



Government Bonds

FINANCIAL EDGE

Liquidity



Credit Quality



Stable Income Stream



Range of Maturities



Government bond markets

Highly liquid

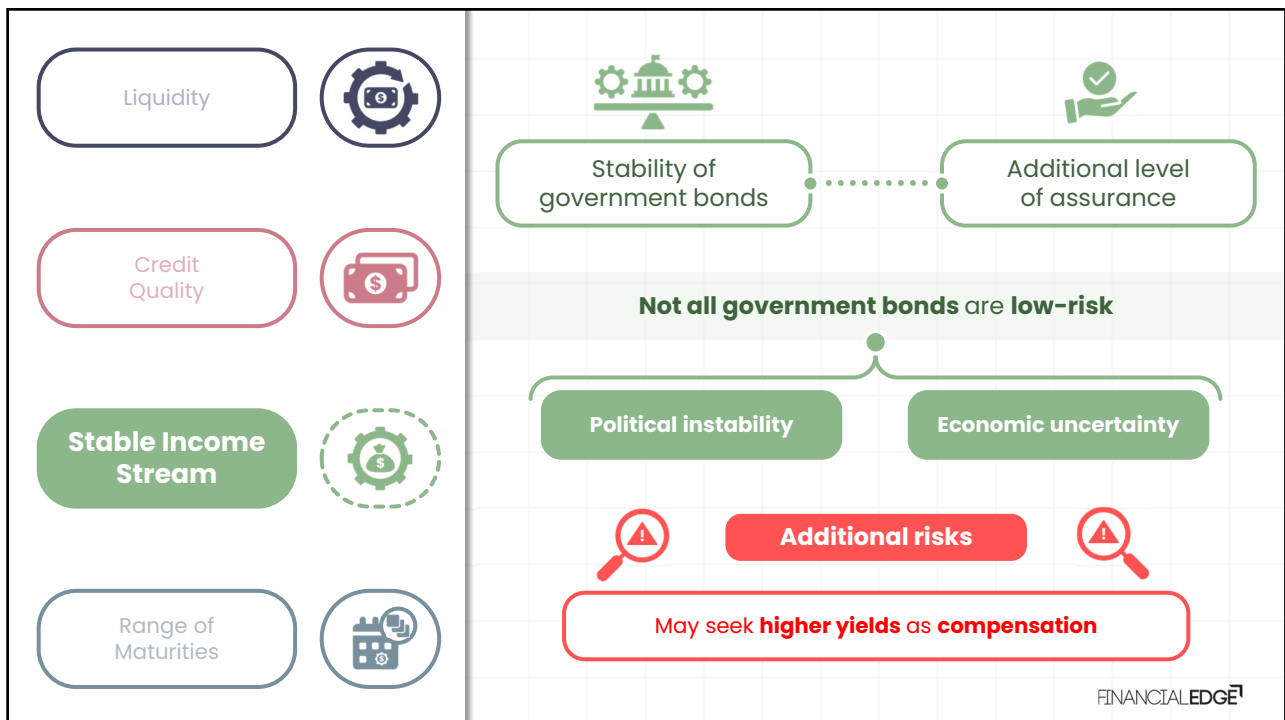
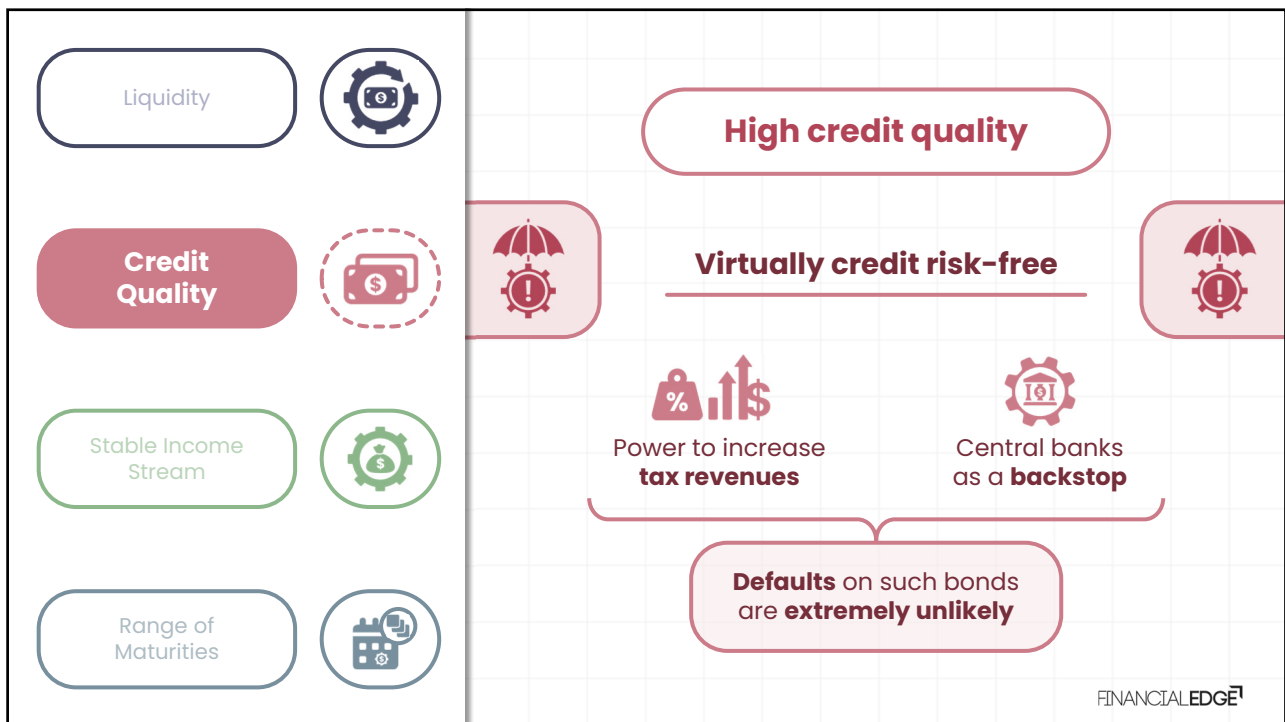


