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# FINC 462/662 -- Fixed Income Securities

FINC-462/662: Fixed Income Securities

## The U.S. Treasury Market

Spring 2022

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## Overview

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Our goals for today

- ☐ Know the different types of securities issued by the U.S. Department of the Treasury
- ☐ Be familiar with the Treasury auction process.

## The U.S. Treasury Market

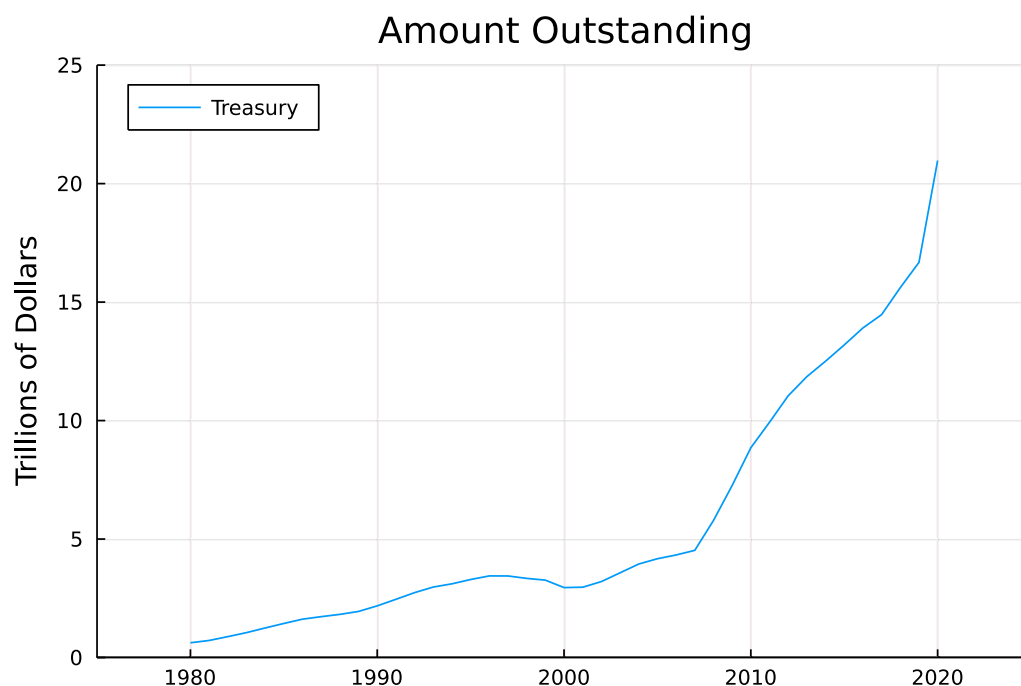
- The Department of the Treasury is the largest single issuer of debt in the world.
- The large volume of total debt and the large size of any single issue have contributed to making the Treasury market the most active and hence the most liquid market in the world

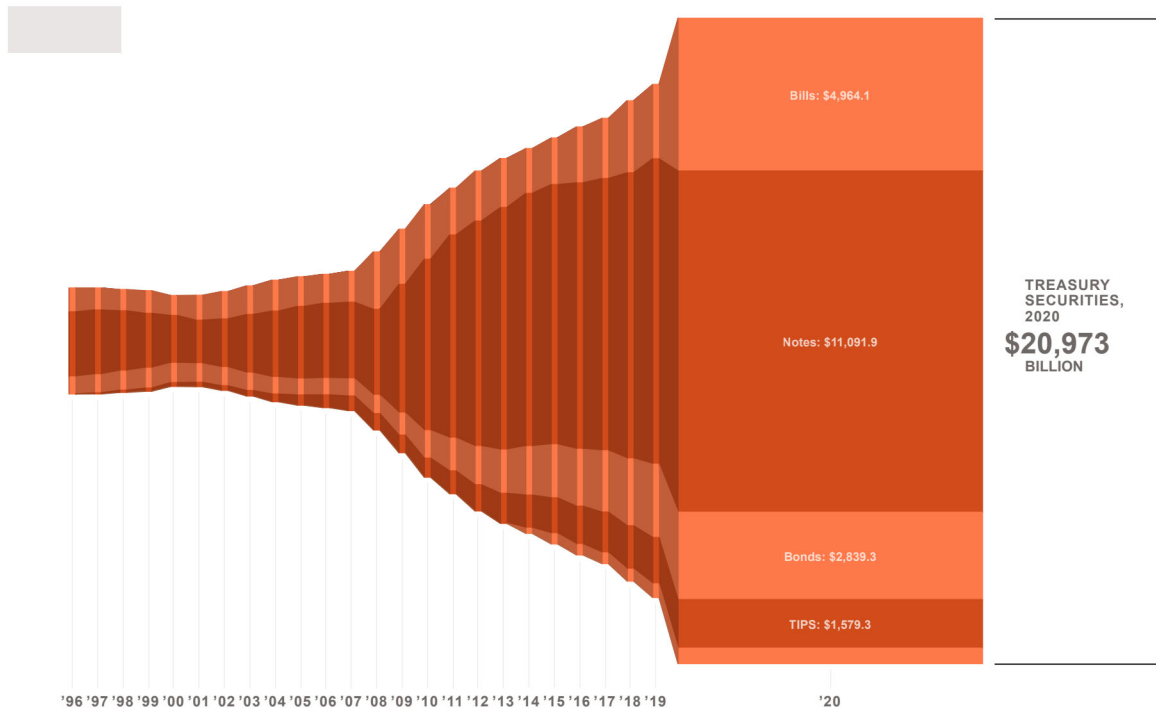
### SIFMA Fixed Income Statistics

## U.S. Treasury Debt Amount Outstanding

Year-end data in trillions of dollars.

