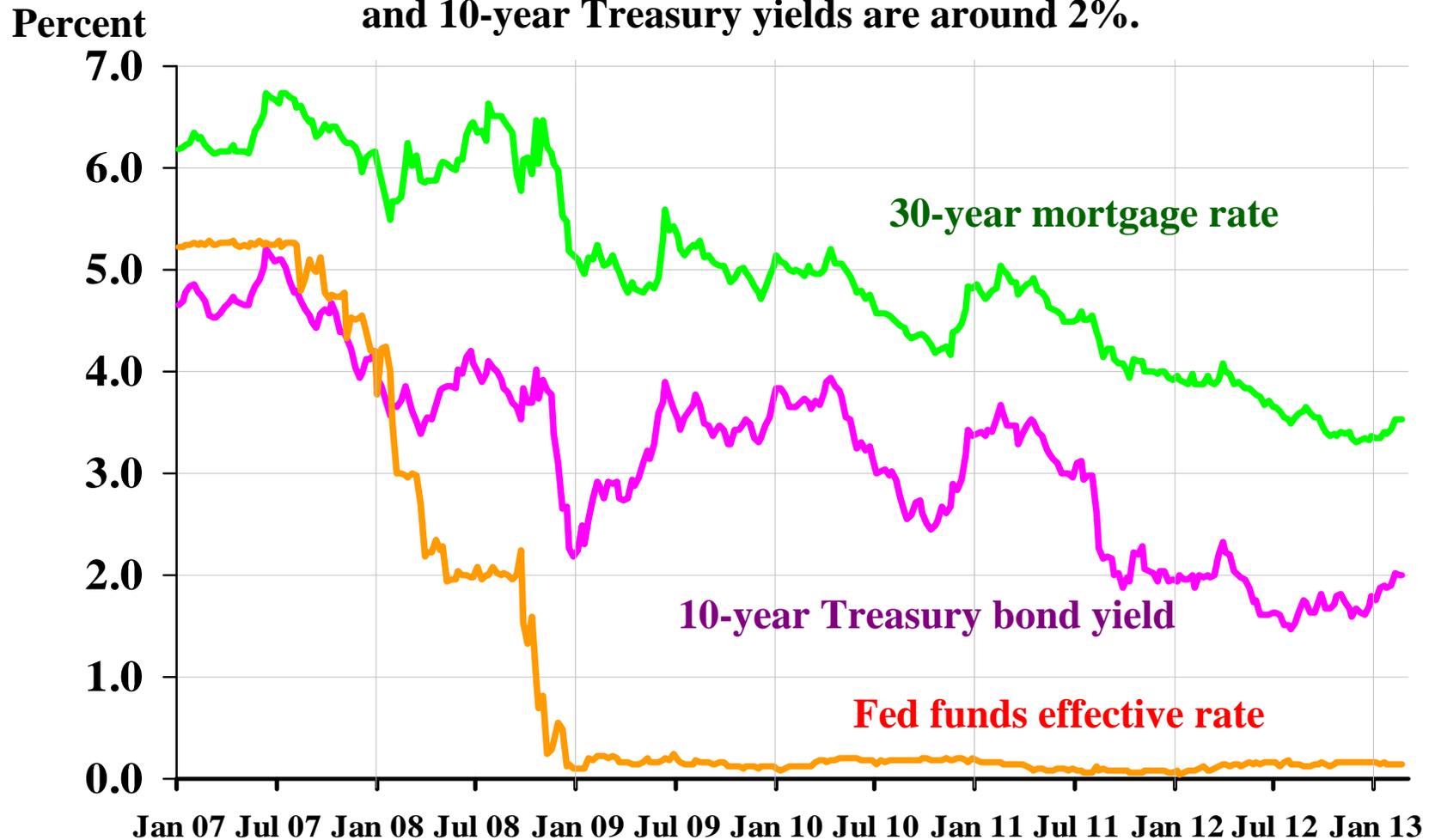
- Federal Reserve’s extraordinary policies to address the financial crisis, “great” recession, and slow recovery
- Challenges posed by current monetary policy
- Nexus between monetary policy and financial stability policy



