

Consequences of Increased Treasury Supply

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Overview

- Are there potential effects of increased Treasury supply on the shape of the Treasury yield curve in general and the components of long rates in particular? Does the maturity structure of the Treasury supply play a role?
- Theoretical underpinnings
- Sizing up the federal debt
 - Consolidated federal balance sheet and Fed/Treasury interactions
 - What role do contingent and obligations of the federal government play?
 - Medicare, Medicaid, Social Security, federal employee & veterans benefits; Fannie, Freddie, FHA; Student loans; State and local pension underfunding; climate, war, terrorism, future pandemics...
- Demand factors
 - Critical role of investor expectations
 - How elastic?
 - Regulation and safe harbors
 - Foreign investors
 - Liquidity and market structure

Theoretical underpinnings

- Theories of the term structure
 - Market segmentation / preferred habitat
 - Unbiased expectations hypothesis
 - Term premium (liquidity, risk)
 - More modern theories emphasize role of volatility and no-arbitrage conditions
- Synthesis in “modified expectations hypothesis”
 - Implied forward rates have three main components: (1) expectations of future spot rates; (2) a (variable and hard to measure) term premium; (3) responses to supply and demand shocks through market segmentation effect; (4) volatility implies noticeable convexity effect at long end of curve
- Question on effects of maturity structure presume importance of segmentation
 - Evidence from fixed income literature on size and duration of segmentation effects is very mixed (several Twist operations had different outcomes; estimating counterfactual is difficult)
 - Changing average duration could also have expectation effects, e.g., long duration creates moral hazard for government to tolerate higher inflation
- Most evidence presented here speaks more to expectations channel

