

Class 11: The U.S. Treasury Market

Financial Markets, Spring 2020, SAIF

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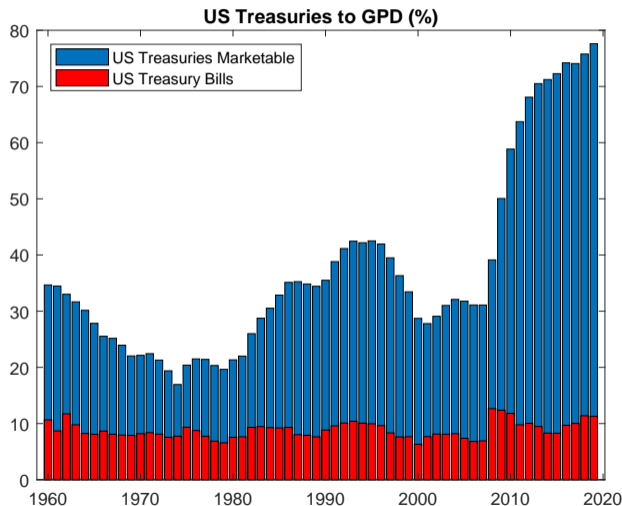
April 22, 2020

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.

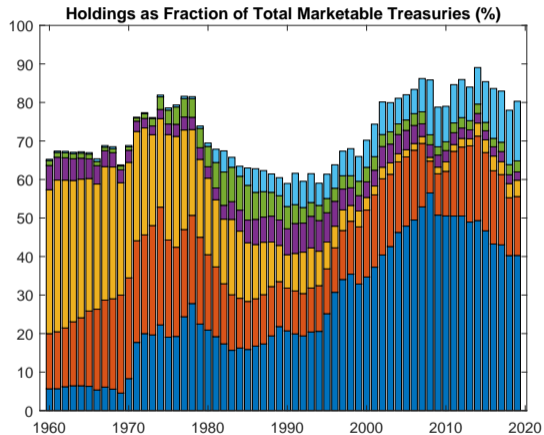
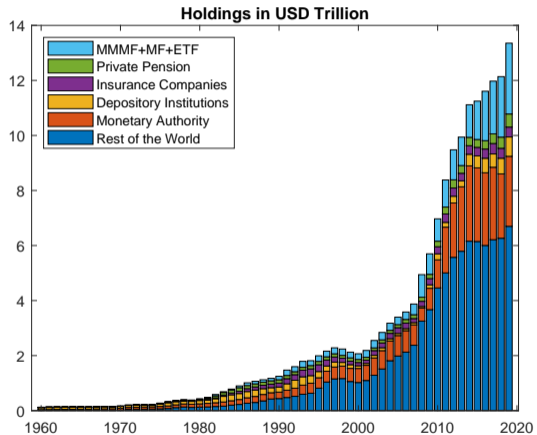
The Fixed Income Market with UST at its Core

Ratios of UST to GDP

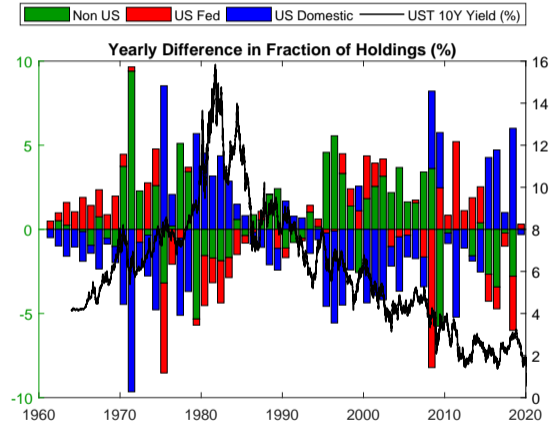
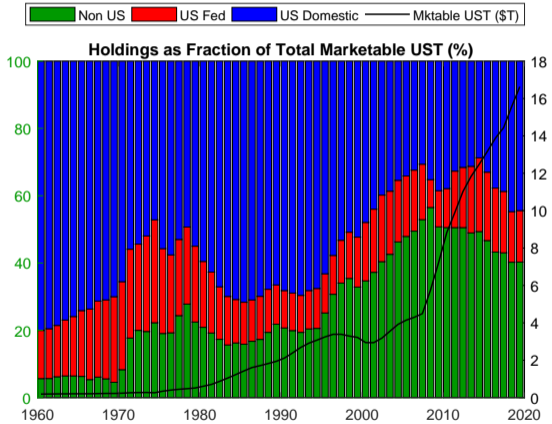