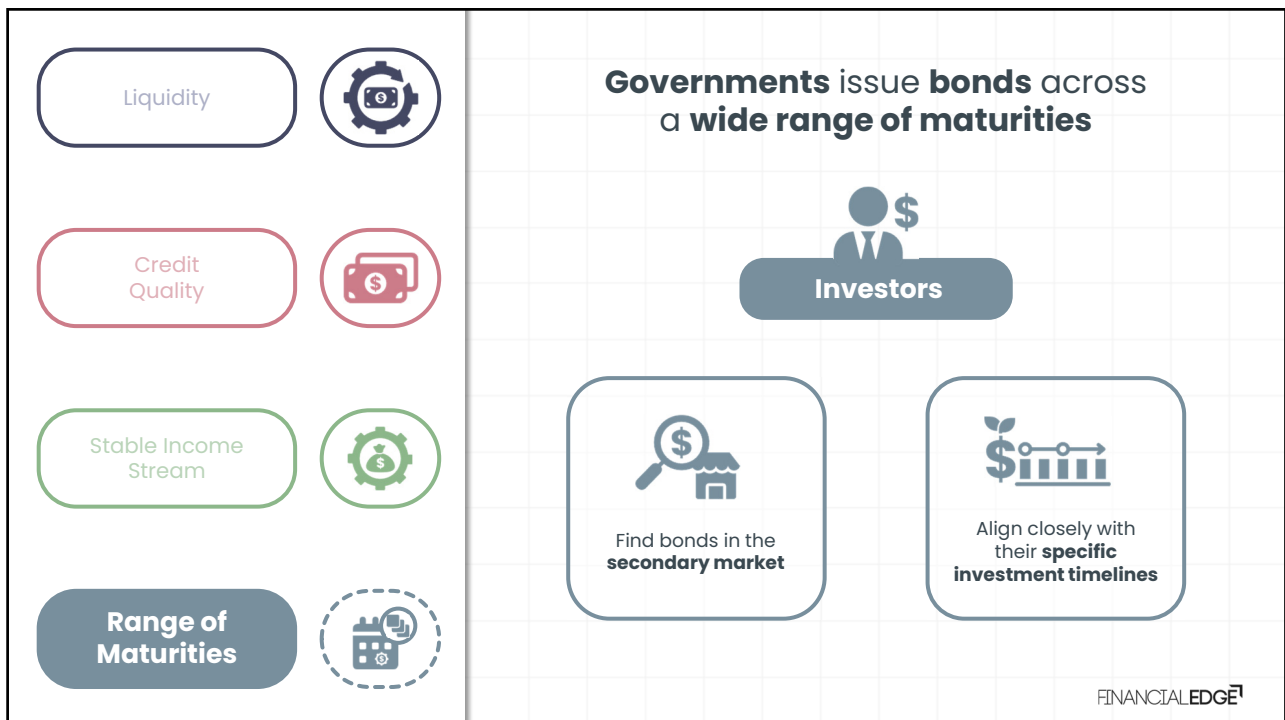
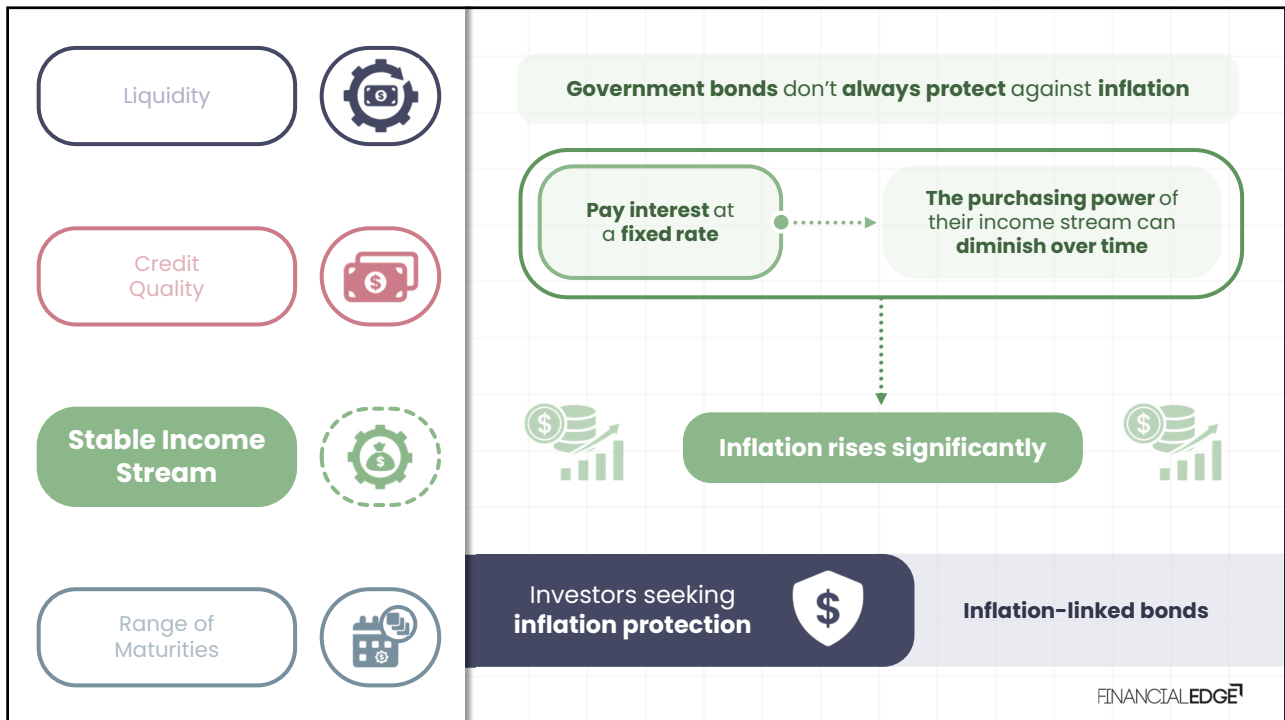
Bonds are traded frequently



Relatively easy and cost-effective for investors to **enter** or **exit** positions

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Government Bond Yields as a Benchmark