Large federal deficits are projected to continue indefinitely

**THE 2020 BUDGET DEFICIT IS CURRENTLY
PROJECTED TO REACH \$4.2 TRILLION**

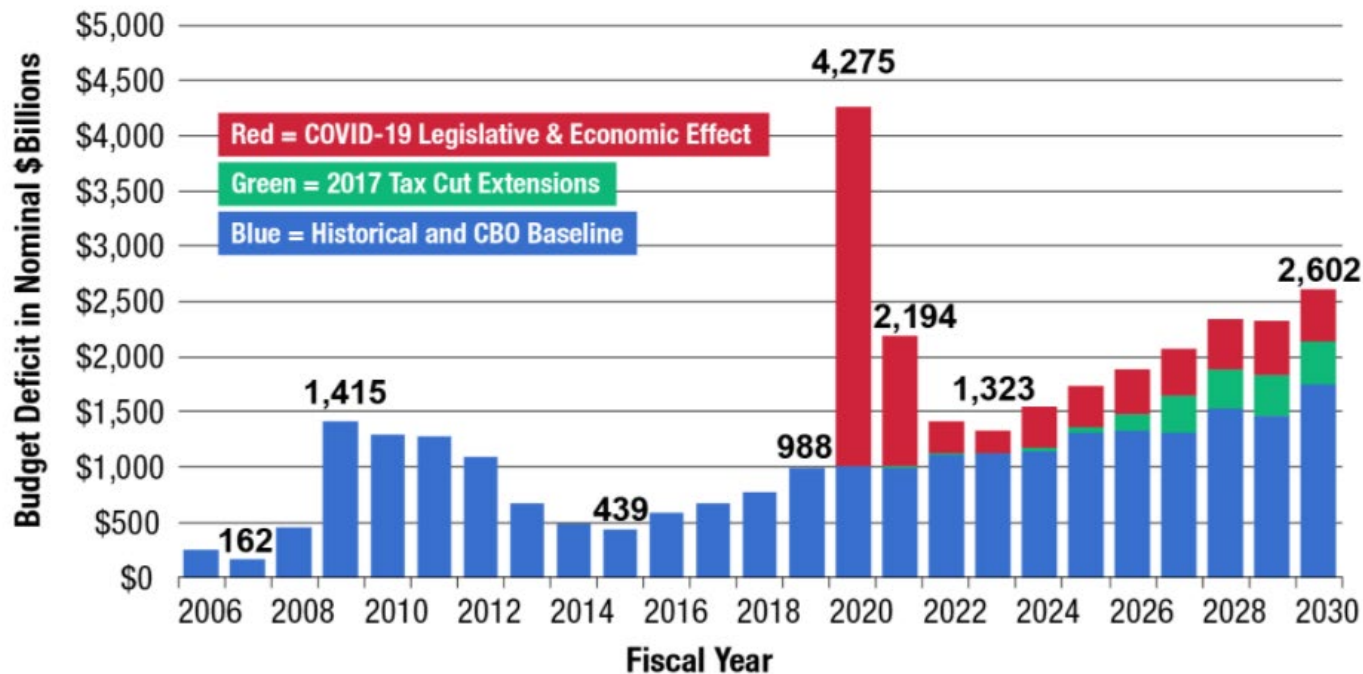
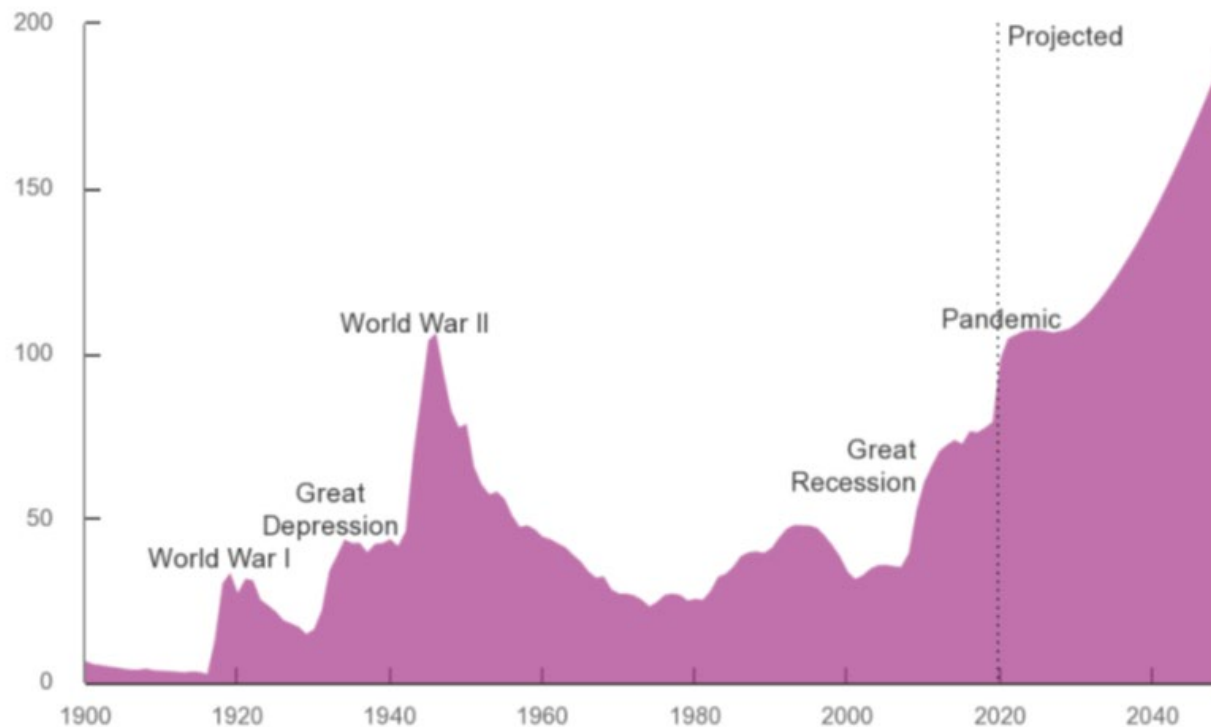


Chart: Manhattan Institute / Source: Estimated using Jan. 2020 CBO baseline and historical data, CBO bill scores, and author estimates of economic costs as of April 2020.
By Brian Riedl, Manhattan Institute (@Brian_Riedl)

