Class 2: The U.S. Treasury Market and Its Monetary Policy

Financial Markets, Spring 2021, SAIF

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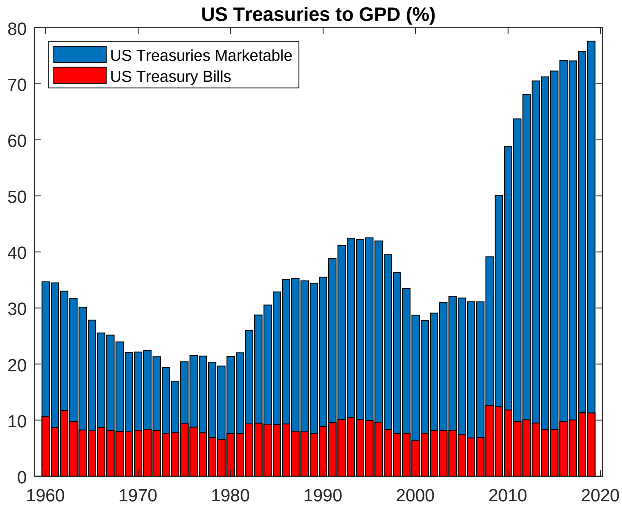
Outline

- The US Treasury (UST) market is unique:
  - The most credit-worthy, essentially free of default risk.
  - Large amount outstanding, highly liquid.
  - Supported by well developed repo and derivatives markets.
- UST provides the most important benchmark curve:
  - The reference curve for cost of funds at different borrowing horizons.
  - Price discovery about inflation and macroeconomic fundamentals happens here.
  - Information on US monetary policy also happens here.
- UST has also become politically charged:
  - Three rounds of quantitative easing after 2008 and the current infinite QE.
  - Large foreign holdings because of the reserve currency status of US dollar.
  - Financing the large and ever growing deficits of the US government.

US Fixed Income Securities, Amounts Outstanding in $ Billion

	Municipal	Treasury	Mortgage-Related	Corporate Debt	Federal Agency Securities	Asset-Backed	Money Markets	Total
2000	1,480.7	2,951.9	4,119.3	3,440.7	1,853.7	701.9	1,614.0	16,162.2
2001	1,603.4	2,967.5	4,711.0	3,862.2	2,157.4	812.0	1,474.0	17,587.5
2002	1,762.8	3,204.9	5,289.4	4,050.1	2,377.7	904.8	1,374.9	18,964.7
2003	1,900.4	3,574.9	5,714.5	4,358.2	2,626.2	995.3	1,292.9	20,462.5
2004	2,876.5	3,943.6	6,301.7	4,573.8	2,700.6	1,100.2	1,399.1	22,895.5
2005	3,099.3	4,165.9	7,218.1	4,646.1	2,616.0	1,281.4	1,644.2	24,671.0
2006	3,285.2	4,322.9	8,389.9	4,889.5	2,631.7	1,656.9	1,958.4	27,134.5
2007	3,550.5	4,516.7	9,386.0	5,328.8	2,905.9	1,963.5	1,788.9	29,440.3
2008	3,666.7	5,774.2	9,467.4	5,514.8	3,208.5	1,829.5	1,599.8	31,060.9
2009	3,851.0	7,260.6	9,352.5	6,099.2	2,726.3	1,712.1	1,138.0	32,139.7
2010	3,968.3	8,853.0	9,258.4	6,738.1	2,537.5	1,507.8	1,057.6	33,920.8
2011	3,931.2	9,928.4	9,075.5	6,850.2	2,326.9	1,359.0	969.3	34,440.5
2012	3,932.8	11,046.1	8,838.1	7,285.8	2,095.8	1,280.3	952.3	35,431.2
2013	3,868.1	11,854.4	8,742.6	7,687.8	2,058.3	1,285.7	951.6	36,448.6
2014	3,824.3	12,504.8	8,842.0	8,048.6	2,028.7	1,349.4	930.4	37,528.1
2015	3,840.4	13,191.6	8,894.8	8,277.7	1,995.4	1,376.6	941.5	38,518.0
2016	3,887.5	13,908.2	9,023.4	8,684.4	1,971.7	1,391.8	884.9	39,751.8
2017	3,901.8	14,468.8	9,304.5	9,008.9	1,934.7	1,457.9	965.9	41,042.6
2018	3,844.5	15,608.0	9,732.3	9,237.2	1,841.6	1,615.6	996.0	42,875.2
2019	3,864.7	16,673.3	10,227.6	9,579.9	1,726.2	1,663.2	1,045.2	44,780.1
2020	3,949.9	20,973.1	11,214.0	10,562.7	1,693.6	1,535.8	986.9	50,916.0