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GOVERNMENT BONDS



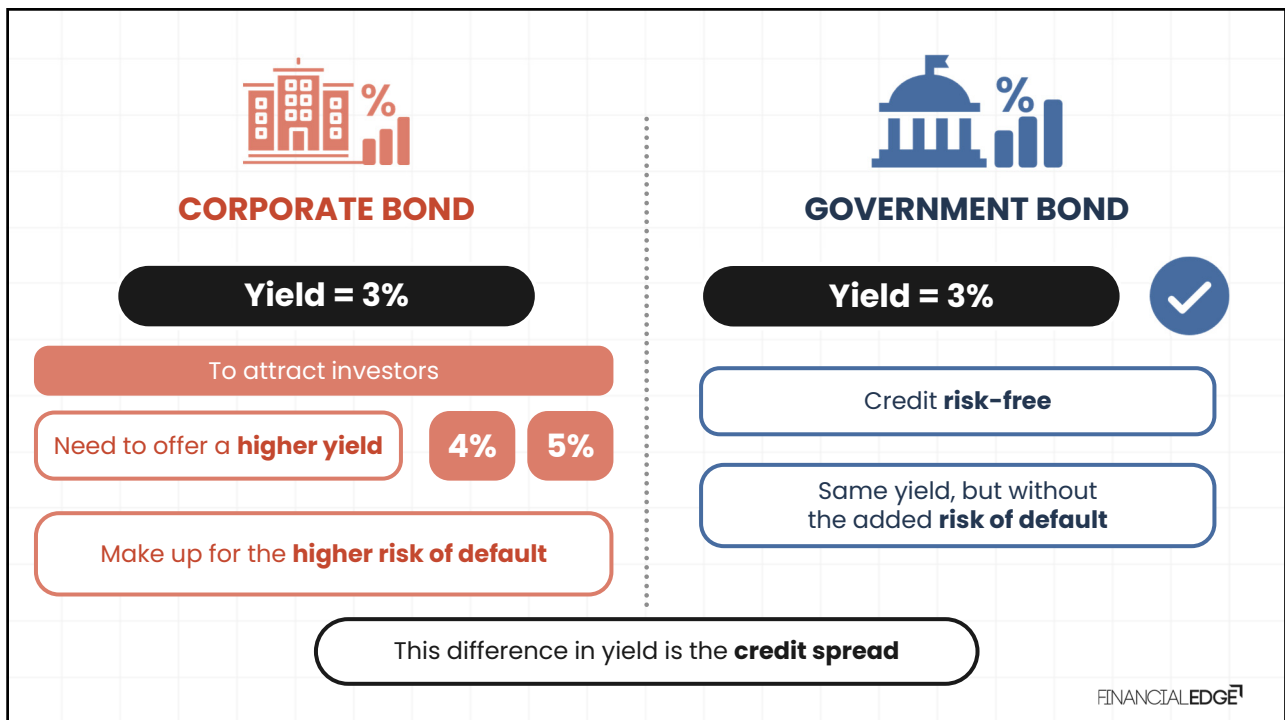
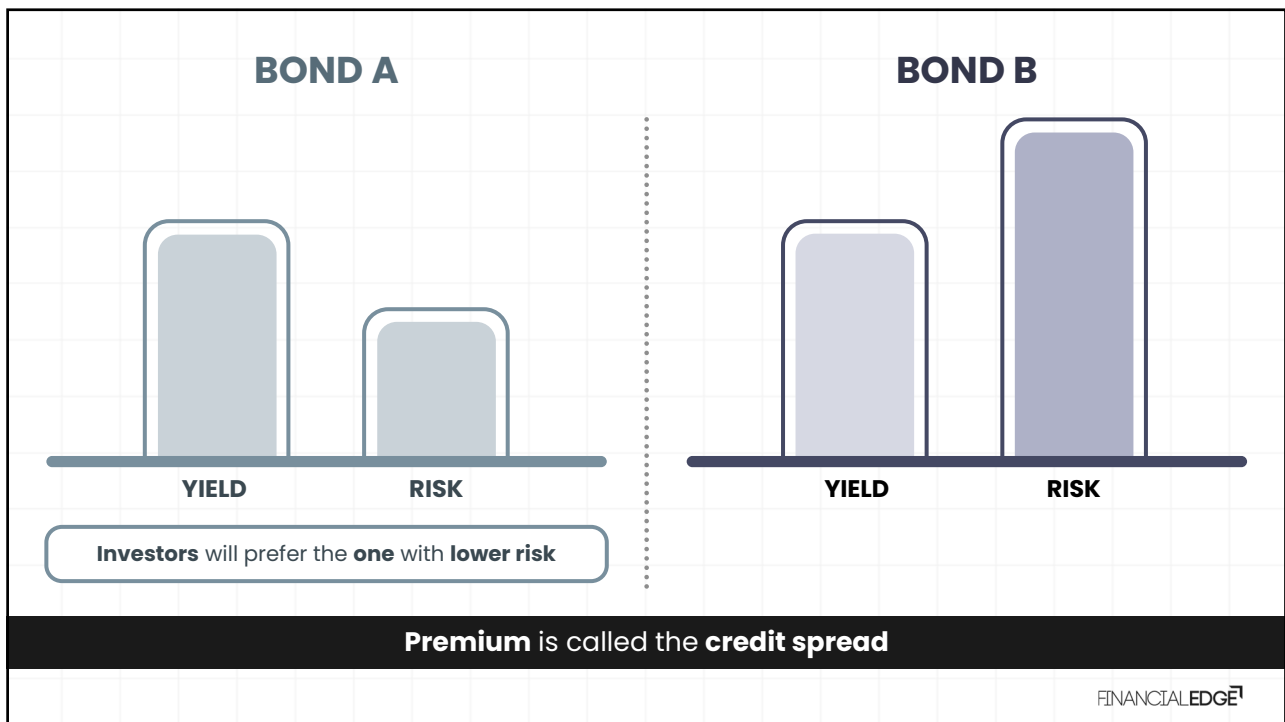
The investment with the **lowest credit risk** in a **country**



Virtually **credit risk-free**

Government bond yields the **benchmark** for all other **bond investments** within a **country**

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US Government Bond Products

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U.S. T-Bills

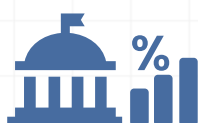
U.S.
T-Notes

U.S.
T-Bonds

STRIPS

TIPS

Government bonds come in a **variety of types**



U.S. GOVERNMENT BOND UNIVERSE

Variety of options across **various maturities** and **structures**



Range of:

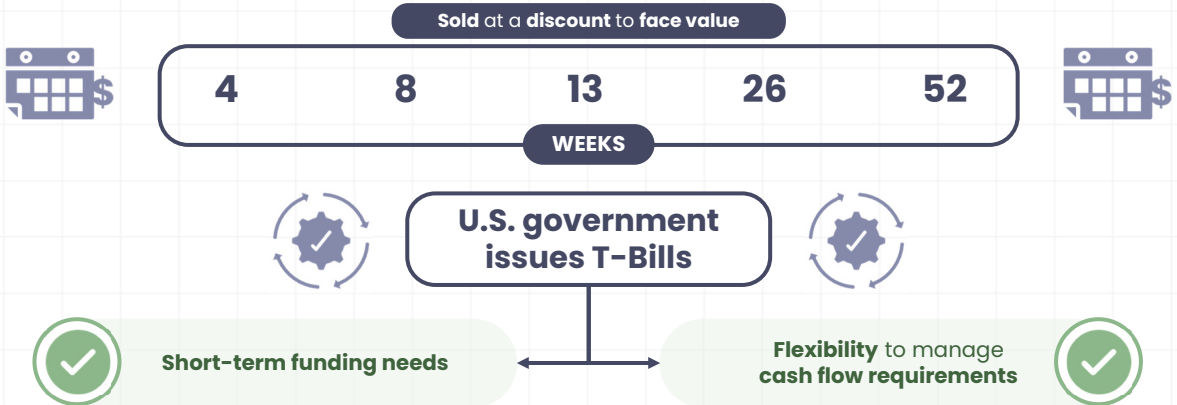
Strategies

Risk preferences

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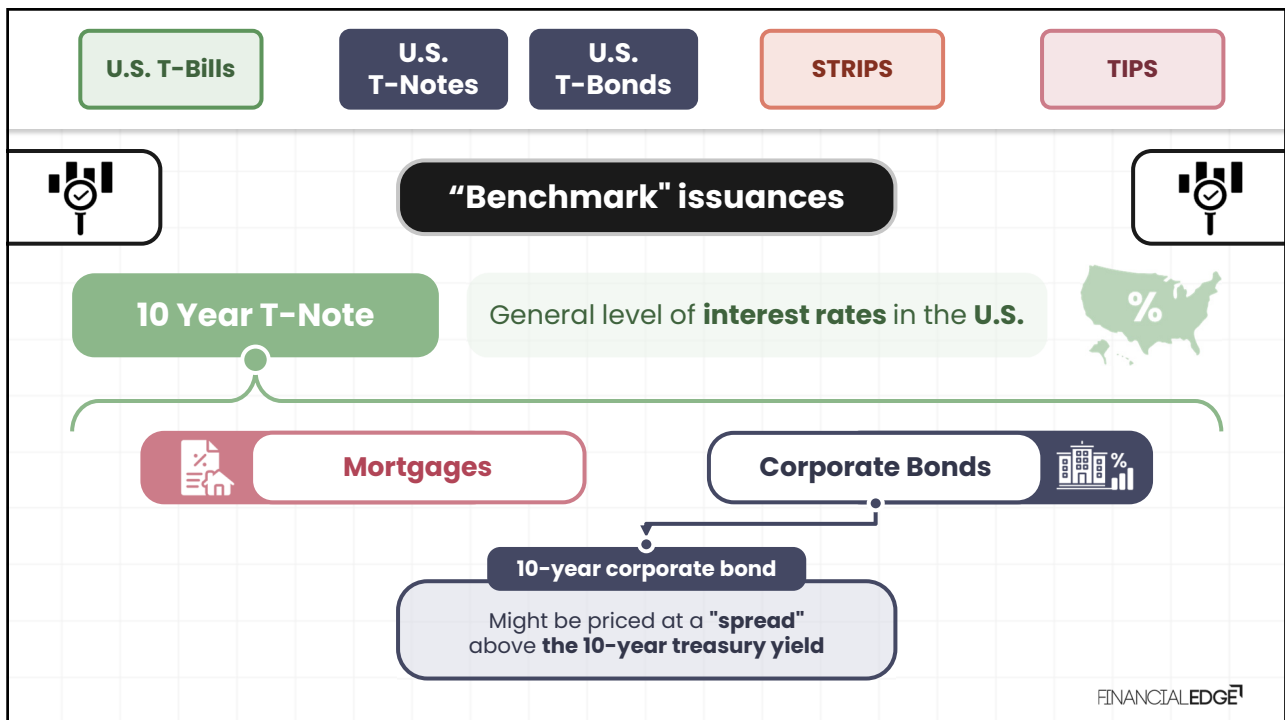