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**Fed lowered fed funds rate from 5.25% in Sep 2007 to 2% by end of Apr 2008.
Resumed cuts in Oct 2008, bringing rate to essentially zero in Dec 2008.
Fed funds rate has been at zero lower bound for over 4 years.**

**30-year mortgage rates are around 3.5%
and 10-year Treasury yields are around 2%.**



Weekly data: Last point plotted is February 15, 2013

During the crisis, the Fed established several new lending programs targeted at easing short-term funding pressures, promoting credit extension, and containing systemic fallout

Standing Facilities

- **Discount Window:** lengthened maturity to 90 days of loans to depository institutions at the primary credit rate; cut spread between primary credit rate and fed funds rate
- **Primary Dealer Credit Facility:** loans to Primary Dealers at the primary credit rate

Term Lending Facilities

- **Term Auction Facility (TAF):** auctions off short-term credit to depository institutions eligible to borrow at the discount window
- **FX Swaps:** dollar swaps with central banks of Australia, Brazil, Canada, Denmark, England, Europe, Japan, Mexico, New Zealand, Norway, Singapore, South Korea, Sweden, Switzerland, and
foreign currency swaps with central banks of England, Europe, Japan, Switzerland



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Targeted Credit Facilities

- **Asset-Backed Commercial Paper Money Market Mutual Fund Lending Facility (AMLF):** loans to banks to fund purchases of high-quality asset-backed CP from MMMFs
- **Commercial Paper Funding Facility (CPFF):** liquidity backstop to U.S. issuers of CP through a special purpose vehicle (SPV) that buys 3-month unsecured and asset-backed CP directly from eligible issuers
- **Money Market Investor Funding Facility (MMIFF):** to complement the CPFF and AMLF by purchasing CDs and CP from money market mutual funds; this facility has not been used
- **Term Asset-Backed Securities Loan Facility (TALF):** financing to support the issuance of asset-backed securities (ABS) collateralized by student loans, auto loans, credit card loans, and loans guaranteed by the Small Business Administration (SBA), loans or leases relating to business equipment, leases of vehicle fleets, floorplan loans, and mortgage-servicing advances, commercial real-estate loans, and insurance premium finance loans



During the crisis, the Fed established several new lending programs targeted at easing short-term funding pressures, promoting credit extension, and containing systemic fallout

Programs to Contain Systemic Fallout (under Fed Res Act Section 13(3))