Source: SIFMA



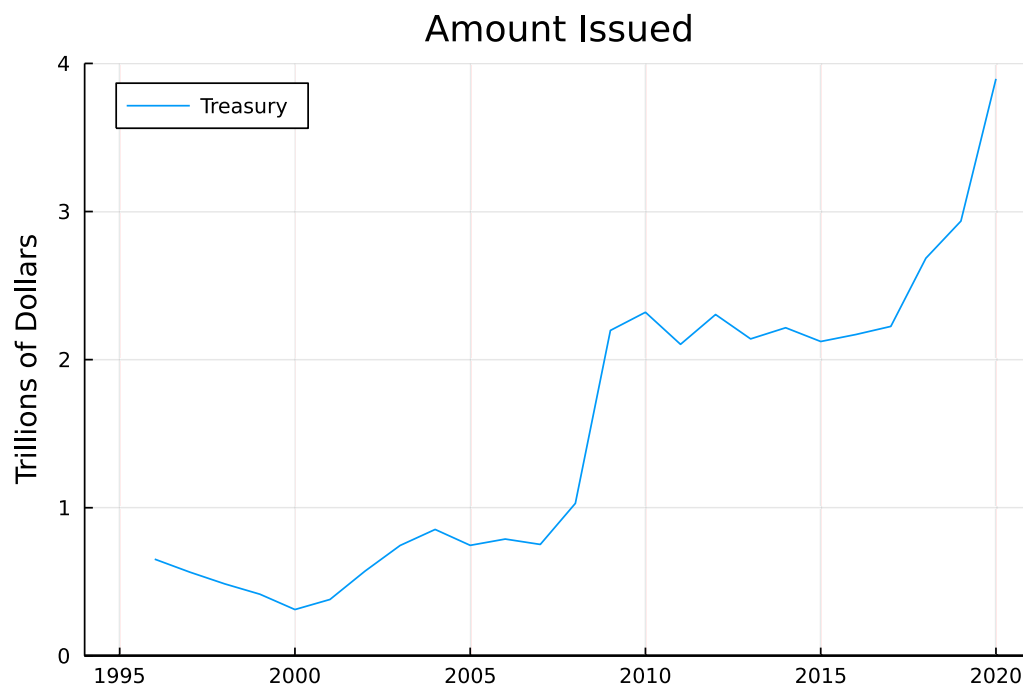


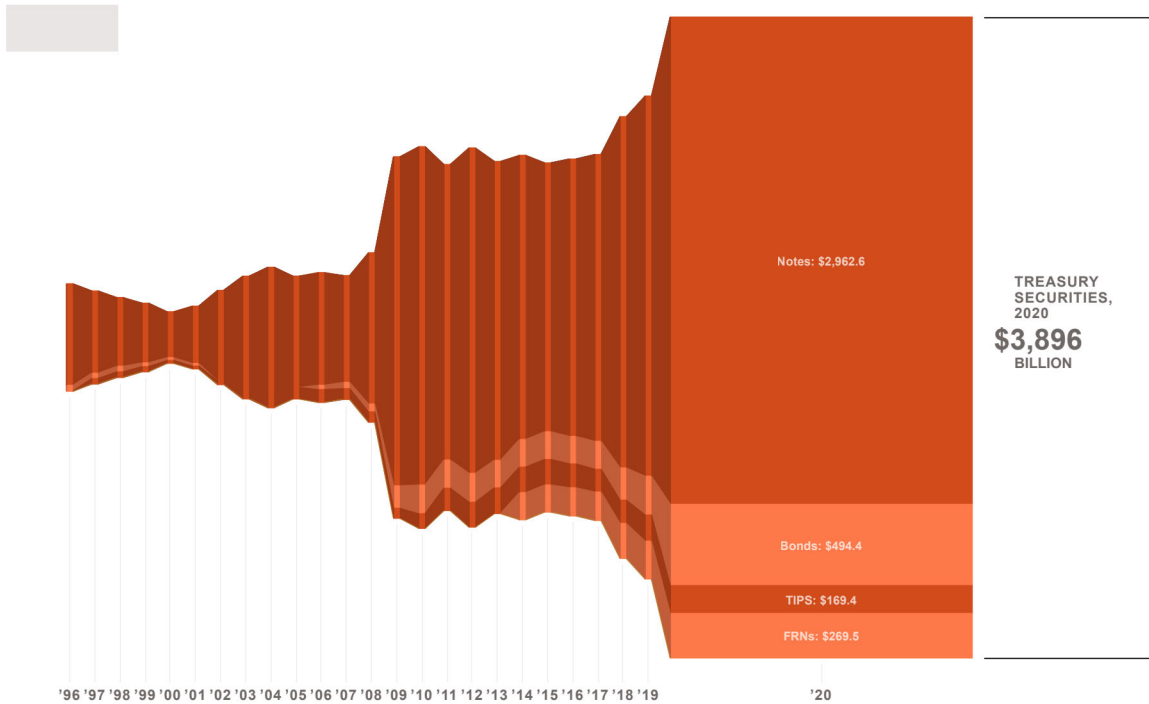
[Link to SIFMA](#)

## U.S. Treasury Debt Amount Issued

Annual data at year-end in trillions of dollars.