- US Public Debt \$23.41T USD.
- US Treasuries \$16.89T USD:
 - ▶ Bills: \$2.56T.
 - ▶ Notes: \$9.99T.
 - ▶ Bonds: \$2.41T.
 - ▶ TIPS: \$1.51T.
- US Muni's: \$3.85T USD.
- US GSE's: \$1.83T USD.
- 中国利率债 55.51 万亿 CNY:
 - ▶ 国债 16.79 万亿.
 - ▶ 政策银行债 16.09 万亿.
 - ▶ 地方政府债 22.63 万亿.

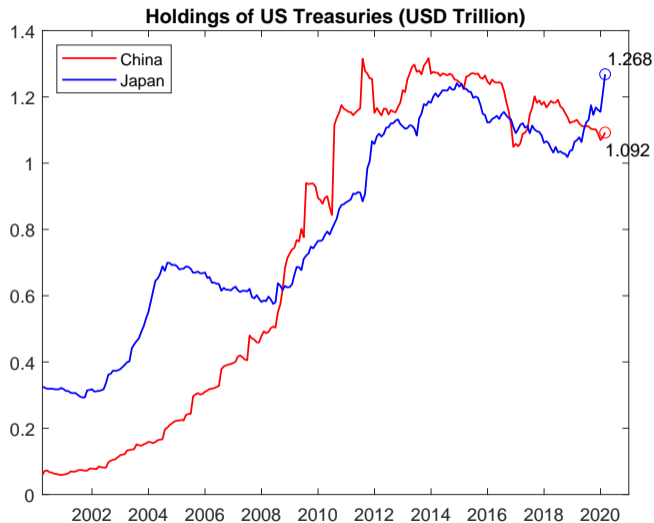
Major Holders of UST



Who Will be Funding the US Deficits?



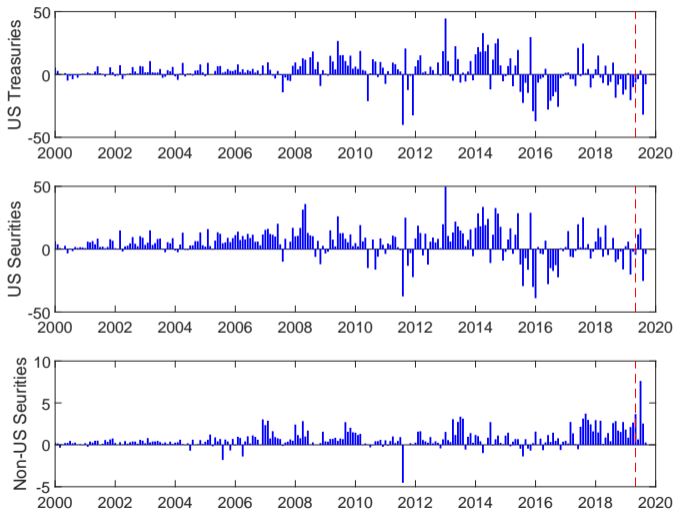
Foreign Holdings of UST (USD Trillion)



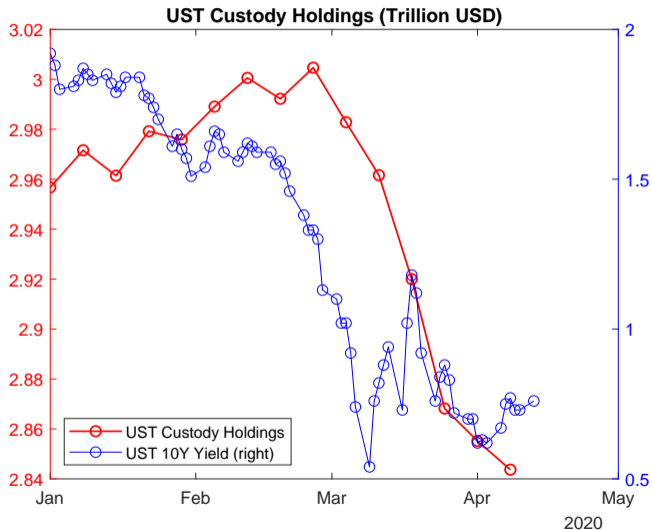
Jan 2020 (USD Billion)