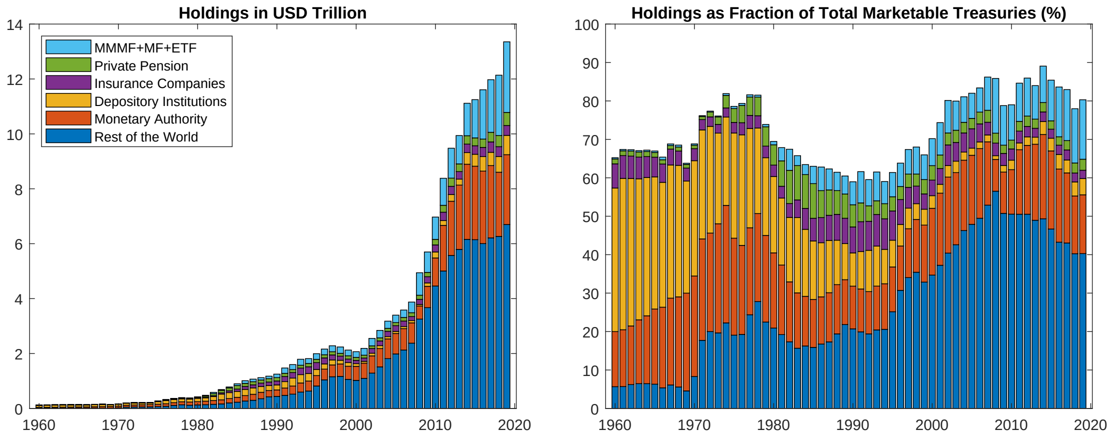
Ratios of UST to GDP



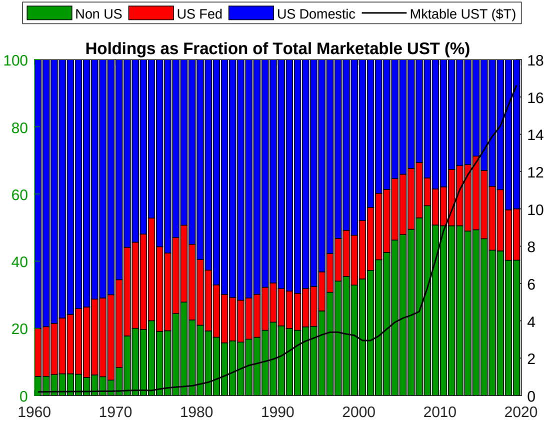
- US Public Debt \$23.41T USD.
- US Treasuries \$16.89T USD:
  - Bills: \$2.56T.
  - Notes: \$9.99T.
  - Bonds: \$2.41T.
  - TIPS: \$1.51T.
- US Muni's: \$3.85T USD.
- US GSE's: \$1.83T USD.

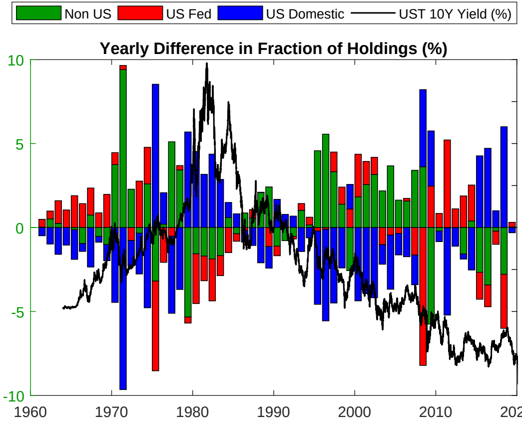
- 中国利率债 55.51 万亿 CNY:
  - 国债 16.79 万亿.
  - 政策银行债 16.09 万亿.
  - 地方政府债 22.63 万亿.

Major Holders of UST

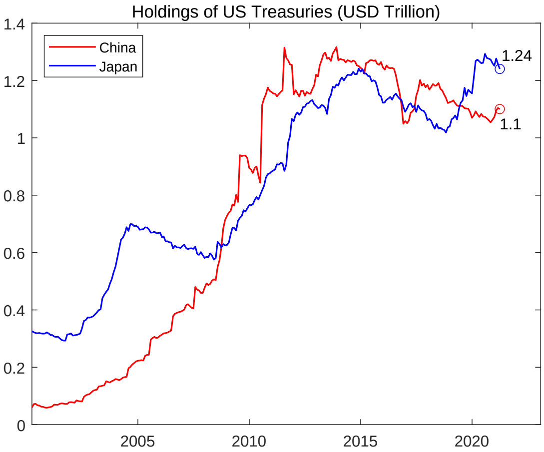


Who Will be Funding the US Deficits?