Public Debt-to-GDP soon will reach unprecedented levels

Federal Debt Held by the Public, 1900 to 2050

Percentage of Gross Domestic Product



Public debt as a share of total U.S. debt and total U.S. capital market

US Equity and Debt Outstanding

	\$ Billions							
	ABS	Corporate Bonds	Corporate Equities	Federal Agencies Securities	Money Markets	Mortgage-Related Securities	Municipal Bonds	Treasury Securities
2005	1,281.4	4,648.6	21,532.9	2,616.0	1,644.2	7,218.1	3,099.0	4,170.0
2006	1,656.9	4,891.3	24,834.6	2,634.0	1,958.4	8,389.9	3,285.4	4,328.0
2007	1,963.5	5,327.5	26,201.1	2,906.2	1,788.9	9,386.0	3,550.5	4,522.6
2008	1,829.5	5,505.4	16,265.5	3,210.6	1,599.8	9,467.4	3,666.1	5,783.6
2009	1,712.1	6,094.6	20,650.7	2,727.5	1,138.0	9,352.5	3,850.8	7,260.6
2010	1,507.8	6,732.1	24,079.1	2,538.8	1,057.6	9,258.4	3,965.4	8,853.0
2011	1,359.0	6,845.5	23,335.9	2,326.9	969.3	9,075.5	3,927.9	9,928.4
2012	1,280.3	7,254.0	26,814.4	2,095.8	952.3	8,838.1	3,927.0	11,046.1
2013	1,285.7	7,680.5	34,425.2	2,056.9	951.6	8,742.6	3,860.6	11,854.4
2014	1,349.4	8,046.7	37,967.6	2,028.7	930.4	8,842.0	3,814.2	12,504.8
2015	1,376.6	8,296.0	37,132.3	1,995.4	941.5	8,894.8	3,830.0	13,191.6
2016	1,391.8	8,698.6	40,203.5	1,971.7	884.9	9,023.4	3,876.4	13,908.2
2017	1,457.9	9,017.9	48,055.8	1,934.7	965.9	9,304.5	3,890.0	14,468.8
2018	1,615.6	9,233.2	43,915.5	1,841.6	996.0	9,732.3	3,835.1	15,608.0
2019	1,620.7	9,597.8	54,623.7	1,825.9	1,045.2	10,055.0	3,854.5	16,673.3
Average	1,512.6	7,191.3	32,002.5	2,314.0	1,188.3	9,038.7	3,748.9	10,273.4
Y/Y % Change	0.3%	3.9%	24.4%	-0.9%	4.9%	3.3%	0.5%	6.8%
5-Year CAGR	3.3%	3.0%	8.0%	-1.8%	2.1%	2.5%	0.1%	4.8%
10-Year CAGR	0.7%	3.6%	8.5%	-3.2%	-0.1%	0.8%	-0.3%	6.5%

Observations:

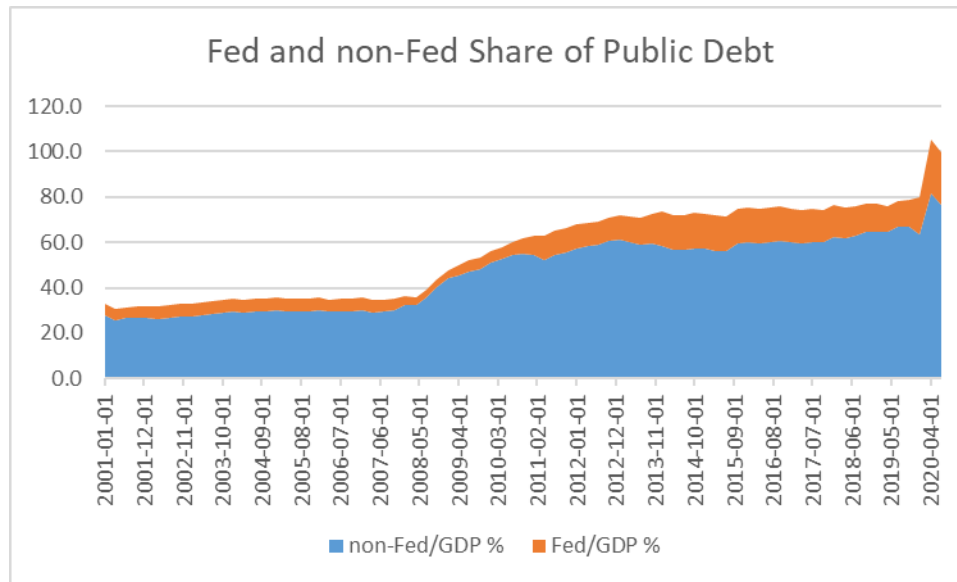
- Total \$99 trillion
- Equity has grown more than debt
- Corporate debt has also grown significantly
- Safe duration is also available via MBS and swaps