Japan	1211.7
China, Mainland	1078.6
United Kingdom	372.7
Brazil	283.3
Ireland	271.4
Luxembourg	255.2
Switzerland	238.1
China, Hong Kong	229.6
Cayman Islands	216.1

Monthly Net Purchases of US Treasury Securities by China (USD Billion)

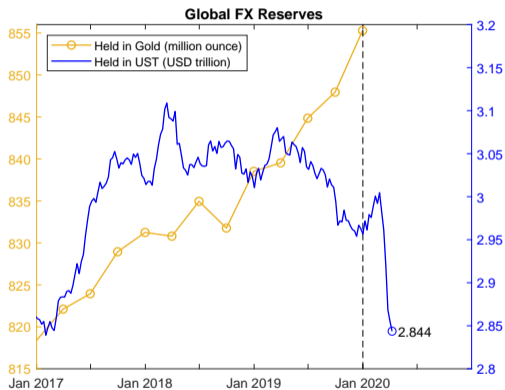
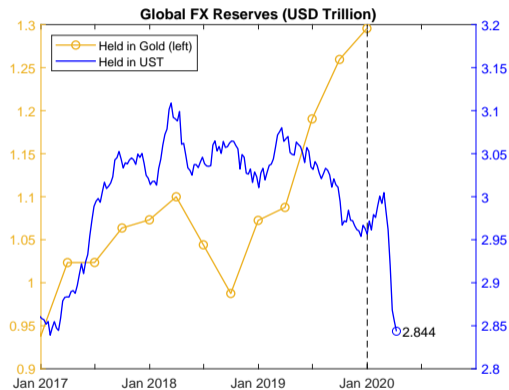


Sharp Drop in Foreign Holdings of UST Amidst Global USD Shortage

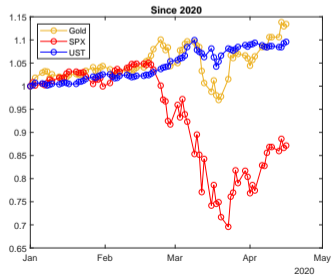
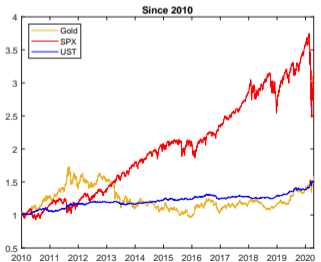
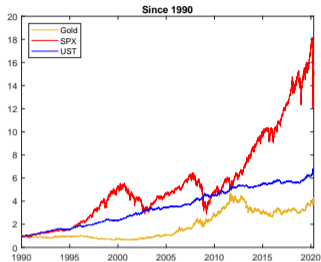


- Amidst global dollar shortage, foreign institutions sold UST to raise USD cash.
- FIMA Repo Facility: FIMA account holders can use UST held at Fed as collateral to borrow USD cash.
- Announced: March 31.
- Effective: April 6.