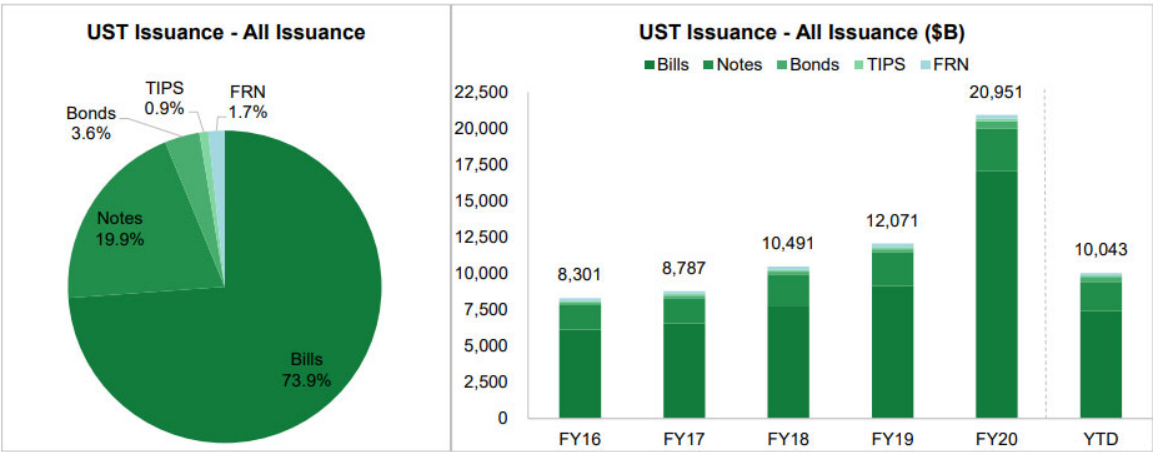
Source: SIFMA



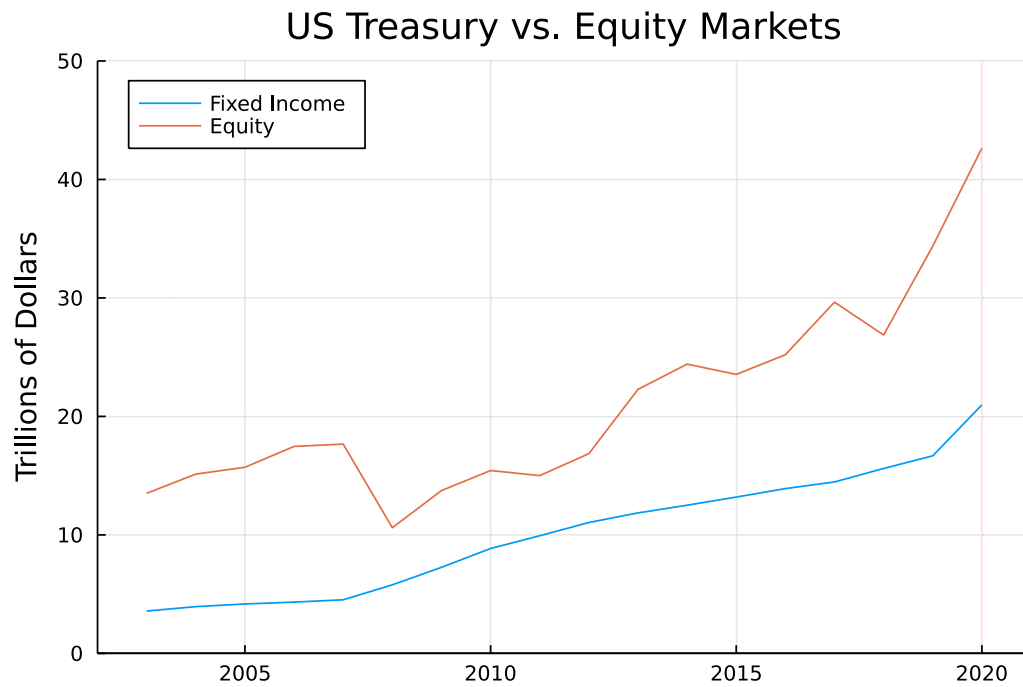


*Note: Issuance is long-term instruments only.*

[Link to SIFMA](#)



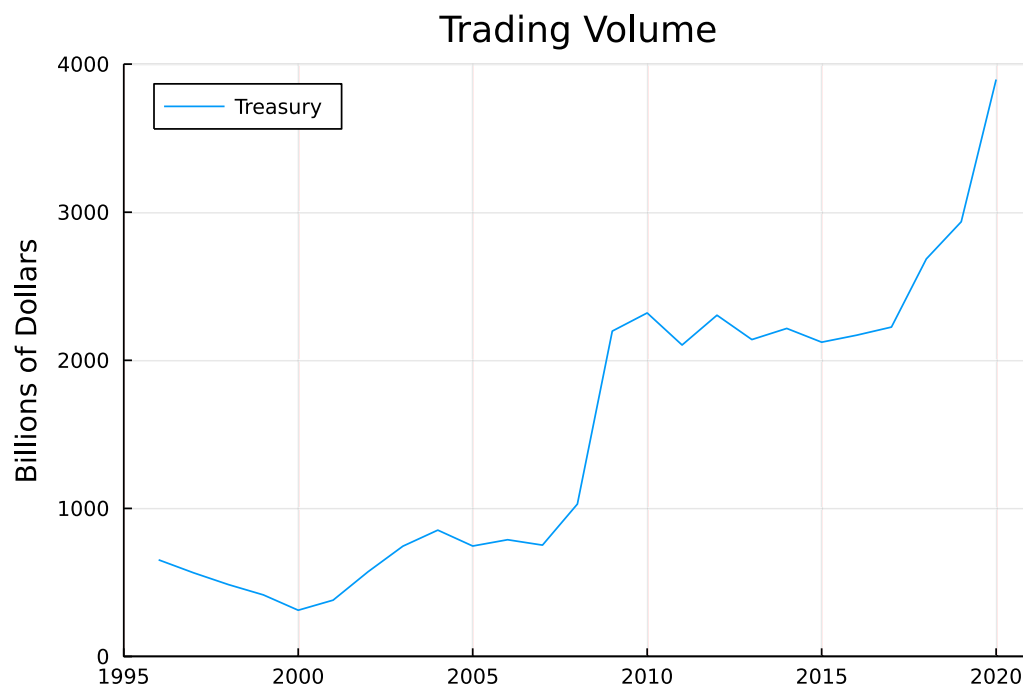
Sources: US Treasury, SIFMA estimates  
 Note: All issuance includes T-Bills