Sources: Bloomberg, Federal Agencies, Refinitiv, SIFMA, The Federal Reserve, U.S. Department of Treasury

Note: Corporate equities include both listed on exchanges and closely held common and preferred shares issued by domestic corporations and U.S. purchases of shares issued by foreign corporations; mortgage-related securities include GNMA, FNMA, and FHLMC mortgage-backed securities and CMOs and private-label MBS/CMOs; Treasury securities include only interest bearing marketable public debt.

- source: SIFMA Fact Book

Non-Fed Trsy holdings have risen more gradually than the total



- Between 1/1/20 and 7/1/20, Fed holdings up by \$1.3 trillion, non-Fed holdings up by \$2.5 trillion
- The \$2.5 trillion is roughly 2.5% of U.S. capital market

Implications of consolidated federal balance sheet

- Open market purchases of Treasury's result in an asset swap between the government and the public: (interest-bearing) reserves in exchange for Treasury's (see example below)
- This shortens the duration of government claims held by the public
- Treasury goal of minimizing borrowing cost should cause it to incorporate anticipated Fed purchase behavior in choosing maturity issuance structure
 - This should partially mitigate effects of maturity structure on term structure

Federal Reserve Balance Sheet

Assets		Liabilities	
Treasurys	2 => 3	Bank notes	1.7
MBS	1.4	Reserves	1.6 => 2.6
Other Fed	0.6	Other Fed	0.7

Gov't Balance Sheet Ex Fed

Assets		Liabilities	
Future taxes	...	Treasurys	16.0
Other	...	Other	...

Consolidated Gov't Balance Sheet

Assets		Liabilities	
Future taxes	...	Treasurys	14 => 13
MBS	...	Reserves	1.6 => 2.6
Other	...	Bank notes	1.7
		Other	...

Bank's and Public's Balance Sheet

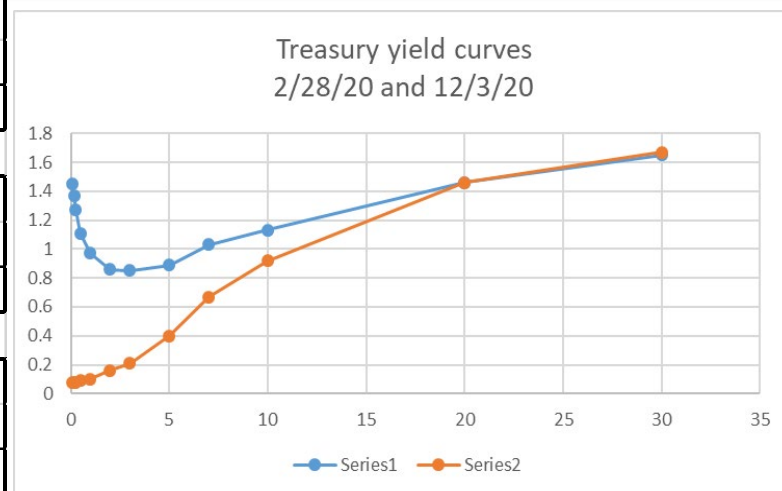
Assets		Liabilities	
Treasurys	14 => 13	Future taxes	...
Reserves	1.6 => 2.6	Other	...
Bank Notes	1.7		
Other	...		

Fed holdings increases by maturity vs. Trsy supply increases FY 2020

Fed Treasury holdings by maturity (\$ billions as of 2/26/20)			
< 1 year	>1 to 5 yrs	>5 to 10 yrs	> 10 yrs
579.6	913.4	325.4	655.7

Fed Treasury holdings by maturity (\$ billions as of 12/2/20)			
< 1 year	>1 to 5 yrs	>5 to 10 yrs	> 10 yrs
1,023.5	1,726.2	829.7	1,035.0

Increase in Fed Treasury holdings by maturity (\$ billions)			
< 1 year	>1 to 5 yrs	>5 to 10 yrs	> 10 yrs
443.9	812.8	504.3	379.3