FX Reserves Held in Gold vs UST



Gold



SPX, UST, and Gold

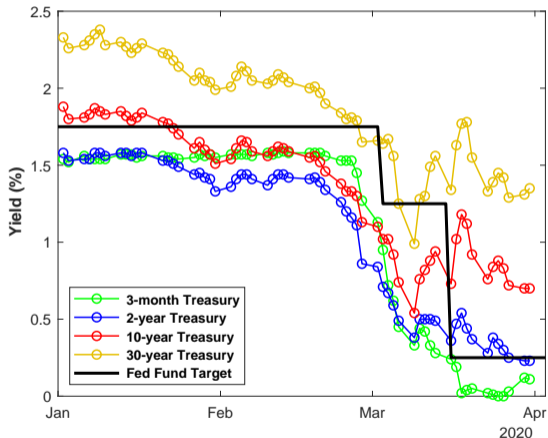
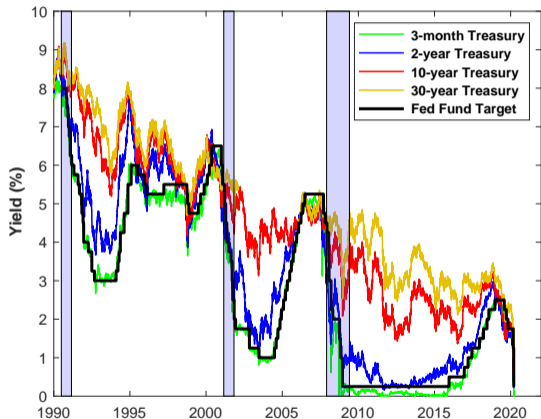
	SPX	UST	GOLD
Monthly Returns 1988-2018			
μ	0.87 [4.15]	0.56 [7.69]	0.42 [1.91]
σ	4.13	1.44	4.34
Monthly Returns 2000-2018			
μ	0.49 [1.78]	0.44 [5.07]	0.82 [2.72]
σ	4.28	1.37	4.68
Monthly Returns 2010-2018			
μ	0.93 [2.70]	0.34 [3.32]	0.42 [1.02]
σ	3.85	1.13	4.52

Corr (%)	SPX	UST	GOLD
Monthly Returns 1988-2018			
SPX	100		
UST	-8	100	
GOLD	-6	12	100
Monthly Returns 2000-2018			
SPX	100		
UST	-36	100	
GOLD	0	24	100
Monthly Returns 2010-2018			
SPX	100		
UST	-51	100	
GOLD	2	33	100

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



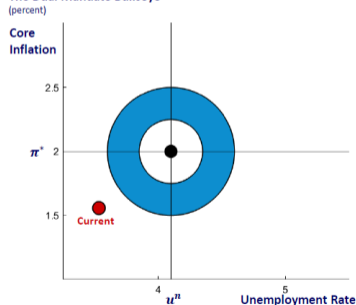
Fed Funds Target Rate, Macroeconomic Fundamentals, and Yield Curve

- 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.

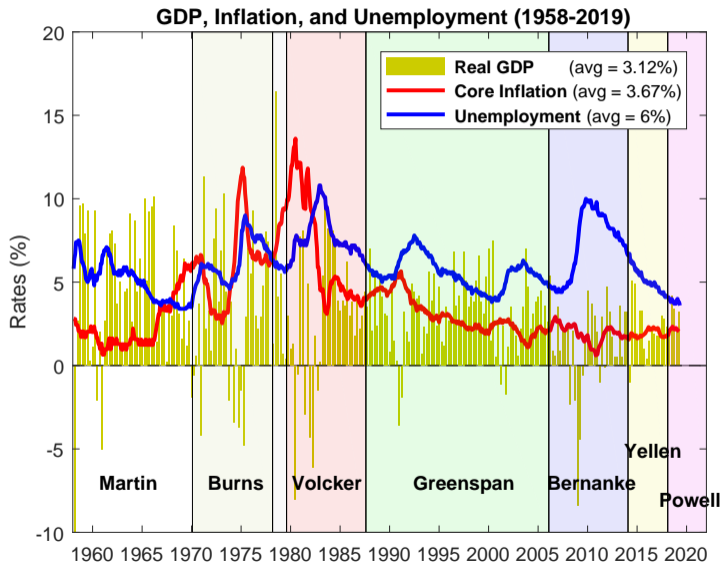
Fed's dual mandate:

- Price stability.
- Maximum employment.