## U.S. Treasury Securities Trading Volume

Annual data at year-end in billions of dollars.

Source: SIFMA



## Types of Treasury Securities

# Treasury Bill (T-bill)

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- Short-term securities with maturities of 4, 13, 26, and 52 weeks.
- Treasury bills do not pay interest before maturity.
  - This is often referred to as a *discount security* or *zero-coupon security*.
- Instead, Treasury bills are issued at a price less than their par value and at maturity, Treasury bills pay back their par value.
  - Intuitively, the “interest” to the investor is the difference between par value and the purchase price.
  - Example: a 52-week T-bill with par value of \$100 has a price of \$98.

# Treasury Note (T-Note)

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- Medium-term securities with maturities of 2, 3, 5, 7, and 10 years.
- Treasury notes pay interest every six months up to and including the maturity date.
  - Example: A 2-year T-note has its last interest payment in two years, and it pays interest after 6 months, 12 months, and 18 months.
- At maturity, Treasury notes pay back their par value.

# Treasury Bond (T-Bond)

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- Long-term securities with maturities of 20 and 30 years.
  - Currently, the Treasury does not issue 15-year Treasury bonds.
- Treasury bonds notes pay interest every six months up to and including the maturity date. At maturity, Treasury notes pay back their par value.
  - Similar to Treasury notes.

## Treasury Marketable Securities

## Coupon bonds

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- Treasury notes and bonds are referred to as **coupon** securities.
- Why?

4 1/2%  
GOLD BOND OF 1927-1942

1451851



F 308

# THE UNITED STATES OF AMERICA

FOR VALUE RECEIVED PROMISES TO PAY TO THE BEARER THE SUM OF  
**ONE HUNDRED DOLLARS**

ON NOVEMBER 15, 1942, AND TO PAY INTEREST ON SAID PRINCIPAL SUM AT THE RATE OF FOUR AND ONE-QUARTER PER CENT PER ANNUM, FROM MAY 15, 1918, SEMIANNUALLY ON MAY 15 AND NOVEMBER 15 IN EACH YEAR, UNTIL THE PRINCIPAL HEREOF SHALL BE PAYABLE, UPON PRESENTATION AND SURRENDER OF THE INTEREST COUPONS AS THEY SEVERALLY MATURE, AT THE TREASURY DEPARTMENT, WASHINGTON, D.C., AT THE HOLDER'S OPTION AT ANY AGENCY OR AGENCIES IN THE UNITED STATES WHICH THE SECRETARY OF THE TREASURY MAY FROM TIME TO TIME DESIGNATE FOR THE PURPOSE, THE PRINCIPAL AND INTEREST HEREOF ARE PAYABLE IN UNITED STATES GOLD COIN OF THE PRESENT STANDARD OF VALUE. THIS BOND IS ONE OF A SERIES OF FOUR AND ONE-QUARTER PER CENT GOLD BONDS OF 1927-42, ISSUED, PURSUANT TO TREASURY DEPARTMENT CIRCULAR NO. 114, DATED MAY 9, 1918, UNDER THE AUTHORITY OF AN ACT OF CONGRESS APPROVED SEPTEMBER 24, 1917, AS AMENDED BY AN ACT OF CONGRESS APPROVED APRIL 4, 1918, UPON CONVERSION OF BONDS AUTHORIZED BY SAID ACT APPROVED SEPTEMBER 24, 1917. REFERENCE IS HEREBY MADE TO SUBDIVISION XI OF SAID CIRCULAR FOR A STATEMENT OF THE FURTHER RIGHTS OF THE HOLDERS OF BONDS OF SAID SERIES AS FULLY AND WITH THE SAME EFFECTS (HEREIN SET FORTH, ALL OR ANY OF THE BONDS OF SAID SERIES MAY BE REDEEMED, AT THE OPTION OF THE UNITED STATES, ON AND AFTER NOVEMBER 15, 1927, AT PAR AND ACCRUED INTEREST, AS IN SAID CIRCULAR PROVIDED. THIS BOND DOES NOT BEAR THE CIRCULATION PRIVILEGE. THIS BOND IS EXCHANGEABLE, WITHOUT CHARGE BY THE UNITED STATES, ON AND AFTER MAY 15, 1920, FOR A LIKE BOND WITH ALL SUBSEQUENT COUPONS ATTACHED.

