

CAFRAL-Levy-IDEAs Workshop

January 6-10, 2014 - New
Delhi, India

**Macroeconomic management and financial regulation in core countries
and the periphery**

Exceptional monetary policy in response to the Crisis: US, Japan and European Union

Jan Kregel
Levy Economics Institute

How Many Crises, How Many Exceptional Policies?

- There were many crises: They were all different
- First: Japan: Post Plaza/Louvre Equity/Real Estate Bubble/Crash 1989
 - Response: ZIRP, Exceptional Stimulus Policy
- Then US 1989-90, 1996, 2006
 - Real Estate Bubble/Sub Prime Crisis
 - Financial System Crisis: Bear Stearns, Lehman
 - Great Recession Real Sector Crisis
- UK Real Estate Bubble:
 - Bank run on Northern Rock: wholesale funding collapses
 - Then Financial System collapse: RBS, Lloyds, Barclays etc
- EU: Icelandic Banks, French Real Estate Funds, German Land Banks
- Sovereign Debt Roll over Crisis: Greece, Portugal, Spain, Italy



Financial Turmoil Timeline (June 2007 - November 2007)

Fed Policy Actions

28-Jun
FOMC maintains the target fed funds rate at 5.25%

17-Jul
Fed, OTS, FTC, and state agencies launch new program to supervise subprime mortgage lenders

7-Aug
FOMC maintains the target fed funds rate at 5.25%

10-Aug
Fed issues statement that it stands ready to provide liquidity via the discount window

17-Aug
Spread between the primary credit rate and the target fed funds rate is reduced to 50 bp

18-Sep
FOMC lowers target fed funds rate 50 bp to 4.75%

31-Oct
FOMC lowers target fed funds rate 25 bp to 4.5%

2-Nov
Fed approves Basel II

Jun 5 10 15 20 25 30 Jul 5 10 15 20 25 30 Aug 5 10 15 20 25 30 Sep 5 10 15 20 25 30 Oct 5 10 15 20 25 30 Nov 5 10 15 20 25 30

Market Events

23-Jun
Bear Stearns pledges \$3.2 bn to aid one of its ailing hedge funds

9-Aug
BNP Paribas freezes three funds after being unable to value subprime mortgage based assets

13-Sep
Northern Rock receives emergency loan from the Bank of England

16-Oct
Citigroup begins a string of major bank writedowns based on subprime mortgage losses

27-Nov
Citigroup raises \$7.5 bn from the Abu Dhabi Investment Authority

Jun 5 10 15 20 25 30 Jul 5 10 15 20 25 30 Aug 5 10 15 20 25 30 Sep 5 10 15 20 25 30 Oct 5 10 15 20 25 30 Nov 5 10 15 20 25 30

Other Policy Actions

26-Jun
SEC begins investigation of 12 CDO issuers

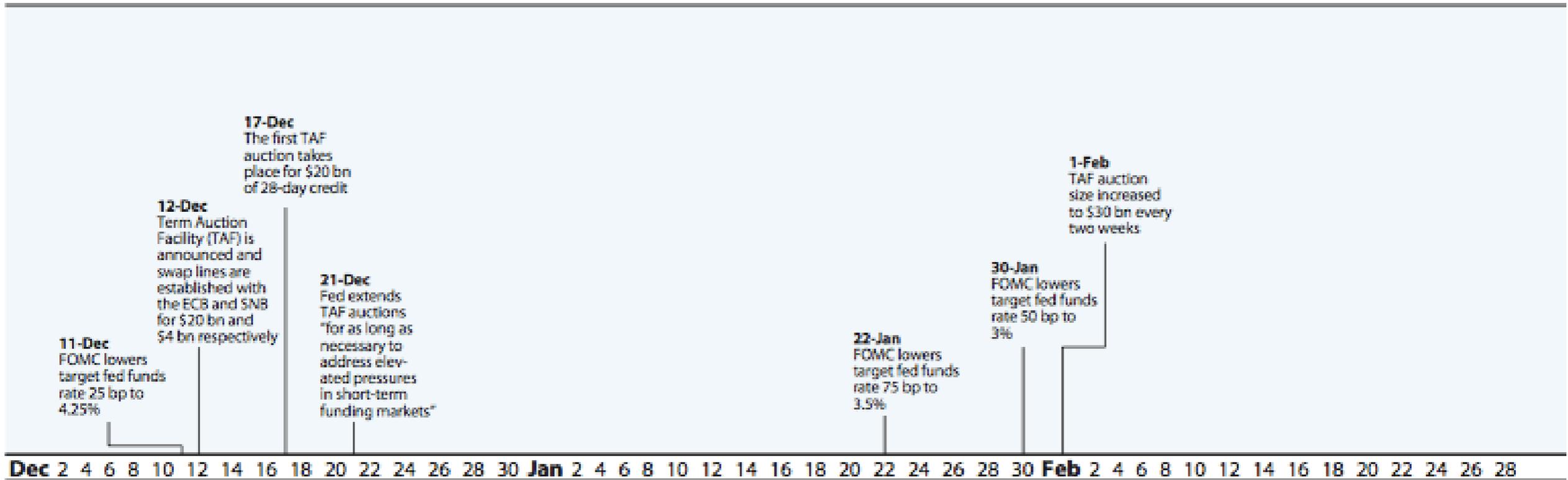
10-Oct
Paulson makes statement on "private sector alliance" to prevent mortgage default



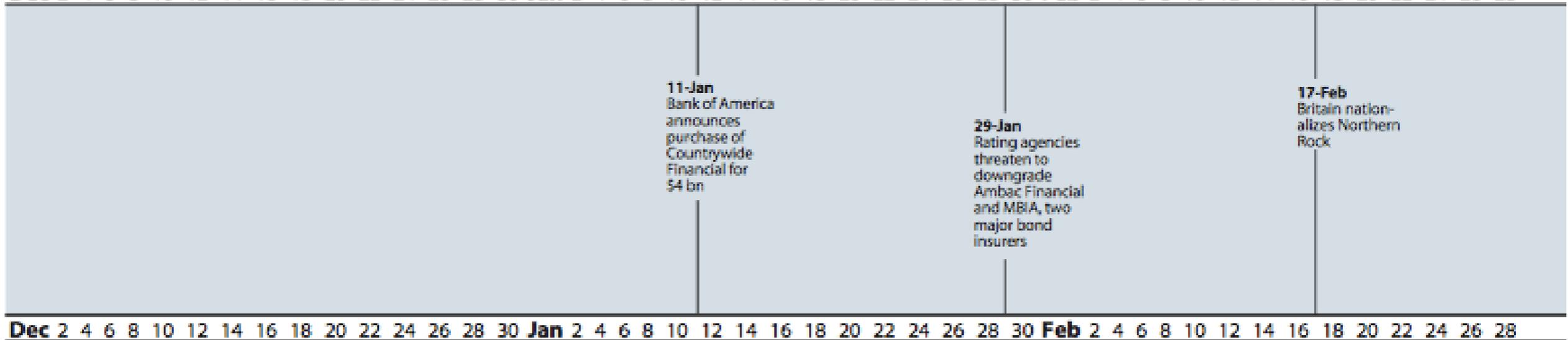
Levy Economics Institute of Bard College

Financial Turmoil Timeline (December 2007 - February 2008)

Fed Policy Actions



Market Events



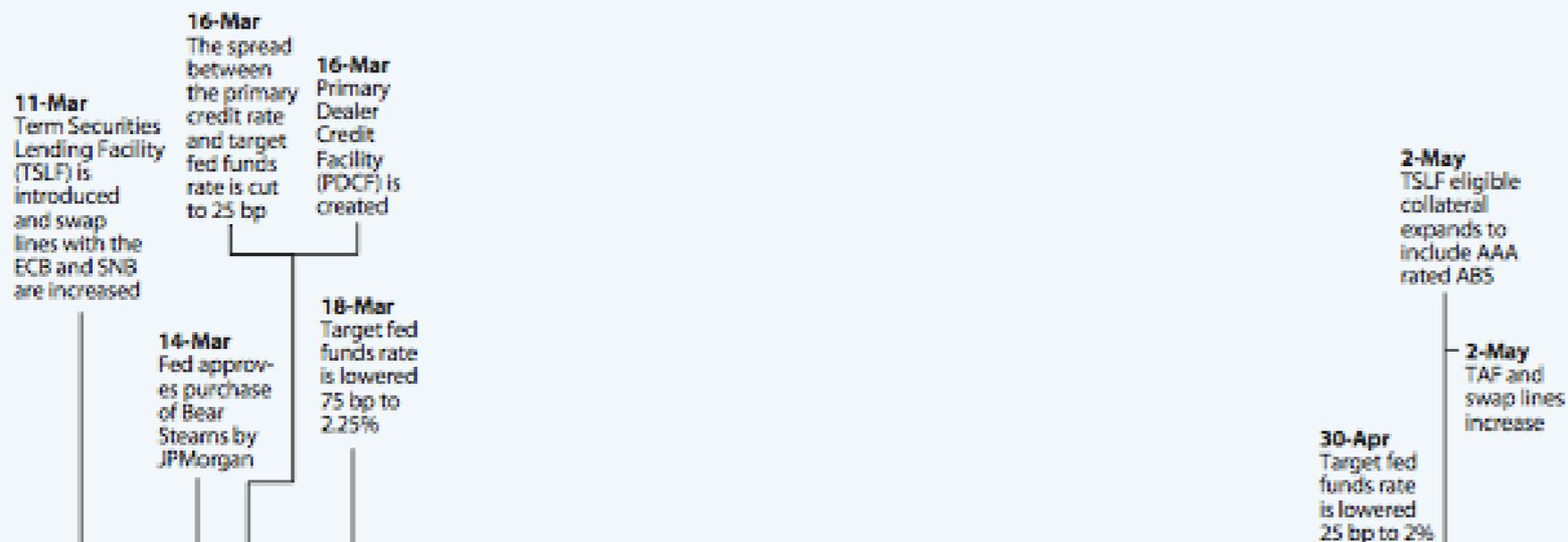
Other Policy Actions



Click on any event for further information. If you encounter broken links or have other feedback, please email Lauri Feldman at lauri.feldman@ny.frb.org.

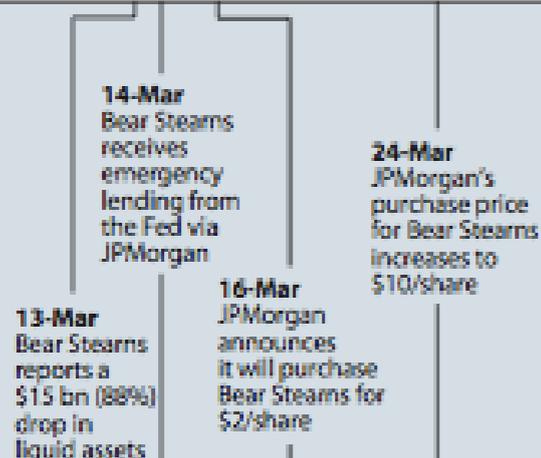
Financial Turmoil Timeline (March 2008-May 2008)

Fed Policy Actions



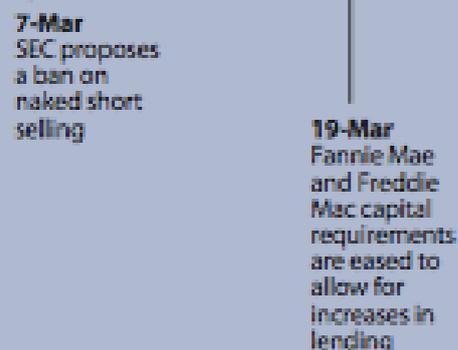
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Market Events



Mar 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 Apr 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 May 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30

Other Policy Actions



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Financial Turmoil Timeline (June 2008-August 2008)

Fed Policy Actions

5-Jun
Bank of America's purchase of Countrywide is approved

13-Jul
Lending to Fannie Mae and Freddie Mac at the primary credit rate is authorized

30-Jul
84-day TAF auctions are introduced and the ECB swap line is increased

Jun 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 Jul 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 Aug 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30

Market Events

6-Jun
S&P downgrades the two largest monoline bond insurers from AAA to AA

16-Jun
Lehman reports a loss of \$2.8 bn in the second quarter

11-July
After FDIC take-over, IndyMac experiences a run on deposits

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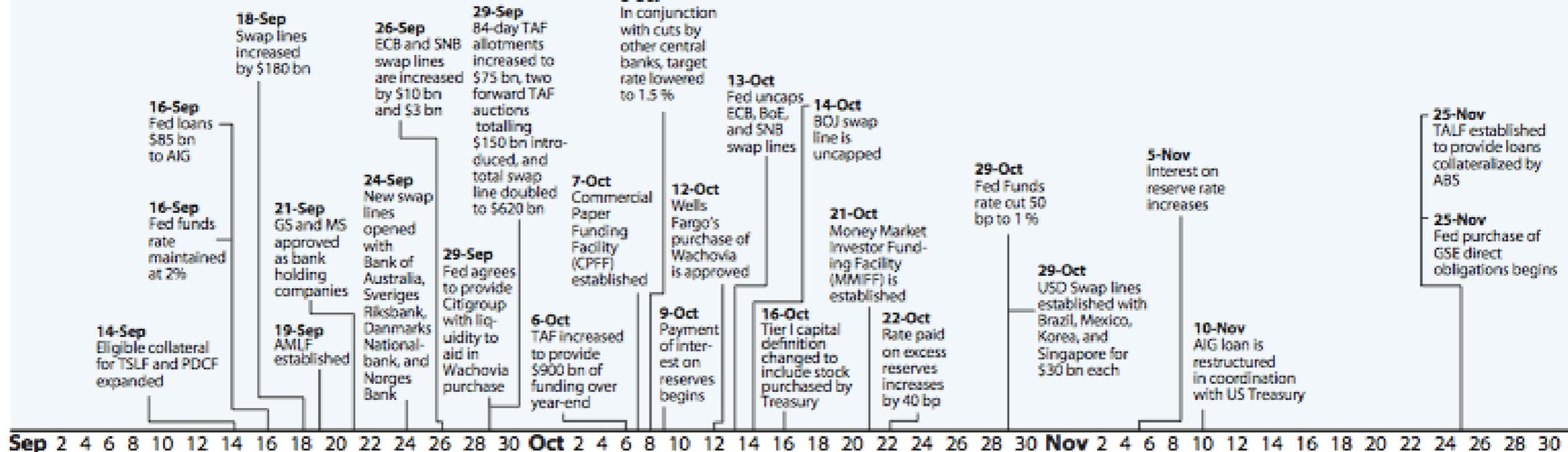
Other Policy Actions

11-July
The FDIC takes over IndyMac

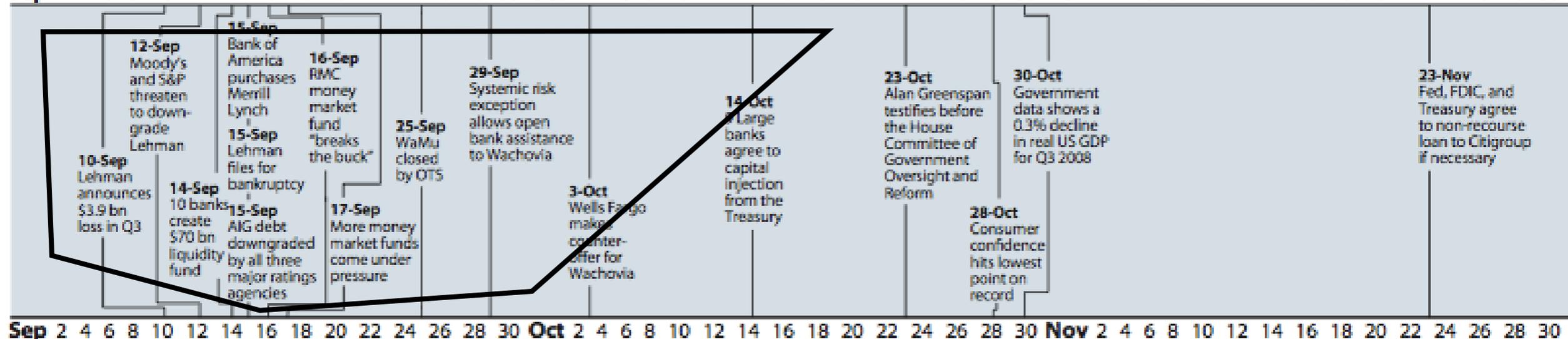
15-July
Treasury Secretary Paulson requests government funds to potentially support Fannie Mae and Freddie Mac

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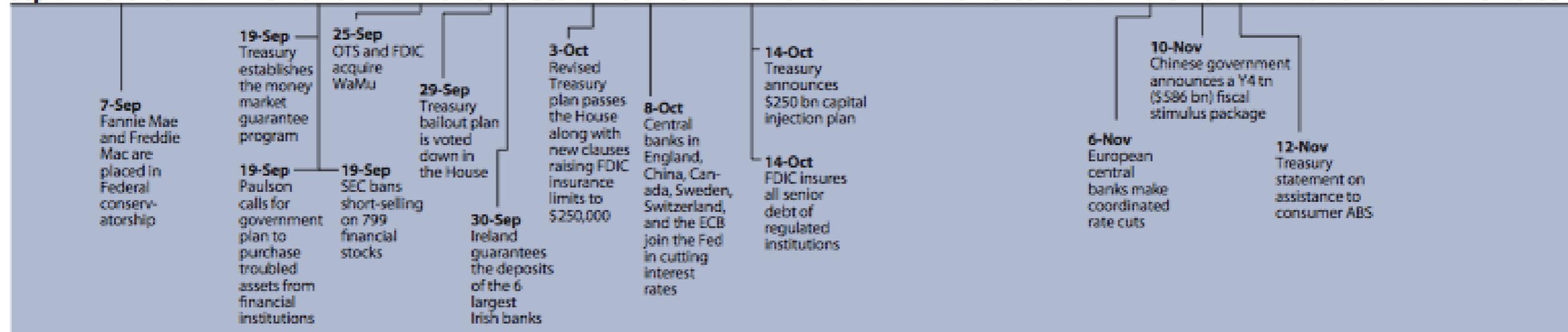
Fed Policy Actions



Market Events



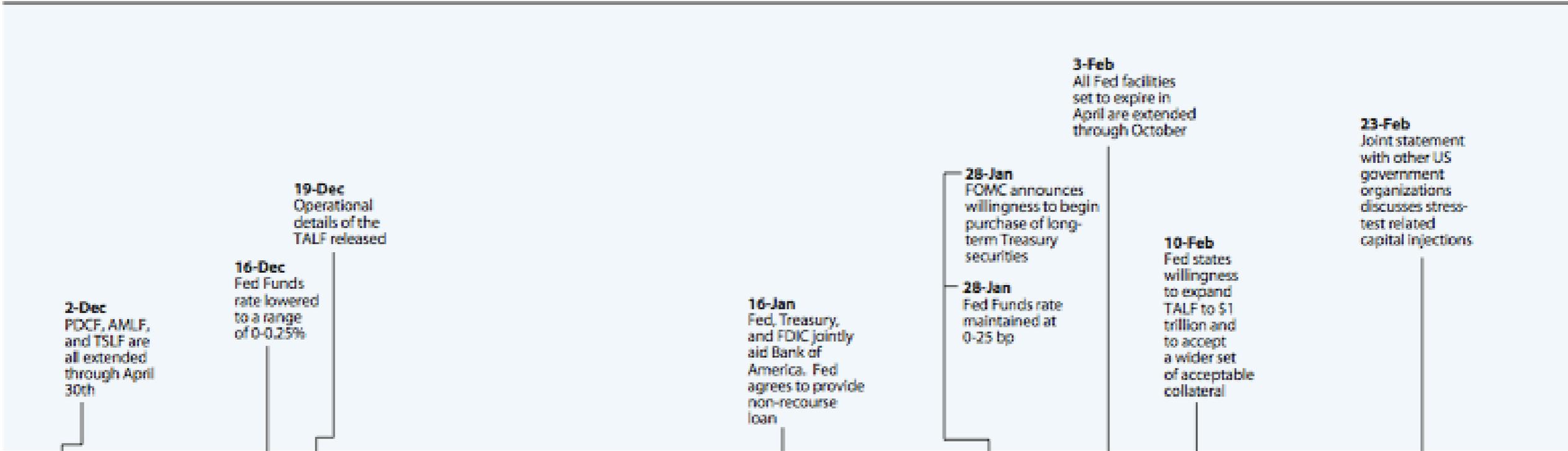
Other Policy Actions



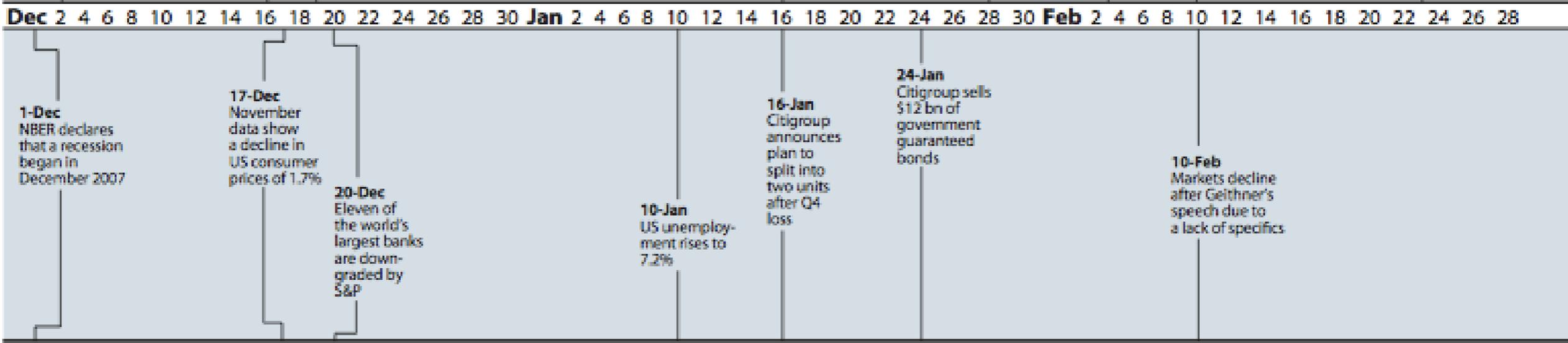
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Financial Turmoil Timeline (December 2008 - February 2009)

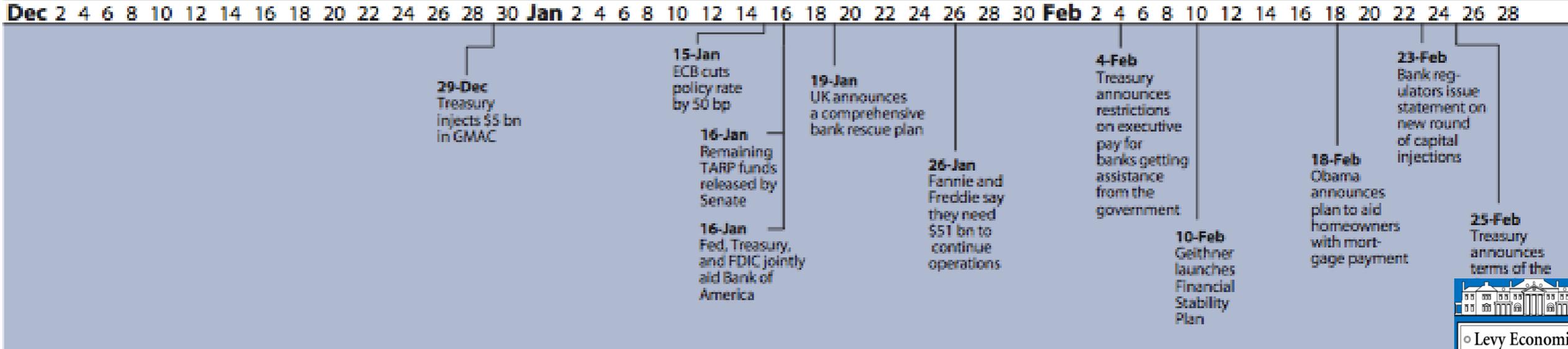
Fed Policy Actions



Market Events



Other Policy Actions

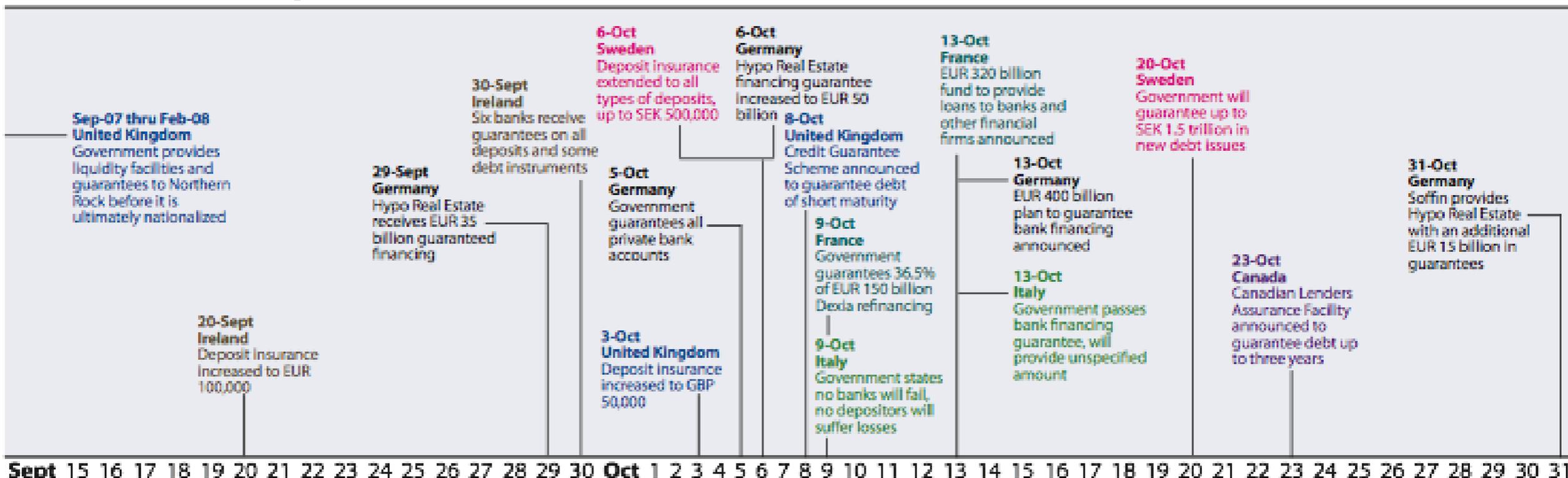


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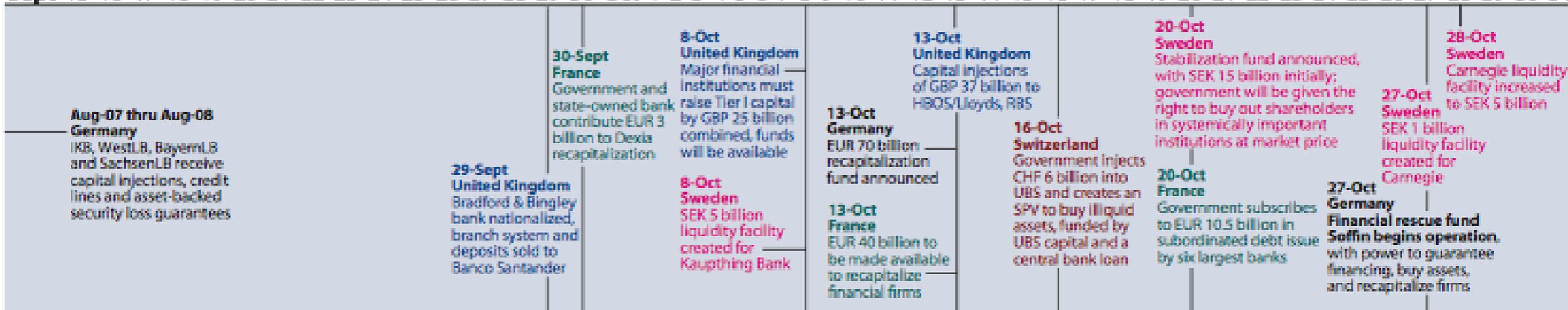