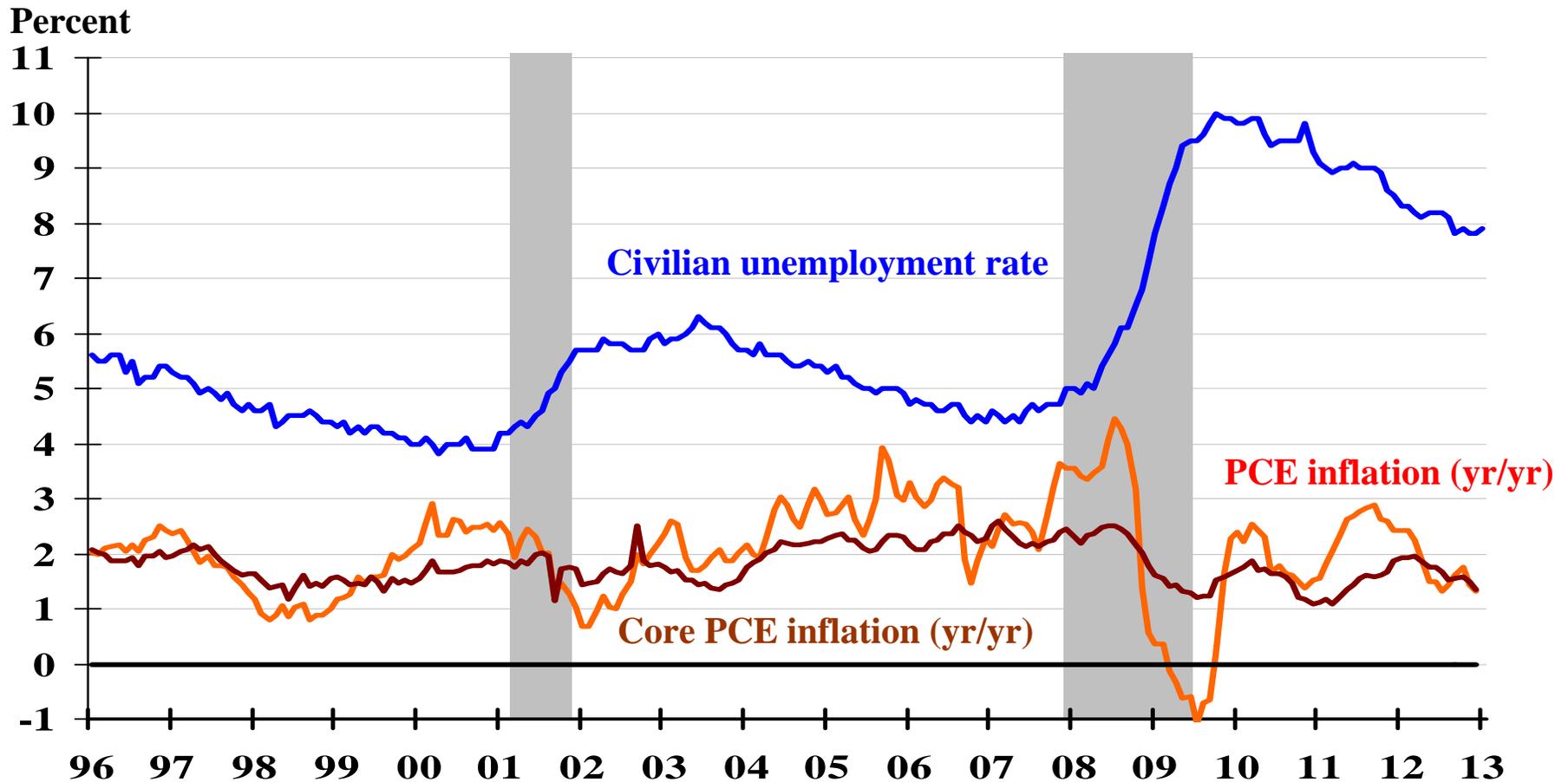
- Maiden Lane I : **Bear Stearns** (Mar 16, 2008)
- Credit to **AIG** (Oct 8, 2008)
- Maiden Lane II: **AIG** residential MBS holdings and Maiden Lane III: **AIG**-backed CDOs (Nov 10, 2008)
- Loan commitment to **Citigroup** (Nov 23, 2008)

- Dodd-Frank Act altered 13(3) to disallow aid to individual companies.

- Reflecting the reduction in financial market stress, all the extraordinary lending facilities were closed by June 2010.



During the recession, the U.S. unemployment rate rose from around 5% to 10% and core inflation fell from around 2% to 1%.



Source: Bureau of Labor Statistics

Monthly data: Last point plotted is January 2013 for unemployment and December 2012 for inflation.



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With the ff rate at the ZLB, the Fed has engaged in nontraditional policies

Balance Sheet Policy

Large-Scale Asset Purchase Programs (LSAPs): “Quantitative Easing”

- QE1:
 - \$1.25 trillion of agency MBS (up to \$500 billion announced on Nov 25, 2008 and up to an additional \$750 billion announced on Mar 18, 2009; completed Aug 2010)
 - \$175 billion of agency debt this year (up to \$100 billion announced on Nov 25, 2008 and up to an additional \$100 billion announced on Mar 18, 2009; completed Aug 2010)
 - \$300 billion of longer-term Treasury securities (announced Mar 18, 2009; completed Oct 2009)
- QE2: \$600 billion (announced Nov 3, 2010; completed June 2011)