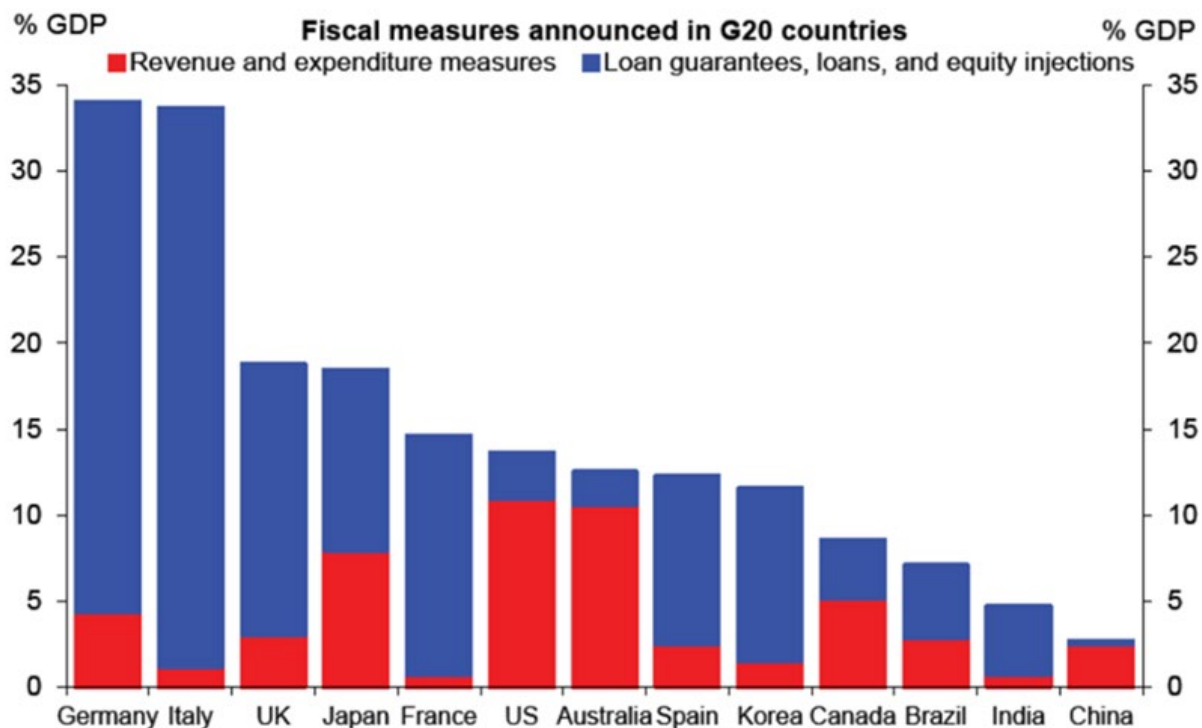
Treasury issuance in fiscal year 2020 (\$ billions, through 9/30/20)				
bills	FRNs	notes (1-10 yrs)	bonds (> 10 yrs)	TIPS
2652	54	900	357	68

- Between 2/26 and 12/2 Fed purchased more than the net increase in supply of notes and bonds (sources: Federal Reserve and Treasury audit report)
- Average **daily** trading volume in Treasury notes and bonds was \$346 billion between March & Oct (source: SIFMA/FRBNY)
- Purchases are large relative to new supply but small relative to volumes traded

Contingent liabilities

- These have also grown during the pandemic, but less in the U.S. than in many other countries

Design and size of fiscal response to COVID-19 has been very different across countries



Note: Data as of May 13, 2020.