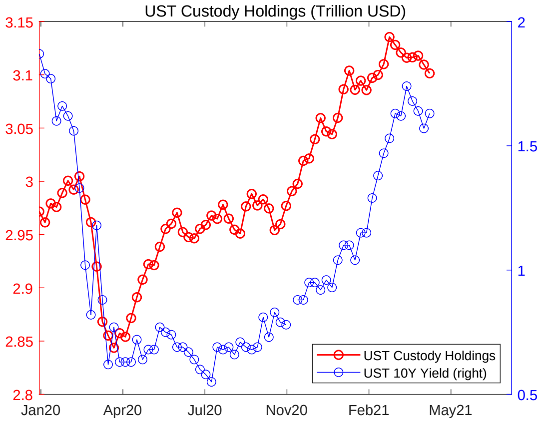


Foreign Holdings of UST (USD Trillion)



	Jan 2020	Mar 2021
Japan	1211.7	1240.3
China, Mainland	1078.6	1100.4
United Kingdom	372.7	443.2
Brazil	283.3	255.5
Ireland	271.4	309.8
Luxembourg	255.2	282.8
Switzerland	238.1	254.8
China, Hong Kong	229.6	227.0
Cayman Islands	216.1	215.2

Sharp Drop in Foreign Holdings of UST Amidst Global USD Shortage

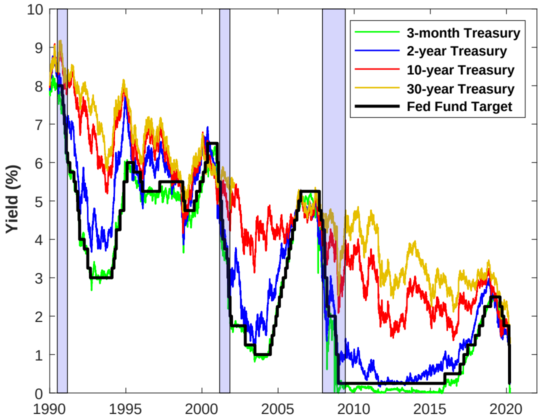


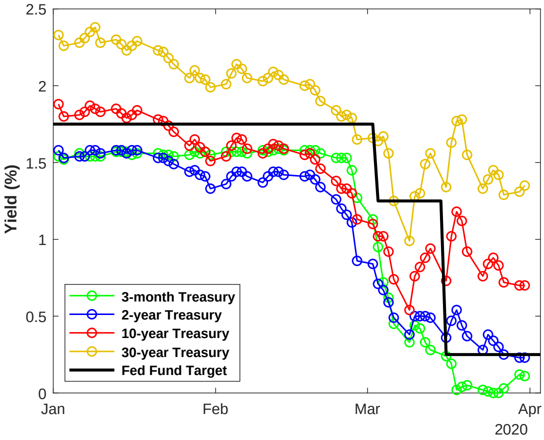
- Amidst global dollar shortage, foreign institutions sold UST to raise USD cash.
- FIMA Repo Facility: FIMA account holders can use UST held at Fed as collateral to borrow USD cash.
- Announced: March 31.
- Effective: April 6.

Monetary Policy and the Yield Curve

- The Fed controls the short-end of the yield curve:
  - FOMC meets every six weeks to set the Fed funds target rate.
  - The Fed funds market: depository institutions lend reserve balances to one another overnight.
  - The Fed uses open market operations to adjust the supply of reserve balances so as to keep the fed funds rate around the target established by the FOMC.
- Fed traditionally does not control the long-end of the yield curve, but
  - Since late 2008, the Fed did three rounds of QE.
  - Since March 2020, the Fed commits to infinite QE.
- Absent of the Fed, the fundamental drivers of the long-term interest rates:
  - Inflation expectations.
  - Long-term economic growth.