Maturity Extension Program: “Operation Twist”

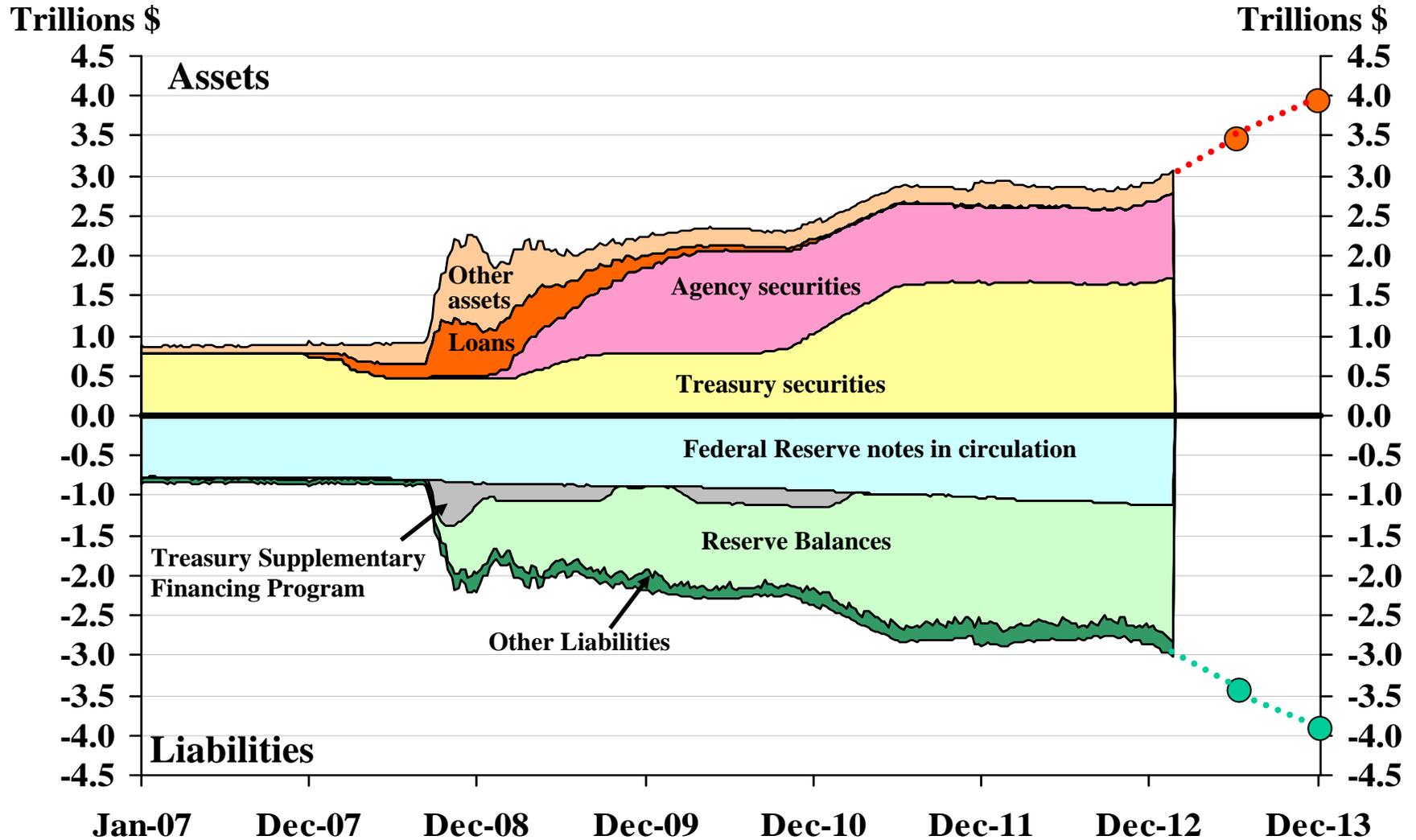
- Extend the average maturity of Fed balance sheet assets by buying \$400 billion of Treasuries with maturities 6 to 30 years and sell an equal amount with maturities 3 years or less (announced Sep 21, 2011 to end June 2012; then extended on June 20, 2012 to year-end 2012 => additional \$267 billion of assets bought and sold).