International Responses to the Crisis Timeline (Sept 2008 - Oct 2008)

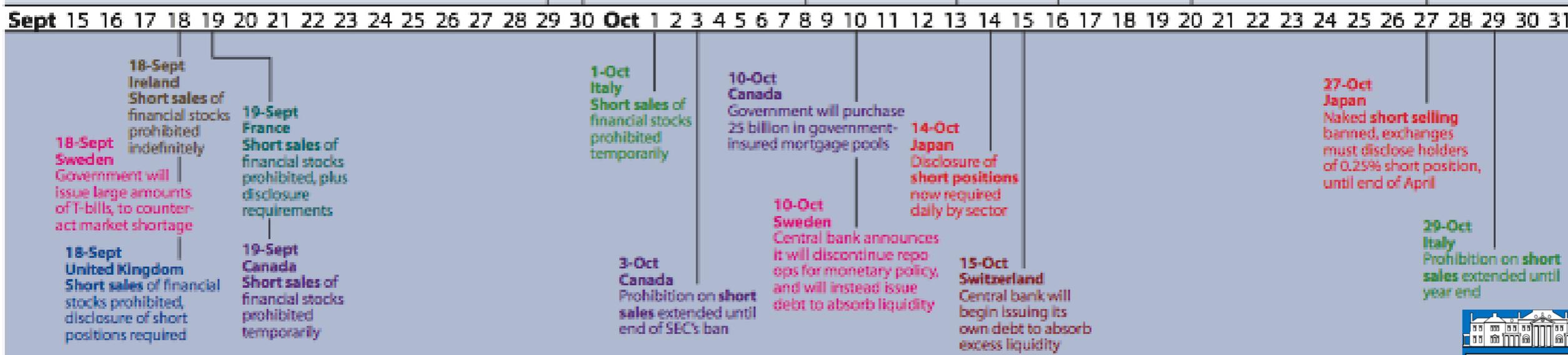
Bank Liability Guarantees



Liquidity and Rescue Interventions



Other Market Interventions



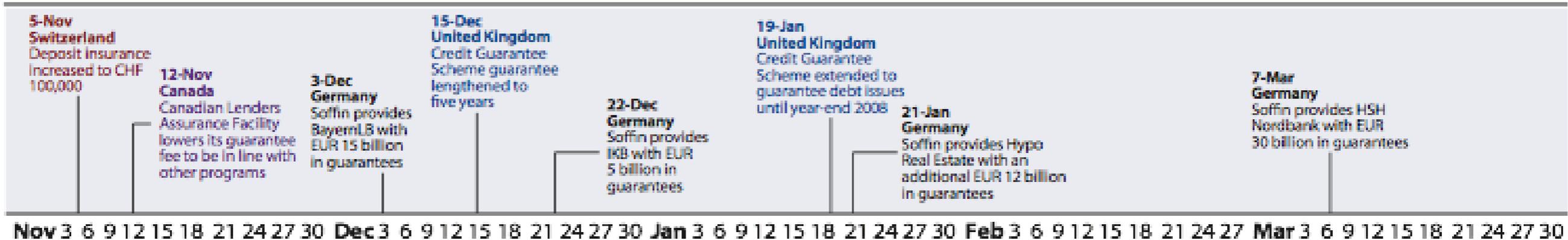
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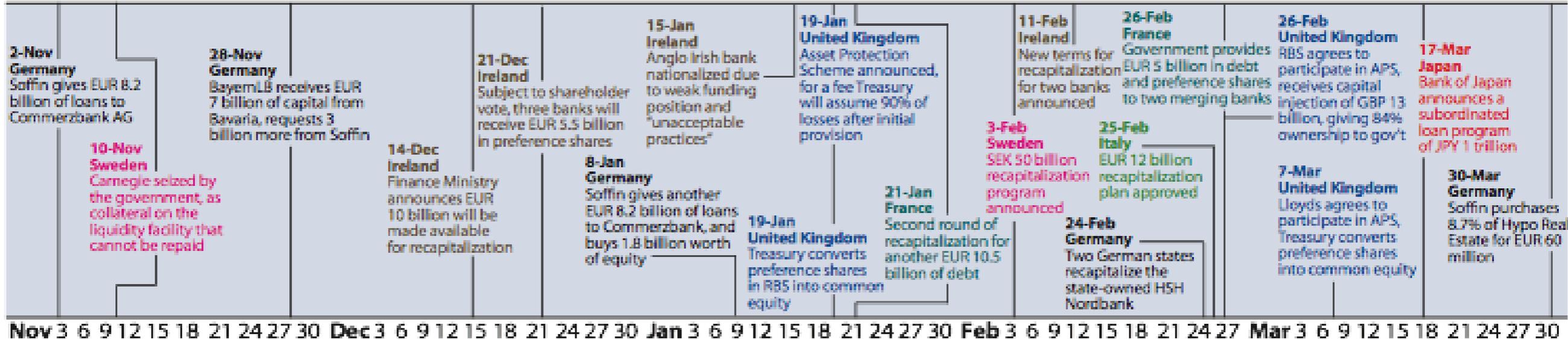


International Responses to the Crisis Timeline (Nov 2008 - Mar 2009)

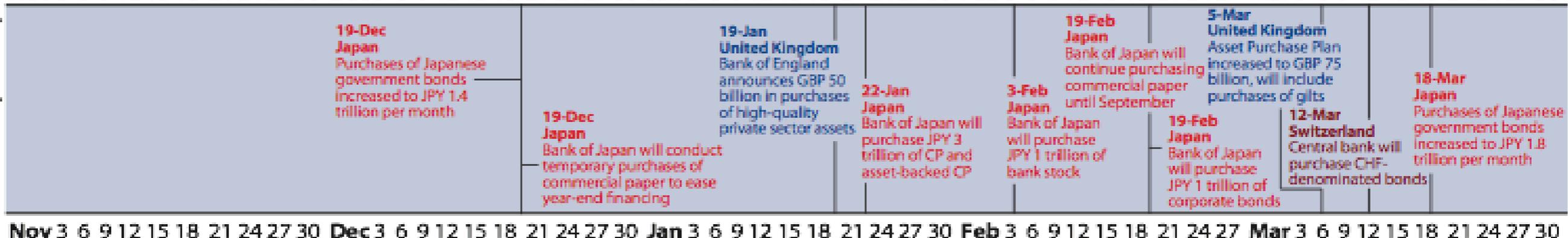
Bank Liability Guarantees



Liquidity and Rescue Interventions



Unconventional Monetary Policy

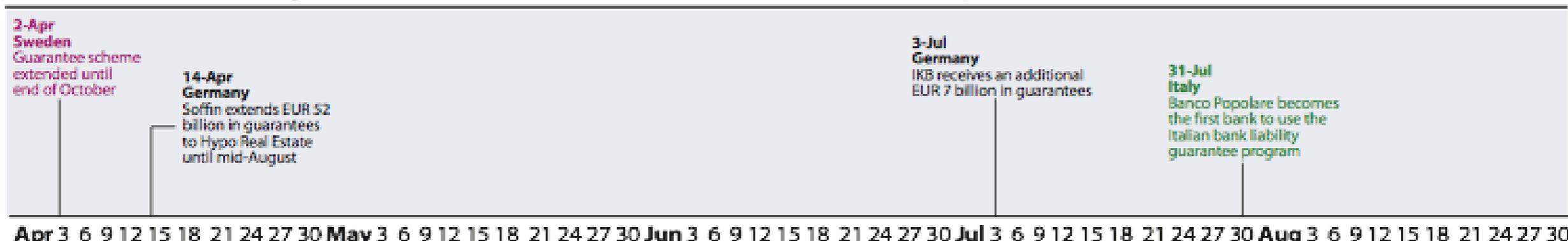


Other Market Interventions



International Responses to the Crisis Timeline (Apr 2009 - Aug 2009)

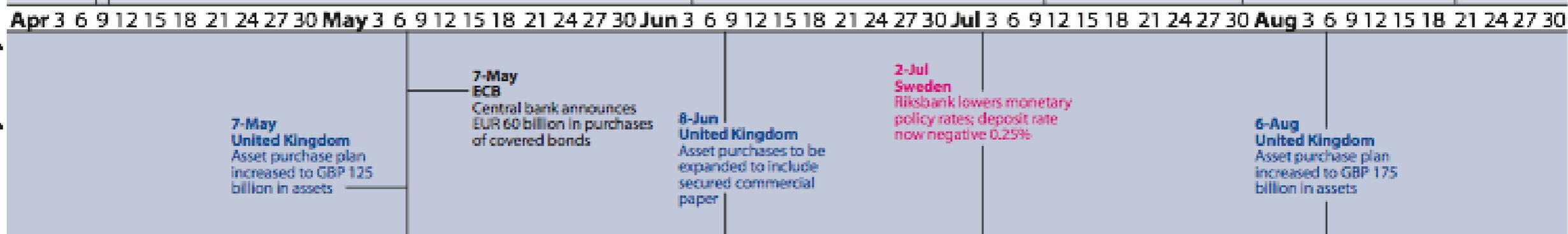
Bank Liability Guarantees



Liquidity and Rescue Interventions



Unconventional Monetary Policy



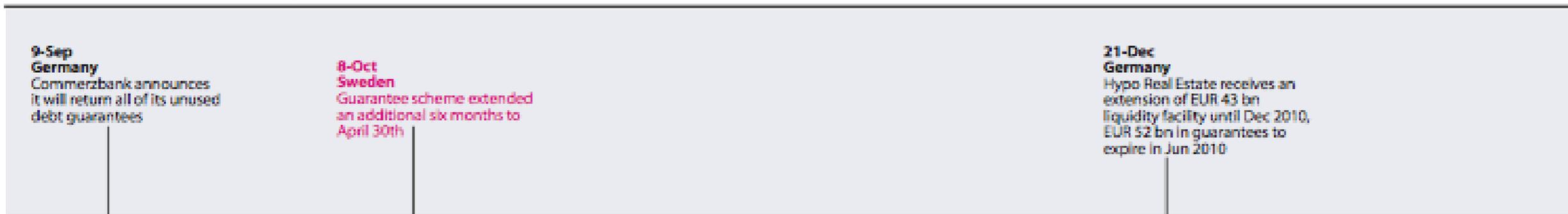
Other Market Interventions



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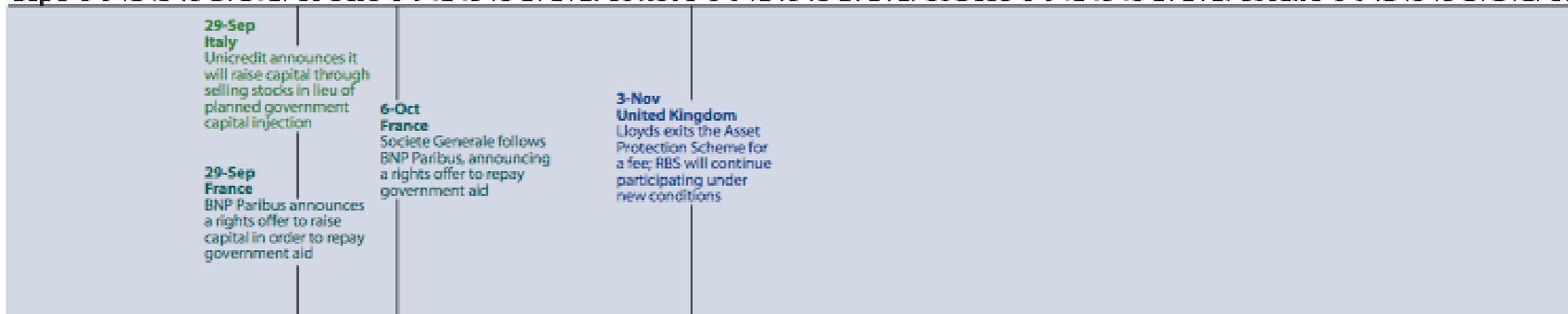
International Responses to the Crisis Timeline (Sep 2009 - Jan 2010)

Bank Liability Guarantees



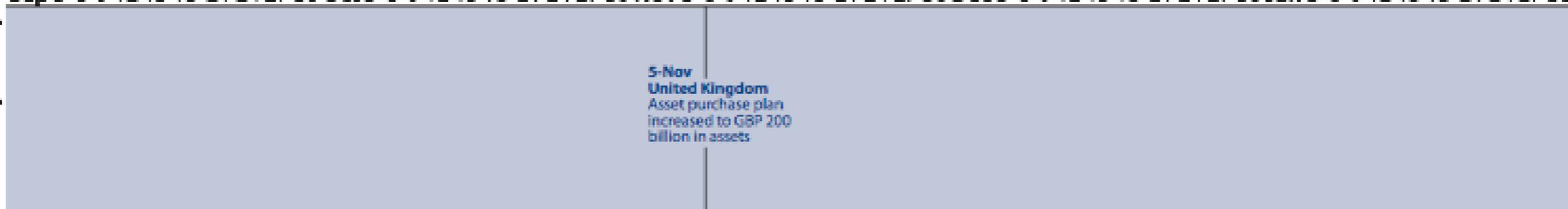
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Liquidity and Rescue Interventions



Sep 3 6 9 12 15 18 21 24 27 30 Oct 3 6 9 12 15 18 21 24 27 30 Nov 3 6 9 12 15 18 21 24 27 30 Dec 3 6 9 12 15 18 21 24 27 30 Jan 3 6 9 12 15 18 21 24 27 30

Unconventional Monetary Policy



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Other Market Interventions



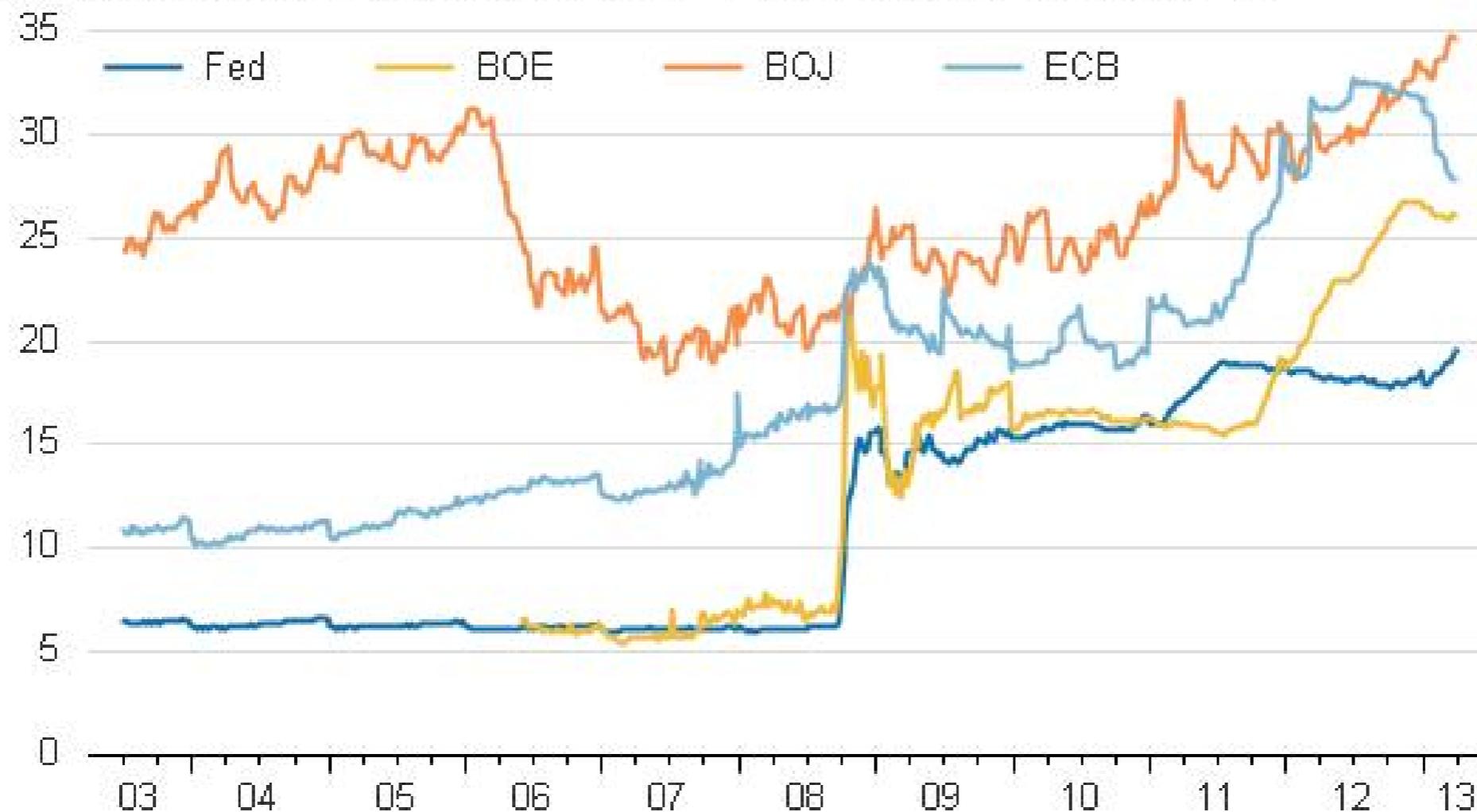
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But they all had one thing in common: Balance Sheets

Balance sheets as percent of GDP

Central bank assets as a percent of IMF nominal GDP forecast - %



Source: Thomson Reuters Datastream

Reuters graphic/Scott Barber 4/4/2013

Extraordinary Monetary Policies: Financial Sector

- In Response to the Crisis
 - Bagheot Rule: Provide liquidity at penalty rates against good collateral did not apply
 - Keynes's Rule: If they want Green Cheese give them Green Cheese
 - Fed Reg 13(3) lend to anyone who cannot get accommodation from financial system
 - But, under mark to market accounting, a liquidity crisis destroys market pricing references and defaults due to failure to access short-term funding meant most financial institutions faced insolvency
- Extreme liquidity preference caused by uncertainty over solvency of counterparties
 - Led to a freeze in all financing of the productive sector
 - Creation of Special Vehicles to acquire bad assets
 - Kahn rule: the financial system is responsible for providing money in exchange for the financial assets the public does not want to hold
 - The Central Bank is responsible for providing reserve deposits in exchange for the financial assets the financial system does not want to hold
 - Payment of interest on all reserve deposits to counter freeze in interbank market
 - Removal of Assets from bank balance sheets to reduce uncertainty over solvency

Policy was Neither New nor Exceptional

- Recommended by Keynes's Treatise on Money in Response to the 1930s Crisis
- Challenged monetary authorities to take "deliberate and vigorous action" to reduce interest rates via "extraordinary" monetary policy action:
- "the purchase of securities by the central bank until the long-term market rate of interest has been brought down ... to any figure at which it is itself prepared to buy long-term securities."... "Thus I see small reason to doubt that the central bank can produce a large effect ... if it is prepared to persist with its open-market policy far enough."
- Thus, Keynes not only recommends pushing the rate of interest down towards zero, but buying in the long-term market to reduce long rates.
- Keynes notes that these policies are not at all different from normal open-market policies, and that the central bank possesses the power to set any interest rate, short or long, at any level it desires.

Extraordinary Monetary Policies: Recovery

- In Response to the Collapse of lending to the Productive Sector and the Great Recession
- Keynes's Monetary Policy à **outrance**
- Restore Lending to the Productive Sector, Support Investment
 - How to make banks lend more
 - How to make business borrow more
 - Flatten (or Invert) the Yield Curve
 - Lower the short price! {ZIRP}
 - Lower the long price! {QE I,II, III}
 - Swap bills for bonds Maturity Extension Program
 - Make Risk Free assets Risky; Drive Investors to Riskier Assets
 - Stock Market Boom, Mortgage Refinancing Boom
- Catch 22 Policy:
- If economy improves allow rates to rise, losses on bonds but higher mortgage and financing costs cut off recovery
- If economy deteriorates extend policy, invest in bonds for capital gains not real investment
- **NO NET IMPACT ON INVESTMENT SPENDING OR CONSTRUCTION**

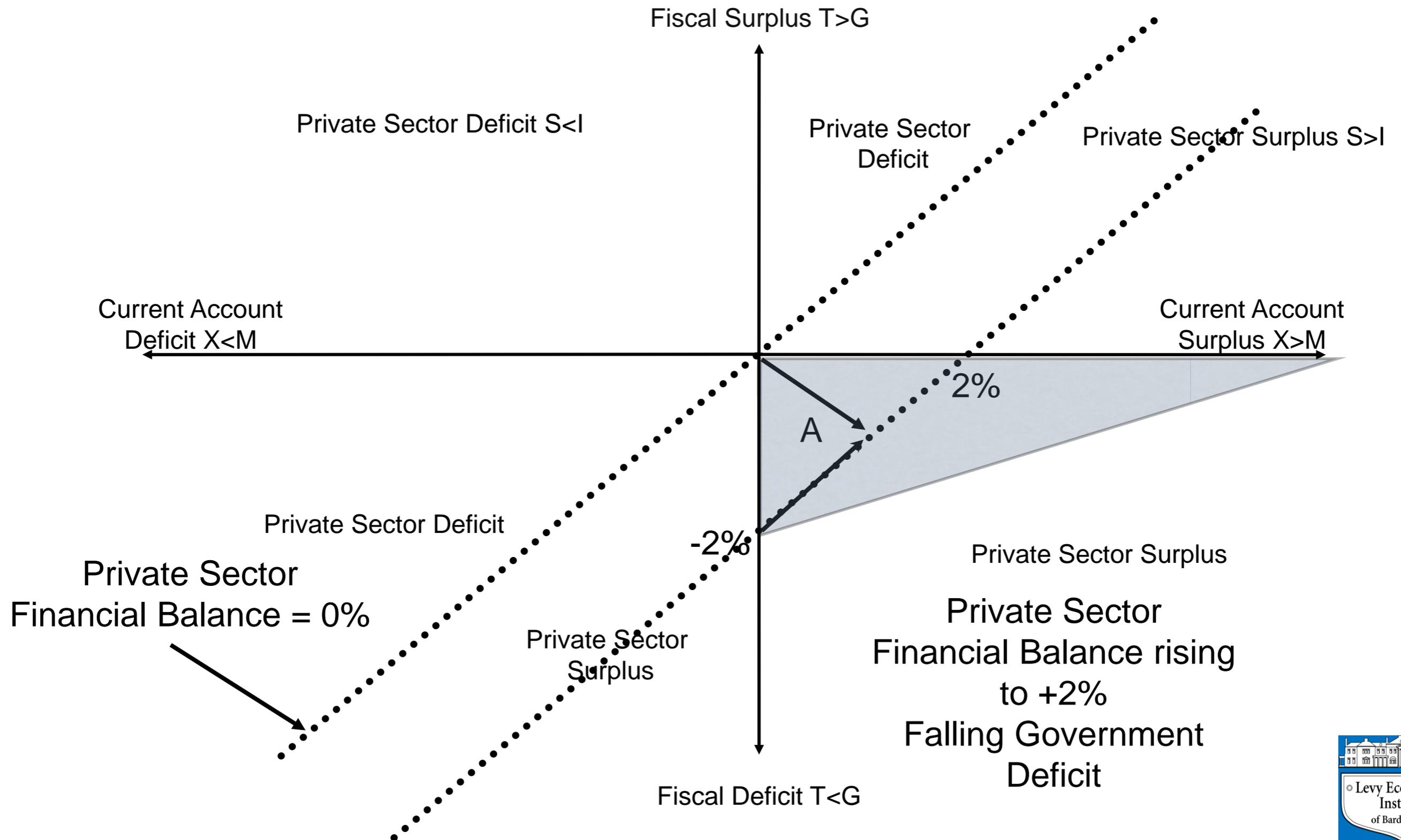
Keynes soon gave up on Monetary Policy Alone

- It is Expected Profit not financing cost that drives expenditure and employment: Effective Demand
- The problem not only wealth destruction in the banks, it is wealth destruction in the households and policies to protect wealth in the firms
- Households could not swap their mortgages for bank deposits the way banks swapped MBS for Central Bank reserves
- Households must earn back their losses and/or reduce expenditures
- Unemployment, falling wages, make this even harder
- Monetary Policy alone is not enough to start Recovery:
- Dunkman (1933): "no technique has been devised for placing bank {reserves} credit directly at the disposal of the community"
- Who can spend without fear of loss?? This is the role of Government

How can Private Sector Rebuild?