Fed Funds Target Rate, Yield Curve, and Business Cycle





Fed Funds Target Rate, Macroeconomic Fundamentals, and Yield Curve

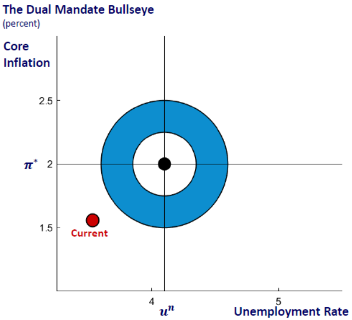
- Monetary policy decision is informed by macroeconomic fundamentals and markets.
- The Taylor (1993) rule is an example:

$$r = 2\% + \pi + 0.5y + 0.5\,(\pi - 2)$$

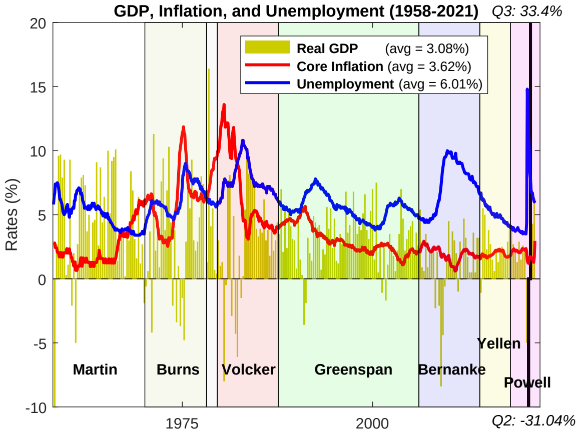
  - π: rate of **inflation**.
  - y: deviation of real **GDP** from a target.
- Markets anticipate future Fed actions:
  - The shape of the yield curve (e.g., slope).
  - Federal funds futures and options.
- Uncertainties in the target rate affect the markets. Fed: more transparency and better communications.

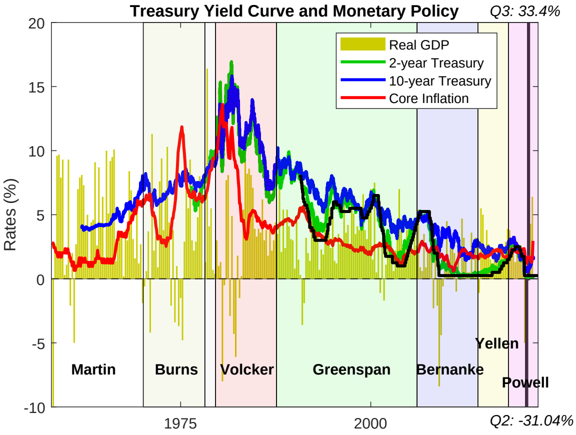
Fed's dual mandate:

- Price stability.
- Maximum employment.



Macroeconomic Indicators, Treasury Yield Curves, and Monetary Policy



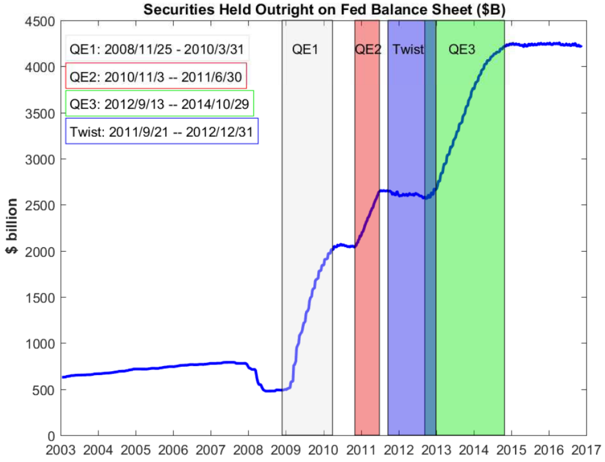


Quantitative Easing and Operation Twist, 2008-2014

- When the short-term interest rates reach to zero, how to bring down longer-term interest rates?
  - QE1: buy Treasury securities, agency debt, and MBS.
  - QE2: buy Treasury securities.
  - QE3: buy Treasury securities and MBS.
  - Operation Twist: buy longer-term, sell shorter-term Treasury securities.
- In buying Treasury securities, the ultimate goal was to precipitate a broad reduction in the cost of credit (e.g., rates on mortgage and corporate bonds).
- *Our purchases of hundreds of billions of dollars of securities were probably the most important and definitely the most controversial tool we would employ.*