Open-Ended Asset Purchase Program: “QE3”

- Purchase agency MBS at a pace of \$40 billion per month (announced on Sep 13, 2012).
- Purchase longer-term Treasuries at a page of \$45 billion per month (announced on Dec 2012; commenced at end of Maturity Extension Program).

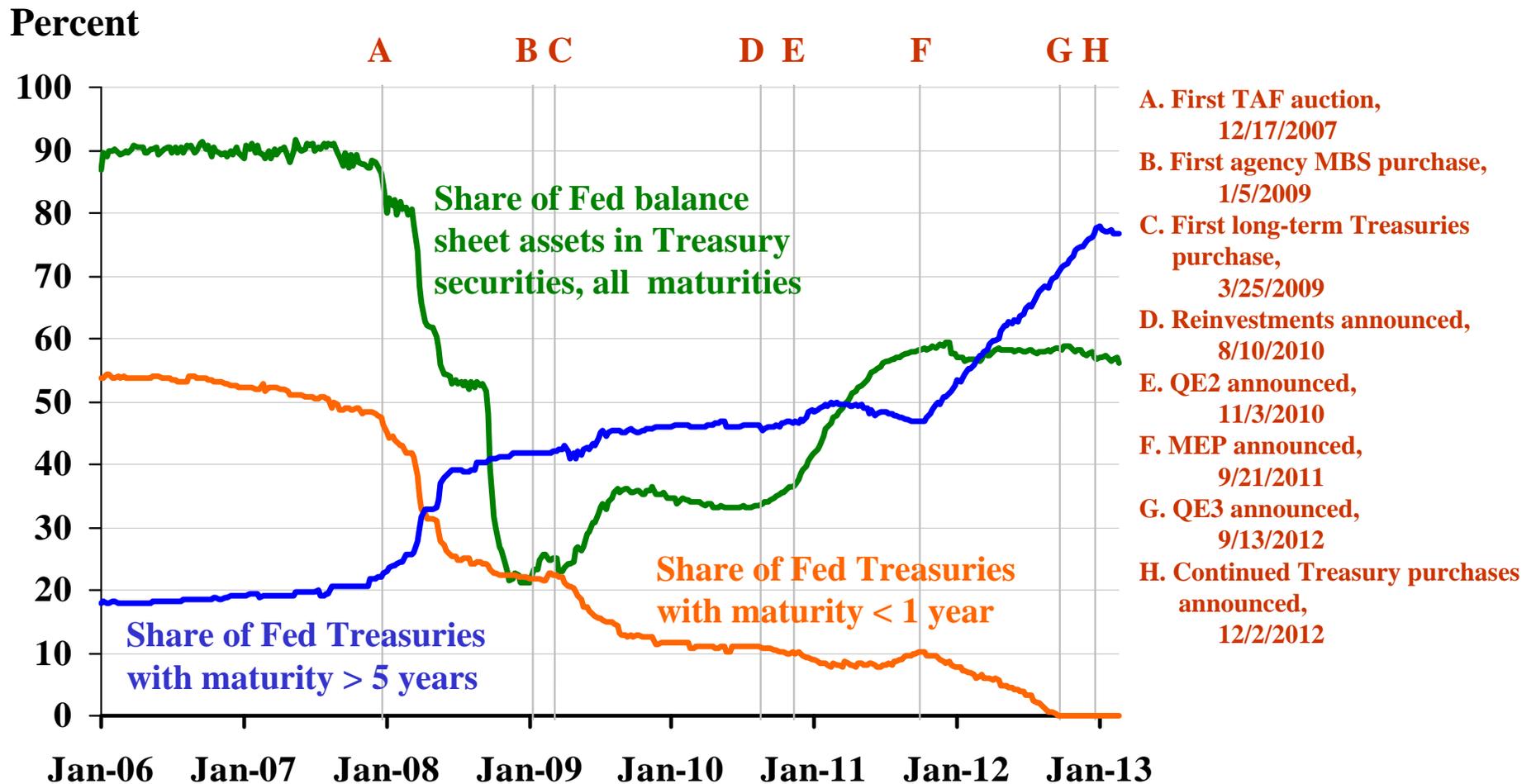
The Fed is expanding its balance sheet.