- Sectoral Financing Objectives in response to the Great Recession:
 - Households $S > I$ Higher Incomes or Lower Consumption to Repay Debt
 - Firms $S > I$ reduce Capacity to avoid losses on Investment, conserve cash in liquidity freeze
 - Private Sector Balance = Households + Firms = $S > I$
 - Foreign Sector Balance:
 - For US: $NX < 0$,
 - For Europe, Japan $NX > 0$
 - Public Sector Balance:
 - For US, Japan Short Term Stimulus $G > T$ rising, Long Term Reduction $G > T$ rising
 - for Europe Austerity Short Term $G > T$ falling, Long Term $G = T$
- Final Expenditures $Y = C + I + G + NX$ or
- Sectoral Financial Balances $S - I = T - G + NX$
- Only compatible with Global $NX > 0$

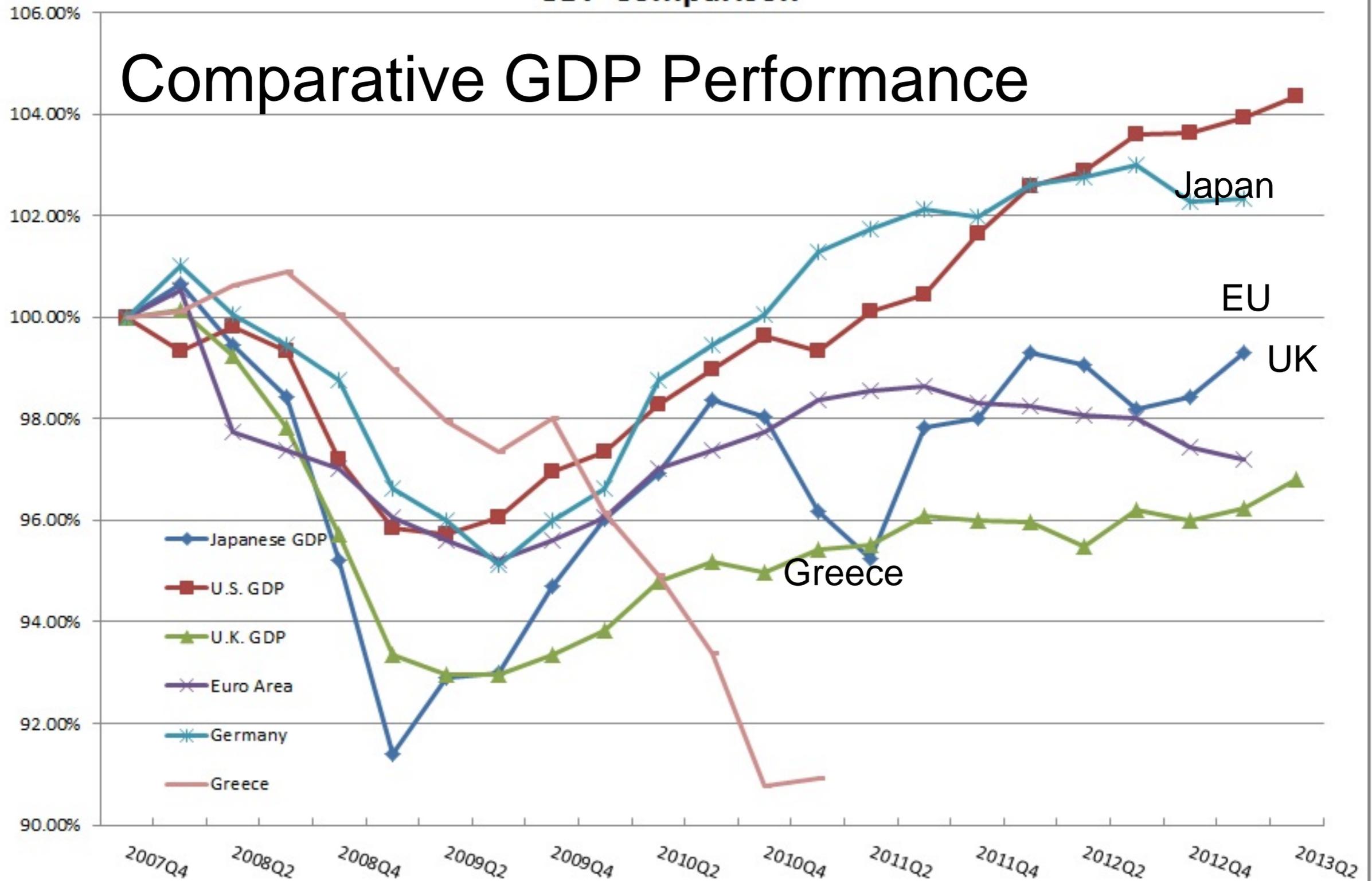
Sectoral Financial Balances $0 = (S-I) + (T-G) + (X-M)$



GDP Comparison

USA

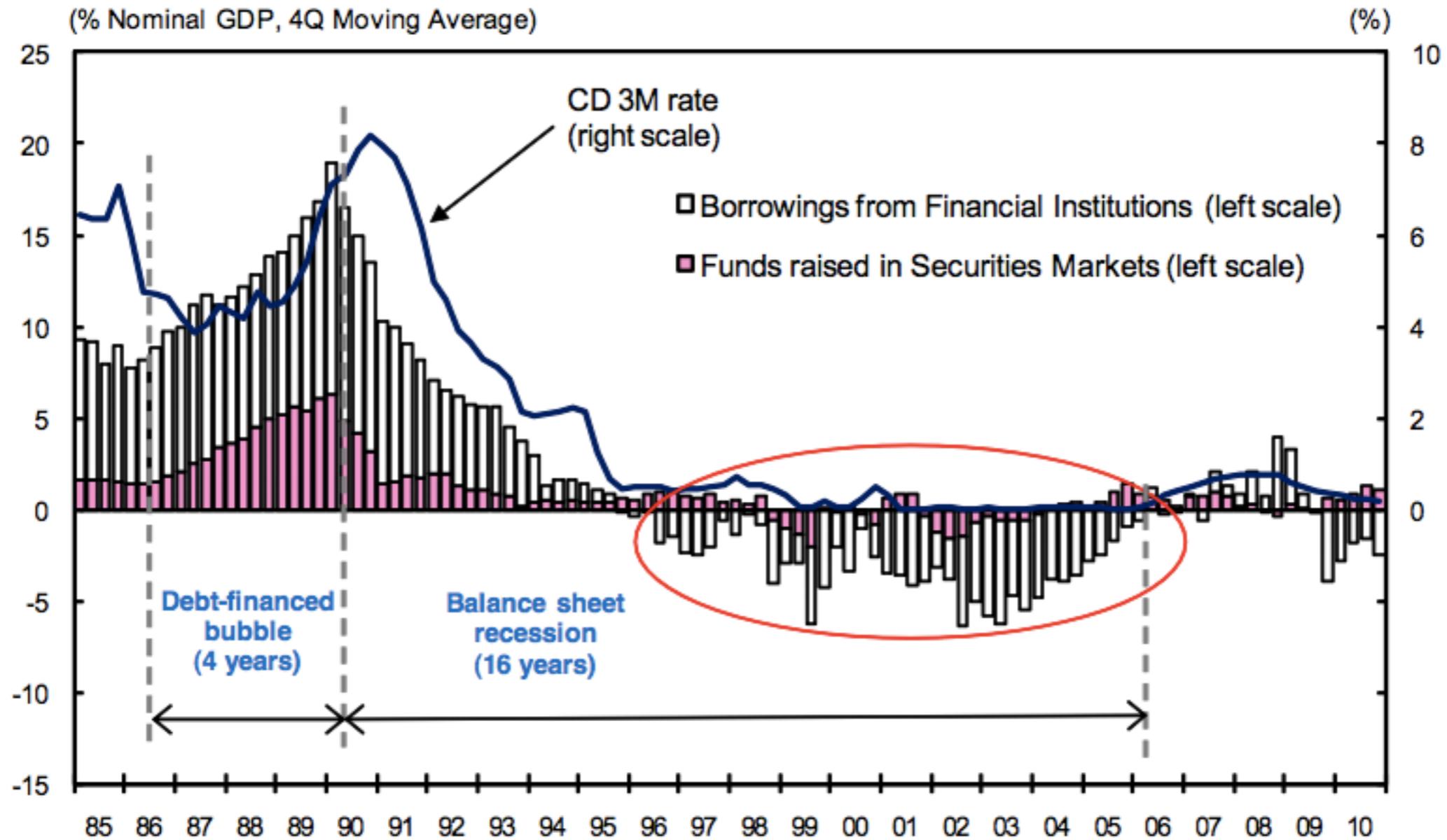
Comparative GDP Performance



avantguard.blogspot.com

Exhibit 6. Japan's de-leveraging with zero interest rates lasted for 10 years

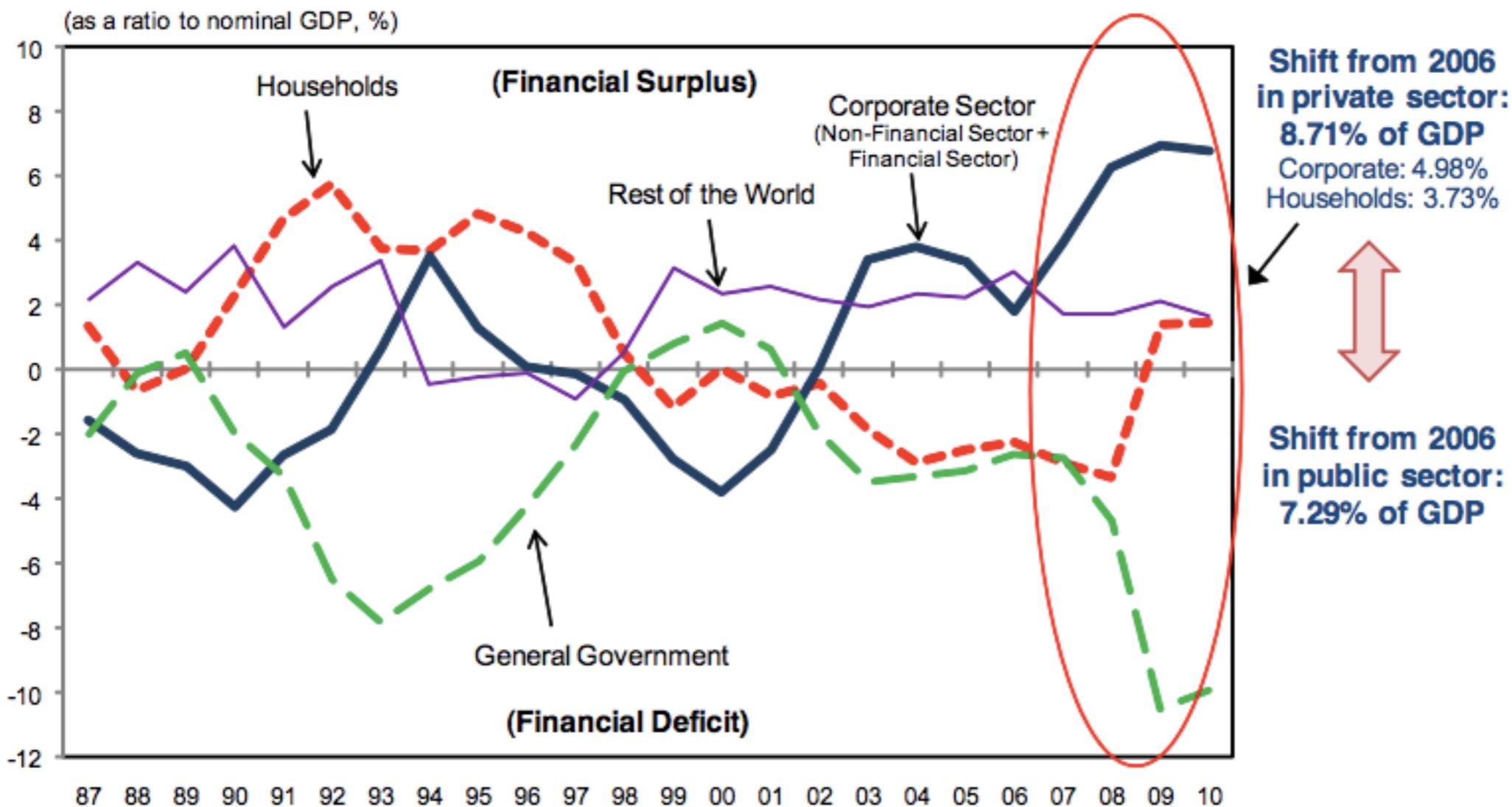
Funds Raised by Non-Financial Corporate Sector



Sources: Bank of Japan, Cabinet Office, Japan

Exhibit 12. UK flow of funds

Financial Surplus or Deficit by Sector

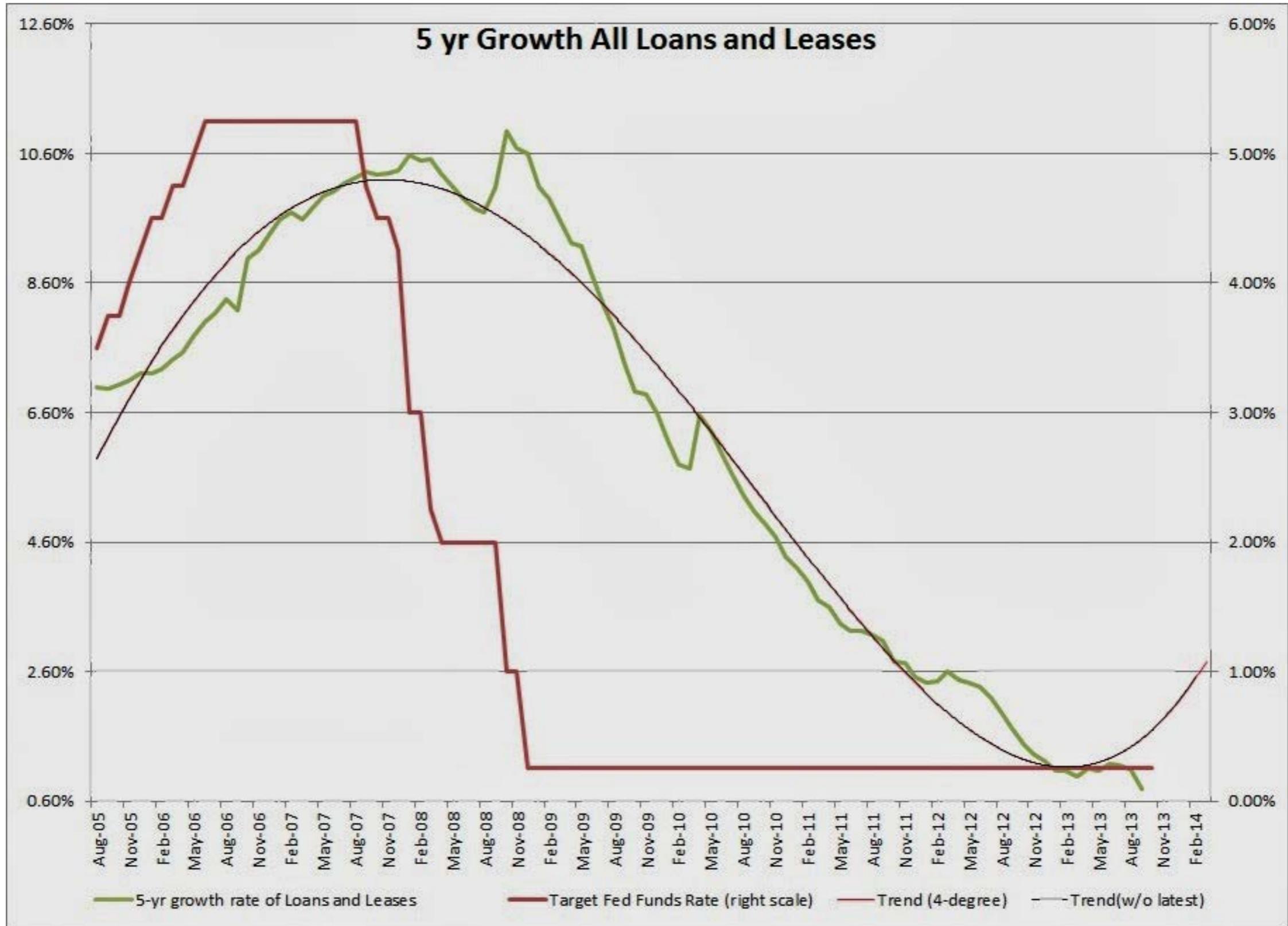


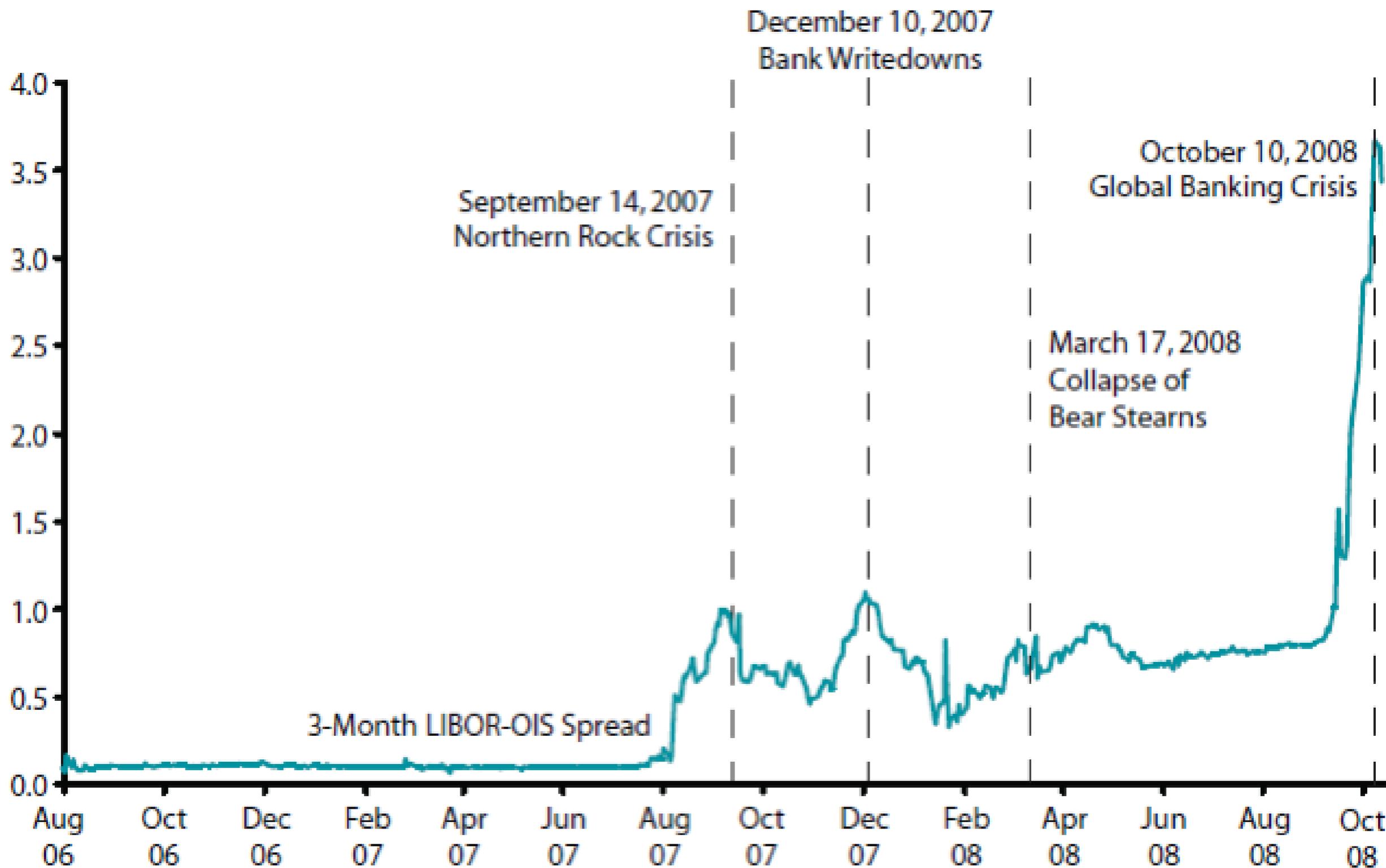
Source: Office for National Statistics, UK

US Exceptional Policies

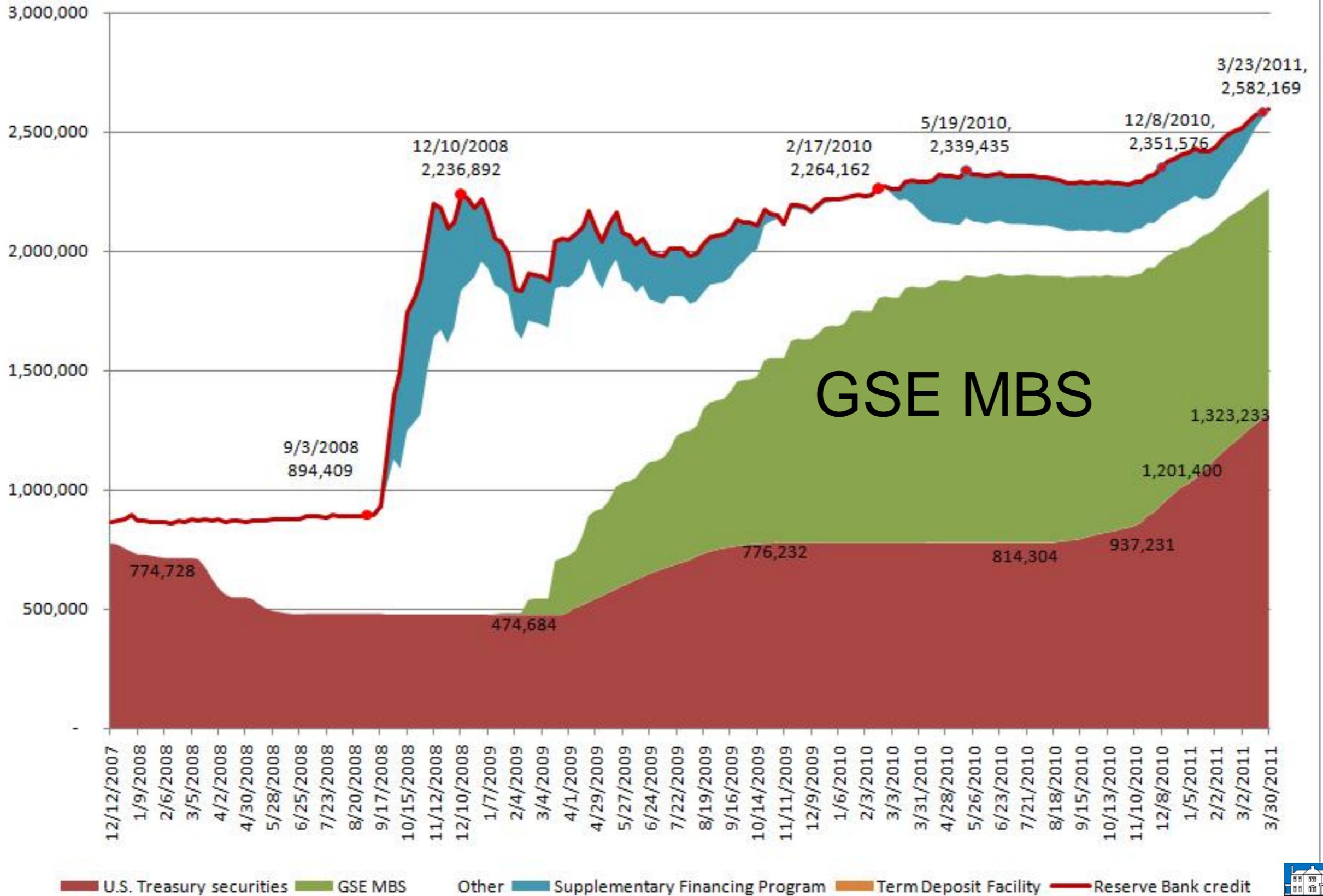
- Crisis in the Financial Sector

The Financial System Stops Lending

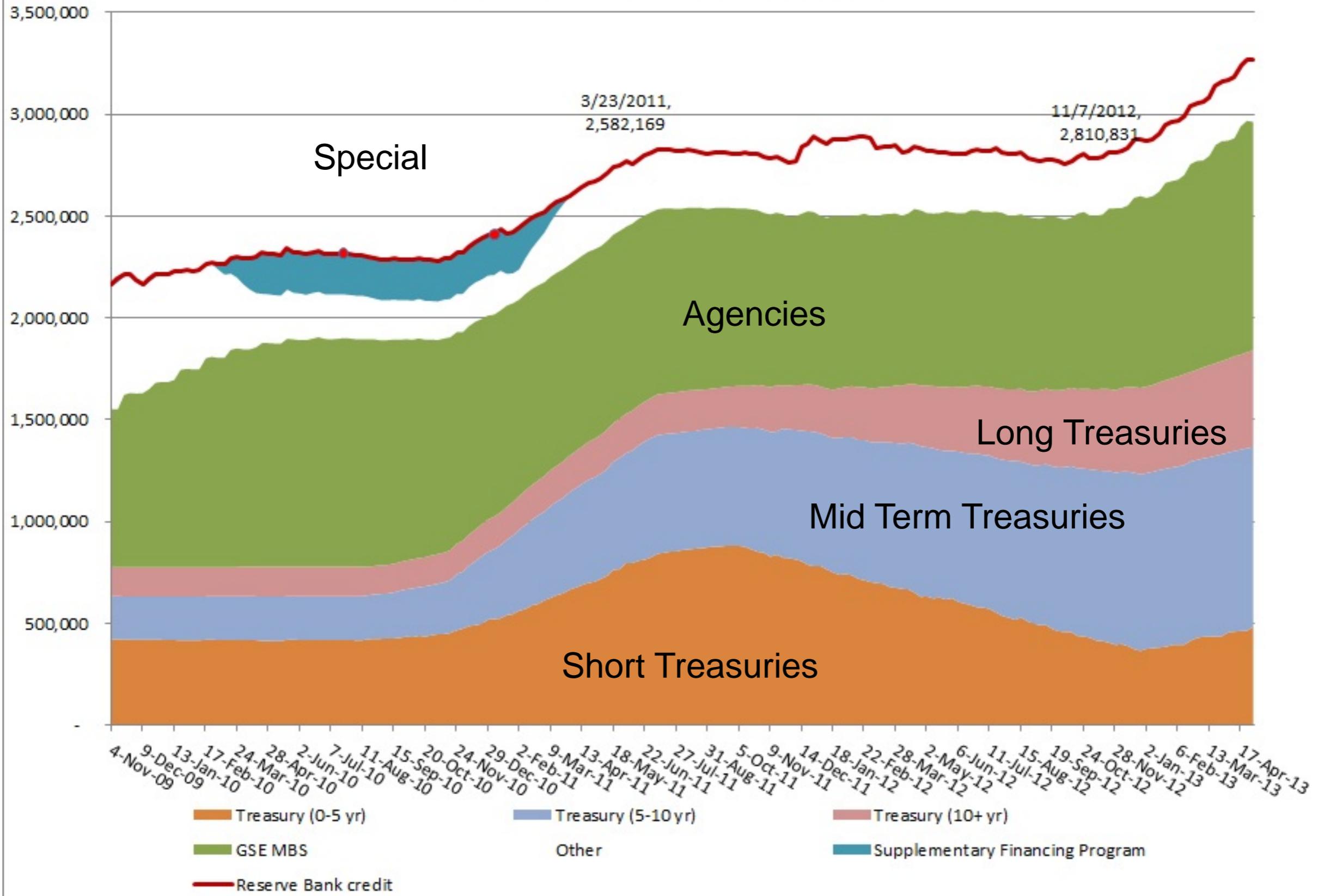




Federal Reserve Balance Sheet



Federal Reserve Balance Sheet



Stage One—Provision of Short-Term Liquidity

- Crisis facilities associated with Stage 1 were aimed at providing “short-term” liquidity to solvent banks and other depository institutions as well as other types of financial institutions.
- Aimed at improving aggregate liquidity and also distribution of liquidity across financial institutions.