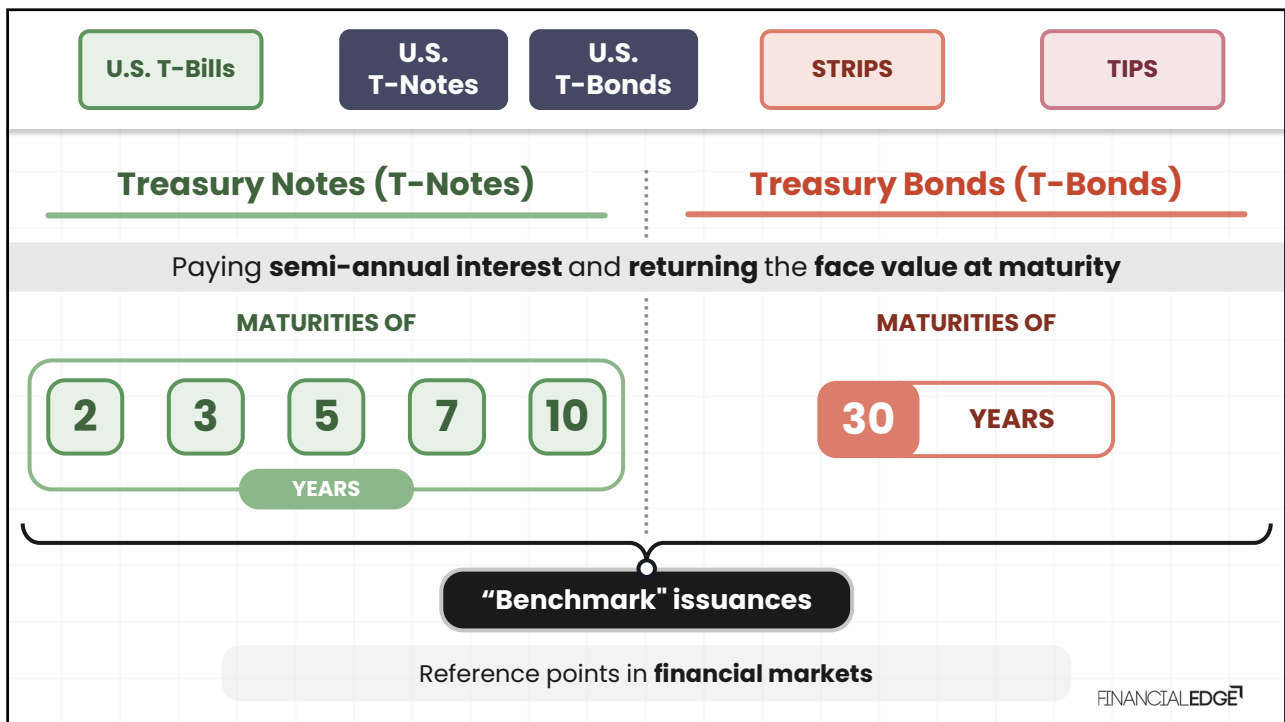
Treasury Bills (T-Bills)

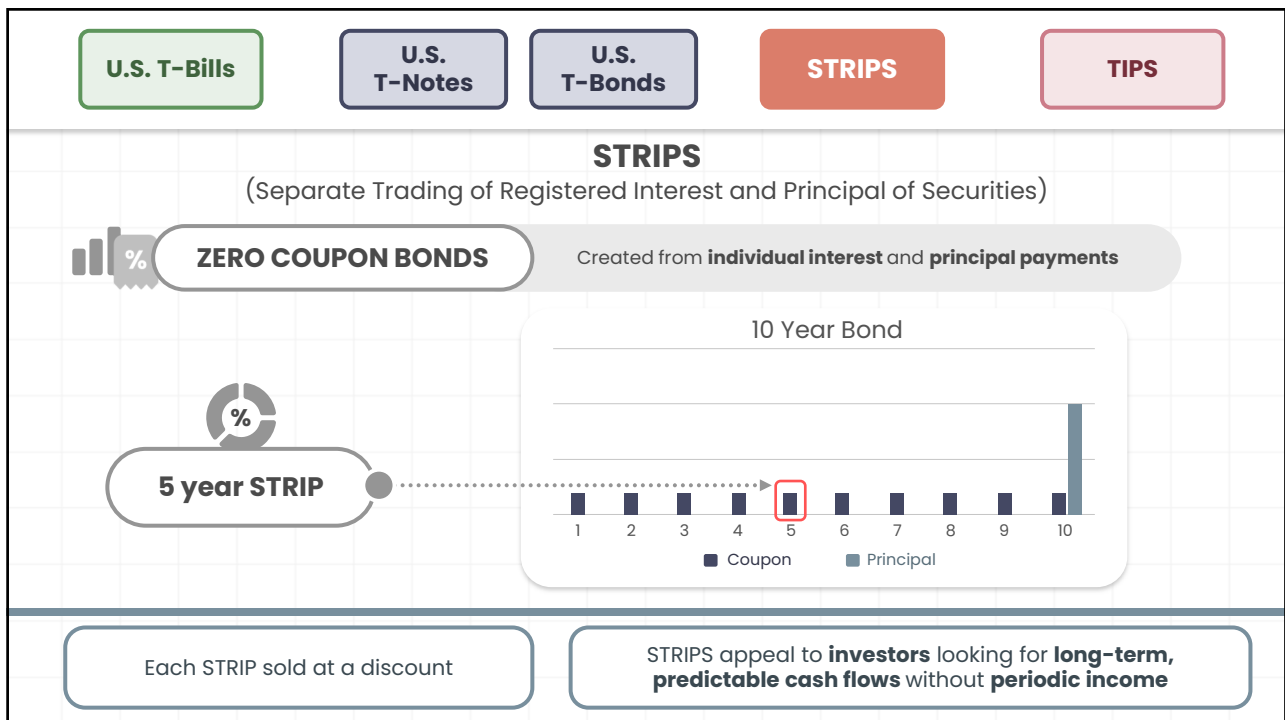
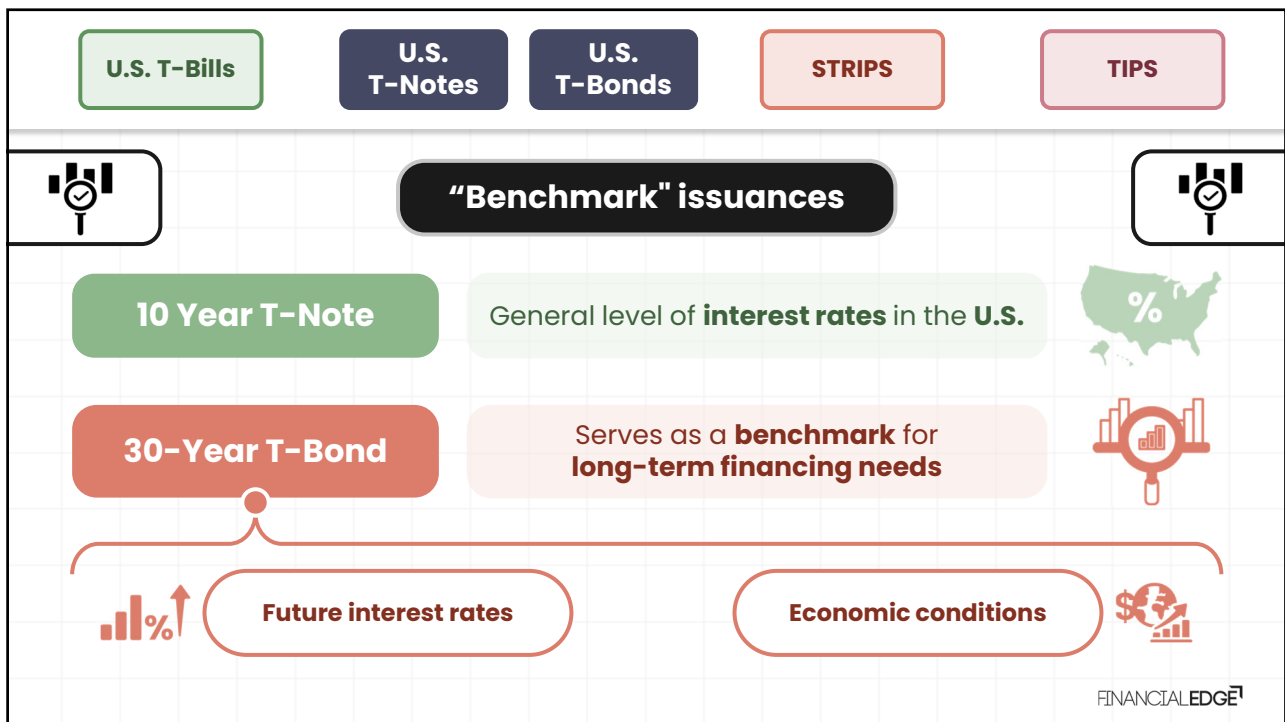
Are short-term securities with maturities of:



Investors are often attracted to T-Bills







U.S. T-Bills

U.S.
T-Notes

U.S.
T-Bonds

STRIPS

TIPS

Treasury Inflation-Protected Securities (TIPS)

Designed to protect against inflation

Coupon **cash flows rise**

The **fixed coupon rate** is applied to an **increased adjusted principal**



Attractive for investors concerned about **preserving purchasing power** over time

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U.S. T-Bills



U.S.
T-Notes

U.S.
T-Bonds



STRIPS



TIPS

Offers a distinct combination of **maturity, yield, and inflation protection features**

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On-the-Run vs. Off-the-Run Bonds

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On-the-run



Off-the-run



Recently issued

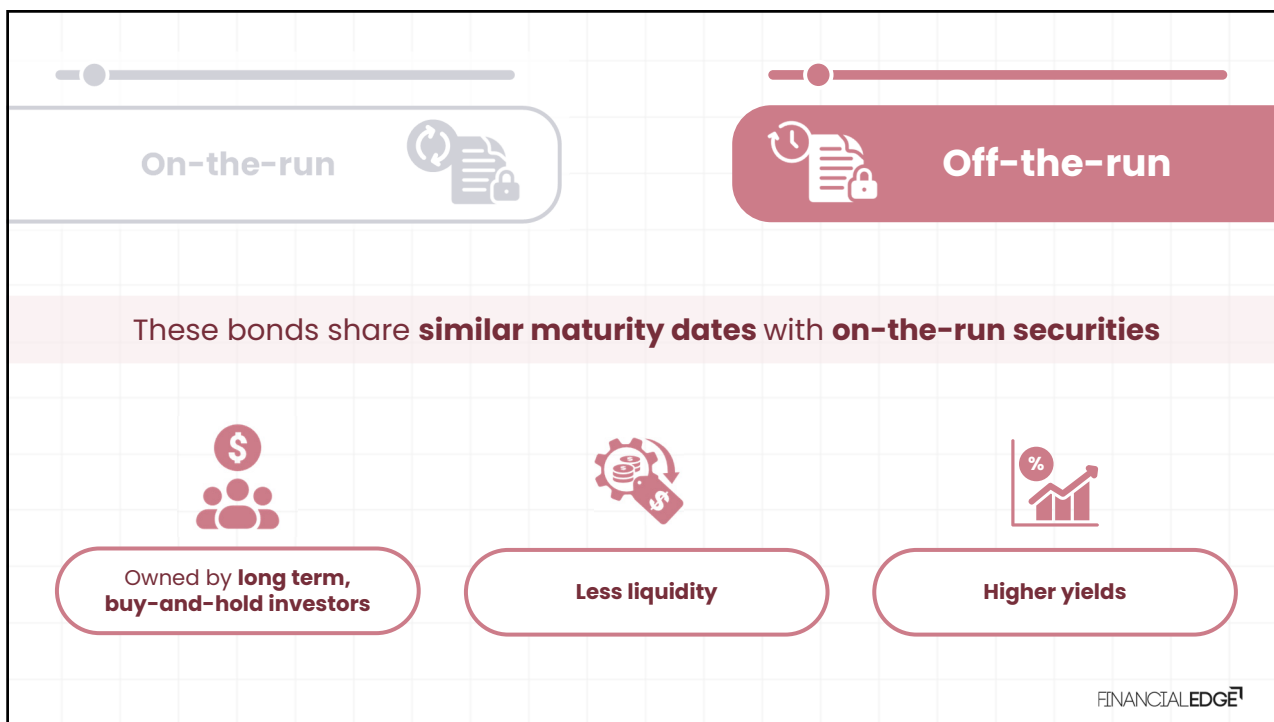
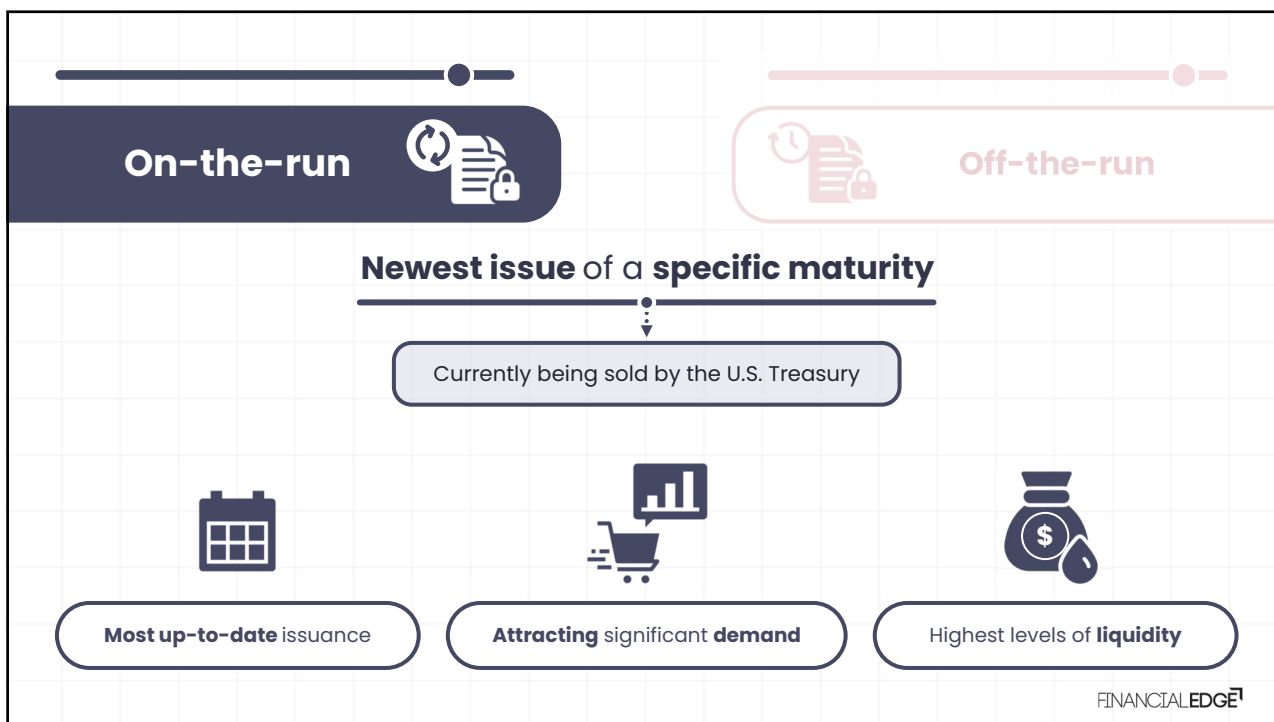
Particular maturity