It is buying agency mortgage-backed securities at a pace of \$40 billion per month and longer-term Treasury securities at a pace of \$45 billion per month.



Weekly data: Last point plotted is February 13, 2013

The composition of the Fed's balance sheet has changed since the crisis.
 Treasury securities are a smaller share and of longer maturity.
 There are no short-term Treasuries on the balance sheet.



Weekly data: Last point plotted is February 13, 2013



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With the ff rate at the ZLB, the Fed engaged in nontraditional policies

Forward Guidance

- December 2008: “In particular, the Committee anticipates that weak economic conditions are likely to warrant exceptionally low levels of the federal funds rate for some time.”
- March 2009: “... economic conditions are likely to warrant exceptionally low levels of the federal funds rate for an extended period.”
- August 2011: “... economic conditions--including low rates of resource utilization and a subdued outlook for inflation over the medium run--are likely to warrant exceptionally low levels for the federal funds rate at least through mid-2013.” The FOMC extended the calendar date to late 2014 in January 2012, and to mid-2015 in September 2012.
- September 2012: “... highly accommodative stance of monetary policy will remain appropriate for a considerable time after the economic recovery strengthens.”
- September 2012: If the outlook for the labor market does not improve substantially, the Committee will continue its purchases ... in a context of price stability.
- December 2012: “... anticipates that this exceptionally low range for the federal funds rate will be appropriate at least as long as the unemployment rate remains above 6-1/2 percent, inflation between one and two years ahead is projected to be no more than a half percentage point above the Committee’s 2 percent longer-run goal, and longer-term inflation expectations continue to be well anchored.”

Effect of nontraditional policies

Large-scale Asset Purchases

- Portfolio balance channel: Particular types of assets are not perfect substitutes => change in support of assets available to private investors affects prices of those assets through the term premium.
 - Once financial markets are functioning well, efficacy of the LSAPs should decline because assets are more substitutable.
- Signaling channel: Central bank intends to pursue a more accommodative policy stance than the public currently expects. Form of commitment.
 - Is the commitment via public's perception of the complications a large balance sheet entails for exit?



Table 1: Empirical Estimates of LSAP Effects

Study	Sample	Method	Estimated Effect of \$600 billion LSAP (± 2 std errs if avail.) ^a
Modigliani-Sutch (1966, 1967)	Operation Twist	time series	0 bp (± 20 bp)
Bernanke-Reinhart-Sack (2004)	Japan, U.S.	event study	400 bp (± 370 bp), 40 bp (± 60 bp)
Greenwood-Vayanos (2008)	postwar U.S. (pre-crisis)	time series	14 bp (± 7 bp)
Krishnamurthy-Vissing-Jorgensen (2010, 2011)	postwar U.S., QE1, and QE2	time series	15 bp (± 5 bp)
Gagnon-Raskin-Remache-Sack (2011)	QE1	event study, time series	30 bp (± 15 bp), 18 bp (± 7 bp)
D'Amico-King (2010)	QE1 Treasury purchases	security-specific event study	100 bp (± 80 bp)
Hamilton-Wu (2011)	QE2	affine no-arbitrage model	17 bp
Hancock-Passmore (2011)	QE1 MBS purchases	time series	depends, roughly 30 bp
Swanson (2011)	Operation Twist	event study	15 bp (± 10 bp)
Joyce-Lasaosa-Stevens-Tong (2011)	U.K. LSAPs	event study, time series	40 bp
Neely (2011)	effect of U.S. QE1 on foreign bond yields	event study	17 bp (± 13 bp)