Term Auction Facility (TAF)

- Announced December 12, 2007
- 12/17/2007-3/8/2010 (approx. 39 months)
- Stress in sub-prime market; credit ratings downgrade; stigma problem; Federal Home Loan Bank System (FHLB) increased lending by 272% (from \$235B to \$875B) second half of 2007; was directed at depository institutions
- Authorized under FRA section 10B
- Auctioned 28 and 84 day discount window loans to eligible depository institutions
- 416 Unique Borrowers, 24 would comprise 71% of all borrowing
- Total loans issued: 4,214
- Cumulative lending: \$3.817 trillion
- Peak outstanding: \$493 billion
- Peak monthly usage: \$347 billion
- All loans repaid in full

Central Bank Liquidity Swaps (CBLS)

- Announced 12/12/07
- 12/17/2007-2/1/2010 (approx. 38 months)
- Reopened for select banks , 5/2010-1/2012
- Foreign banks having difficulty borrowing dollars; implemented to prevent fall in asset prices resulting from selling out of positions; was directed at foreign central banks
- Authorized under FRA section 14
- Swapped U.S. dollars for foreign currency
 - U.S. not subject to FX risk
- 10 borrowers (ECB comprised 80% of total borrowing)
- 569 loans issued 12/17/2007-2/1/2010
- Cumulative Lending: \$10.057 trillion
- Peak outstanding: \$583.13 billion
- Peak monthly usage: \$2.887 trillion
- All transactions were executed in full, in accordance with the terms of the swap arrangements

Single-Tranche Open Market Operations (ST OMO)

- Announced March 3/7/2008
- 3/7/2008-12/31/2008 (approx. 9 months)
- Intent was to ease strains in the agency MBS market by providing liquidity; directed at primary dealers
- Provided liquidity via repo operations
- 19 Borrowers, top 5 borrowed 69% of all loans
- Total loans issued: 375
- Cumulative lending: \$855 billion
- Peak outstanding: \$80 billion
- Peak Monthly Usage: \$20 billion
- All loans repaid in full

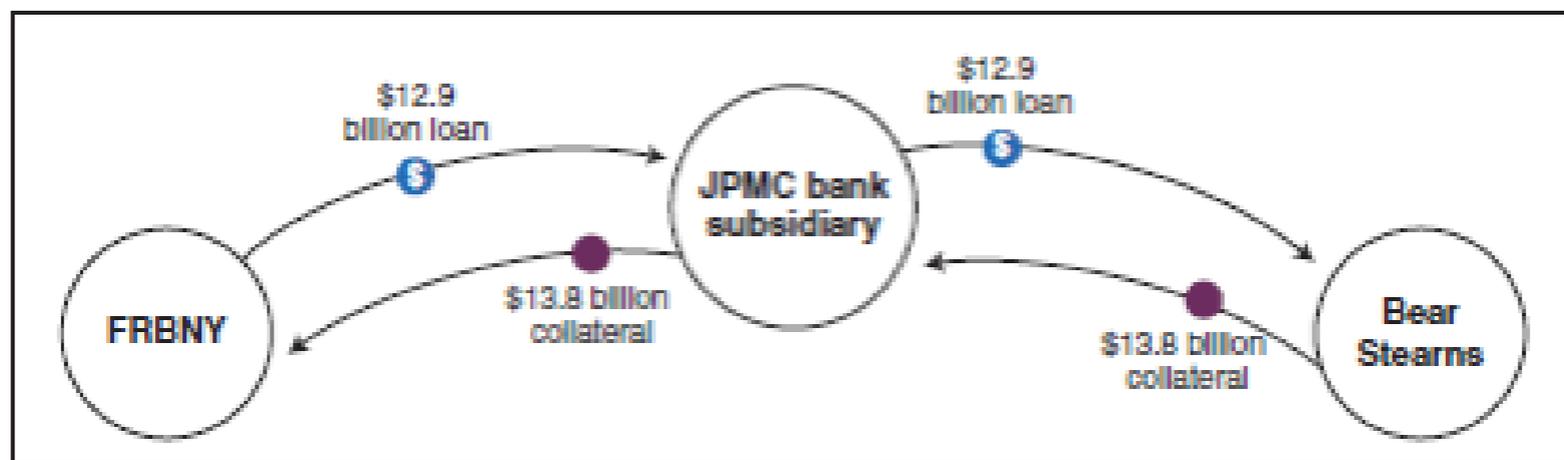
Term Securities Lending Facility & TSLF Options Program (TSLF & TOP)

- Announced 3/11/2008
- Closed:
 - 7/1/2009 (Schedule 1) (approx. 16 months)
 - 2/1/2010 (Schedule 2) (approx. 22 months)
- Authorized under FRA section 13(3); first time to be used
- Fed concerned about efficacy of conventional liquidity channel via depository institutions; repo market showing signs of considerable pressures; directed at primary dealers
- Auctioned treasury securities to primary dealers for a fee at a term of one month; was implemented to provide more acceptable collateral base for trades and prevent settlement fails
- Under TOP, offered supplementary liquidity in times of heightened market pressure
- 18 borrowers (11 used TOP), 9 dealers comprised 86% of all borrowing
- Total loans issued: 560
- Cumulative Lending: \$2.006 trillion
- Peak outstanding: \$235 billion
- Peak monthly usage: \$260 billion
- All loans repaid in full

Bear Stearns & Maiden Lane I

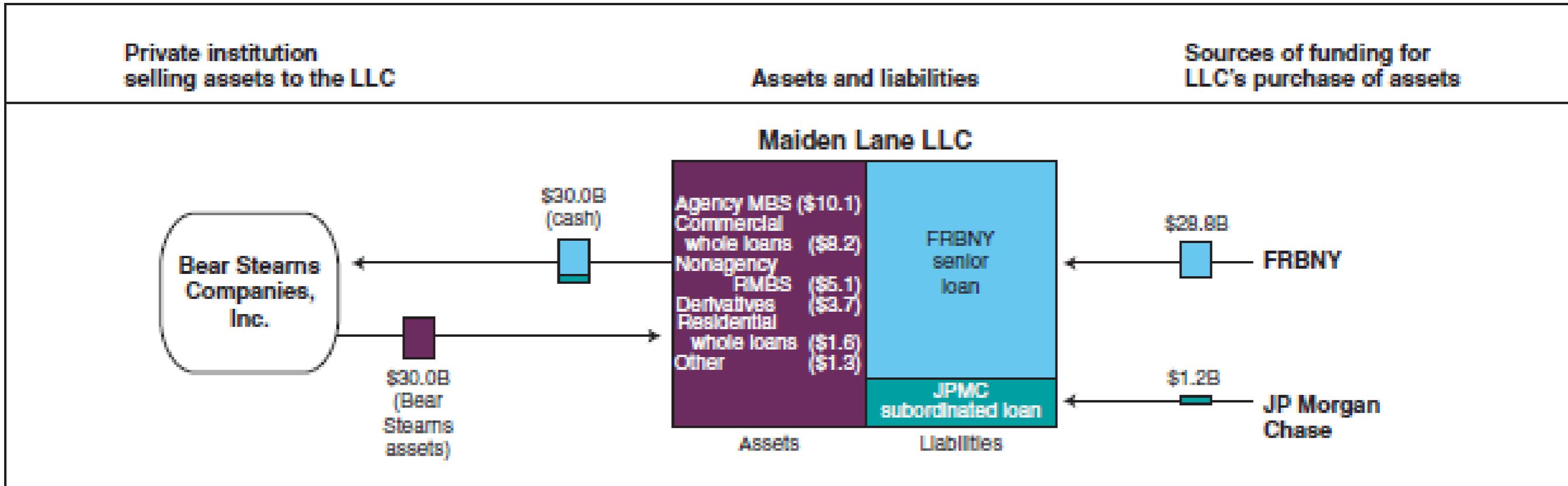
- Negotiated March 2008
- Bridge Loan to Bear Stearns through JP Morgan
 - March 14, 2008—\$12.9 billion
 - Repaid with interest two days later
- Maiden Lane I; created a Special Purpose Vehicle (SPV)
 - \$28.991 billion
 - Repaid June 12, 2012

Bear Stearns—JPMorgan Bridge Loan Transaction Structure



Source: GAO presentation of Federal Reserve Board information.

Maiden Lane I Transaction Structure



Source: GAO analysis of FRBNY information.

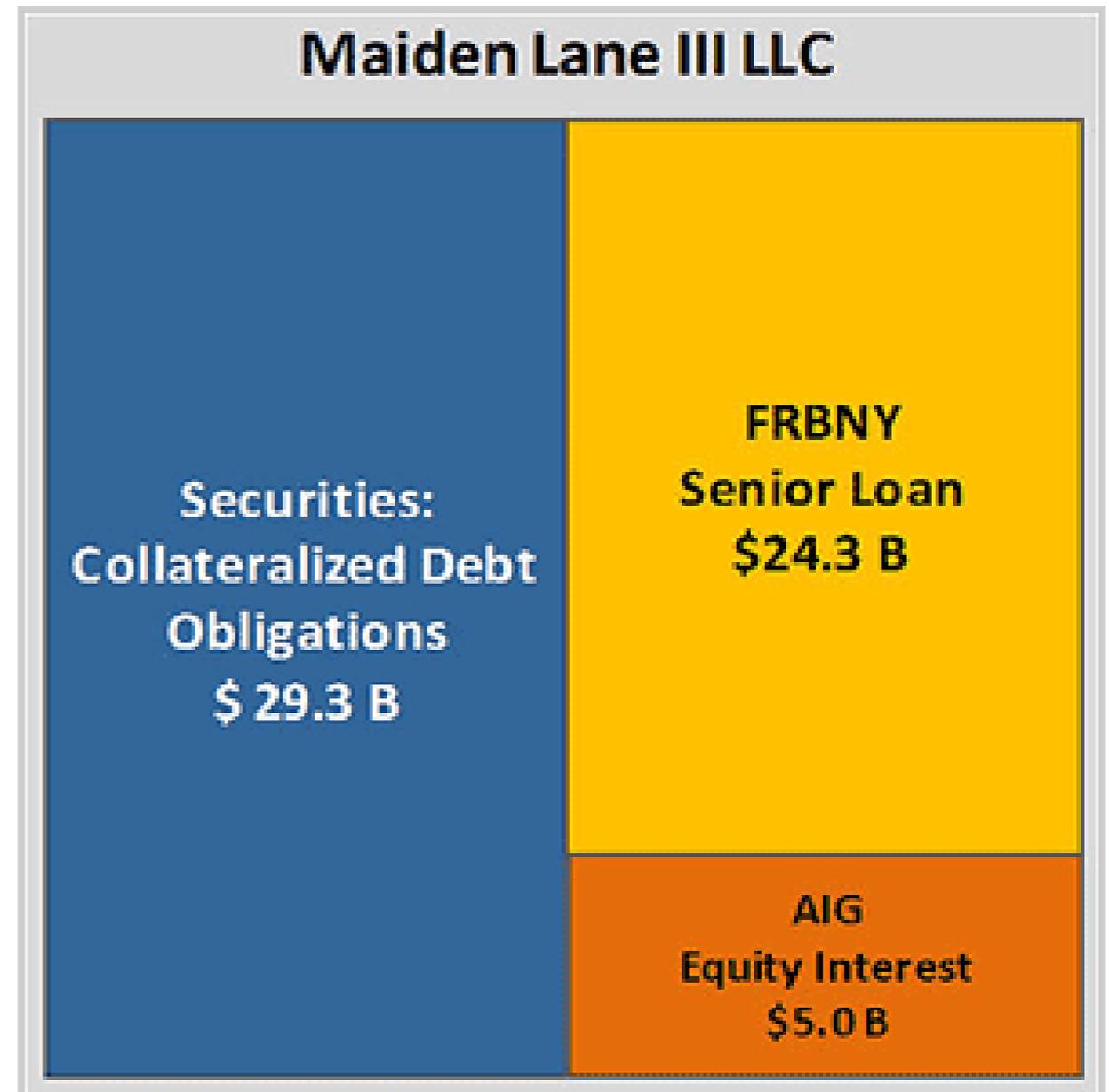
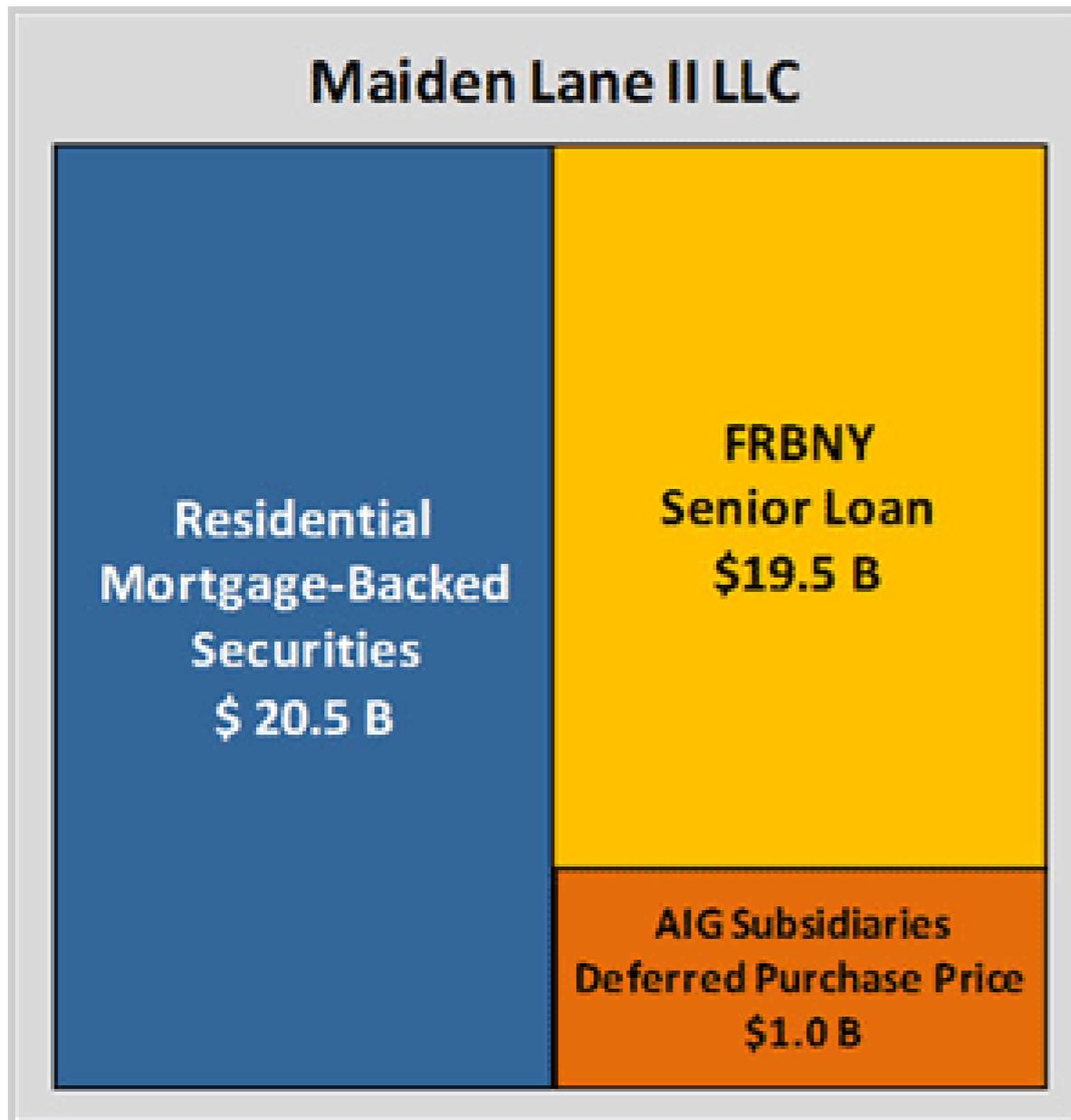
Primary Dealer Credit Facility (PDCF)

- Announced 3/16/2008
- 3/17/2008-2/1/2010 (approx. 23 months)
- Designed to help investment banks *directly* by providing cash against collateral; directed at primary dealers
- Authorized under FRA section 13(3)
- Lent reserves on an overnight basis directly to Primary Dealers; similar to conventional discount window lending to depository institutions
- 18 borrowers, 6 would comprise 92% of all borrowing
- Total loans issued:
 - 1,021 for PDCF
 - 355 to London affiliates
- Cumulative lending: \$8.95 trillion
- Peak outstanding: \$146.56 billion
- Peak monthly usage: \$2.47 trillion
- All loans repaid in full

AIG Support Operation

- Revolving Credit Facility
 - Designed to help with liquidity shortfalls
 - \$140.31 billion
 - Fully repaid
- Securities Borrowing Facility
 - Engaged in repos against AIG collateral
 - \$802.32 billion
 - Fully repaid
- Maiden Lane II—SPV
 - Purchase non-agency RMBS
 - \$19.5 billion.
 - Assets sold February 28, 2012
- Maiden Lane III—SPV
 - Was an attempt to “restructure” AIG’s debt to Fed.
 - Purchase multi-sector CDOs against which AIG had written CDSs
 - \$24.3 billion
 - Sale of securities allowed repayment to the Fed on June 14, 2012 and repayment of AIG equity interest on July 16, 2012. All remaining securities sold August 23, 2012.
- All required authorization of section 13(3) of FRA

More Maiden Lanes

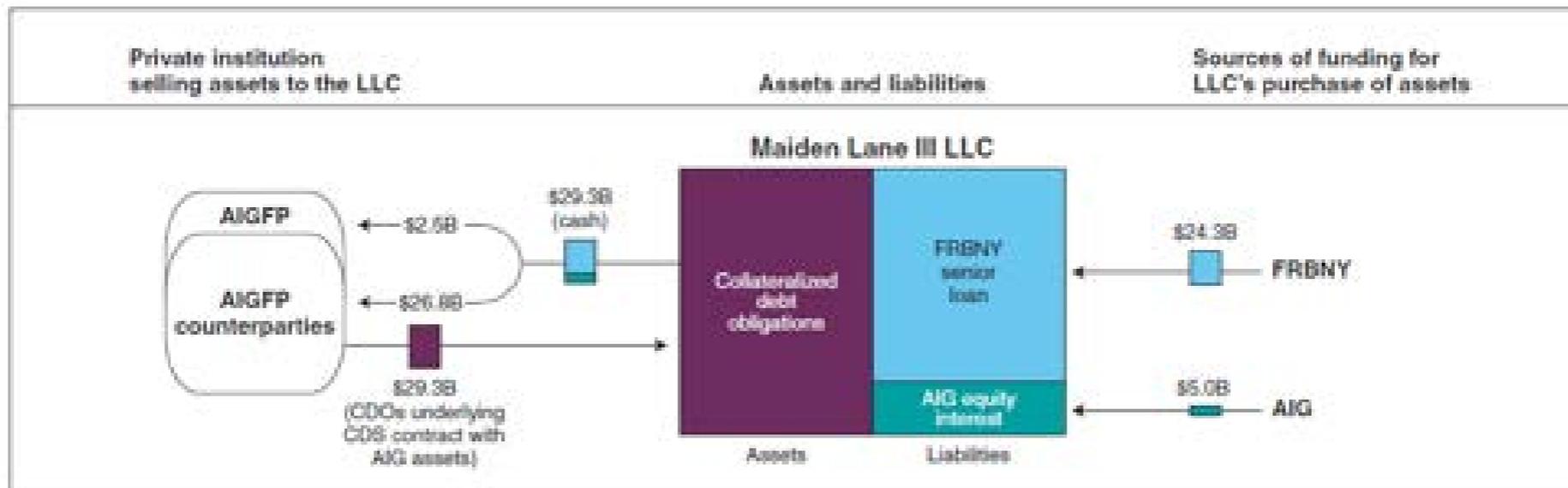


Maiden Lane II Transaction Structure



Source: GAO analysis of FRBNY information.

Maiden Lane III Transaction Structure



Source: GAO analysis of FRBNY information.

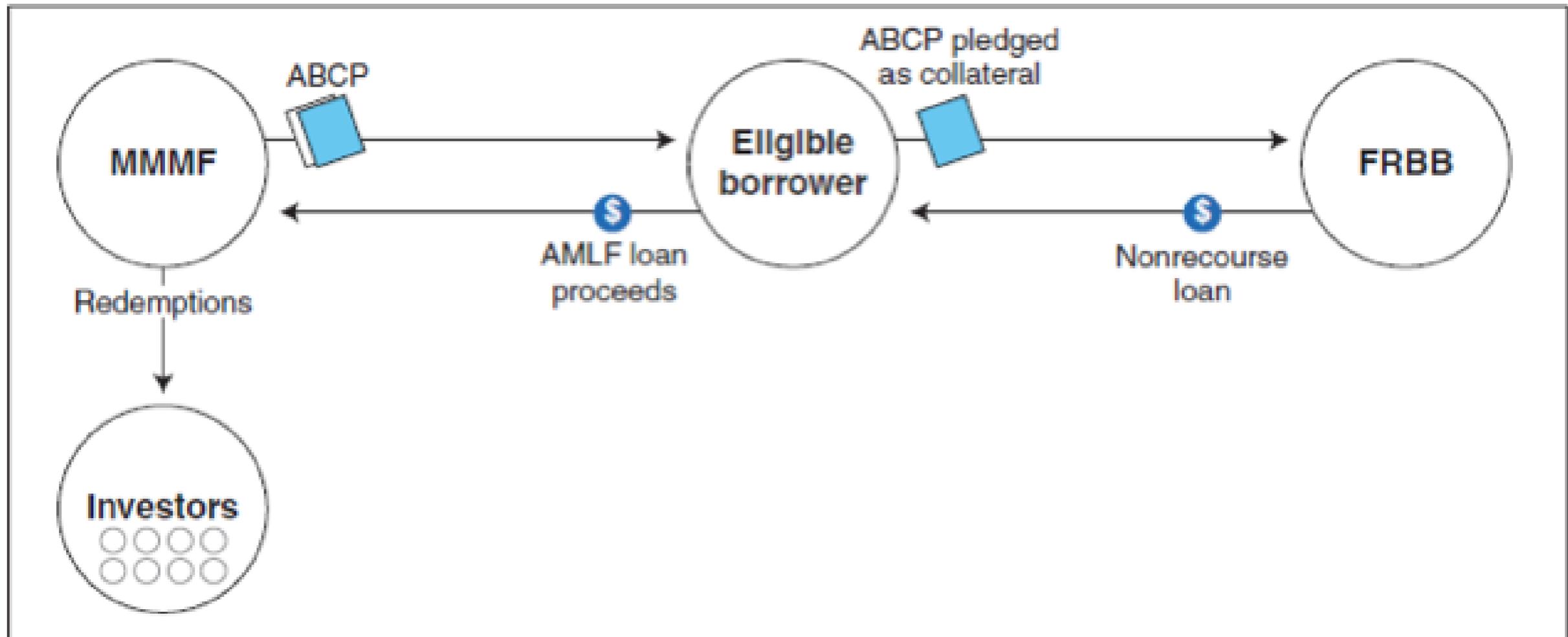
Stage Two—Provision of Liquidity to Borrowers and Investors in Key Credit Markets

- Departure from conventional LOLR operations.
- Designed to restart the flow of credit to households and businesses through the institution of programs designed to provide loans to intermediaries who would then purchase new Private debt issued in key financial markets.
- Fed begins to act as “market or dealer” LOLR.

Asset-Backed Commercial Paper Money Market Fund Liquidity Facility (AMLF)

- Announced 9/19/2008
- 9/22/2008-2/1/2010 (approx. 15 months)
- Money market mutual funds (MMMFs) experiencing considerable withdrawals and forced to liquidate positions; first facility to be directed at credit markets; specifically MMMFs
- Authorized under FRA section 13(3)
- Made nonrecourse loans to intermediary borrowers to purchase ABCP from MMMFs
- 11 borrowers (from 7 holding companies), two of which would comprise 92% of total borrowing
- 161 sellers
- Total loans issued: 1,133
- Cumulative lending: \$217.45 billion
- Peak outstanding: \$152.1 billion
- Peak monthly usage: \$97.6 billion
- All loans repaid in full

AMLF, Cont'd: Structure

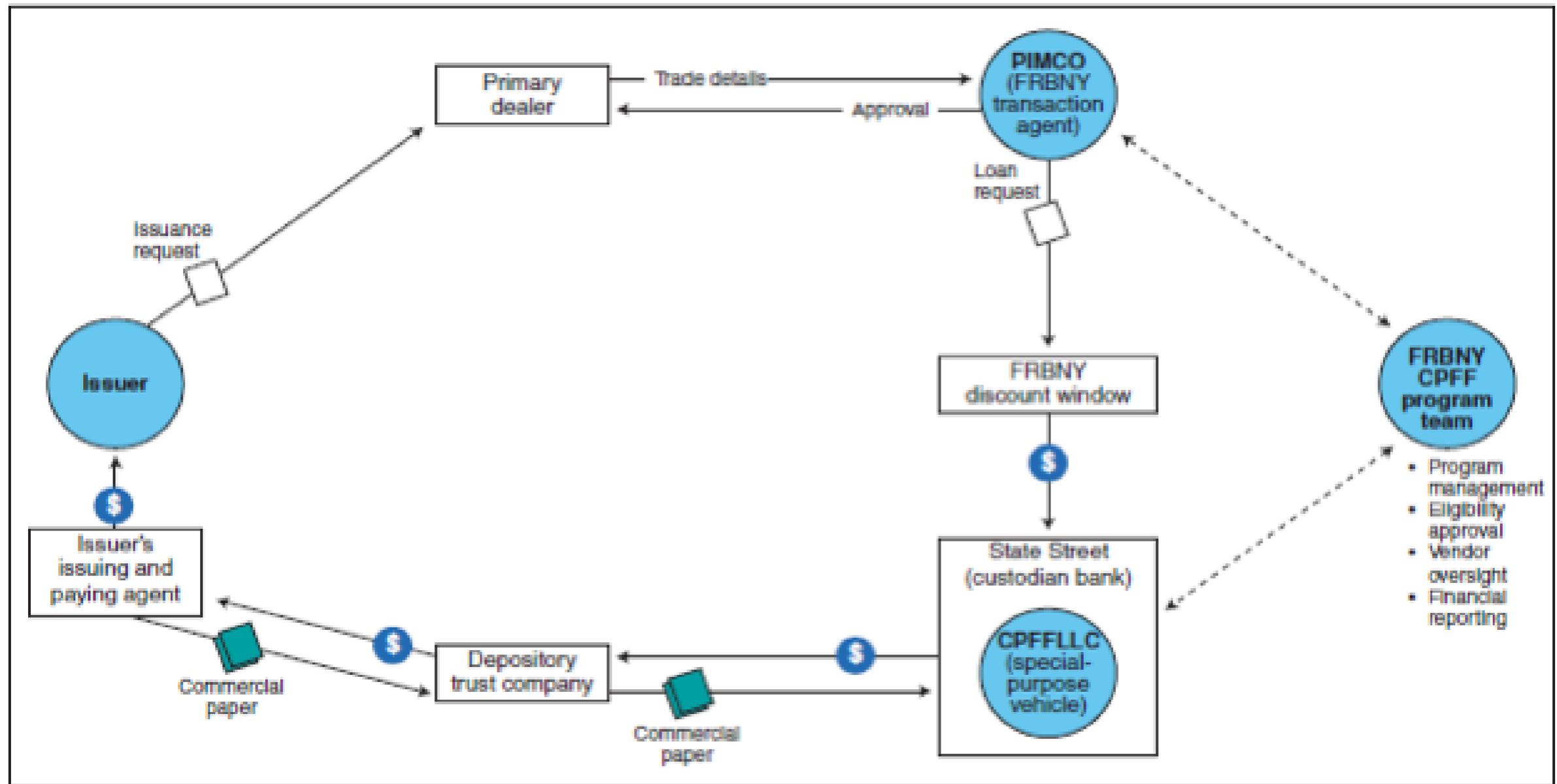


Source: GAO presentation of FRBB information.