Source: IMF, DB Global Research

Unfunded and contingent liabilities eclipse public Treasury debt

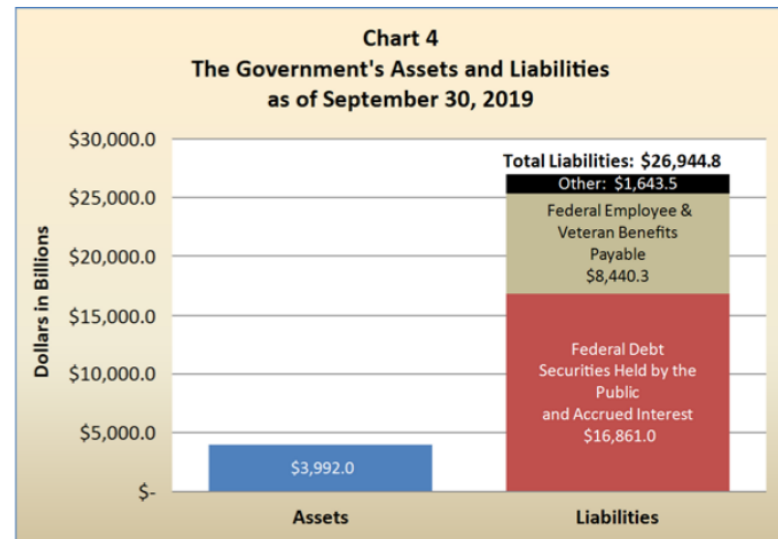
- Capitalized Social Security plus Medicare underfunding \approx \$90 trillion
- Federal employee and Veteran \approx \$8.4 trillion
- State and local pension plan underfunding \approx \$4 trillion (Rauh, 2019)
- Fannie, Freddie and Ginnie guarantees on mortgage debt \approx \$7.7 trillion
- PBGC, FDIC, disaster...



- Assets provide minor offsets

Chart 4 summarizes the assets and liabilities that the government reports on its Balance Sheet. As of September 30, 2019:

- Total assets (\$4.0 trillion) consist mostly of \$1.4 trillion in net loans receivable (primarily student loans) and \$1.1 trillion in net PPE.
 - Other significant government resources not reported on the Balance Sheet include stewardship assets, natural resources, and the government's power to tax and set monetary policy.
- Total liabilities (\$26.9 trillion) consist mostly of: (1) \$16.9 trillion in federal debt securities held by the public and accrued interest and (2) \$8.4 trillion in federal employee and veteran benefits payable.

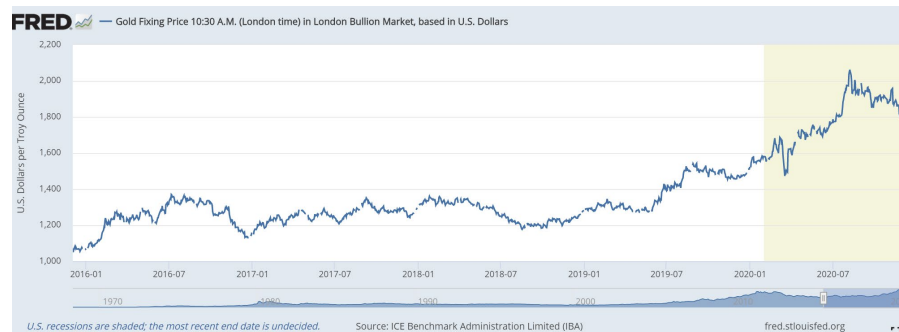


Unfunded and contingent liabilities eclipse public Treasury debt

- Including broader liability measures suggests broad debt-to-GDP already over 500%
- However, the growth in these liabilities over the last several decades does not appear to have dampened investor comfort with long-dated Treasury's
- Suggests that impact of another \$4-6 trillion in pandemic-related debt on Treasury demand may be quite small
 - Do investors ignore long-term sustainability?
 - How long will they ignore it?

Demand factors: Critical role of investor expectations

- Run-up in demand for alternative stores of value like gold and bitcoin



- Segments of popular financial press suggests debt is being monetized and inflation is likely or inevitable
 - Distinction between QE and monetization not obvious (Gurkaynak and Lucas, 2020 VoxEU)
- Recent academic research suggests U.S. gov't debt may be in bubble territory
 - Projected primary surpluses estimated in a stochastic macro/asset pricing model do not cover projected liabilities with plausible discount rates
 - Jiang, Zhengyang and Lustig, Hanno N. and Van Nieuwerburgh, Stijn and Xiaolan, Mindy Z., The U.S. Public Debt Valuation Puzzle (October 10, 2019).
- Possibility of “sudden stops”?

Demand factors: How elastic is Treasury demand?