WASHINGTON, MAY 9, 1918.

RECORDED: *ME*



*W. C. Clegg*  
SECRETARY OF THE TREASURY

ACT APPROVED SEPTEMBER 24, 1917,  
AS AMENDED BY ACT APPROVED APRIL 4, 1918.

THE UNITED STATES OF AMERICA

WILL PAY TO BEARER ON  
AT THE TREASURY  
DEPARTMENT, WASHINGTON,  
OR AT A DESIGNATED AGENCY,  
BEING SIX MONTHS  
INTEREST THEN DUE ON  
\$100 COUPON BOND OF THE

MAY 15 1920  
\$213  
4 1/2% SECOND  
LIBERTY LOAN  
CONVERTED

1451851 *Houston B. Palmer* 4  
REGISTER OF THE TREASURY

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1451851 *Houston B. Palmer* 1  
REGISTER OF THE TREASURY



# Treasury Floating Rate Note (FRN)

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- First issued in 2014 by the U.S. Treasury.
- Maturity of 2 years.
- Pay interest every three months up to and including the maturity date.
  - At maturity, FRNs pay back their par value.
- The interest on an FRN varies with interest rate on 13-week Treasury bills.

# Treasury Inflation Protected Securities (TIPS)

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- First issued in 1997 by the U.S. Treasury.
- Maturities of 5, 10, and 30 years.
- TIPS pay interest every six months up to and including the maturity date. At maturity, Treasury notes pay back their par value.
  - Similar to Treasury notes and bonds.
- Key difference is that both par value and interest go up with the rate of inflation.

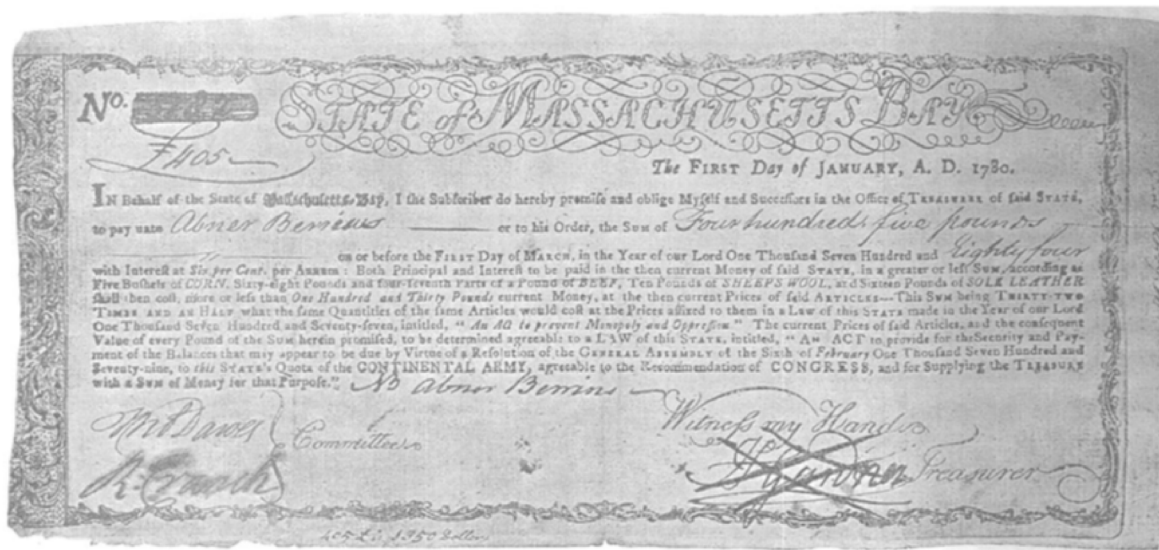
## Inflation-Linked notes date back centuries

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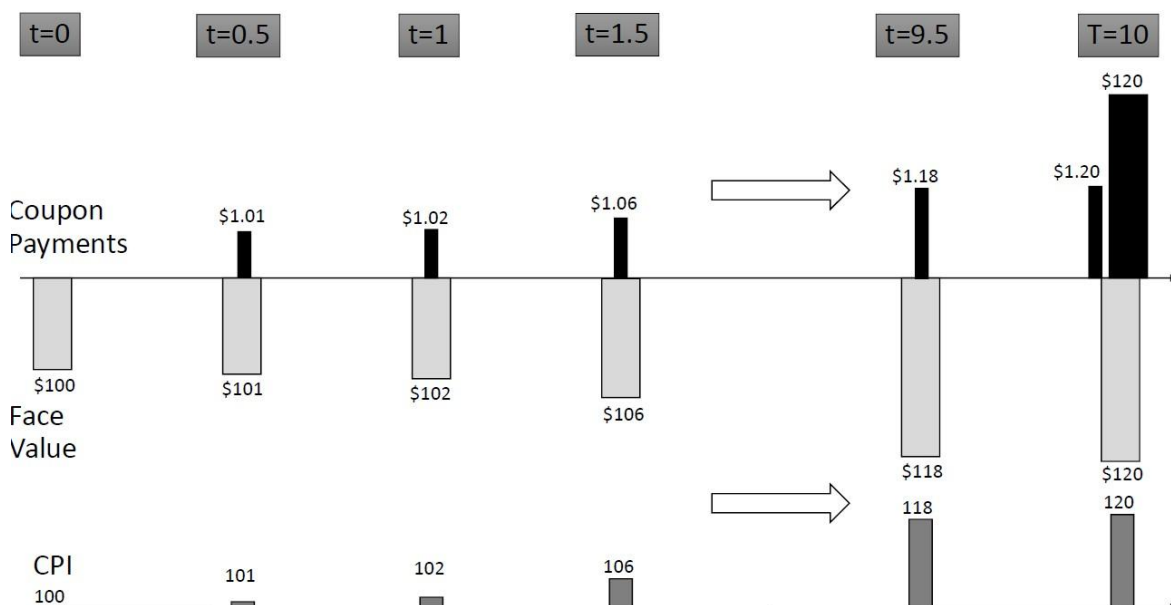
Both Principal and Interest to be paid in the then current Money of said State, in a greater or less Sum, according as Five Bushels of Corn, Sixty-eight Pounds and four-seventh Parts of a Pound of Beef, Ten Pounds of Sheeps Wool, and Sixteen Pounds of Sole Leather shall then cost more or less than One Hundred and Thirty Pounds current Money, at the then current Prices of said Articles.