Commercial Paper Funding Facility (CPFF)

- Announced 10/7/2008
- 10/27/2008-3/8/2010 (approx. 15 months)
- Commercial paper (CP) showing signs of stress; source of funding for both financial and non-financial businesses; investors wary of the credit and liquidity risk; as with AMLF this facility was directed at credit markets; specifically the commercial paper market
- Authorized under FRA section 13(3)
- Purchased highly rated U.S. dollar denominated, unsecured and ABCP with a maturity of three month; created an SPV
- 120 borrowers, 11 of which comprised 54% of total borrowing
- Total loans issued: 1,157
- Cumulative Lending: \$737.07 billion
- Peak Outstanding: \$350.5 billion
- Peak monthly usage: \$226 billion
- All loans repaid in full

CPFF, Cont'd: Structure



Source: GAO presentation of FRBNY information.

Term Asset-Backed Securities Loan Facility (TALF)

- Announced 11/25/2008
- 3/17/09-6/30/2010 (approx. 14 months)
- Asset-backed securities (ABS) packaging bank loans, credit card receivables, student loans, equipment, etc. began to see an increase in lending standards; TALF created to drive new issuances of ABSs; directed at providers of credit to small businesses and households
- Authorized under FRA section 13(3)
- Made nonrecourse loans to borrowers who bought ABCP from issuers
- 177 borrowers, 9 of which would comprise 54% of total borrowing
- Total loans issued: 2,310
- Cumulative lending: \$71.09 billion
- Peak outstanding: \$48 billion
- Peak monthly usage: \$10.72 billion
- Real Housewives of Wall Street

Stage Three—Purchases of Medium- and Long-Term Securities

- Designed to further facilitate the smooth operation of credit markets through the “expansion of traditional open market operations support to the functioning of credit markets through the purchase of long-term securities for the Fed’s portfolio” (Federal Reserve, 2011).

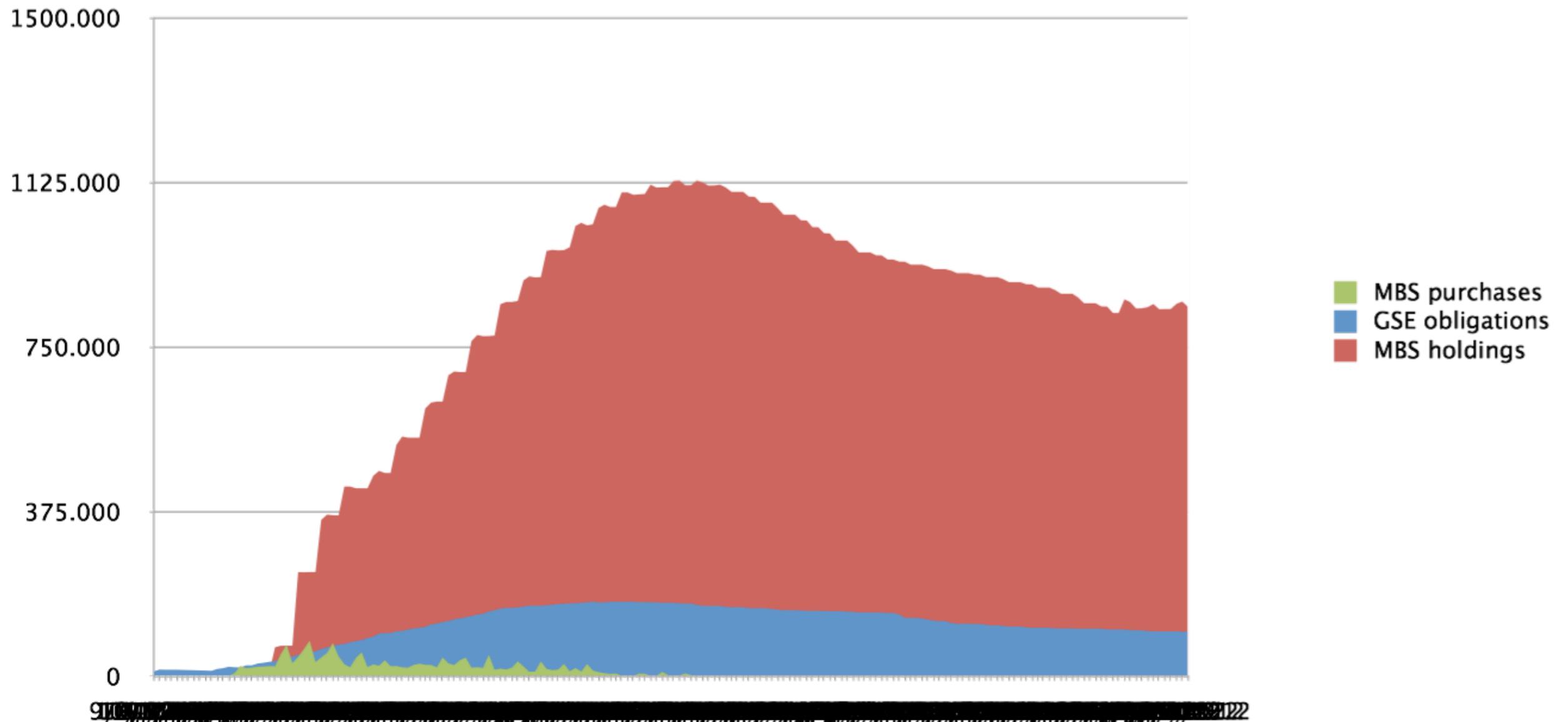
Agency Mortgage-Backed Securities Purchase Program

- Announced 11/12/2008
- 1/5/2009-3/31/2010 (approx. 15 months)
- Designed to help support the housing market by decreasing cost of borrowing; directed at the housing market via purchase of MBSs
- Authorized under FRA section 14
- 16 borrowers, 7 comprising 79% of total borrowing
- Total Loans Issued: 10,057
- Cumulative lending: \$1,850.1
- Peak Outstanding: \$1,127.6
- Peak monthly usage: \$361.5
- As of March 1, 2012, \$840.79 billion on Fed's balance sheet

Government Sponsored Entity Direct Obligation Purchase Program

- Problems in subprime market began to impact the market for conventional mortgages.
- Announced November 25, 2008.
- Authorized to purchase up to \$160 billion in direct GSE obligations.

MBS Purchase Program, Cont'd



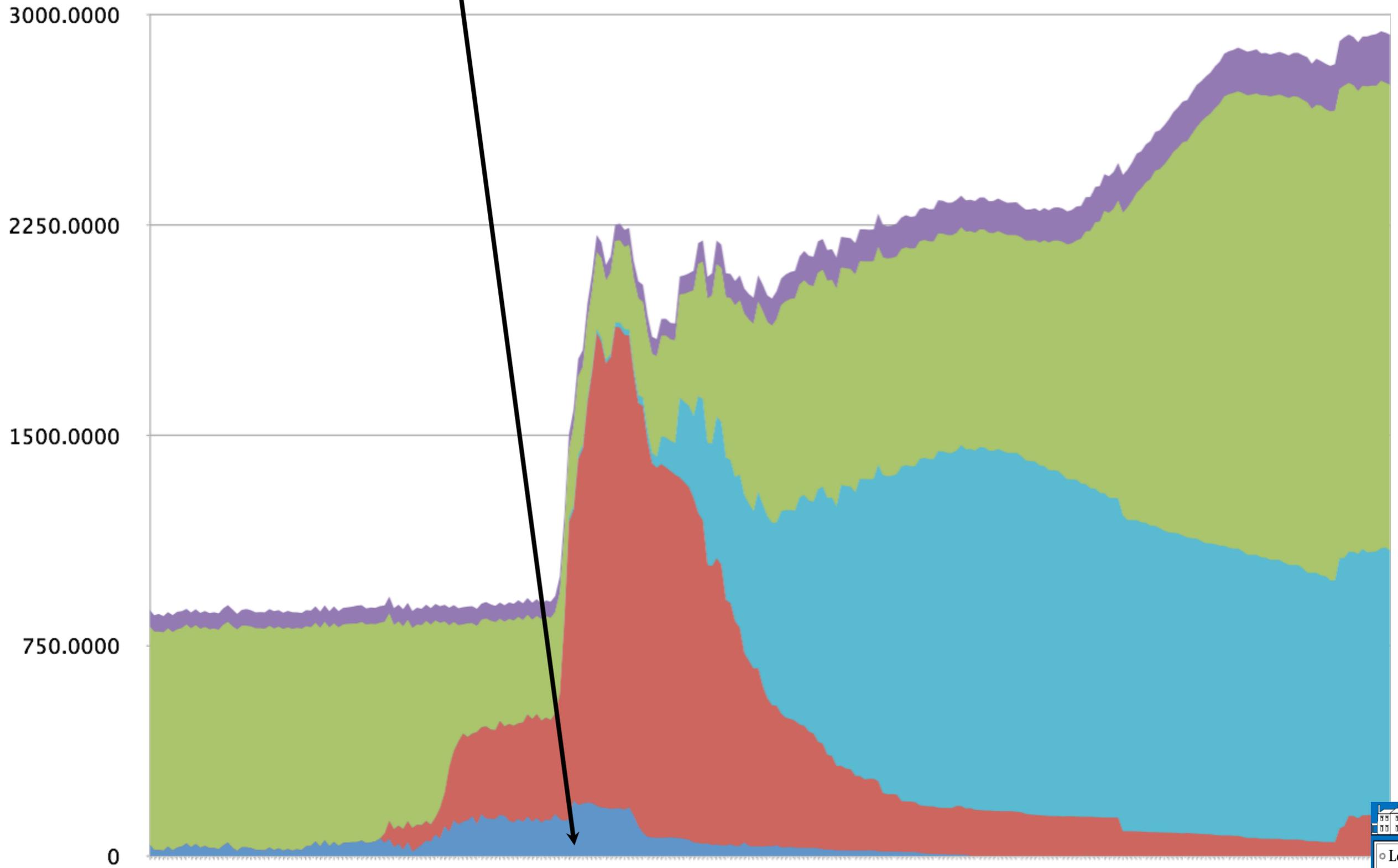
Summary

- Three facilities (TAF, CBLS, and PDCF) would comprise 77.3% of borrowing across all facilities
- Excluding CBLS, which provided dollar liquidity to central banks and not private institutions, thirteen banks would comprise 79% of total borrowing totaling to \$15.418 trillion
 - The top three were Citigroup (\$2.654 trillion), Merrill (\$2.429 trillion) and Morgan Stanley (\$2.274 trillion)

Summary, by Facility

Conventional			Unconventional		
Facility	Total	Percentage	Facility	Total	Percentage
TAF	\$3,818.41	12.8%	CBL5	\$10,057.4	33.77%
TSLF/ TOP	2,005.7	6.7	ST OMO	855	2.87
			PDCF	8,950.99	30.05
			Bear Stearns Bridge Loan	12.9	0.04
			Maiden Lane I	28.82	0.10
			Maiden Lane II	19.5	0.07
			Maiden Lane III	24.30	0.08
			AIA/ ALICO	25	0.08
			AIG RCF	140.32	0.47
			AIG SBF	802.32	2.69
			AMLF	217.45	0.73
			CPFF	737.07	2.47
			TALF	71.09	0.24
			GSE	169.01	0.57
			MBS	1,850.14	6.21
TOTALS	\$5,824.12	19.55%		\$23,961.48	80.45%

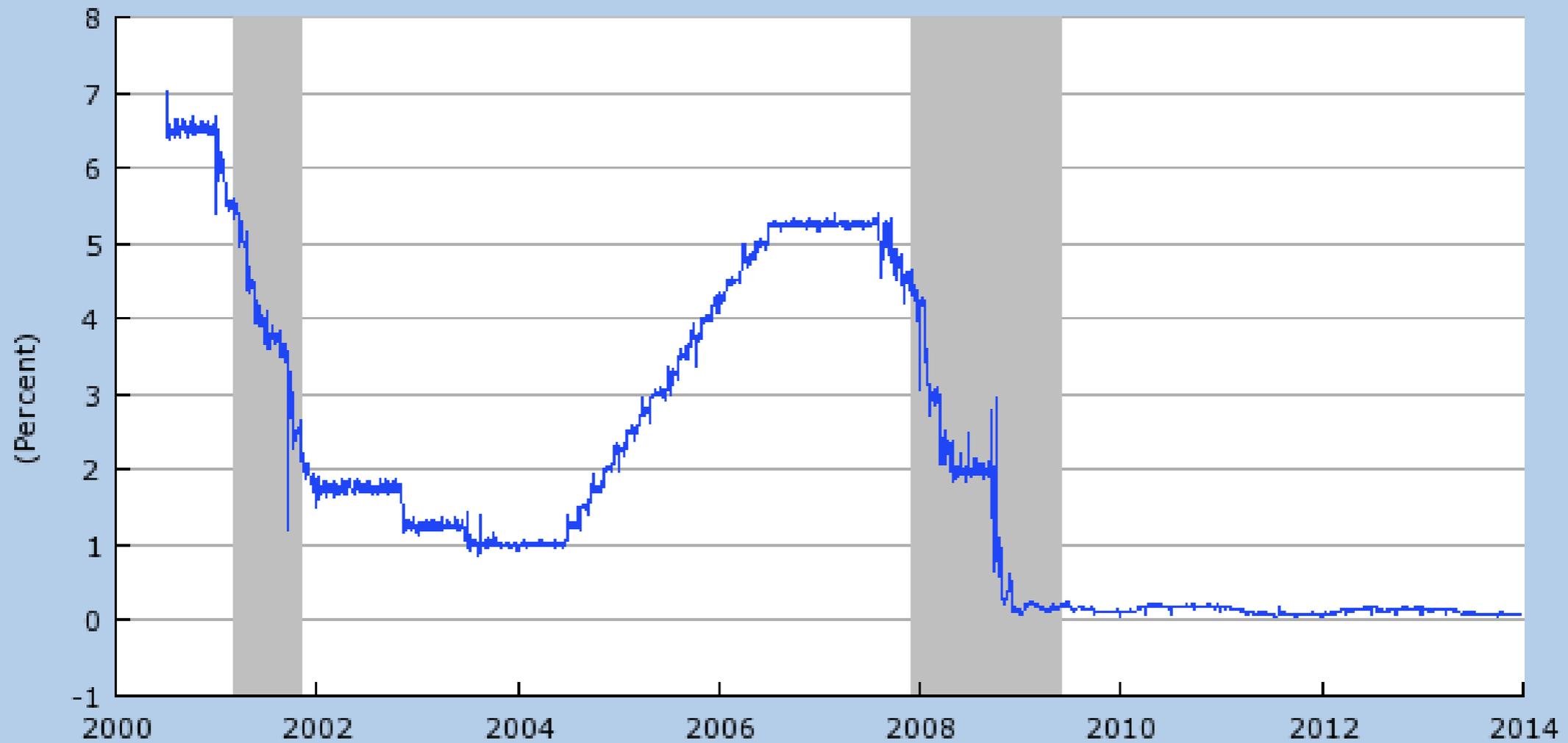
Normal vs. Exceptional



Exceptional Policy Response to the Great Recession

- Learning from Japan, or Friedman, or Keynes
- ZIRP: Zero Interest Rate Policy end 2008
- Quantitative Easing
- Maturity Transformation

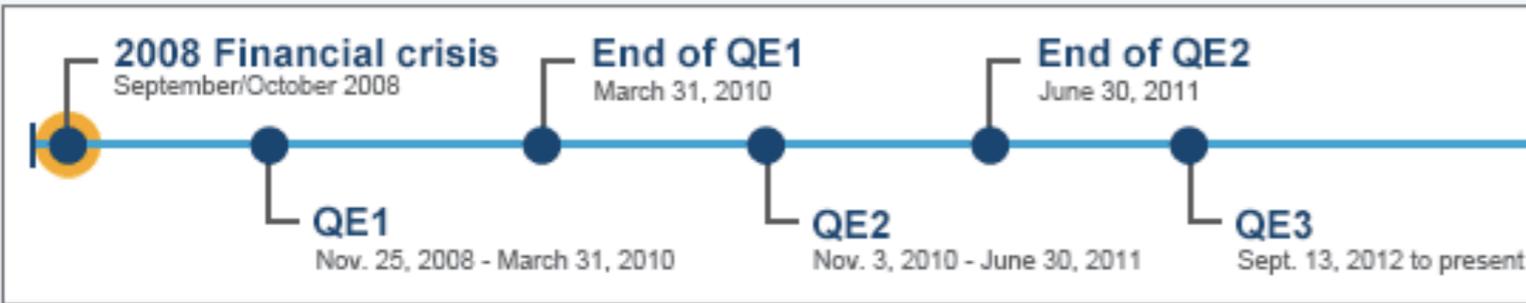
Effective Federal Funds Rate (DFF)
Source: Board of Governors of the Federal Reserve System



Shaded areas indicate US recessions.
2013 research.stlouisfed.org

Mortgage rates and the Fed

Click through the timeline below to see the effect the Fed's moves had on mortgage rates.



2008 financial crisis (collapse/bailout phase): September/October 2008

What the Fed did

- On Sept. 8, 2008, the U.S. Treasury seized control of mortgage giants Fannie Mae and Freddie Mac and pledged a \$200 billion cash injection to help the companies cope with mortgage default losses.
- About a week later the government bailed out American International Group Inc., or AIG, with \$85 billion.
- The Fed refused to save Lehman Brothers and the company was forced to file for bankruptcy. Some of the largest financial institutions were on the verge of collapse as the mortgage market melted down. As the crisis hit the global market, the credit freeze spread.
- The Treasury and the Federal Reserve began working on a \$700 billion bailout plan.
- President George W. Bush signed the bailout plan into law Oct. 3.
- Weeks later, on Oct. 29, the Fed cut the key interest rate to 1 percent.



Mortgage rates and the Fed

Click through the timeline below to see the effect the Fed's moves had on mortgage rates.



QE1: Nov. 25, 2008 - March 31, 2010

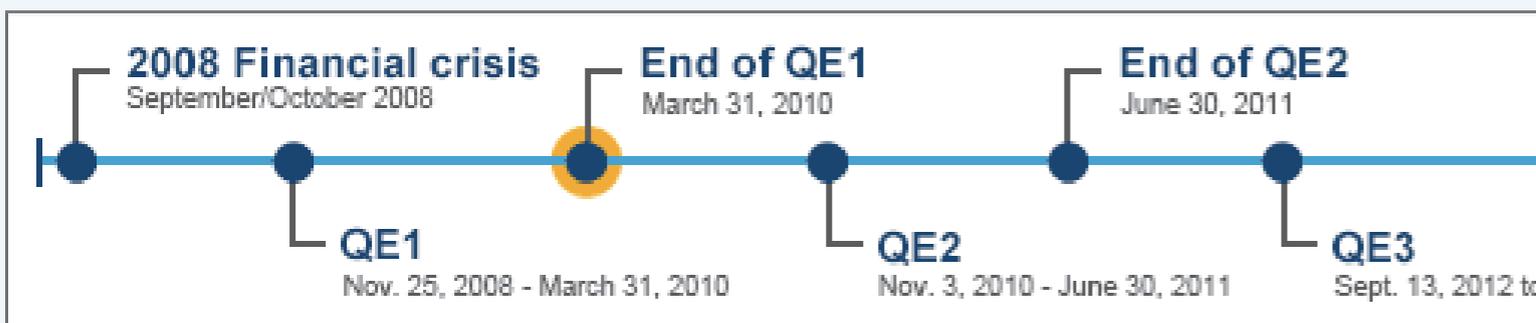
What the Fed did

- The Fed initiated purchases of \$500 billion in mortgage-backed securities.
- It announced purchases of up to \$100 billion in debt obligations of mortgage giants Fannie Mae, Freddie Mac, Ginnie Mae and Federal Home Loan Banks.
- The Fed cut the key interest rate to near zero, Dec. 16, 2008.
- In March 2009, the Fed expanded the mortgage buying program and said it would purchase \$750 billion more in mortgage-backed securities.
- The Fed also announced it would invest another \$100 billion in Fannie and Freddie debt and purchase up to \$300 billion of longer-term Treasury securities over a period of six months.
- The quantitative easing program, or QE1, concluded in the first quarter of 2010, with a total of \$1.25 trillion in purchases of mortgage-backed securities and \$175 billion of agency debt purchases.



Mortgage rates and the Fed

Click through the timeline below to see the effect the Fed's moves had on mortgage rates.



End of QE1: March 31, 2010

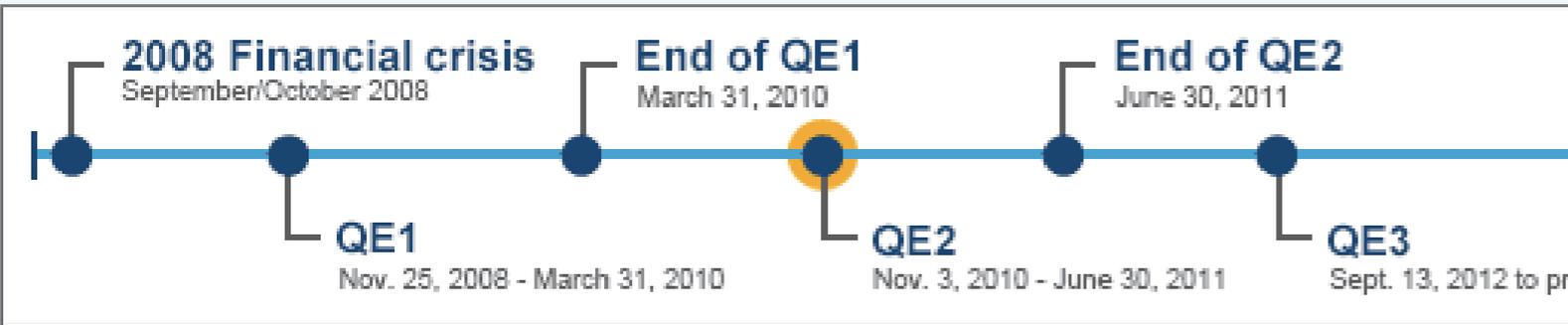
What the Fed did

- After completing the purchase of \$1.25 trillion in mortgage-backed securities, \$300 billion in Treasury bonds and \$175 billion in federal agency debt, the Fed ended QE1.
- QE1 was initially open-ended. The Fed did not set an end date for the program until about six months out, as it slowed the buying pace.



Mortgage rates and the Fed

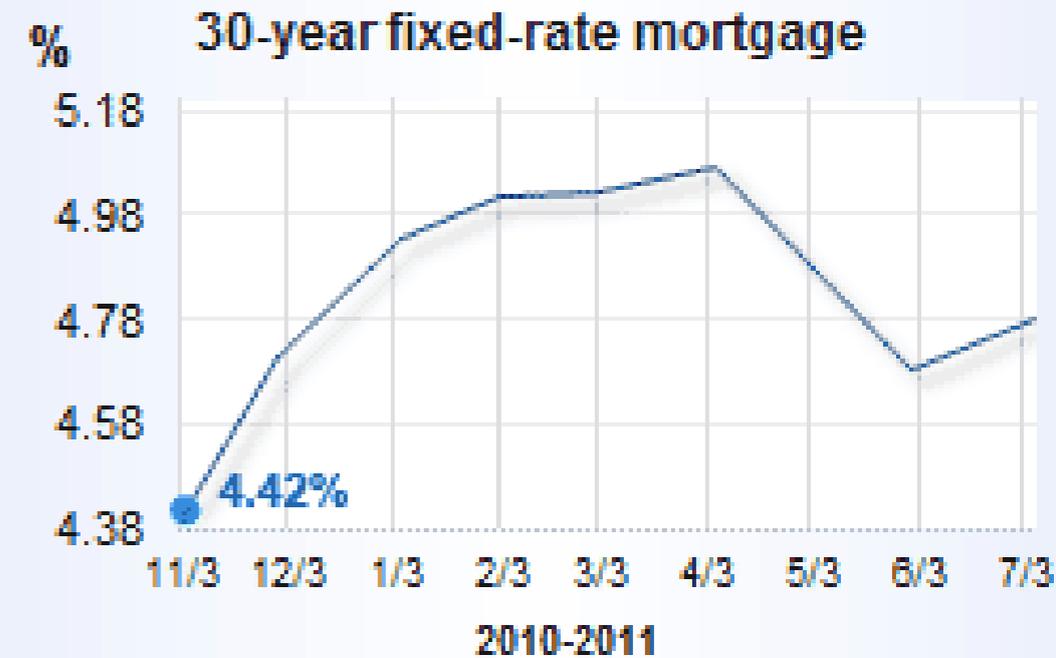
Click through the timeline below to see the effect the Fed's moves had on mortgage rates.



QE2: Nov. 3, 2010 - June 30, 2011

What the Fed did

- The Fed continued to reinvest payments on securities purchased during the QE1 program
- In addition, it began the purchase of \$600 billion of longer-term Treasury securities.