  – Ben Bernanke in *The Courage to Act.*

Three Rounds of QE, 2008-2014

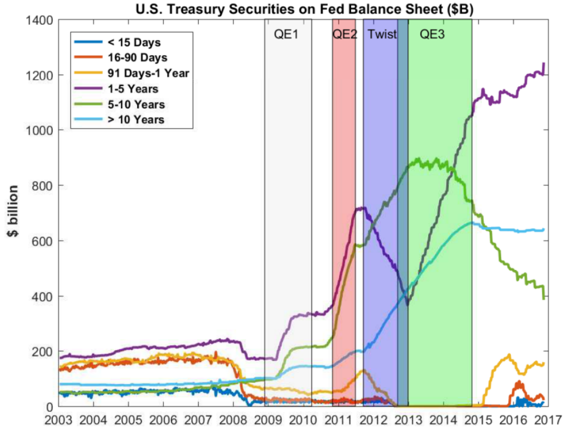


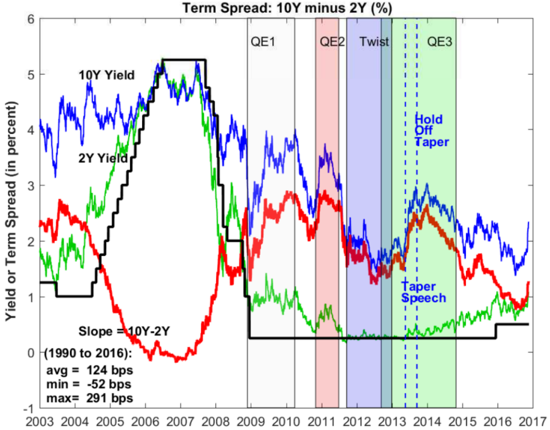
Total Reserve Bank Credit: $4.45T:

- Securities Held Outright: $4.22T.
  - UST: $2.46T.
  - Agency: $39.7B.
  - MBS: $1.72T.
- Repo: 0.
- Loans: $206M.
- Maiden Lane: $1.7B.
- Central Bank Swaps: 0.

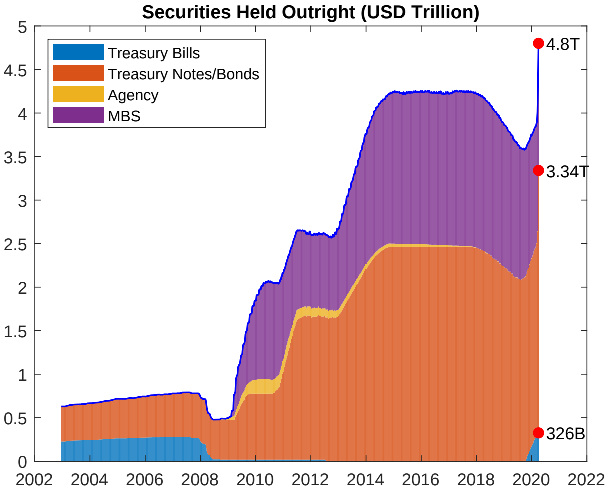
As of Oct 29, 2014.

QE and Treasury Yield Curve





2020 Infinite QE



- Fed announcements:
  - March 15: $700B QE.
  - March 23: Infinite QE.
- Total Fed Credit: $5.77T:
  - Securities Held Outright: $4.80T.
    - UST: $3.34T.
    - MBS: $1.46T.
  - Repo: $263B.
  - Loans: $129B.
    - PDCF: $33B.
    - MMMFLF: $53B.
  - Central Bank Swaps: $348.5B.

As of Apr 1, 2020.