These plus other studies estimated decline in 10-yr Treasury yield:

QE1: 40 to 110 bps
QE2: 14 to 45 bps
MEP: 8 to 15 bps

Effect of nontraditional policies

Forward Guidance

- Transparency: Reduce uncertainty about policy in the future => policy more effective because public forms more accurate expectations.
- Credible commitment to keep policy rate lower for longer than under traditional policy rule with a commitment to price stability over the longer run can lead to better economic outcomes by changing current expectations.
 - Temporarily raise public's expectations of inflation => pushes real interest rates down => induce consumers to save less and spend more today (Eggertsson and Woodford, 2003).
 - Influence public's expectations about future economic prospects by implying strong pickup in growth and incomes in the future so they don't have to save as much today and so they can spend more today (Werning, 2012).
- For forward guidance to stimulate economy today: **credible commitment**.
 - “Committing” to a time inconsistent policy
 - Need public to understand current policy is nonstandard (too easy), but central bank is still committed to price stability over medium to longer run
- Empirical results on forward guidance is mixed.
 - Kool and Thornton (2012): forward guidance in Norway and Sweden improved market participants' forecasts of interest rates; no effect in New Zealand
 - Gersbach and Hahn (2008): forward guidance increases welfare if cost of renegeing is low; but ability to renege => effectiveness is low

The FOMC will review its asset purchases at the March meeting

Potential Benefits:

- Easing financial conditions to spur economic activity in general and in the housing market in particular
- Helping labor markets and preventing possible longer run economic damage from prolonged unemployment and skill loss
- Keeping inflation closer to 2% goal and avoiding deflation
- Note, the benefits may wane over time

Potential Costs:

- Undermining financial stability by encouraging excessive risk-taking in a search for yield
- Undermining financial market functioning by purchasing a large share of available assets
- Undermining the FOMC's ability to exit smoothly from the period of extraordinary monetary policy accommodation
 - Fed will need to rely on IOER, term deposits, and reverse RPs
 - Will to exit?
- Undermining longer-run price stability
- Undermining Fed independence – Fed is subject to duration risk that could lead to capital losses and negative remittances to U.S. Treasury => Political risk, which could undermine Fed independence

How should central banks respond to financial imbalances?

- Severity of recent financial/economic crisis => Need to consider whether/and how monetary policy and financial stability policy can be used to reduce the chance of a similar crisis in the future
- Imbalances can build up even in a low-inflation environment
 - Low, stable inflation may be a necessary condition but is not a sufficient condition for financial stability
- Asset prices are conceptually different from prices of current goods and services
 - Asset prices are forward looking and reflect market participants' expectations about assets' future stream of services
- Nexus – Monetary policy needs to consider financial stability policy, if only because:
 - Transmission mechanism of monetary policy through financial system
 - Endogeneity – is our current zero interest rate monetary policy promoting financial instability?
 - Adrian and Shin, 2009: Possible linkages between monetary policy and financial institution leverage
 - Financial stability policy can affect macroeconomy: 1990s credit crunch

Monetary policy and asset prices:

Should monetary policy “clean” or “lean” (Wm. White);

Should monetary policy be a “fire extinguisher” or “smoke detector” (R. Kroszner)

- Traditional strategy

- Monetary policy responds to asset prices (whether driven by fundamentals or not) only to the extent those movements contain information about inflation and output growth

- Mop up the mess but don't limit the development of misalignment

$$i = r^* + \pi + \alpha(\pi - \pi^*) + \beta(y - y^*)$$

- Activist strategy

- Monetary policy should take extra action to stem a developing imbalance
- “Lean against the bubble”

$$i = r^* + \pi + \alpha(\pi - \pi^*) + \beta(y - y^*) + \gamma(q - q^*)$$

- Separation strategy

- Monetary policy should focus on price stability and maximum employment
- Supervisory/regulatory policy should focus on financial stability issues like leverage, risk-taking, deviations of asset prices from fundamentals
- Tinbergen Principle: if there are more goals than instruments, some goals may not be met. (Note, that this does not necessarily => separation.)