Mortgage rates and the Fed

Click through the timeline below to see the effect the Fed's moves had on mortgage rates.



End of QE2: June 30, 2011

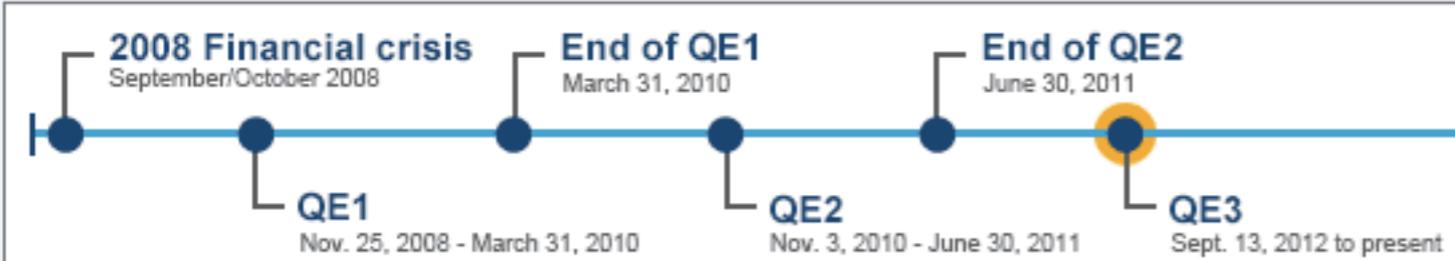
What the Fed did

- As previously announced, the Fed concluded its \$600 billion bond purchasing program.
- QE2 was conducted at an even pace, and the end date was telegraphed from the start of the program.



Mortgage rates and the Fed

Click through the timeline below to see the effect the Fed's moves had on mortgage rates.



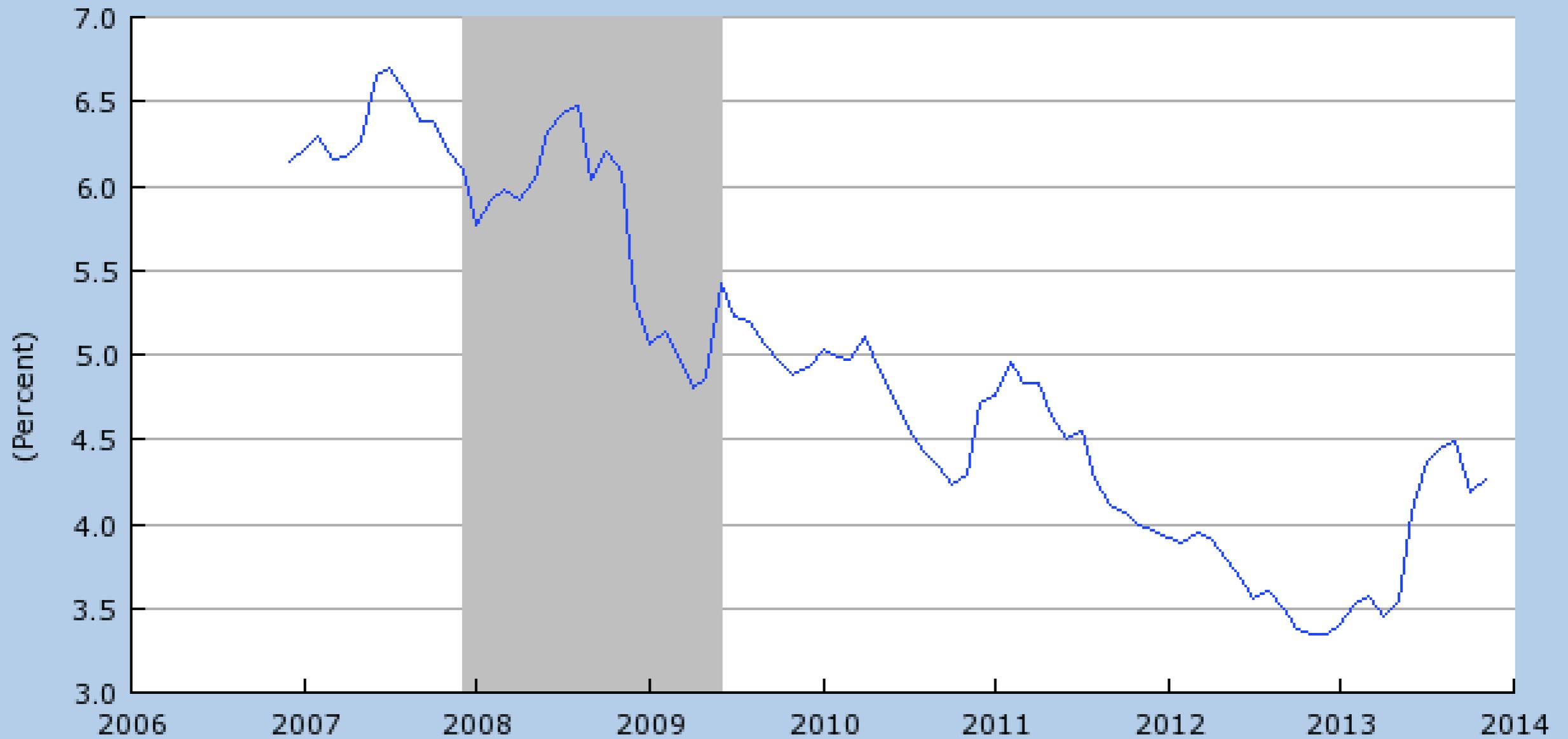
QE3: Sept. 13, 2012 to present

What the Fed did

- The Fed is planning to buy another \$40 billion in mortgage-backed investments each month until the economy improves. That's on top of the tens of billions of dollars in mortgages it already had been buying each month, making U.S. banks flush with cash.
- The central bank continues to sell short-term bonds and use the money to buy long-term bonds.
- The time period during which the Fed will keep interest rates near zero was extended from the end of 2014 to mid-2015.



30-Year Conventional Mortgage Rate (MORTG)
Source: Board of Governors of the Federal Reserve System

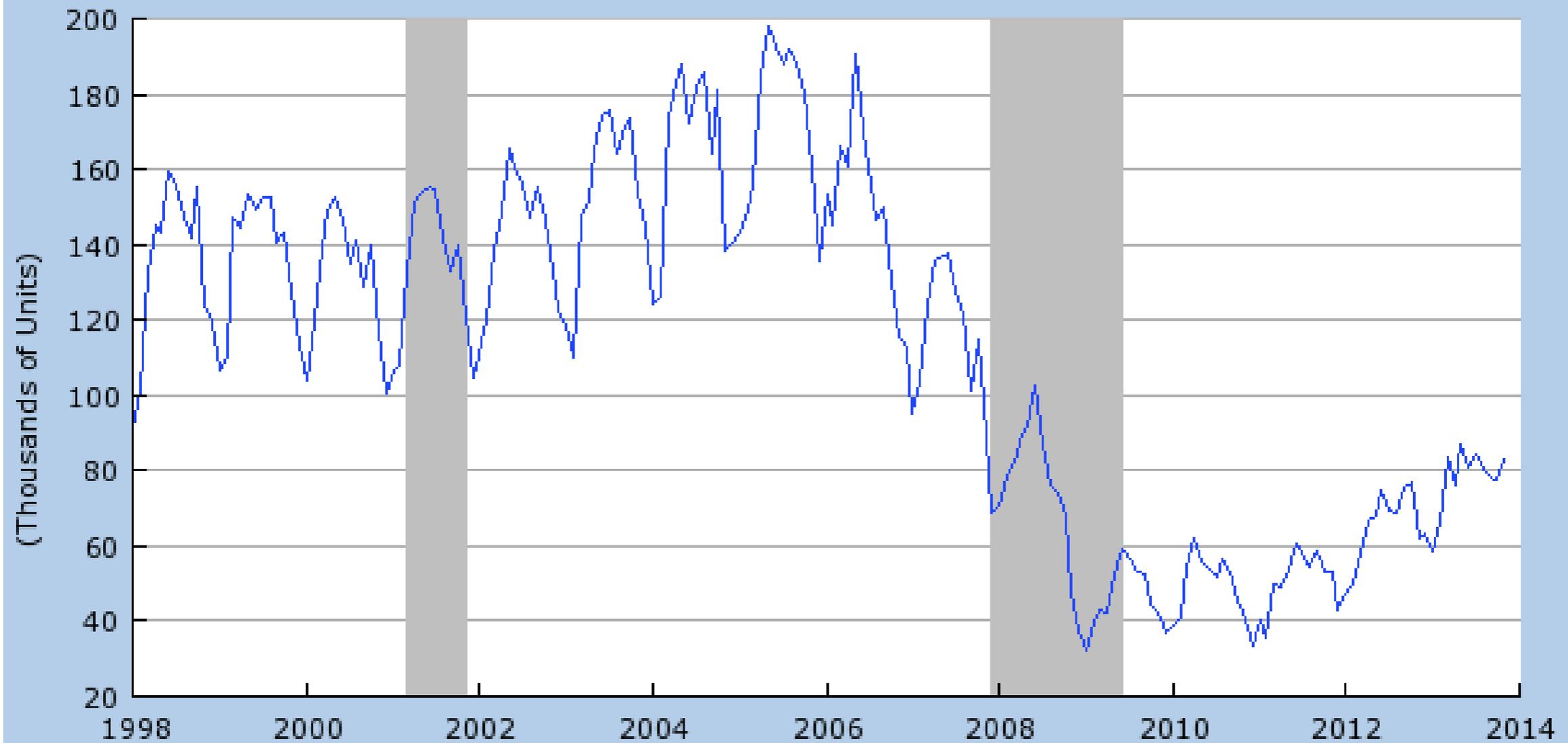


Shaded areas indicate US recessions.
2013 research.stlouisfed.org



Housing Starts: Total: New Privately Owned Housing Units Started (HOUSTNSA)

Source: U.S. Department of Commerce: Census Bureau



Shaded areas indicate US recessions.
2013 research.stlouisfed.org



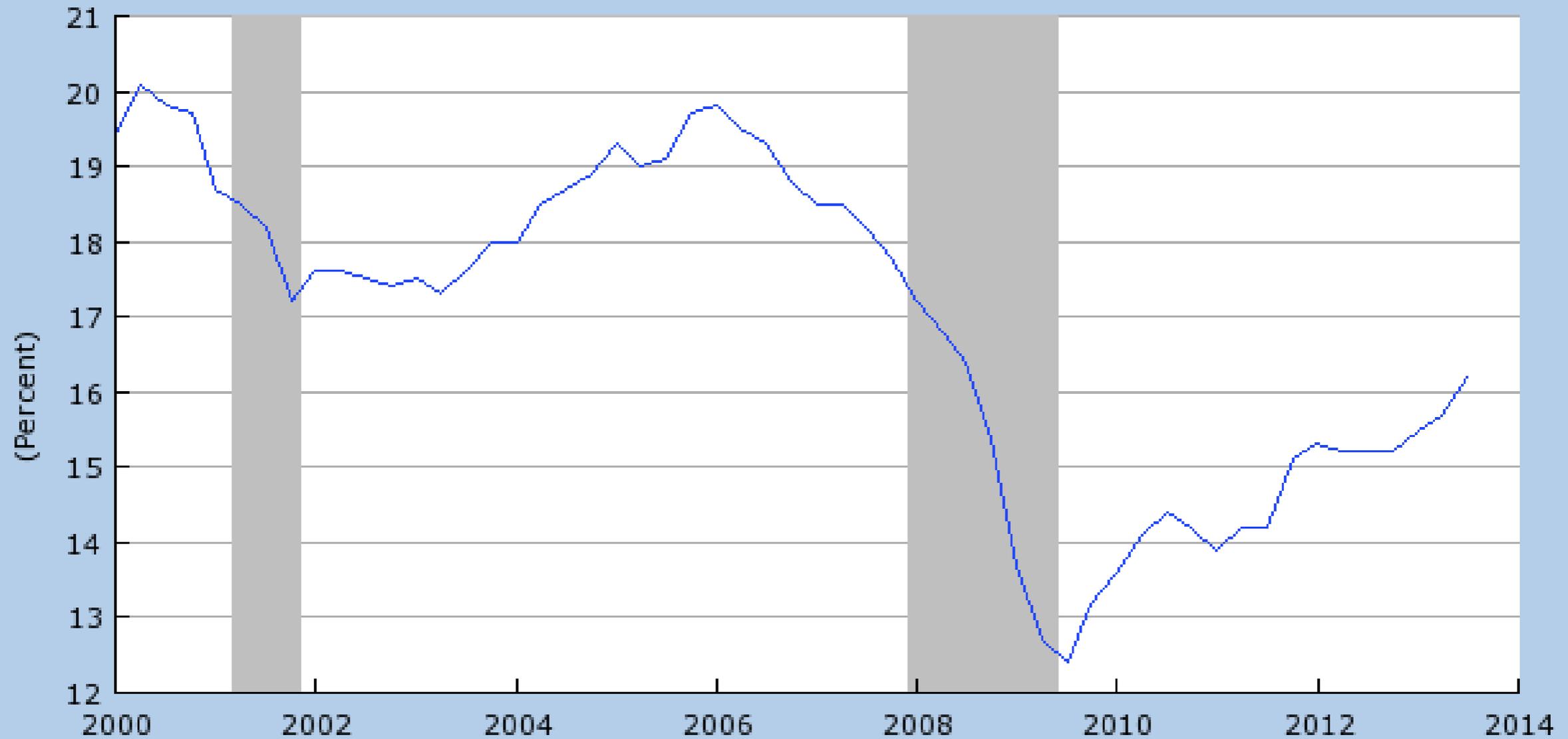
Dow Jones Industrial Average (DJIA)
Source: S&P Dow Jones Indices LLC



Shaded areas indicate US recessions.
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Shares of gross domestic product: Gross private domestic investment (A006RE1Q156NBEA)

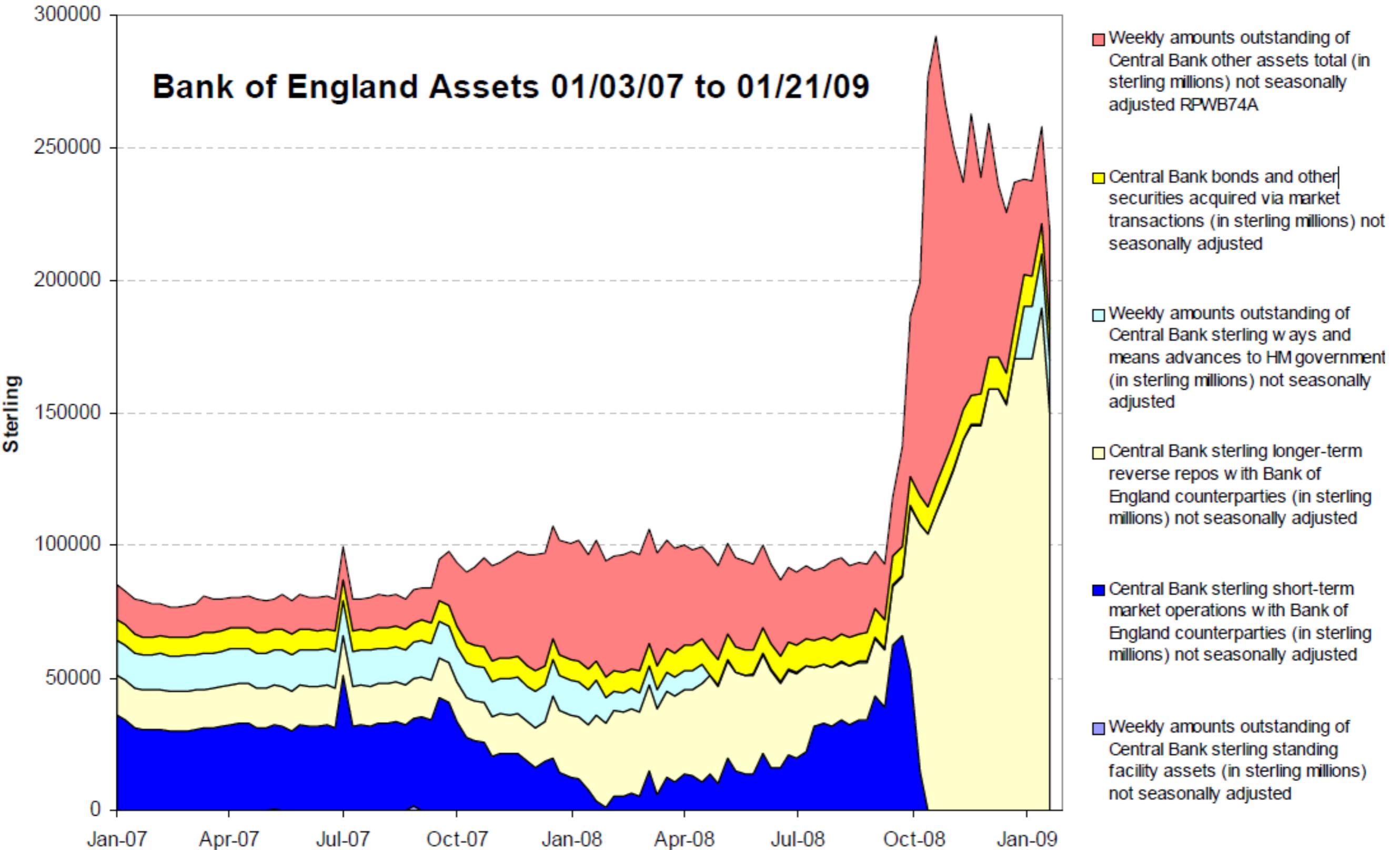
Source: U.S. Department of Commerce: Bureau of Economic Analysis



Shaded areas indicate US recessions.
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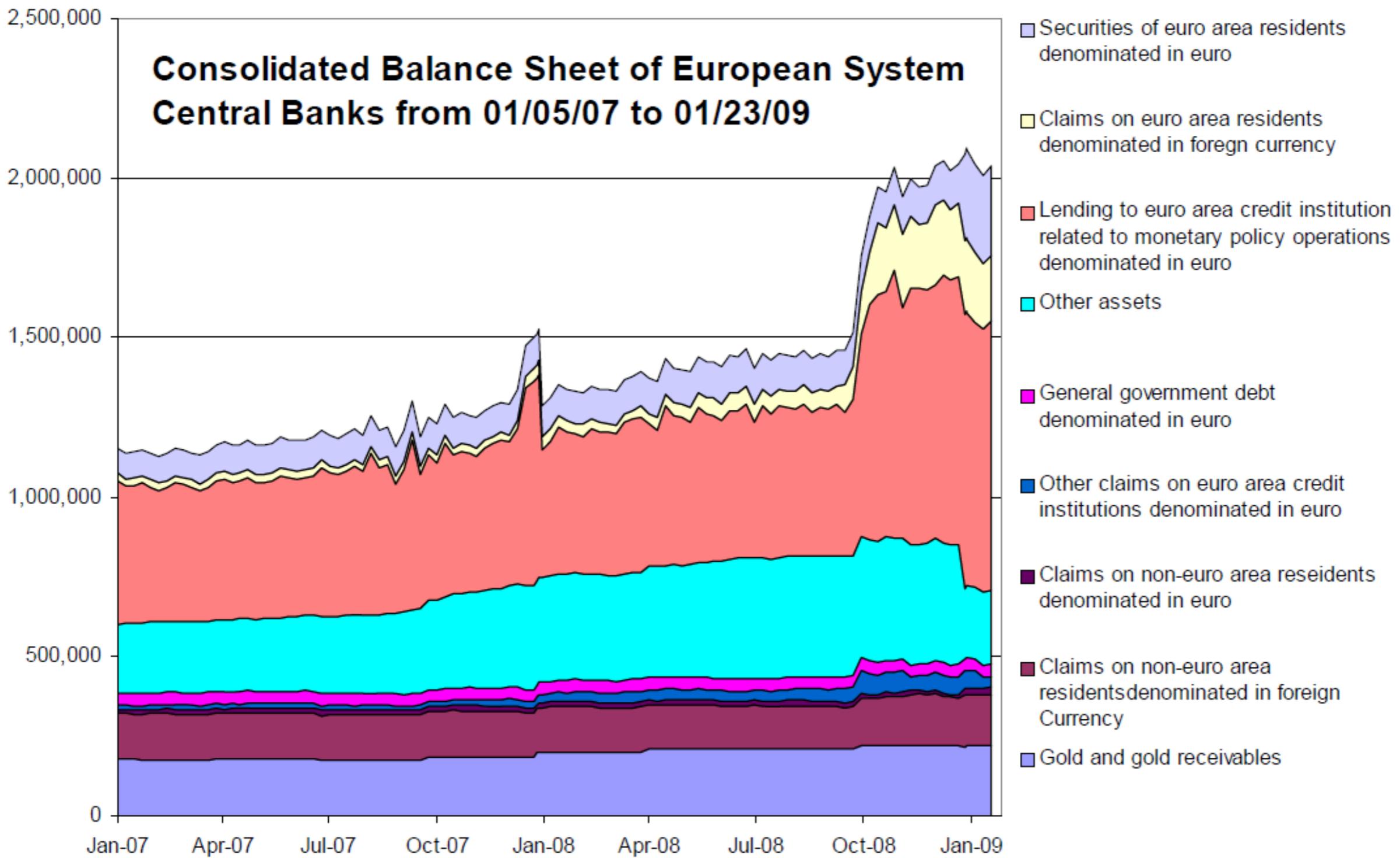
Bank of England Assets 01/03/07 to 01/21/09



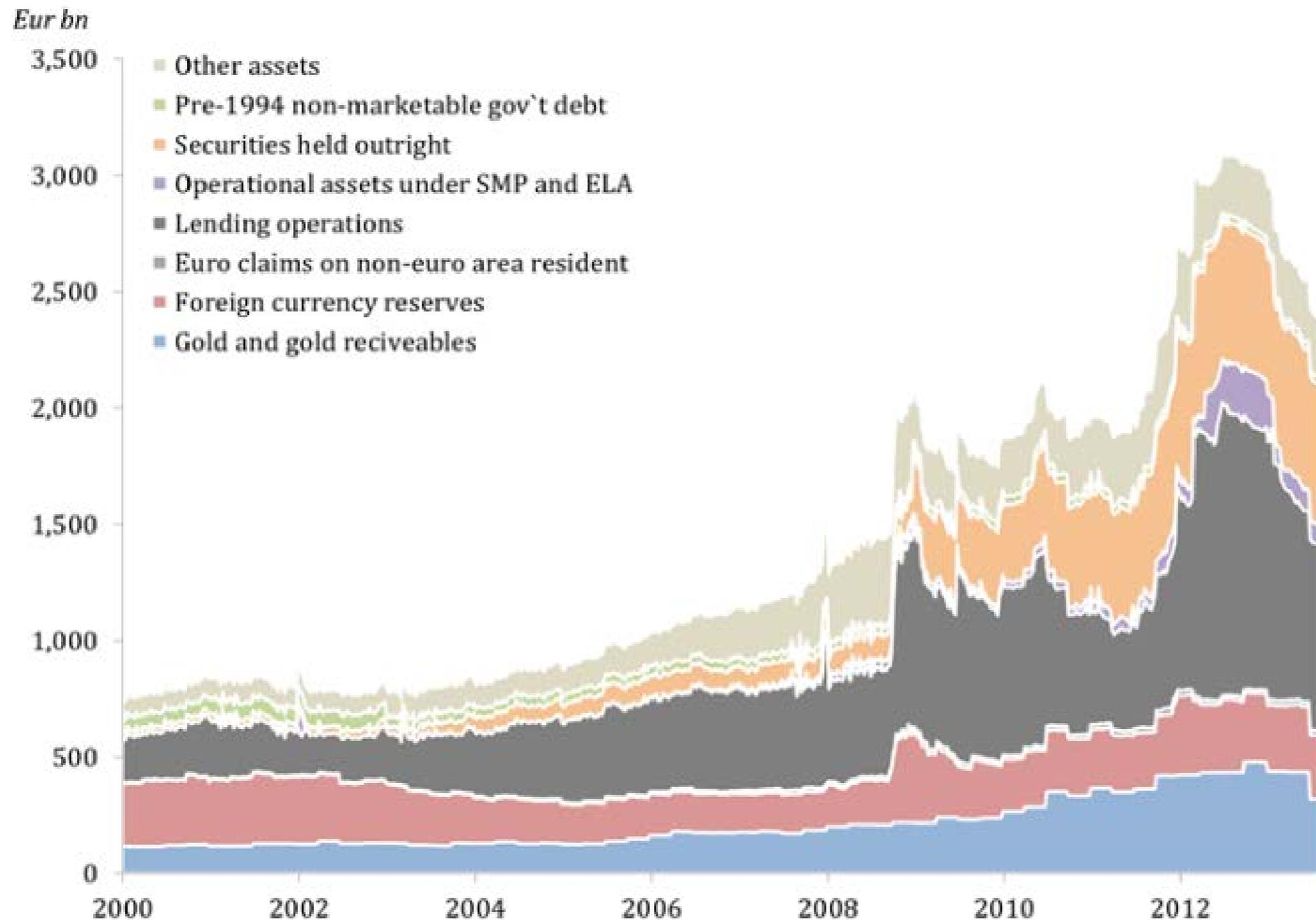
ECB Exceptional Measures

- Crisis in Europe was different
 - French and German holders of MBS
 - Sovereign country default
 - Iceland, Ireland
- ECB policy was primarily to support Sovereign Debt Markets