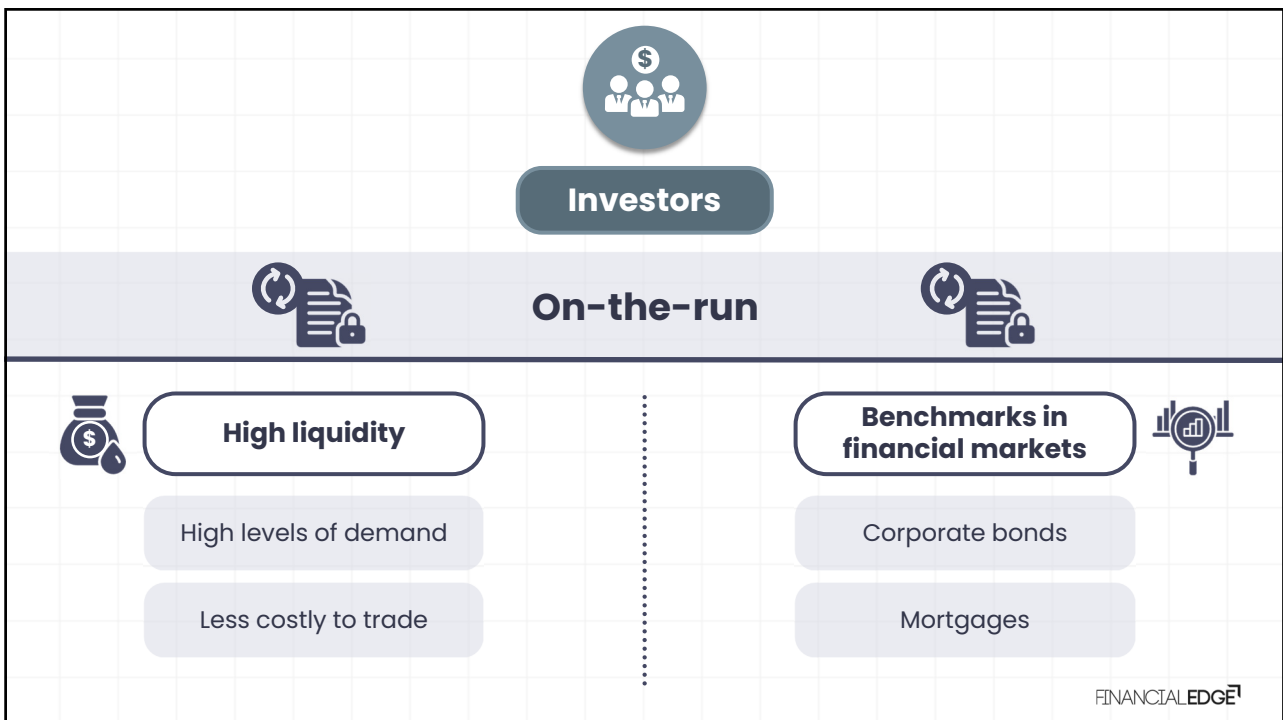


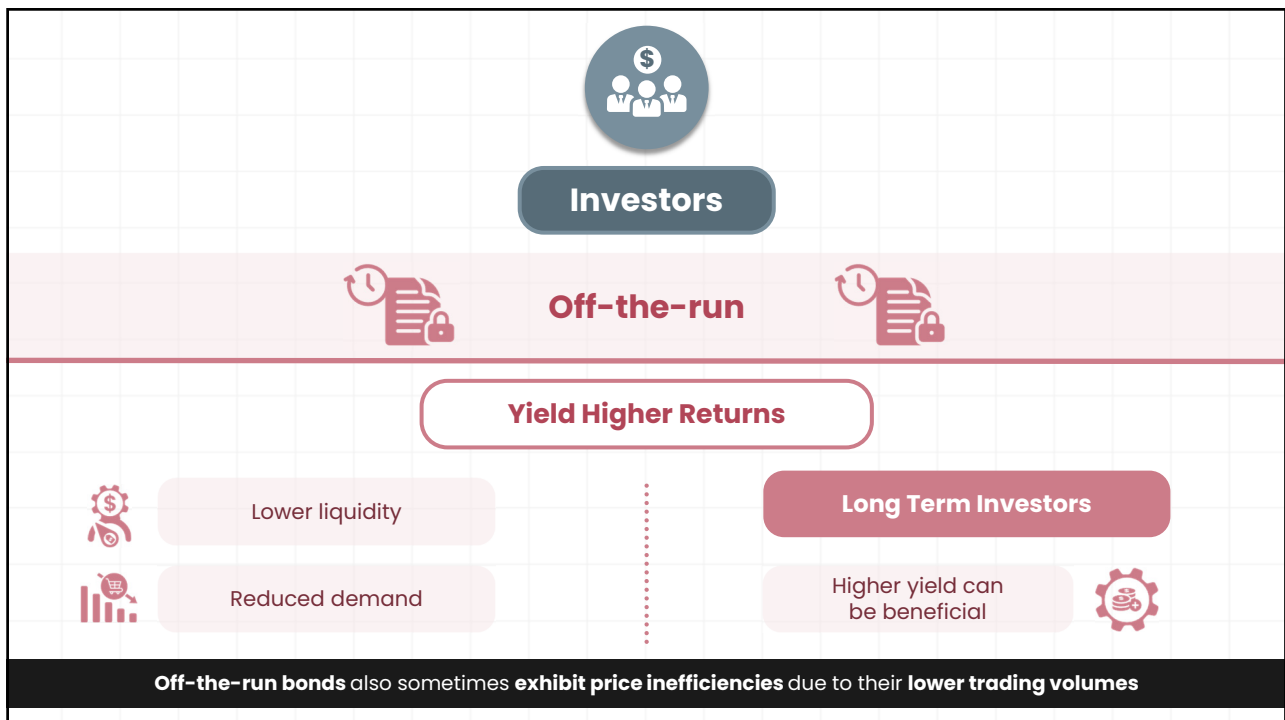
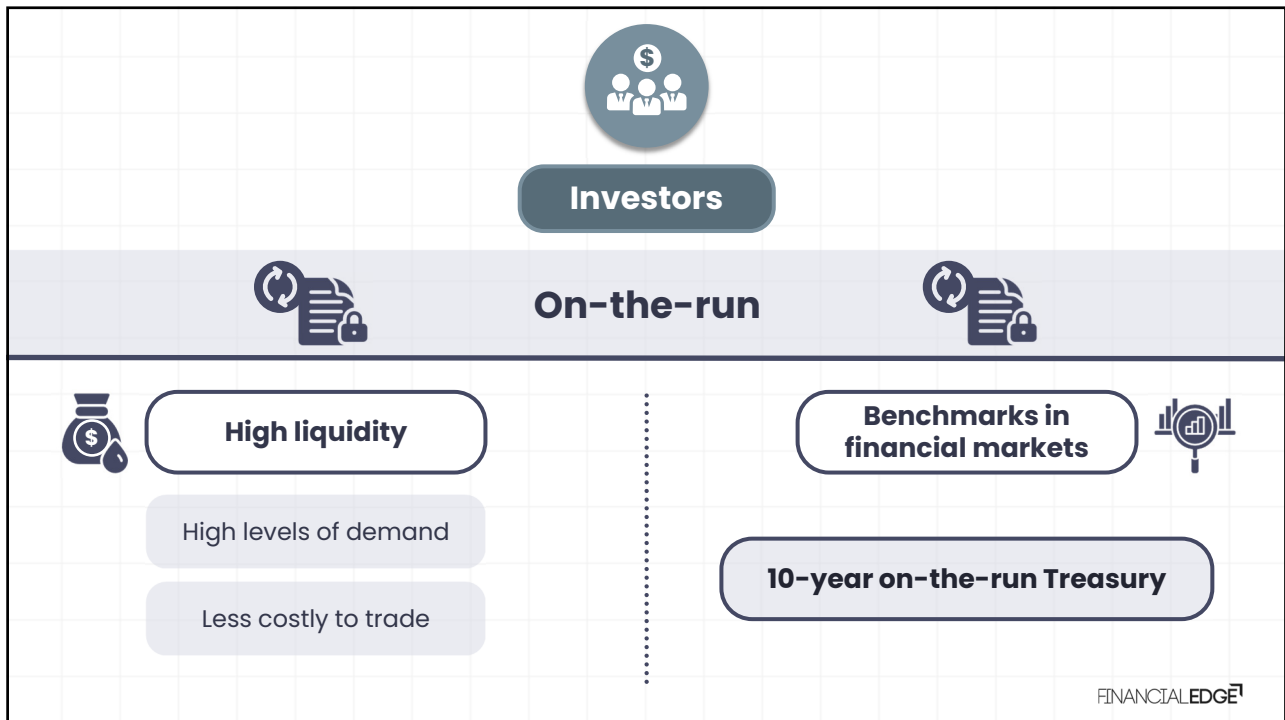
Older securities