Fed Balance Sheet, April 15, 2020

Millions of dollars

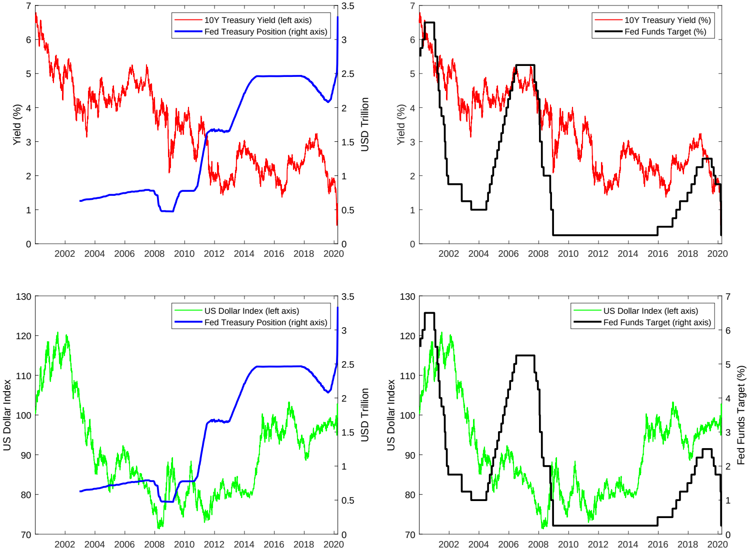
Reserve Bank credit, related items, and reserve balances of depository institutions at Federal Reserve Banks	Averages of daily figures: Week ended Apr 15, 2020	Change from week ended Apr 8, 2020	Change from week ended Apr 17, 2019	Wednesday Apr 15, 2020
Reserve Bank credit	6,196,020	+ 227,982	+2,299,746	6,329,072
Securities held outright (1)	5,195,539	+ 222,862	+1,448,965	5,359,376
U.S. Treasury securities	3,717,414	+ 206,286	+1,563,958	3,788,858
Bills (2)	326,044	0	+ 326,044	326,044
Notes and bonds, nominal (2)	3,140,587	+ 190,299	+1,124,023	3,206,144
Notes and bonds, inflation-indexed (2)	217,244	+ 14,619	+ 102,094	222,692
Inflation compensation (3)	33,539	+ 1,369	+ 11,797	33,978
Federal agency debt securities (2)	2,347	0	0	2,347
Mortgage-backed securities (4)	1,475,778	+ 16,576	- 114,993	1,568,171
Unamortized premiums on securities held outright (5)	250,328	+ 20,389	+ 115,251	262,334
Unamortized discounts on securities held outright (5)	-7,123	+ 834	+ 5,923	-6,896
Repurchase agreements (6)	201,596	- 26,047	+ 201,596	181,100
Foreign official	1	+ 1	+ 1	0
Others	201,596	- 26,047	+ 201,596	181,100
Loans	128,604	- 1,400	+ 128,580	120,349
Primary credit	41,034	- 2,479	+ 41,024	36,284
Secondary credit	0	0	0	0
Seasonal credit	0	0	- 13	0
Primary Dealer Credit Facility	35,590	+ 2,891	+ 35,590	33,409
Money Market Mutual Fund Liquidity Facility	51,944	- 1,849	+ 51,944	50,656
Other credit extensions	0	0	0	0
Net portfolio holdings of Commercial Paper Funding Facility II LLC (7)	141	+ 141	+ 141	974
Float	-266	- 72	- 58	-361
Central bank liquidity swaps (8)	393,063	+ 7,698	+ 393,008	378,291

Fed Balance Sheet, May 26, 2021

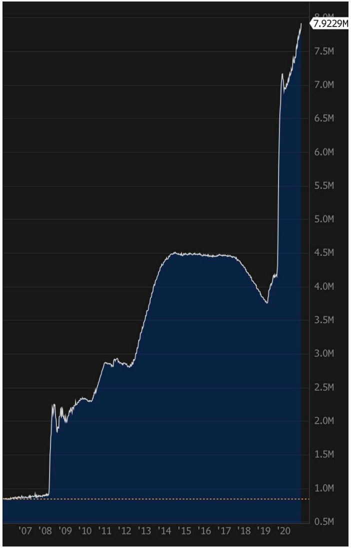
Millions of dollars

Reserve Bank credit, related items, and reserve balances of depository institutions at Federal Reserve Banks	Averages of daily figures			Wednesday May 26, 2021
	Week ended May 26, 2021	Change from week ended		
		May 19, 2021	May 27, 2020	
Reserve Bank credit	7,889,230	+ 14,150	+ 829,669	7,864,068
Securities held outright[1]	7,357,676	+ 21,764	+1,398,951	7,333,769
U.S. Treasury securities	5,082,105	+ 19,687	+ 980,997	5,087,157
Bills[2]	326,044	0	0	326,044
Notes and bonds, nominal[2]	4,364,470	+ 17,375	+ 882,789	4,367,786
Notes and bonds, inflation-indexed[2]	341,427	+ 1,600	+ 84,833	342,856
Inflation compensation[3]	50,164	+ 712	+ 13,375	50,471
Federal agency debt securities[2]	2,347	0	0	2,347
Mortgage-backed securities[4]	2,273,224	+ 2,077	+ 417,954	2,244,265
Unamortized premiums on securities held outright[5]	349,749	- 388	+ 45,140	348,761
Unamortized discounts on securities held outright[5]	-13,427	- 288	- 7,883	-13,622
Repurchase agreements[6]	7	+ 7	- 174,923	46
Foreign official	0	0	- 1	0
Others	7	+ 7	- 174,922	46
Loans	83,993	+ 2,315	- 23,313	84,894
Primary credit	626	+ 10	- 18,205	633
Secondary credit	0	0	0	0
Seasonal credit	2	+ 1	0	3
Primary Dealer Credit Facility	0	0	- 6,961	0
Money Market Mutual Fund Liquidity Facility	0	0	- 34,321	0
Paycheck Protection Program Liquidity Facility	83,365	+ 2,305	+ 36,173	84,258
Other credit extensions	0	0	0	0
Net portfolio holdings of Commercial Paper Funding Facility II LLC[7]	8,554	- 2	- 3,024	8,554
Net portfolio holdings of Corporate Credit Facilities LLC[7]	25,976	+ 66	- 3,876	26,037
Net portfolio holdings of MS Facilities LLC (Main Street Lending Program)[7]	30,552	- 64	+ 30,552	30,559
Net portfolio holdings of Municipal Liquidity Facility LLC[7]	10,913	- 212	+ 10,913	10,879
Net portfolio holdings of TALF II LLC[7]	4,922	0	+ 4,922	4,923
Float	-124	- 18	+ 88	-160
Central bank liquidity swaps[8]	678	+ 42	- 448,058	678