*Source: "Inflation-indexed Securities: Bonds, Swaps and Other Derivatives", 2nd Edition, M. Deacon, A. Derry, D. Mirfendereski, Wiley.*





## TIPS Inflation-Adjustment



# Treasury STRIPS

- The Treasury does not issue zero-coupon notes or bonds.
- However, because of the demand for zero-coupon instruments with no credit risk, the private sector has created such securities.
- The process of separating the interest on a bond from the underlying principal is called coupon stripping
- Zero-coupon Treasury securities were first created in August 1982 by large Wall-Street firms.
  - The problem with these securities was that they were identified with particular dealers and therefore reduced liquidity.
  - Moreover, the process involved legal and insurance costs.
  - Today, all Treasury notes and bonds (fixed-principal and inflation-indexed) are eligible for stripping.
- The zero-coupon Treasury securities created under the STRIPS program are direct obligations of the U.S. government

## Treasury STRIPS in Bloomberg

Name	Tic...	Coupon	Maturity	Mty Type	Ctry/Reg	Curr	Identifier
STRIP*	S	0.000	08/15/2051	NORMAL	US	USD	912834XG8
United States Treasury Strip Coupon	S	0.000	05/15/2051	NORMAL	US	USD	912834WZ7
United States Treasury Strip Coupon	S	0.000	02/15/2051	NORMAL	US	USD	912834WR5
United States Treasury Strip Coupon	S	0.000	11/15/2050	NORMAL	US	USD	912834WJ3
United States Treasury Strip Coupon	S	0.000	08/15/2050	NORMAL	US	USD	912834WC8
United States Treasury Strip Coupon	S	0.000	05/15/2050	NORMAL	US	USD	912834VV7
United States Treasury Strip Coupon	S	0.000	02/15/2050	NORMAL	US	USD	912834VM7
United States Treasury Strip Coupon	S	0.000	11/15/2049	NORMAL	US	USD	912834VE5
United States Treasury Strip Coupon	S	0.000	08/15/2049	NORMAL	US	USD	912834UY2
United States Treasury Strip Coupon	S	0.000	05/15/2049	NORMAL	US	USD	912834UR7
United States Treasury Strip Coupon	S	0.000	02/15/2049	NORMAL	US	USD	912834UH9
United States Treasury Strip Coupon	S	0.000	11/15/2048	NORMAL	US	USD	912834UB2
United States Treasury Strip Coupon	S	0.000	08/15/2048	NORMAL	US	USD	912834TV0
United States Treasury Strip Coupon	S	0.000	05/15/2048	NORMAL	US	USD	912834TP3
United States Treasury Strip Coupon	S	0.000	02/15/2048	NORMAL	US	USD	912834TF5
United States Treasury Strip Coupon	S	0.000	11/15/2047	NORMAL	US	USD	912834SZ2
United States Treasury Strip Coupon	S	0.000	08/15/2047	NORMAL	US	USD	912834RR1
United States Treasury Strip Coupon	S	0.000	05/15/2047	NORMAL	US	USD	912834RK6
United States Treasury Strip Coupon	S	0.000	02/15/2047	NORMAL	US	USD	912834RB6
United States Treasury Strip Coupon	S	0.000	11/15/2046	NORMAL	US	USD	912834QV3

## Treasury Auctions

MARKETS | CREDIT MARKETS

## Flood of New Debt Tests Bond Market

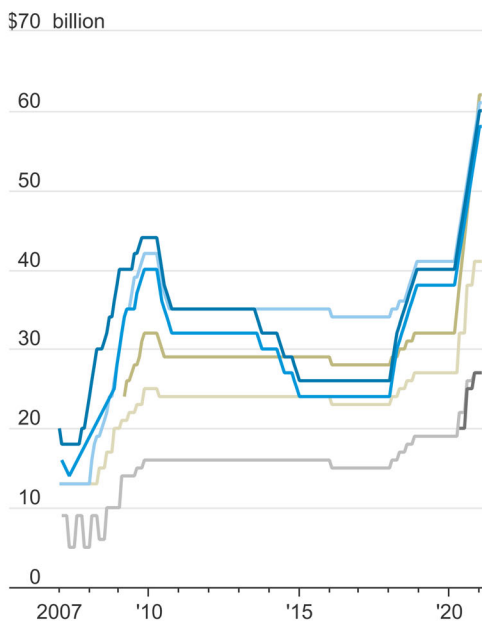
Supply seen as one factor driving yields higher as investors anticipate economic resurgence fueled by vaccinations and government stimulus

Source: The Wall Street Journal, March 10, 2021.