The Dual Mandate Bullseye



Macroeconomic Indicators: GDP, Inflation, and Employment



US GDP Forecast

96) Chart		97) Set as Default View		Disclaimer		Economic Forecasts				
Country/Region/World		Contributor		Contributor Composite		<input type="radio"/> Yearly <input checked="" type="radio"/> Quarterly				
 United States <input type="button" value="Browse"/>		<input checked="" type="radio"/> Private <input type="radio"/> Official		Actual/ Forecasts		Probability of Recession 100.0%				
Indicator	Q2 19	Q3 19	Q4 19	Q1 20	Q2 20	Q3 20	Q4 20	Q1 21	Q2 21	Q3 21
Economic Activity										
Real GDP (YoY%)	2.3	2.1	2.3	1.0	-6.7	-4.2	-2.7	-0.7	6.3	4.1
+ Real GDP (QoQ% SAAR)	2.0	2.1	2.1	-2.5	-25.1	7.2	5.7	4.0	3.5	2.8
Industrial Production (Yo...)	1.2	0.2	-0.7	-1.7	-8.6	-5.6	-3.6	-0.3	2.3	2.6
Price Indices										
CPI (YoY%)	1.8	1.7	2.1	2.1	0.8	0.9	1.0	1.4	2.1	2.1
+ PCE Price Index (YoY%)	1.4	1.4	1.4	1.7	0.8	0.9	1.0	1.2	1.8	1.8
Housing Market										
Housing Starts (000s SAA...)			1336	1442	1100	1174	1247	1260	1306	1329
New Home Sales (000s S...)			710	715	520	596	624	663	668	690
Existing Home Sales (Mln...)			5.4	5.4	4.7	5.0	5.1	5.2	5.3	5.4
Building Permits (000s S...)			1448	1426	1200	1191	1185	1288	1353	1372
Labor Market										
Unemployment (%)	3.6	3.6	3.5	3.8	12.0	9.0	7.6	7.0	6.5	6.1
Non Farm Payrolls (000s ...)	182	208	184	-701	-2905	127	249	241	200	184
Average Hourly Earnings ...	3.4	3.1	3.0	3.1	2.9	2.7	2.8	2.8	2.7	2.8

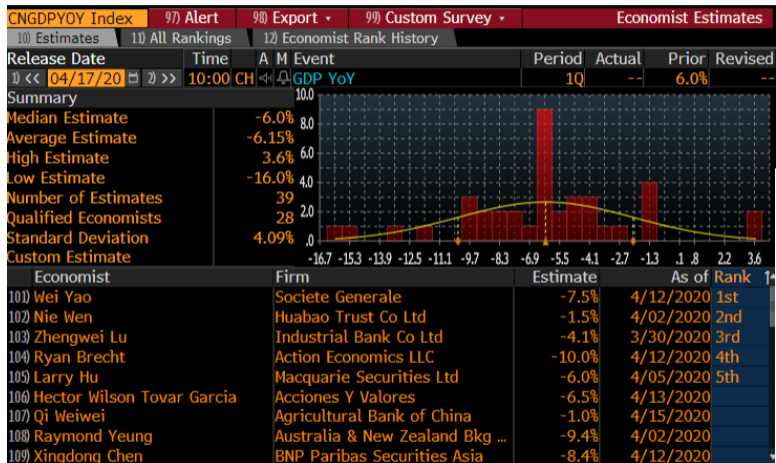
CN GDP Forecast

96 Chart		97 Set as Default View		Disclaimer		Economic Forecasts				
Country/Region/World		Contributor		Contributor Composite		<input type="radio"/> Yearly <input checked="" type="radio"/> Quarterly				
* China		Browse		<input checked="" type="radio"/> Private <input type="radio"/> Official						
Indicator		Actual/ Forecasts				Probability of Recession			20.0%	
	Q2 19	Q3 19	Q4 19	Q1 20	Q2 20	Q3 20	Q4 20	Q1 21	Q2 21	Q3 21
Economic Activity										
Real GDP (QoQ%)	1.6	1.4	1.5	-2.8	2.8	2.5	1.6	1.1	1.4	1.4
Real GDP (YoY%)	6.2	6.0	6.0	-5.4	3.6	5.9	6.3	10.3	6.0	5.5
Fixed Asset Investment (...)	5.8	5.4	5.4	-24.5	5.0	6.0	5.9	8.4	6.0	6.0
Industrial Production (Yo...)	5.6	5.0	5.9	-5.2	4.4	5.6	6.0	11.2	5.6	4.9
Retail Sales (YoY%)			7.7	-7.7	7.0	7.5	7.9	11.1	9.1	7.9
Price Indices										
CPI (YoY%)	2.6	2.9	4.3	5.0	4.0	3.0	1.7	1.7	1.8	2.2
PPI (YoY%)			-1.2	-0.4	-1.2	-0.7	-0.2	1.2	1.3	1.4
Labor Market										
Unemployment (%)	3.6	3.6	3.6	4.1	4.0	3.9	4.0	3.8	3.8	3.7
External Balance										
Curr. Acct. (% of GDP)	0.9	1.1	1.0	0.2	0.9	0.8	0.9	0.6	0.8	0.8
Export Trade (YoY%)			0.0	-13.8	-6.0	-2.7	0.2	10.0	12.1	8.0
Import Trade (YoY%)			0.5	-5.0	-2.8	1.0	1.0	8.0	11.7	5.0
Fiscal Balance										
Budget (% of GDP)				-3.7	-7.5	-8.1	-8.1	-3.2	-5.9	-7.2