UST, USD, and the Fed



Post-2020 US Monetary Policy



- 2020:
  - 3/03: Fed: rate cut by 50 bps.
  - 3/12: Fed: injects $1.5T via term repo.
  - 3/15: Fed: rate to zero and $700B QE.
  - 3/17: Fed: CP funding & PD credit facility.
  - 3/18: Fed: MMMF liquidity facility.
  - 3/23: Fed: Infinite QE announced at 8 am.
- Long-Term Projections:
  - "If the Fed balance sheet to debt ratio stays at the post GFC average (c.30% vs c.35% current) then the Fed balance sheet would be around $40tn in 2050 from just under $8tn today."
  - "Can the Fed Ever Raise Interest Rates?"

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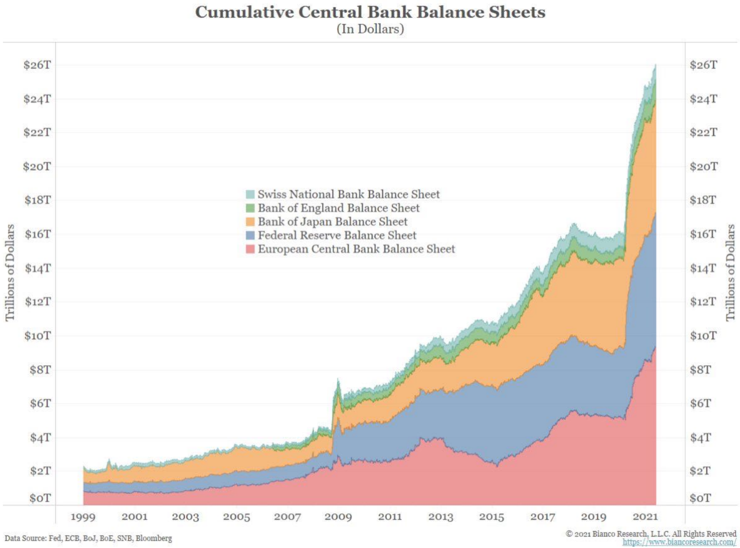
Cumulative Central Bank Balance Sheets
(In Dollars)
Swiss National Bank Balance Sheet
Bank of England Balance Sheet
Bank of Japan Balance Sheet
Federal Reserve Balance Sheet
European Central Bank Balance Sheet
Trillions of Dollars
$26T
$24T
$22T
$20T
$18T
$16T
$14T
$12T
$10T
$8T
$6T
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Data Source: Fed, ECB, BoJ, BoE, SNB, Bloomberg
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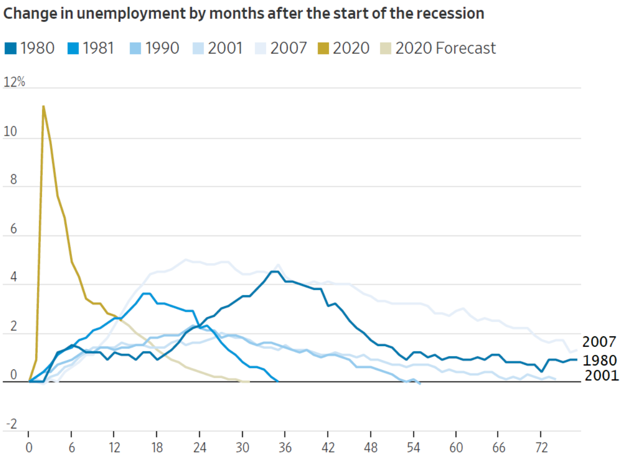
The Fed is Playing with Fire?