[Link to Article](#)

Treasury Debt Auction Sizes

■ 2y ■ 3y ■ 5y ■ 7y ■ 10y  
■ 20y ■ 30y



Source: BofA Global Research

The Treasury Department had just sold a record \$126 billion in three-year notes, 10-year notes and 30-year bonds over the previous three days. Demand was solid for the first of those two auctions but soft for the 30-year sale on Feb. 11.

Primary dealers, financial institutions that can trade with the Fed and are required to bid at auctions, were left with a relatively large share of the total—an outcome that Jefferies analysts noted at the time did “not bode particularly well for the market” given the likelihood that dealers would try to unload some of their new bonds.

Sure enough, Treasuries—and 30-year bonds in particular—fared poorly the following day. Trading volumes were relatively light for the size of the move, and analysts characterized the rise in yields as more of a buyers strike than a surge in selling—one possibly influenced by the volume of new bonds that investors had just absorbed.

## Treasury Auctions Basics

- Treasury securities are sold in the primary market through sealed-bid auctions.
- Each auction is **announced** several days in advance by means of a Treasury Department press release or press conference.
- The **announcement** provides details of the offering, including the *offering amount* and the *term* and *type* of security being offered, and describes some of the auction rules and procedures.

## Treasury Auction Announcement

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# TREASURY NEWS

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Department of the Treasury • Bureau of the Fiscal Service



Embargoed Until 08:30 A.M.  
August 04, 2021

CONTACT: Treasury Auctions  
202-504-3550

## TREASURY OFFERING ANNOUNCEMENT <sup>1</sup>

Term and Type of Security	10-Year Note
Offering Amount	\$41,000,000,000
Currently Outstanding	\$0
CUSIP Number	91282CCS8
Auction Date	August 11, 2021
Original Issue Date	August 16, 2021
Issue Date	August 16, 2021
Maturity Date	August 15, 2031
Dated Date	August 15, 2021
Series	E-2031
Yield	Determined at Auction
Interest Rate	Determined at Auction
Interest Payment Dates	February 15 and August 15
Accrued Interest from 08/15/2021 to 08/16/2021	Determined at Auction
Premium or Discount	Determined at Auction

### Treasury Auction Announcements

## Treasury Auction Process

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- The auction for Treasury securities is conducted on a competitive bid basis.
- There are two types of bids that may be submitted by a bidder:
  - noncompetitive bids
  - competitive bids
- A noncompetitive bid is submitted by an entity that is willing to purchase the auctioned security at the yield that is determined by the auction process

## Noncompetitive Bids

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- When a noncompetitive bid is submitted, the bidder only specifies the **quantity** sought.
  - The quantity in a noncompetitive bid may not exceed 5 million.

## Treasury Auction Results - Noncompetitive Bids

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# TREASURY NEWS

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Department of the Treasury • Bureau of the Fiscal Service



For Immediate Release  
August 11, 2021

CONTACT: Treasury Auctions  
202-504-3550

## TREASURY AUCTION NONCOMPETITIVE RESULTS

Term and Type of Security	10-Year Note
CUSIP Number	91282CCS8
Series	E-2031
Issue Date	August 16, 2021
Maturity Date	August 15, 2031
Original Issue Date	August 16, 2021
Dated Date	August 15, 2021
Total Offering Amount	\$41,000,000,000
<b>Amount Tendered</b>	
Noncompetitive	\$15,437,600
FIMA (Noncompetitive)	\$0
<b>Tentative Total<sup>1</sup></b>	<b>\$15,437,600</b>

Approximate Amount Remaining for Competitive Bids

\$40,984,562,400

## Competitive Bids

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- A competitive bid specifies both the **quantity** sought *and* the **yield** at which the bidder is willing to purchase the auctioned security.
- The competitive bids are then arranged from the **lowest yield** bid to the **highest yield** bid submitted.
  - The highest yield accepted by the Treasury is referred to as the **stop-out yield** (or **high yield**).

## Treasury Auction Results - Competitive Bids

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# TREASURY NEWS

Department of the Treasury • Bureau of the Fiscal Service



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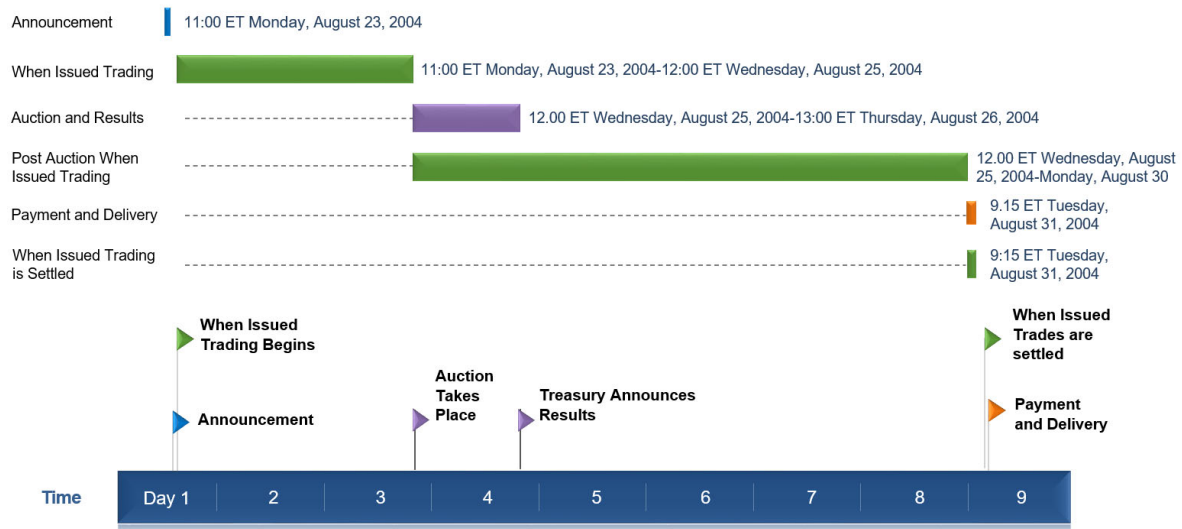
## TREASURY AUCTION RESULTS