1) Calendars		2) Alerts		3) Export		4) Settings		Economic Calendars			
China				Browse		14:15:27		04/17/20		- 04/24/20	
Economic Releases		All Economic Releases				View <input checked="" type="radio"/> Agenda <input type="radio"/> Weekly					
	Date	Time	A	M	R	Event	Period	Surv(M)	Actual	Prior	Revised
21)	04/17	10:00				GDP YoY	1Q	-6.0%	-6.8%	6.0%	--
22)	04/17	10:00				GDP SA QoQ	1Q	-12.0%	-9.8%	1.5%	--
23)	04/17	10:00				GDP YTD YoY	1Q	-6.0%	-6.8%	6.1%	--
24)	04/17	10:00				Industrial Production YoY	Mar	-6.2%	-1.1%	--	--
25)	04/17	10:00				Industrial Production YTD YoY	Mar	-10.0%	-8.4%	-13.5%	--
26)	04/17	10:00				Retail Sales YoY	Mar	-10.0%	-15.8%	--	--
27)	04/17	10:00				Retail Sales YTD YoY	Mar	-12.5%	-19.0%	-20.5%	--
28)	04/17	10:00			****	Property Investment YTD YoY	Mar	--	-7.7%	-16.3%	--
29)	04/17	10:00			****	Fixed Assets Ex Rural YTD YoY	Mar	-15.0%	-16.1%	-24.5%	--
30)	04/17	10:00			****	Surveyed Jobless Rate	Mar	--	5.9%	6.2%	--
31)	04/17				****	FX Net Settlement - Clients CNY	Mar	--	--	5.1b	--
32)	04/20	09:30			****	1-Year Loan Prime Rate	Apr	3.85%	--	4.05%	--
33)	04/20	09:30			****	5-Year Loan Prime Rate	Apr	4.65%	--	4.75%	--
34)	04/23	09:00				Swift Global Payments CNY	Mar	--	--	2.11%	--
35)	04/24	10:00				Bloomberg April China Economic Survey					