Broda and Druckenmiller, May 10, 2021:

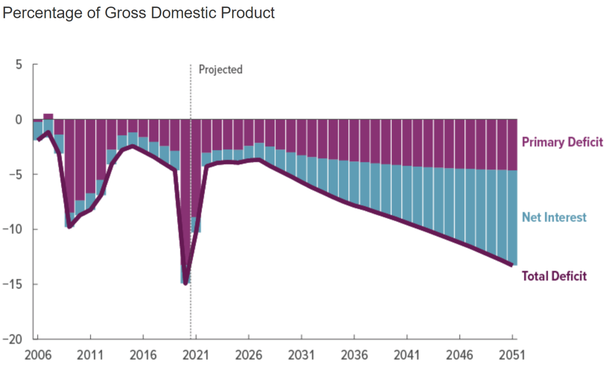
The current stage of recovery:

- GDP back to pre-recession levels.
- Unemployment recovers by 70%, four times as fast as in a typical recession.

Normally, the Fed would be planning its first rate hike. Instead, the Fed

- Tells the market that the first hike will happen in 32 months.
- Continues the $120B a month bond purchases.

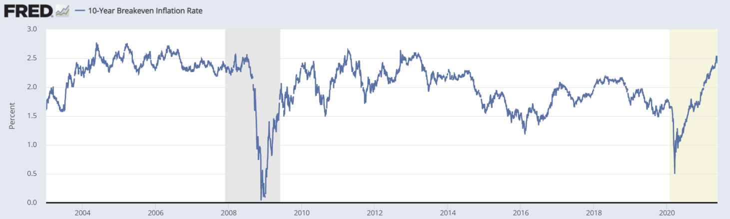
Future Fiscal Burdens of USA

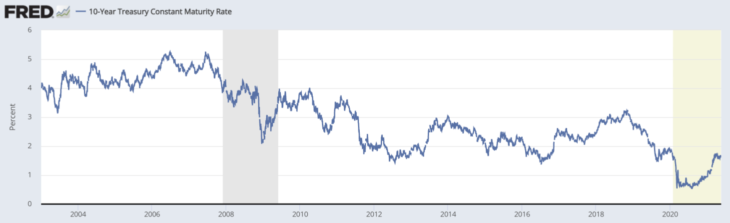


US Congressional Budget Office:

- **Deficits:** Largest since 1945.
- **Federal Debt:** Projected to be 202% by 2051.
- **Spending:**
  - Interest expenses.
  - Social security and medicare for an aging population.
- **A growing debt burden:**
  - Fiscal crisis.
  - Higher inflation.
  - Undermine confidence in USD.

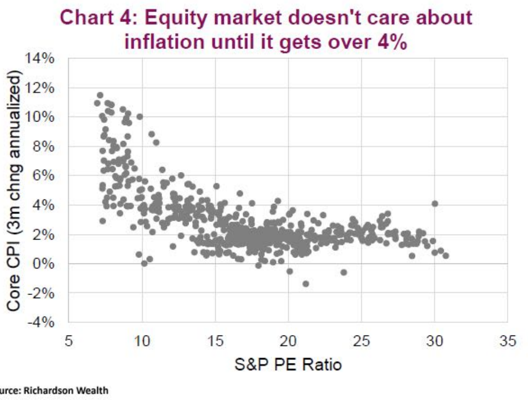
Breakeven Inflation Rate



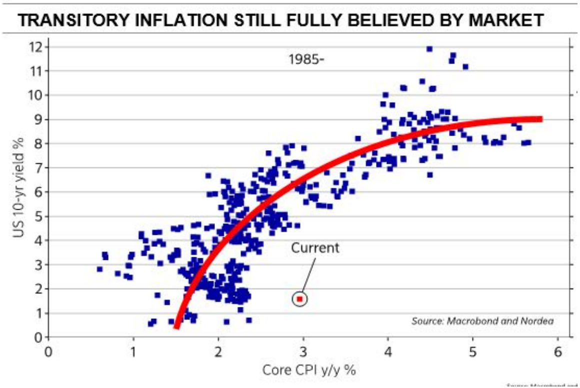


Annual Inflation Rate

The Response of Equity and Bond to Inflation



Equity Valuation and Inflation



Treasury Yield and Inflation

S&P 500 Price to Earnings Ratio