Term and Type of Security	10-Year Note
CUSIP Number	91282CCS8
Series	E-2031
Interest Rate	1-1/4%
High Yield <sup>1</sup>	1.340%
Allotted at High	90.39%
Price	99.160510
Accrued Interest per \$1,000	\$0.03397
Median Yield <sup>2</sup>	1.315%
Low Yield <sup>3</sup>	0.880%
Issue Date	August 16, 2021
Maturity Date	August 15, 2031
Original Issue Date	August 16, 2021
Dated Date	August 15, 2021

## Additional Treasury Auction information

### Auction and When Issued Timeline

- 1 Treasury announces the auction. When Issued trading begins.
- 2 The auction is held. Treasury announces winners the next day.
- 3 Payment is made. Treasury delivers upon payment.



Sources: Federal Reserve Bank of New York, Mercer, J.M., M.E. Moore, R.J. Whitby and D.B. Winters (2013); Goldreich (2007). See p. 22 for full citations.

# Auction Schedule

## Upcoming Treasury Auctions

Instrument	Auction Frequency
4-week Bills	Weekly (Tuesdays)
13-week Bills	Weekly (Mondays)
26-week Bills	Weekly (Mondays)
52-week Bills	Every 4 weeks (Tuesdays)
2-year Notes	Monthly (End of month)
3-year Notes	Monthly (Middle of month)
5-year Notes	Monthly (End of month)
7-year Notes	Monthly (End of month)
10-year Notes	Monthly (Middle of month)
30-year Bonds	Monthly (Middle of month)
5-year TIPS	Three times per year (Apr, Aug, Dec)
10-year TIPS	Bimonthly (Jan, Mar, May, Jul, Sep, Nov)
30-year TIPS	Three times per year (Feb, Jun, Oct)
2-year FRN	Monthly (End of month)

## Treasury Auction Example

- Treasury Department announces \$11 billion offering
- There are \$1 billion in noncompetitive bids received,
- Thus, there is  $\$11 - \$1 = \$10$  billion left to be allocated to competitive bidders.
- Suppose 6 competitive bidders submit the following sealed bids.

Name	Yield	Amount
Bidder 1	2.998%	\$3.5 billion
Bidder 2	2.999%	\$2.5 billion
Bidder 3	3.000%	\$3.0 billion
Bidder 4	3.000%	\$3.0 billion
Bidder 5	3.001%	\$2.0 billion
Bidder 6	3.002%	\$1.0 billion

**Question:** What do Bidder 1 to Bidder 6 get awarded in the auction?

→ The Treasury works its way down the list of competitive bids and accepts the total amount submitted at the lowest possible bid yields (highest prices) until the full offering amount has been awarded.



Name	Yield	Amount Bid	Amount Awarded	Competitive Amount
				\$10 billion
Bidder 1	2.998%	\$3.5 billion		-\$3.5 billion
				\$6.5 billion
Bidder 2	2.999%	\$2.5 billion		-\$2.5 billion
				\$4.0 billion

- At this point there are \$4 billion remaining for competitive bidding.
- However, there are a total of \$6 billion in bids at the next lowest rate (3.000%) by Bidder 3 and Bidder 4.
- The highest accepted rate (3.000%) is known as the **stop-out rate**.
- In this case, each bidder at this rate is awarded a percentage of their total bid amount.
  - The **allocation percentage** is calculated by dividing the remaining competitive offering by the total amount bid at the stop-out rate.

$$\frac{\text{Remaining Competitive Offering}}{\text{Total Bids at Stop-Out Rate}} = \frac{\$4 \text{ billion}}{\$6 \text{ billion}} = 66.7\%$$

- Bidder 3 and Bidder 4 each get a partial allocation of \$2 billion (66.67% x \$3.0 billion)

Name	Yield	Amount Bid	Amount awarded	Allocation percentage	Rate awarded
Bidder 1	3.00%	\$3.5 billion	\$3.5 billion	100%	3.00%
Bidder 2	3.00%	\$2.5 billion	\$2.5 billion	100%	3.00%
Bidder 3	3.00%	\$3.0 billion	\$2.0 billion	66.67%	3.00%
Bidder 4	3.00%	\$3.0 billion	\$2.0 billion	66.67%	3.00%
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Bidder 5	3.00%	\$2.0 billion	\$0	0%	N/A
Bidder 6	3.00%	\$1.0 billion	\$0	0%	N/A

## General Auction Timing

### General Auction Timing

## Wrap-Up

Our goals for today

- ☒ Know the different types of securities issued by the U.S. Department of the Treasury
- ☒ Be familiar with the Treasury auction process.

## Reading

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Fabozzi, Fabozzi, 2021, Bond Markets, Analysis, and Strategies, 10th Edition

Chapter 7