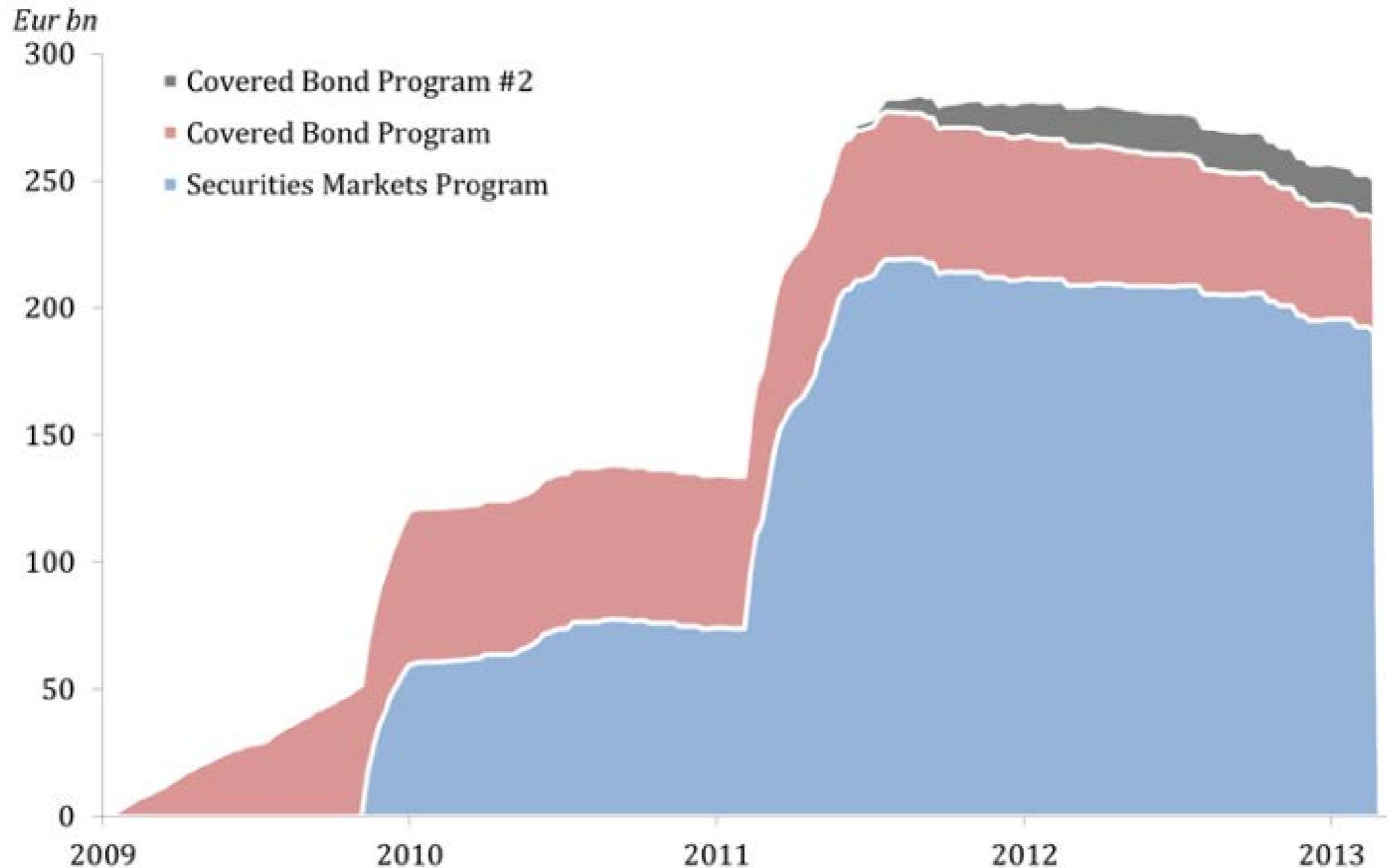
Consolidated Balance Sheet of European System Central Banks from 01/05/07 to 01/23/09



ECB balance sheet; assets



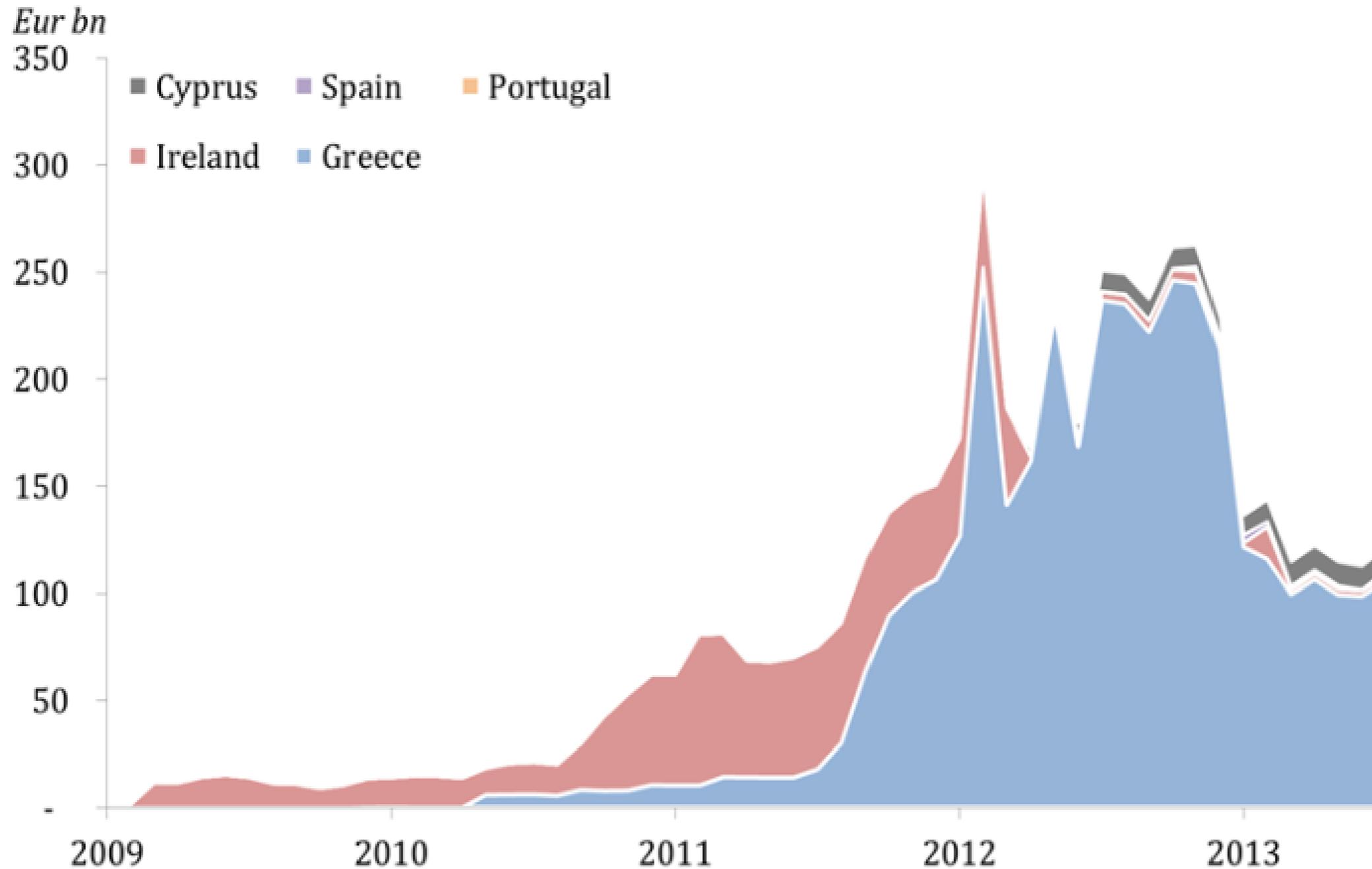
Securities held for monetary purposes



Enhanced credit support: Fixed rate tender procedures with full allotment

- Following the Bundesbank operating procedures, the ECB lends at auction against approved collateral at fixed or variable rates or volumes. Thus banks require eligible collateral to bid on ECB liquidity. When there is a shortage of eligible assets in the banking system and interbank lending halts there is a liquidity crisis and banks must access the marginal lending facility that charges a premium interest rate to banks that are unable to participate in the normal weekly tender auction.
- The ECB first responded by granting full allotment to banks bidding at the normal refinancing operation, but this made the marginal lending facility redundant and countered the Bagheot principle of lending against good collateral at a penalty rate.
- In addition some eligible assets such as sovereign issued bonds deteriorated in quality below ECB requirements requiring repayment or the tender of better assets. Thus credit rating standards were softened in May 2010 for Greek sovereign- and sovereign guaranteed bonds, and a year later for Portuguese bonds and in July 2011 for Irish bonds.
- In May 2010 the ECB bought government bonds directly in the secondary market under the Securities Market Program. The support to mark-to-market asset prices improved bank balance sheets.
- However, the larger the proportion of bank assets in the hands of official holders who could not accept default meant a larger write-down for private investor in case of default. This tended to offset the positive impact of ECB action on interest rates.

Emergency Lending Facility (ELA)



Source: Banco de España, Central Bank of Cyprus, Banco de Portugal, Central Bank of Ireland, Bank of Greece, own calculations, *estimates provided by Bawerk.net

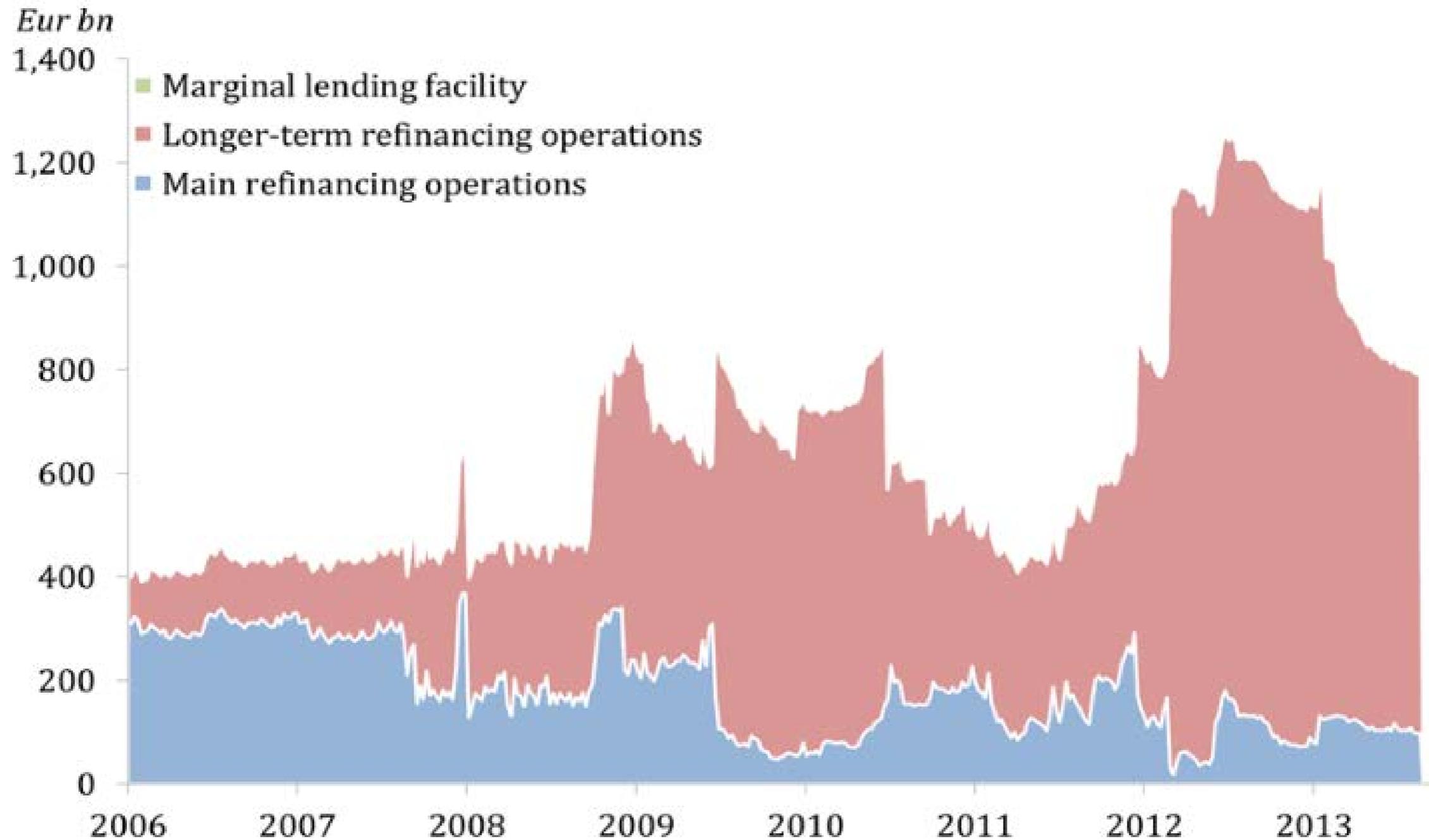
Emergency Liquidity Assistance (ELA)

- Article 14.4 of the Statutes of the European System of Central Banks and of the European Central Bank states:
- “National central banks may perform functions other than those specified in this Statute unless the Governing Council finds by majority of two thirds of the votes cast, that these interfere with the objectives and task for ESCB. Such functions shall be performed on the responsibility and liability of national central banks and shall not be regarded as being part of the functions of the ESCB.
- In other words an NCB can undertake any funding operations of its domestic banking system as long as the governing council of the ECB does not object.
- This is the equivalent of the Fed Section 13.3 and is commonly referred to as emergency lending. When its national banking system has pledged all eligible collateral within the European system of central banks, the NCB can extend lending at discretionary credit standards.

LTROs

- In addition to the ELA, the ECB on September 6 2012 decided on “additional measures to preserve collateral availability for counterparties to maintain their access to the Eurosystem’s liquidity-providing operations.”
- The ECB suspended “minimum credit rating thresholds in the collateral eligibility requirements for the purpose of the Eurosystem’s credit operations in the case of marketable debt instruments issued or guaranteed by the central government...”
- In plain English, it means European banks can pool all sorts of outstanding loans of dubious quality into one single “marketable debt instrument” get the government to sign a guarantee and pledge the bond as collateral at the ECB!
- The original decision to provide full allotment in the main refinancing operations was restricted to only one week, creating uncertainty over its maintenance. The ECB had long term refinancing facility available for maturities up to three months, but the facility was traditionally not a means to conduct interest rate policy. In other words, the ECB would not use the long-term facility to manage interest rates. In order to end uncertainty in the bank funding market, the ECB under Mario Draghi announced they would conduct three-year LTRO’s with fixed rates.
- The response was almost overwhelming as the LTRO facility rose to more than €1.1 trillion during two operations in December 2011 and March 2012.

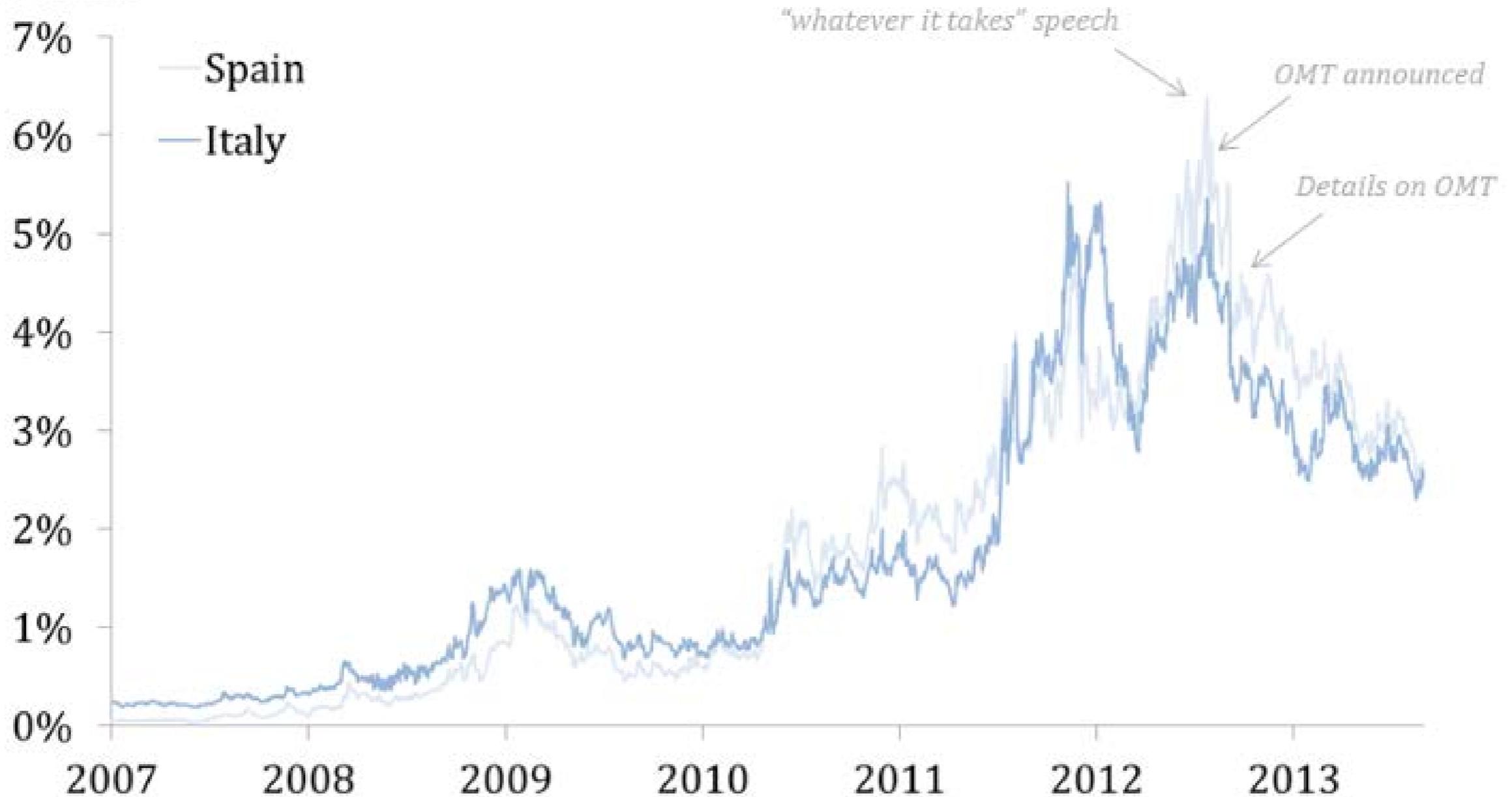
Refinancing operations (MRO & LTRO)



Source: European Central Bank (ECB)

Ten year Bund spreads

vs. bunds



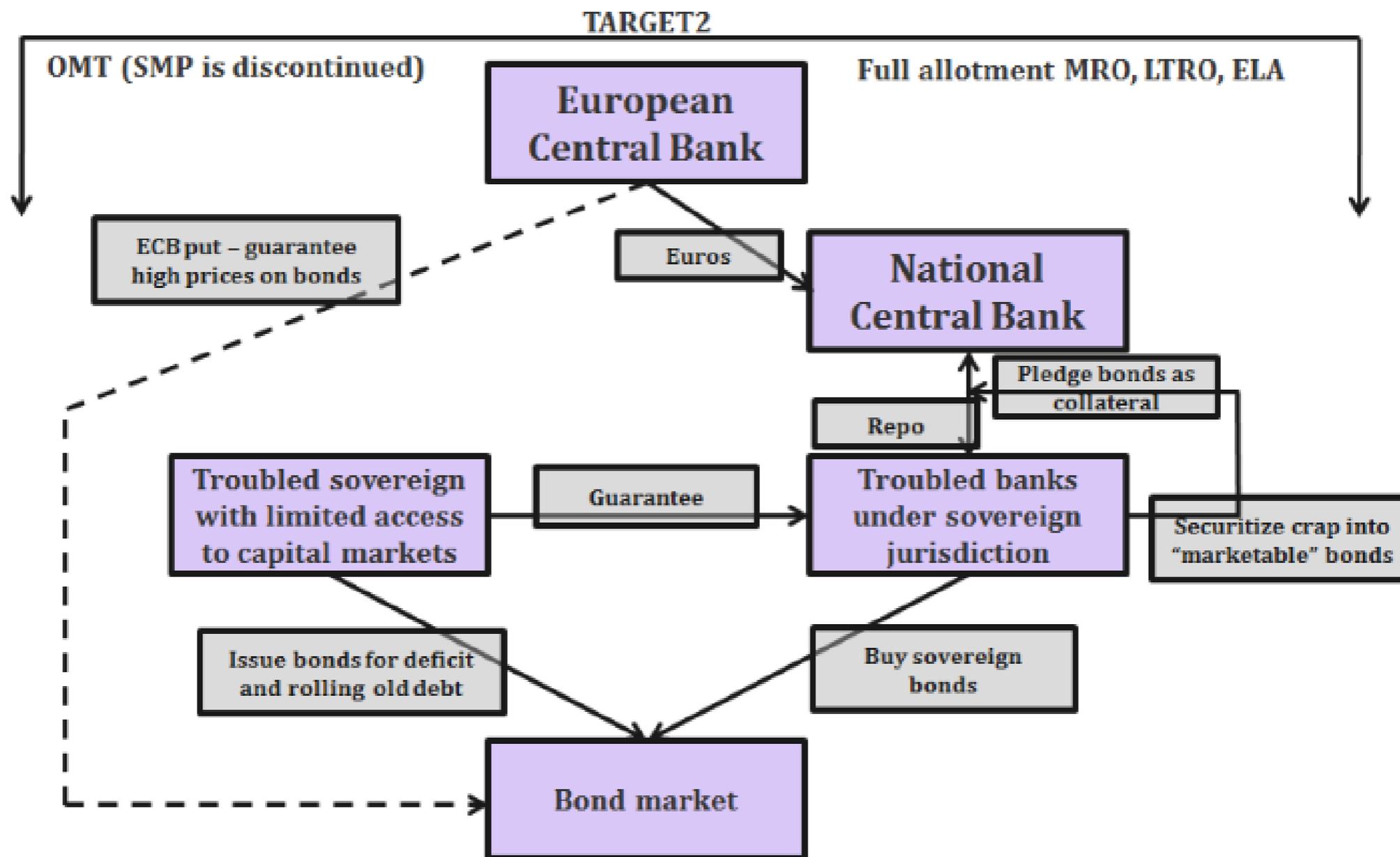
source: Bloomberg

Current Policy:

Outright market transactions (OMT)

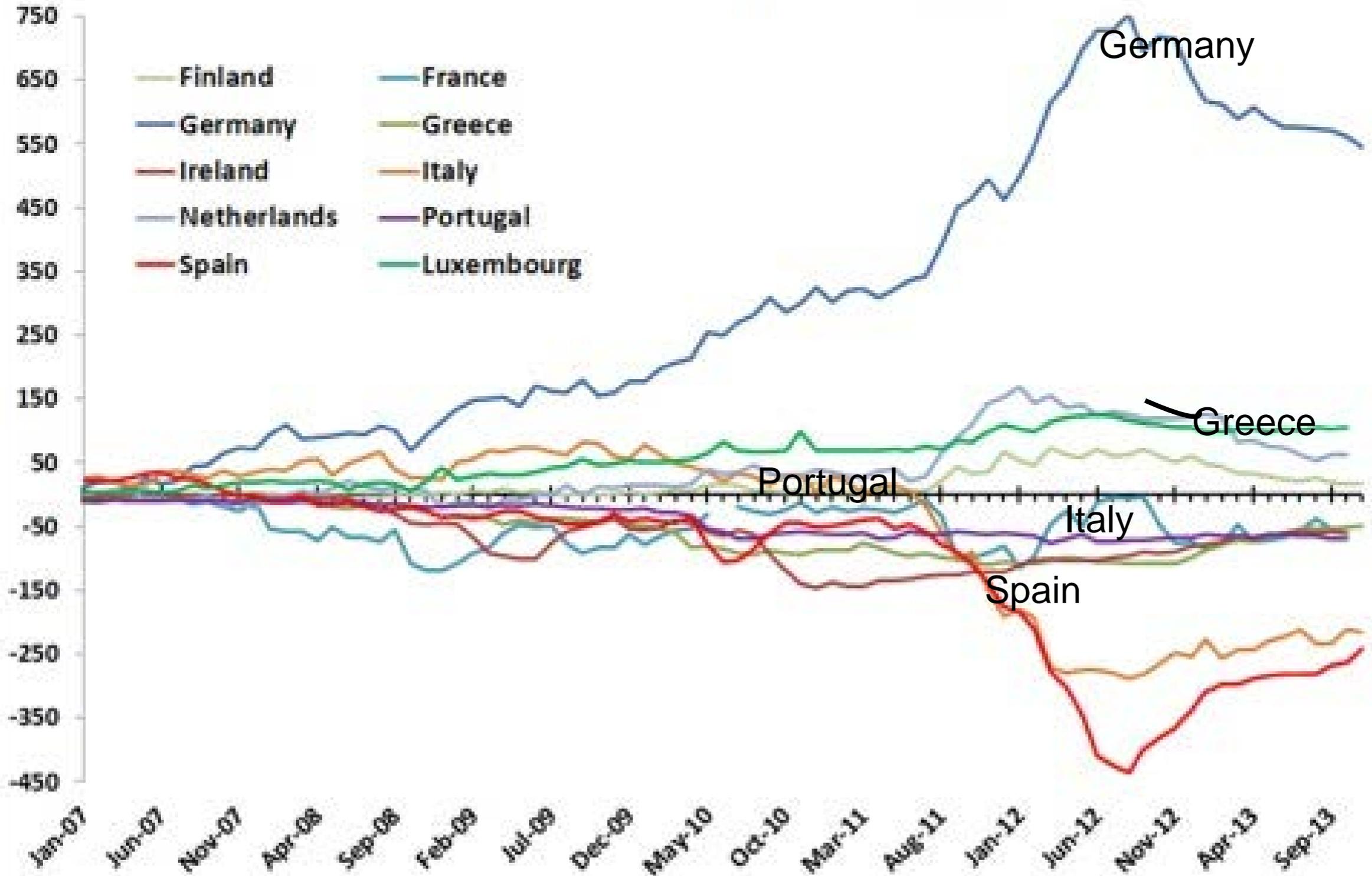
- Despite measures taken by the ECB yield spreads on peripheral bonds continued to rise until July 26 2012 when Chairman of the Governing Council, Mario Draghi announced that the ECB would “whatever it takes”
- Yield spreads declined and have remained low; capital flight from the periphery was reversed and investors moved into high yielding Spanish bonds given the explicitly announced put-option from the ECB.
- A week later Draghi formally announced that the ECB would buy unlimited amounts of sovereign bonds in the secondary market for every country that signed up for conditionality under an ESM-program.
- The fiscal objectives in the conditions made OMT a quasi fiscal program and hence outside the ECB mandate because the ECB actions depend on fiscal authorities ability to meet preconditions. As a result OMT is under investigation by German court.
- All OMT purchases will be treated “pari passu” in case of default.
- The OMT is a put on prices and which makes Sovereign investments in peripheral bonds virtually riskless.