- Traditional view is that elasticities in liquid financial markets are high
 - Large macro supply and demand shocks are accommodated with minimal price changes
 - E.g., \$5 trillion increase in Treasury supply
 - A provocative recent working paper that questions that perspective: “In Search of the Origins of Financial Fluctuations: The Inelastic Markets Hypothesis,” Xavier Gabaix and Ralph S.J. Koijen, 2020
- Critical determinants
 - Foreign investors
 - Institutional investors
 - Regulation and safe harbors
 - Move towards more dependence on collateralized borrowing increases Treasury demand (e.g., LIBOR to SOFR)
 - Contractual collateral requirements; Treasury liquidity and market structure

Will foreign investors continue to treat the U.S. as the safest haven?

- Starting debt levels were already high in large developed countries with high COVID-19 infection rates, but have remained relatively low in Asia ex Japan and the Pacific.

Large economies with high infection rates			Asia & Pacific			
Country	D/GDP (% in 2020)		Country	D/GDP (% in 2020)	Country	D/GDP (% in 2020)
Brazil	101		Australia	47	Korea	48
France	118		Cambodia	31	Malaysia	68
Germany	73		China	62	Nepal	39
Italy	161		Hong Kong	29	Philippines	49
Spain	123		India	89	Singapore	131
UK	108		Indonesia	38	Taiwan	42
US	131		Japan	266	Thailand	50
					Vietnam	47

MAJOR FOREIGN HOLDERS OF TREASURY SECURITIES
(in billions of dollars)
HOLDINGS 1/ AT END OF PERIOD

- So far demand is steady:

Country	Sep 2020	Aug 2020	Jul 2020	Jun 2020	May 2020	Apr 2020	Mar 2020	Feb 2020	Jan 2020	Dec 2019	Nov 2019	Oct 2019	Sep 2019
Japan	1276.2	1278.4	1293.0	1261.5	1260.4	1266.5	1272.6	1268.6	1211.8	1155.2	1160.6	1168.5	1146.2
China, Mainland	1061.7	1068.0	1073.4	1074.4	1083.7	1072.8	1081.6	1092.3	1078.6	1069.9	1089.1	1101.5	1102.4
United Kingdom	428.9	419.9	424.7	445.6	445.8	429.2	469.7	477.1	450.3	392.1	400.5	412.7	412.7
Ireland	315.8	335.3	330.8	330.3	324.2	301.3	271.6	282.8	271.7	281.9	289.7	285.4	274.1
Brazil	265.1	265.0	265.7	264.1	264.4	259.5	264.4	285.9	283.3	281.8	293.3	298.5	303.0
Grand Total	7071.0	7083.2	7097.0	7046.6	6978.0	6903.4	6949.5	7226.2	7027.3	6844.2	6902.1	6946.4	6923.5
Of which:													
For. Official	4199.5	4200.0	4191.9	4148.0	4105.9	4047.4	4117.9	4264.9	4169.9	4076.9	4101.2	4122.9	4150.9
Treasury Bills	371.5	385.0	393.6	382.5	355.7	331.0	283.2	306.1	294.8	268.6	273.6	288.1	290.8
T-Bonds & Notes	3828.1	3815.0	3798.4	3765.5	3750.2	3716.4	3834.6	3958.8	3875.1	3808.3	3827.6	3834.8	3860.1

Will foreign investors continue to treat the U.S. as the safest haven?

- Foreigners hold about 1/3 of total debt-held-by-the-public (as of 7/20)
- Foreigners hold about 40% of portion outside of FRBs (as of 7/20)
- Policy and market developments in China will be critical

Concluding remarks

- The U.S. and other developed countries appear to be running out of fiscal space
 - Record debt and deficits, unconventional monetary policies and expansive credit policies
 - But fiscal imbalances were almost as serious before the pandemic, and investor demand for Treasury's not noticeably affected
- Developed countries continue to borrow at low rates from global capital markets, and inflation is low, but that situation may not last
- What will drive the dynamics of the long end of the yield curve in the medium run?
 - Predicting investor responses from historical experience is problematic
 - Expectations about future course of monetary and fiscal policy part of the story
 - A complicated combination of clientele effects, and evolving beliefs about the risk perceptions of *other* investors
- Will the yield curve provide early warning signals?
 - “Do not wait for the bond market to help us out; that is not its job.” Peter Fisher, 2007