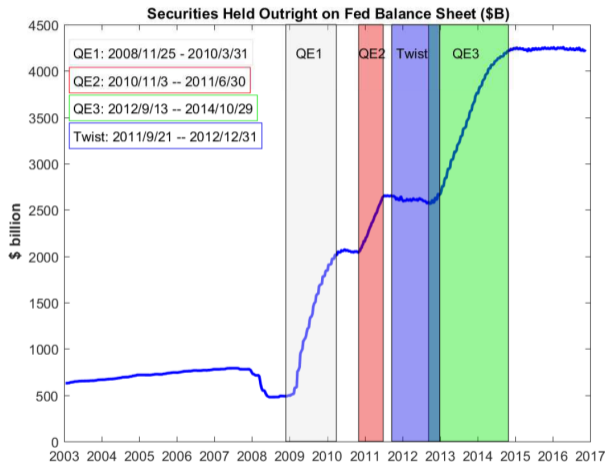
CN Q1 2020



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

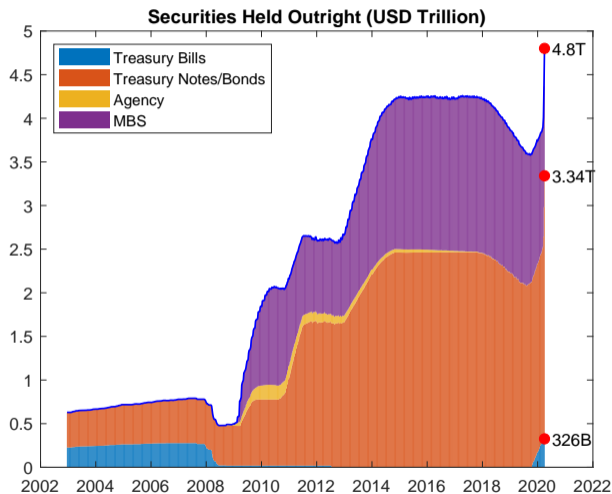


Total Reserve Bank Credit: \$4.45T:

- 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.

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

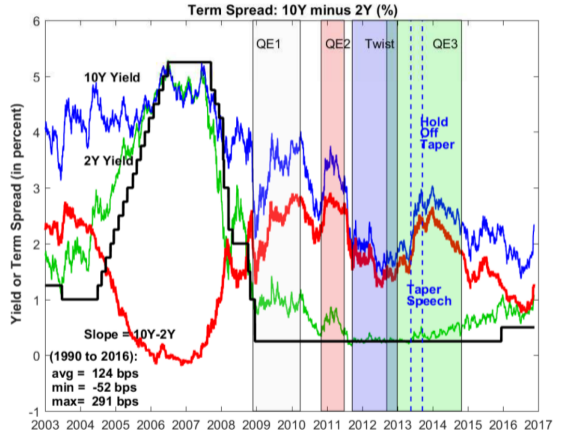
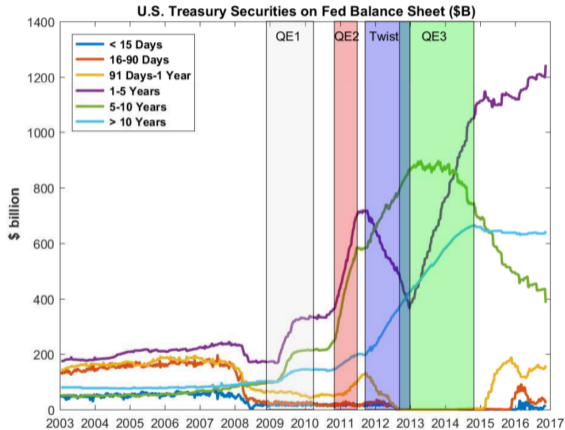
Millions of dollars

Reserve Bank credit, related items, and
reserve balances of depository institutions at
Federal Reserve Banks

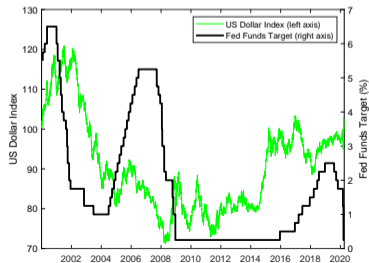
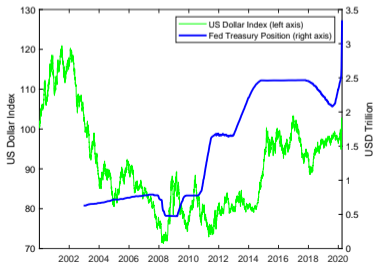
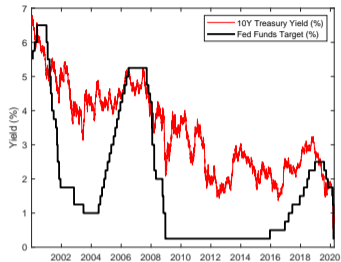
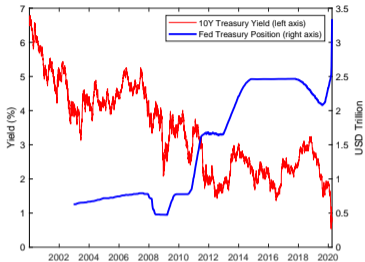
Averages of daily figures
Week ended Change from week ended Wednesday
Apr 15, 2020 Apr 8, 2020 Apr 17, 2019 Apr 15, 2020

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

QE and Treasury Yield Curve



UST, USD, and the Fed



Main Takeaways