How should central banks respond to financial imbalances?

- Areas of agreement
 - Monetary policy should not target asset prices
 - Asset prices play an important role in monetary policy transmission
 - Aggregate demand and inflation
 - Central bank has responsibility for promoting financial stability
 - Activist view does not want policymakers to respond to small misalignments in prices
 - Large misalignments should affect outlook for inflation and output gap or at least the risks surrounding the baseline forecasts

$$i = r^* + \pi + \alpha(\pi[q] - \pi^*) + \beta(y - y^*)[q]$$

- Implication: Should consider a sufficiently long time horizon when setting monetary policy



How should central banks respond to financial imbalances?

- Arguments against activism
 - Too hard to measure bubbles
 - Not all bubbles are alike: tech bubble vs. housing bubble
 - Important difference was leverage
 - Monetary policy not effective against bubbles even if detectable: blunt instrument
- Counterarguments
 - Measuring imbalances is hard but so is measuring expected inflation, maximum employment, the output gap, etc.
 - Blunt instrument gets into all the “cracks” (Stein, 2013).
- The question is whether one can detect if the risk of financial system instability is rising and if so, whether there are effective ways to counteract those rising imbalances.
 - Policymakers must balance the risks to future macroeconomic stability posed by not taking action with the risks of taking action, given how hard it is to discern whether a rapid change in asset prices is sustainable or not.
 - In order to make this assessment, we must develop our macroeconomic models to explicitly incorporate asset prices and financial intermediation.
 - Are there benefits to rule-like financial stability policies as in monetary policy, versus discretion?

What tools should central bank use to address financial imbalances?

- New research: may be optimal to use a blend of monetary and financial stability policies including countercyclical capital requirements, capital buffers, loan-to-value limits.
 - Jeanne and Korinek (2012): 3-period Kiyotaki and Moore (1997) type of model to study optimal mix of ex ante (macro-prudential) and ex post (bailout = interest rate) policies to address financial imbalances. Optimal policy => mix of both.
 - Macro-prudential policy solves the time inconsistency of bailouts:
 - Ex ante the planner wants to commit to being tough to ensure that the private sector holds greater precautionary savings, but ex post the planner wants to provide bailout to relax financial constraint.
 - Macro-prudential policy addresses the pecuniary externality:
 - When shock hits everyone has to sell assets at fire-sale prices so there is financial amplification, but individual agents do not internalize that their actions lead to relative price movements that reinforce shocks in the aggregate.
 - Bailouts are more state-contingent.



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- New research: may be optimal to use a blend of monetary and financial stability policies including countercyclical capital requirements, capital buffers, loan-to-value limits.
 - Collard, Dellas, Diba, and Loisel (2012): New Keynesian model with banks to study the interaction between monetary policy (interest rate policy) and macro-prudential policy (state-contingent capital requirement).
 - Monetary policy affects the volume but not necessarily the type of credit and prudential policy affects both.
 - Macro-prudential policy should react only to shocks that affect banks' risk-taking incentives.
 - In response to shocks, monetary policy should move opposite to prudential policy in order to mitigate the macroeconomic effects.



Challenges

- Must remain humble
 - Models are still being built – we don't have a good workhorse model that includes a well-developed financial sector or even multiple interest rates
 - Macroprudential supervisory tools are in their infancy
 - We do not know how the incentives and expectations created by the policy actions during the crisis will interact with the new regulatory framework
 - Very difficult to know when a bubble is forming – best we might be able to do is monitor credit growth, leverage, spreads, reliance on short-term funding
 - Not all volatility is “excessive”
 - “Will future regulators and monetary policymakers be accused of bursting 10 of the past 2 asset bubbles?” (Yellen, 2012)
 - Difficult to calibrate magnitude of policy
 - Financial instability => transmission mechanism is impaired.
 - Still have work to do on reducing weaknesses in the financial regulatory structure in the U.S. – resolution mechanism for systemically important bank and nonbank financial institutions





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