ECB bailing out Europe

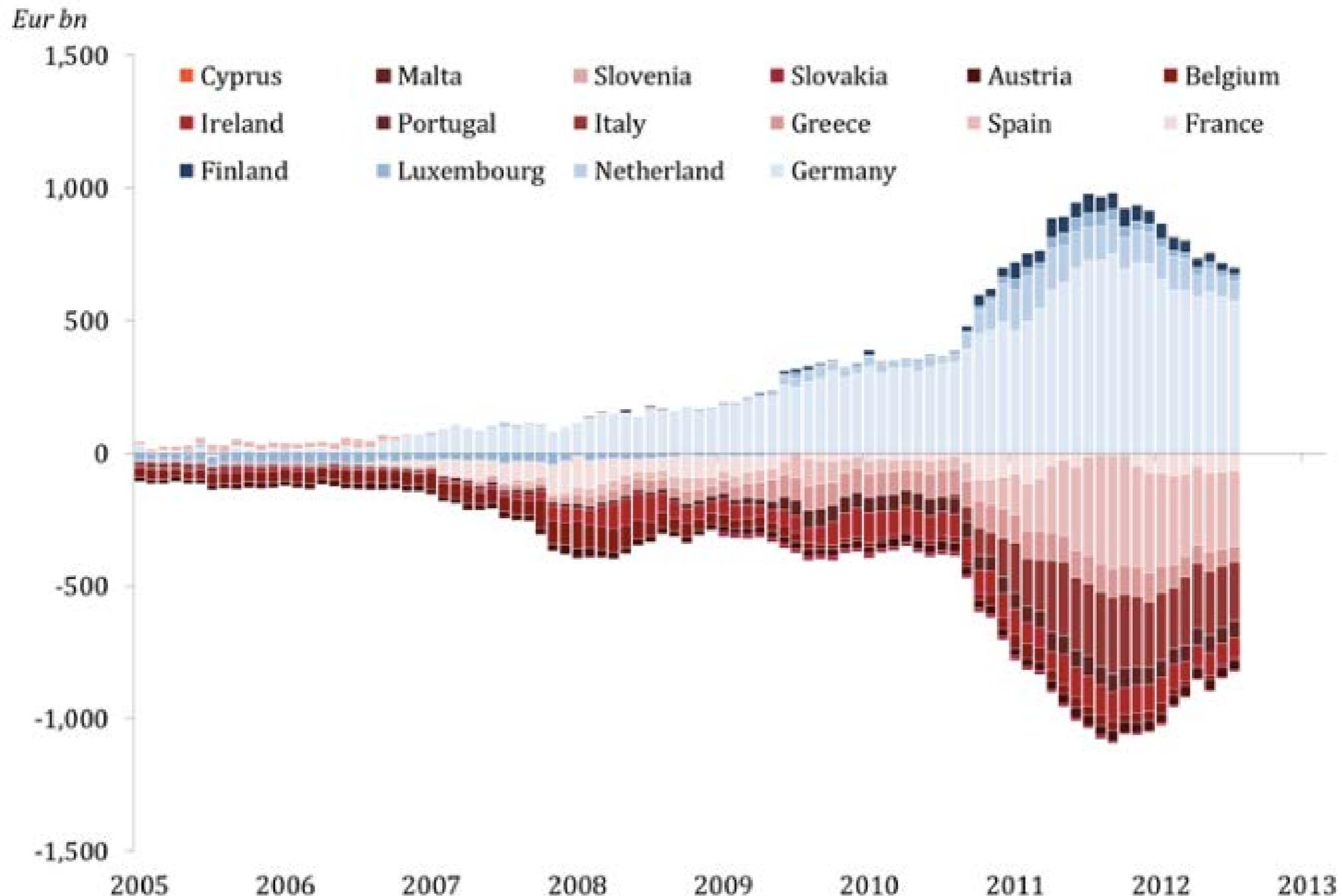


Source: Bawerk.net

Net Balance with the Eurosystem / Target [bn €]

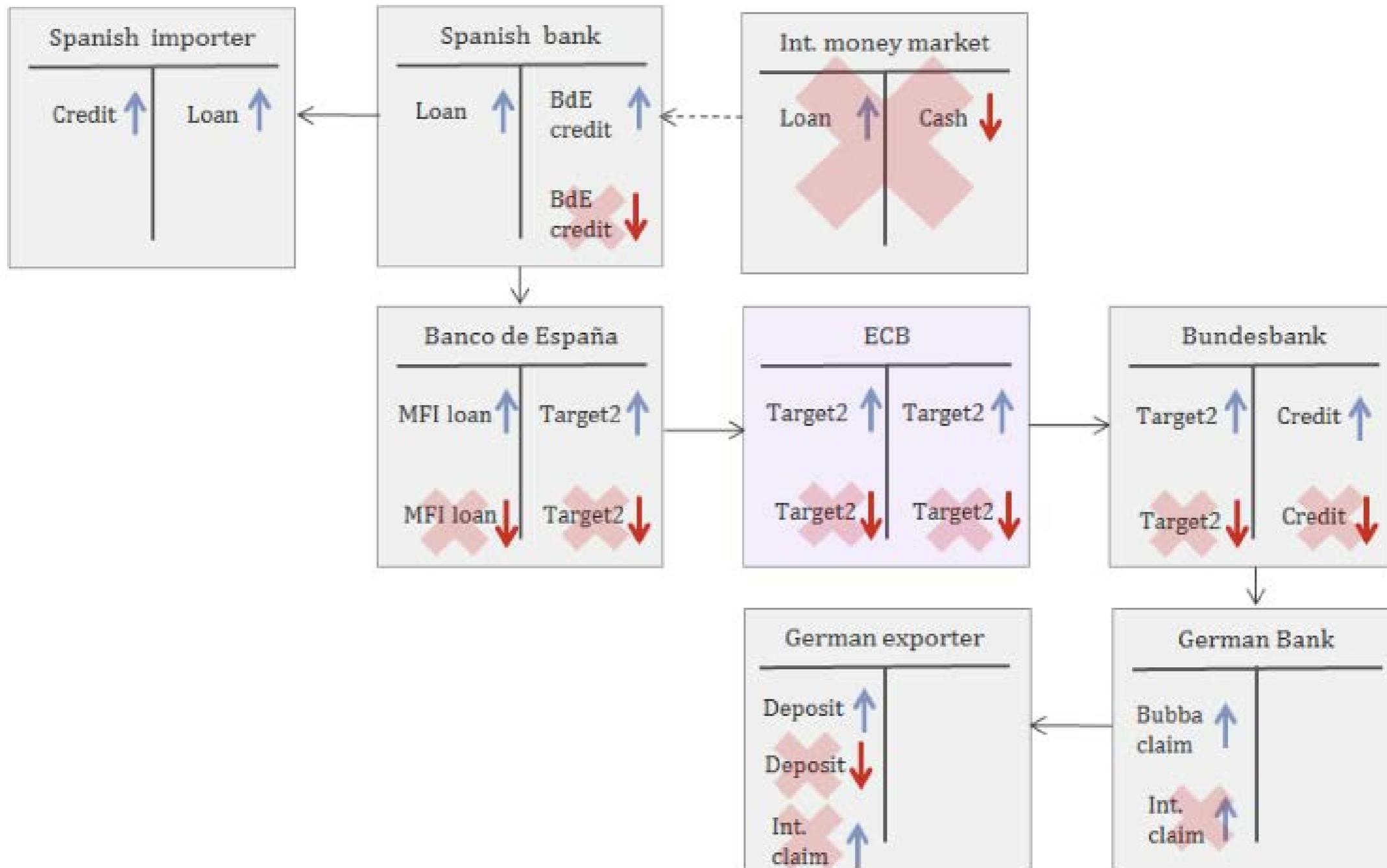


Target2 balances in EMU



Target 2 ECBS Level Playing Field

- Spanish importer buys from a German company
- Spanish importer finances the payment with a loan from Spanish Bank
- Spanish bank can't fund in international or local market
- Spanish bank issues acceptance as collateral for advance from the Banco de España.
- Banco de España issues "temporary" credit line used by Bundesbank to provide funds to German exporter's bank.
- The bank acceptance on the Banco de España balance sheet is balanced by Target 2 liability. This Target 2 liability is a Bundesbank Target 2 asset.
- This asset is balanced by a liability to the exporter's bank. The exporter's bank provides the exporter with a deposit credit.
- The Spanish bank loan to the importer is thus transferred to the exporter as a deposit in its German bank.
- Normally the deposit would enter EU capital flows providing a Spanish claim on Germany offsetting the Spanish importers loan.
- When capital flows ceased, there is no offset and T2 balances may accumulate without limit. They replaced capital flows and reached around 1 T Euro



The Essence of the ECB Support Policy

- The banking system is allowed to pool securitize into “marketable” bonds which will receive a “guarantee” from the sovereign state. As the ECB accepts all sovereign guarantees the new marketable bonds are almost money good.
- The bonds can be pledged as collateral at the national central bank, which in turns receive the right to manufacture euros from the centralized central bank
- The national central bank provide euro liquidity (and dollar through the swap line if needed) to the banking system.
- As a gratitude for the state guarantee, the banking sector will buy government bonds for the euros received from the NCB
- That said the banks are obviously not reluctant to buy these bonds since the OMT put provided by the ECB guarantees the price through an implicit yield ceiling.
- In this elaborate scheme developed since the crises erupted the ECB is bailing out both banks and sovereigns by allowing monetization of increasingly dubious assets.

Non-ECB Support Measures: EFSF, ESFM, ESM

- A bilateral loan facility of €80bn was created for Greece, administered by the European Commission with advice and funding from the IMF.
- When this quickly proved insufficient the European Financial Stability Facility (EFSF) and SPV capable of issuing bonds for €440bn., but with no capital paid. The EFSF was combined with the European Financial Stabilization Mechanism (EFSM) capable of raising €60bn using the EU budget as collateral.
- The EFSF was supplanted by the European Stability Mechanism (ESM), but its disbursements (€188bn) will run alongside ESM capacity until the last disbursement is repaid in 2048.

European Financial Stability Facility

	EZ16	EZ16 w/o bailed out	EZ16 w/o Spain
Austria	5,239	5,640	6,468
Belgium	6,544	7,045	8,080
Cyprus	369	-	-
Estonia	-	-	-
Finland	3,383	3,642	4,177
France	38,369	41,307	47,375
Germany	51,094	55,005	63,086
Greece	5,301	-	-
Ireland	2,997	-	-
Italy	33,716	36,297	41,630
Luxembourg	471	507	582
Malta	171	184	211
Netherlands	10,760	11,584	13,286
Portugal	4,723	-	-
Slovakia	1,871	2,014	2,310
Slovenia	887	955	1,095
Spain	22,404	24,120	-
Total	188,300	188,300	188,300

European Stability Mechanism (ESM)

	Capital Key	Paid-in Capital	Callable Capital	w/o bailed out	Incl EFSF	Capital Buffer	Lending Capacity
<i>Austria</i>	2.78%	2,220	19,425	23,970	30,418	5,550	13,875
<i>Belgium</i>	3.47%	2,773	24,266	29,944	37,999	6,933	17,333
<i>Cyprus</i>	0.20%	157	1,370	-	-	391	978
<i>Estonia</i>	0.26%	205	1,791	2,210	2,804	512	1,279
<i>Finland</i>	1.79%	1,434	12,544	15,479	19,643	3,584	8,960
<i>France</i>	20.32%	16,260	142,272	175,559	222,785	40,649	101,623
<i>Germany</i>	27.06%	21,652	189,453	233,779	296,666	54,129	135,323
<i>Greece</i>	2.81%	2,247	19,657	-	-	5,616	14,041
<i>Ireland</i>	1.59%	1,270	11,112	-	-	3,175	7,937
<i>Italy</i>	17.86%	14,288	125,019	154,269	195,768	35,720	89,299
<i>Luxembourg</i>	0.25%	200	1,748	2,157	2,737	499	1,248
<i>Malta</i>	0.09%	72	632	780	990	181	452
<i>Netherlands</i>	5.70%	4,560	39,899	49,234	62,478	11,400	28,499
<i>Portugal</i>	2.50%	2,001	17,511	-	-	5,003	12,508
<i>Slovakia</i>	0.99%	793	6,937	8,560	10,863	1,982	4,955
<i>Slovenia</i>	0.47%	376	3,289	4,059	5,151	940	2,350
<i>Spain</i>	11.87%	9,494	83,075	-	-	23,736	59,339
Total	100%	80,000	700,000	700,000	888,300	200,000	500,000

ESM

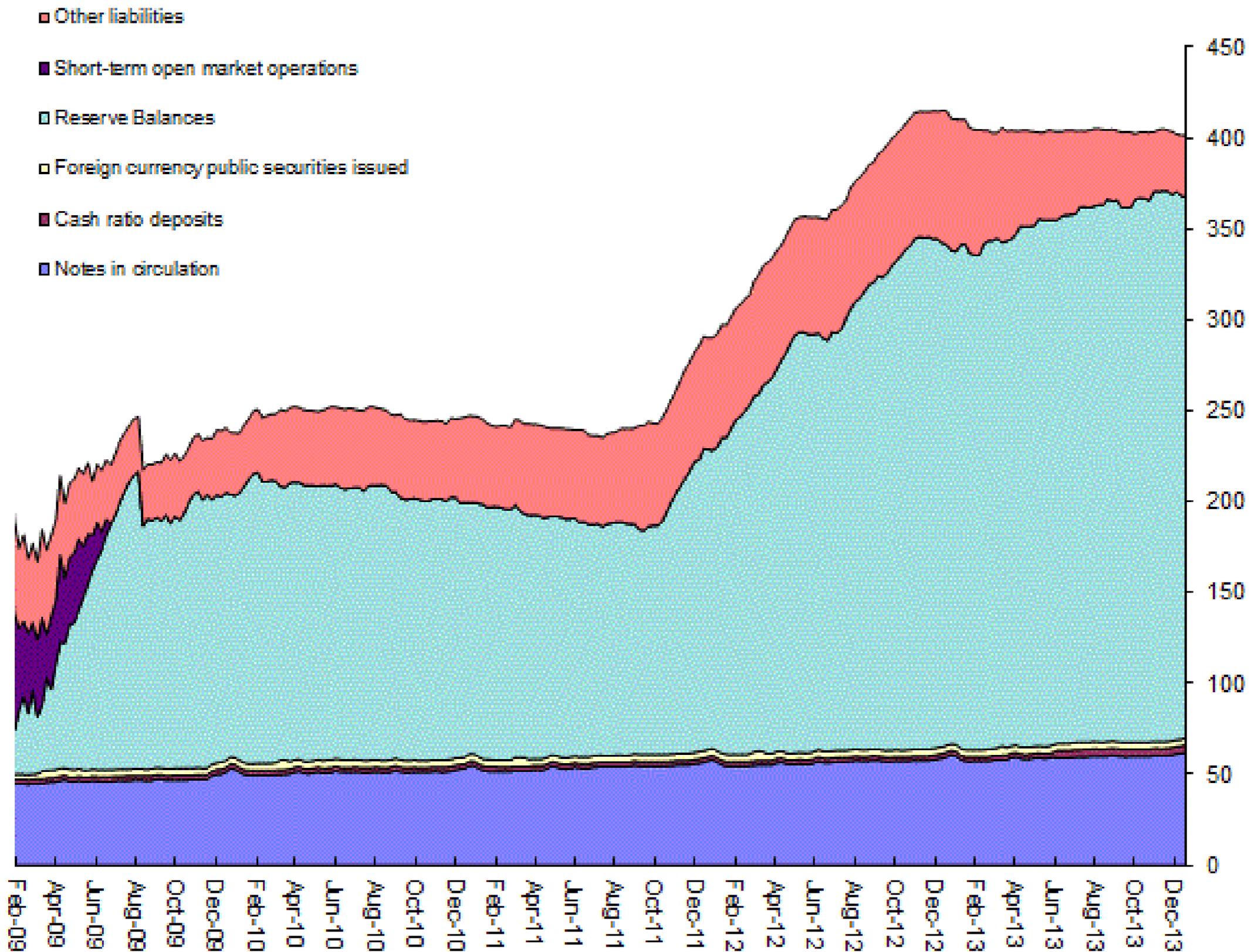
- Direct Loans
 - A member without market access or at unreasonable rates can receive a direct loan. A memorandum of understanding must be signed detailing the adjustment program to get the nation back on a sound footing. Money paid in tranches which may consist of several disbursements conditional on progress.
- Precautionary Financial Assistance
 - A precautionary credit line can be established for a country deemed sound in the form of A pre-conditioned Precautionary Conditioned Credit Line (PCCL) or the more stringent Enhanced Conditioned Credit Line (ECCL) for one year extended for two more six-month periods.
- Primary Market Support Facility (PMSF)
 - Instead of a direct loan, the ESM may engage in primary market purchases. The ESM can also buy in the secondary market in order to manipulate bond yields.
- Recapitalization of Financial Institutions
 - The ESM may provide a loan to for the specific purpose of recapitalizing financial institutions. The ESM will not provide a loan if banks have not tried to tap private market for capital first. ESM loan will be senior to all other capital, the problem of subordination thus re-emerges, now in the banking sector.

Other Securities Market Measures

- Collective Action Clauses (CAC) on all new euro area government bonds
- Transfer of ECB profits from SMP.
- The ECB under SMP bought Greek bonds at a discount but were repaid at par producing ECB “profits”. The “profit” would be transferred to the Greek ministry of finance. However since the ECB cannot engage in fiscal policy, the “profits” were sent back to the owners of the ECB according to their share of the capital stock and were then transferred to Greece.
- Debt-buy backs.
 - Some of the money Greece received was used to buy back debt in the market at a discount in order to reduce the nominal value of outstanding stock, but these buy-backs have a tendency to increase the market value of outstanding stock and usually do not provide long-term debt relief.
- PSI will be sought in exceptional cases
 - The preamble of the ESM Treaty states that a proportionate private sector involvement shall be sought in exceptional cases. While it does not state what exceptional, Greece must have been regarded exceptional as they forced a “voluntarily” PSI in the winter of 2012.

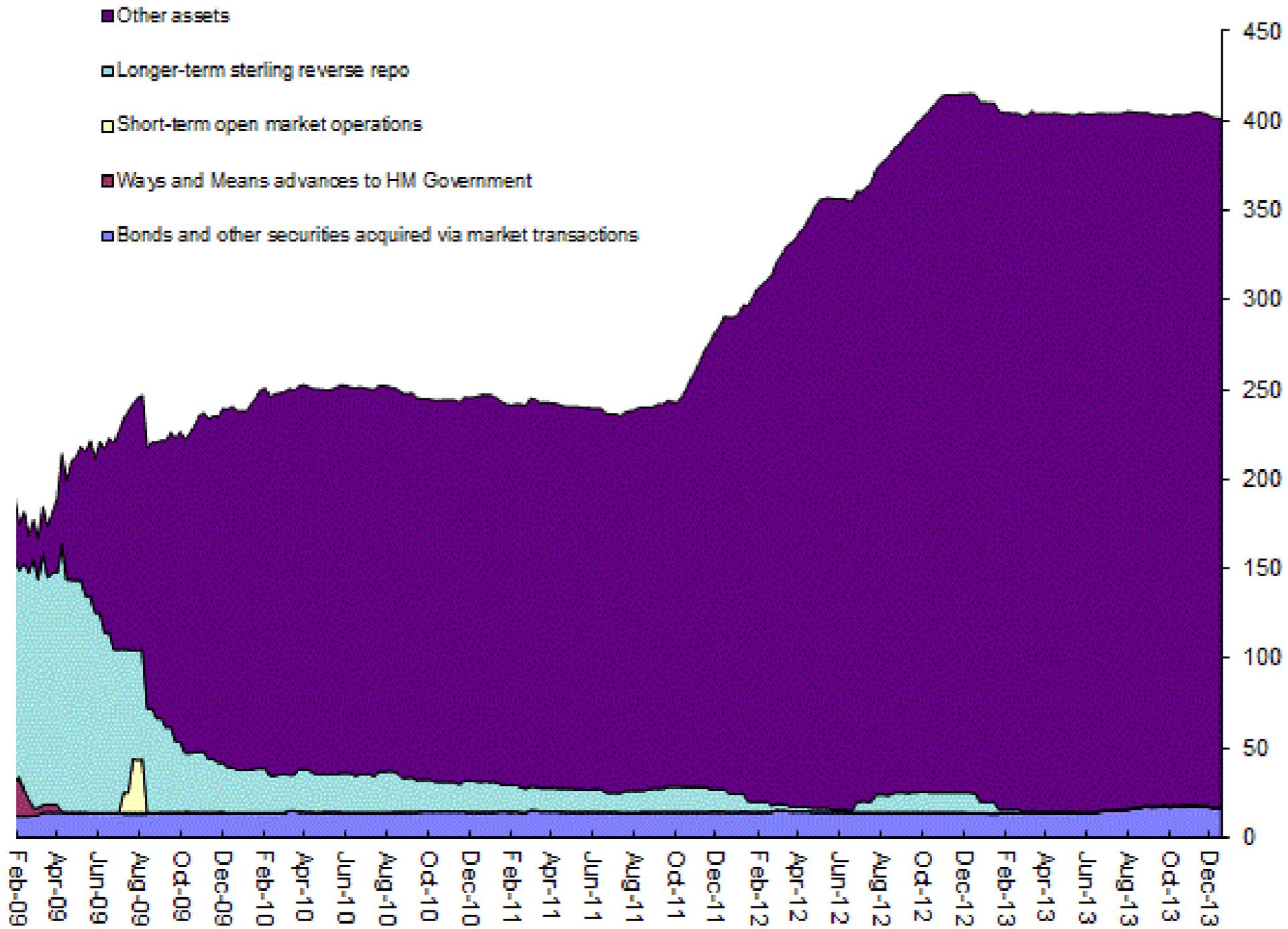
Bank of England consolidated balance sheet: liabilities (a)

€ billions



Bank of England consolidated balance sheet: assets (a)

£ billions



Other operations: Quantitative Easing

In January 2009, under a remit from the Chancellor of the Exchequer, the Bank established a subsidiary company, the Bank of England Asset Purchase Facility Fund (BEAPFF), with the initial objective of improving the liquidity of the corporate credit market by making purchases of high-quality private sector assets. In March 2009 the remit was extended to allow the MPC to use the Asset Purchase Facility to make purchases of assets (now including gilt-edged securities) in pursuit of its monetary policy aims.

The accounts of the Fund are not consolidated with those of the Bank. But the Fund is financed by loans from the Bank and those loans are included in “other assets” in the chart above. They account for the bulk of the increase in “other assets” since March 2009. The Bank’s loans to the Fund were in the initial phase financed with a deposit by the government’s Debt Management Office with the Bank. Since March 2009, as already noted, the Bank’s loans have been financed by increased reserves liabilities on the Bank’s balance sheet. See the [Asset Purchase Facility Balance Sheet Impact](#) pages for more information. The transactions of the Fund itself are reported separately. See [Asset Purchase Facility Quarterly Report](#) [page for the latest report](#). [The greatest part](#) of the Fund’s purchases has been of gilts.

The Special Liquidity Scheme was introduced in April 2008 to improve the liquidity position of the banking system by allowing banks and building societies to swap their high quality mortgage-backed and other securities for UK Treasury Bills for up to three years. As these trades are stock lending transactions they are off balance sheet. The drawdown period for the scheme closed on 30 January 2009. For more information see the [Special Liquidity Scheme](#) pages.

Chart 3: Bank of England consolidated balance sheet: liabilities^(a)

sheet: liabilities^(a)

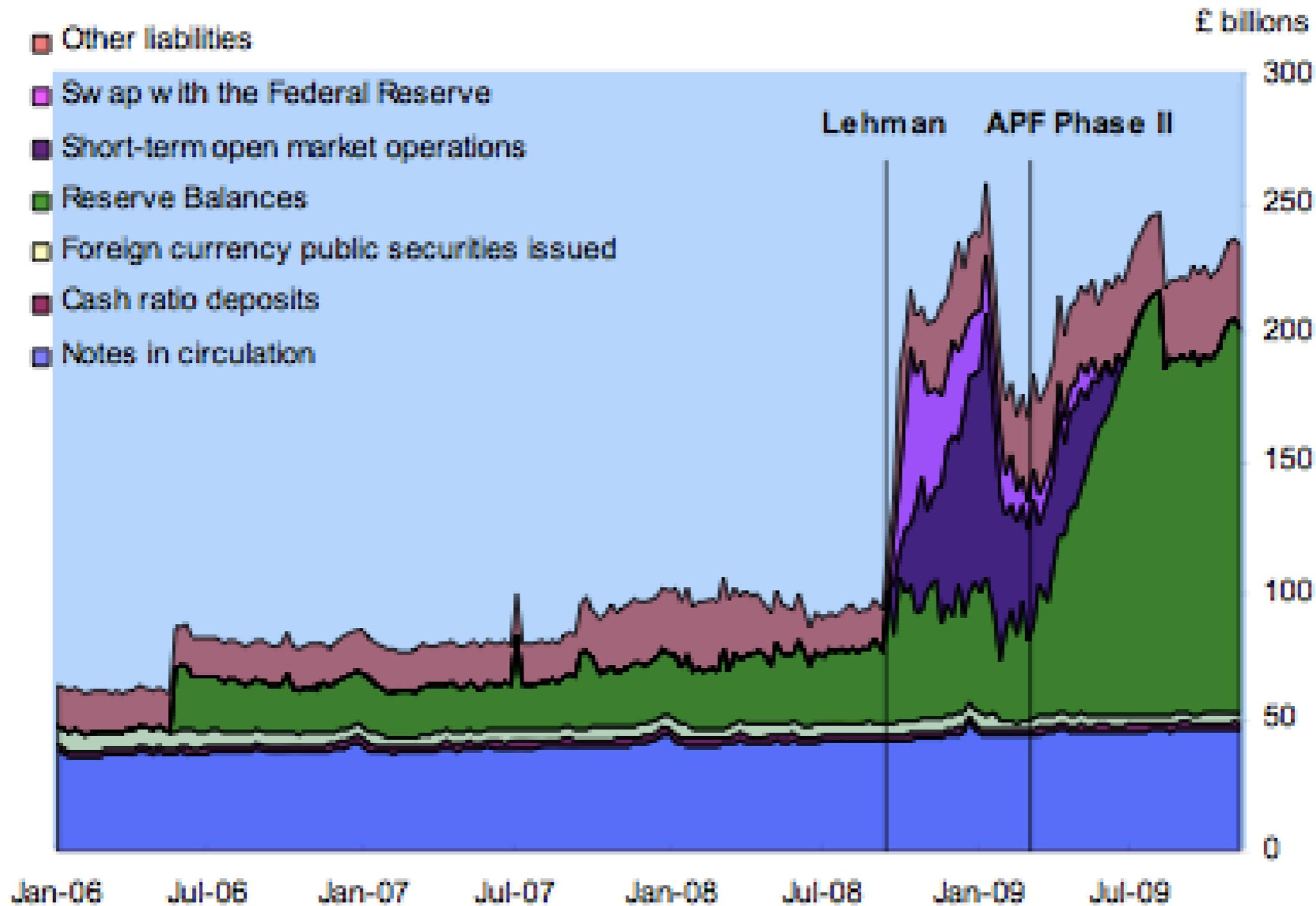


Chart 4: Bank of England consolidated balance sheet: assets^(a)