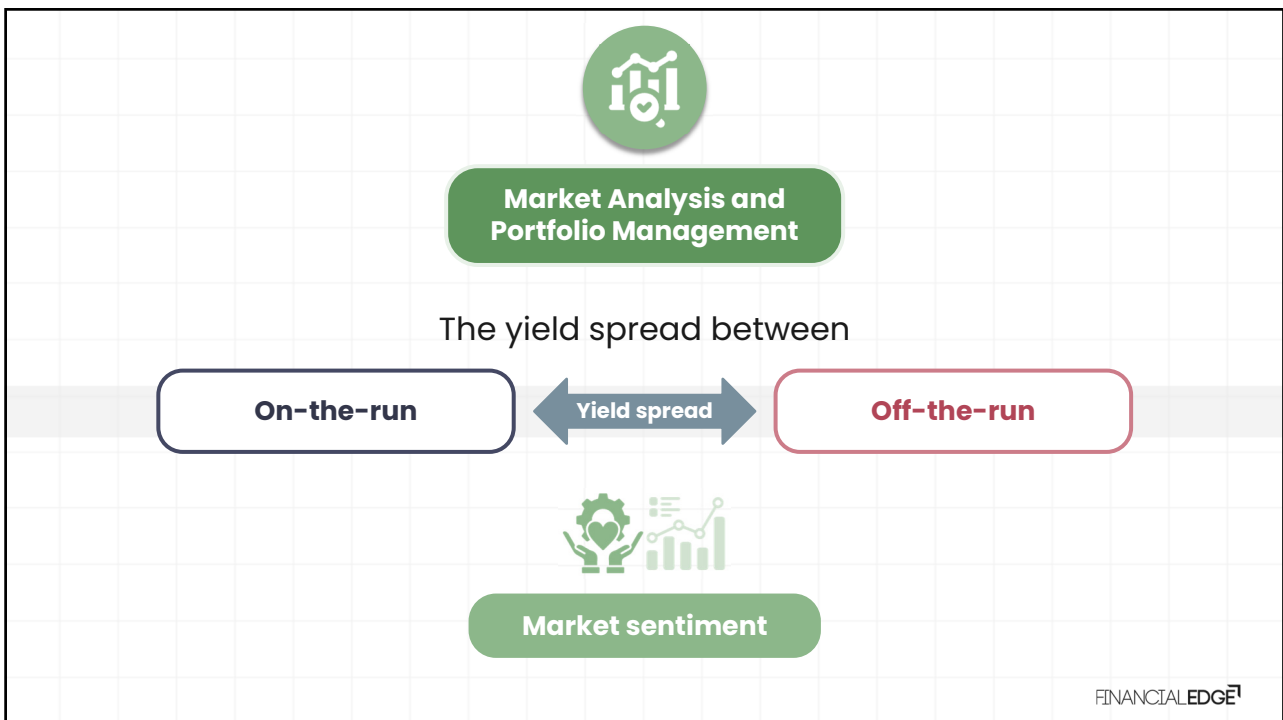
Similar maturities

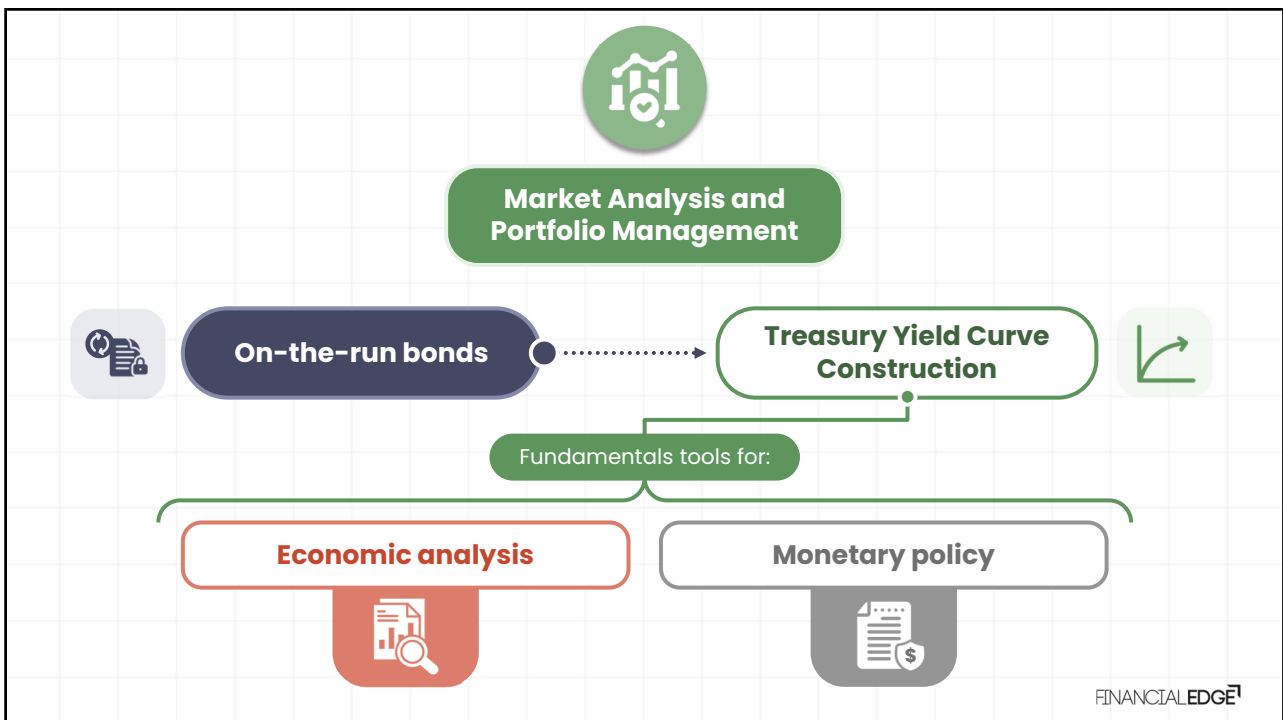
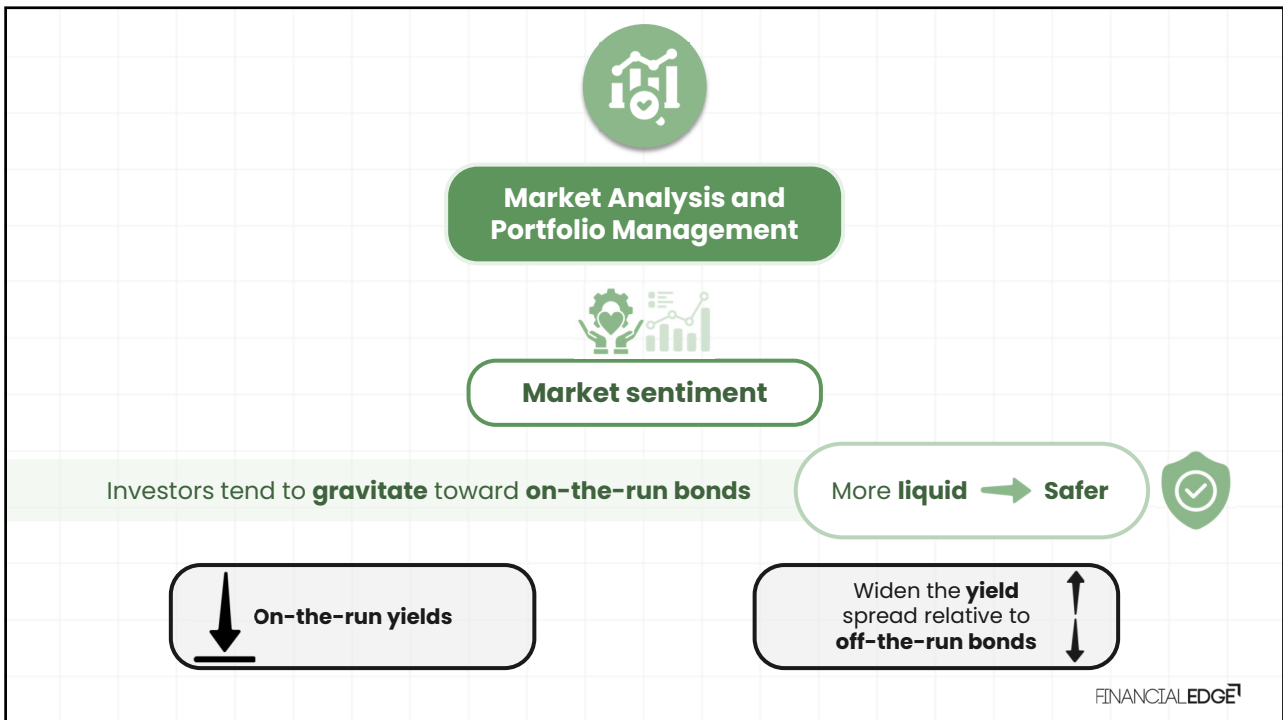
FINANCIALEDGE¹

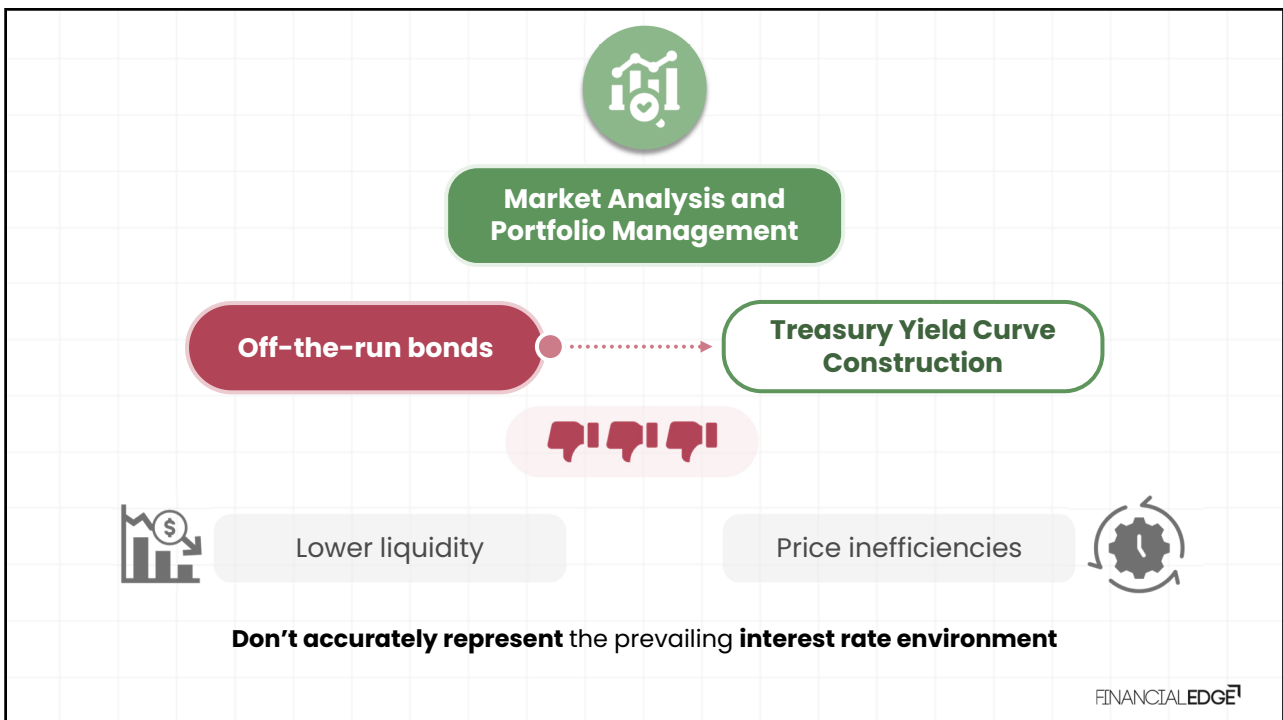
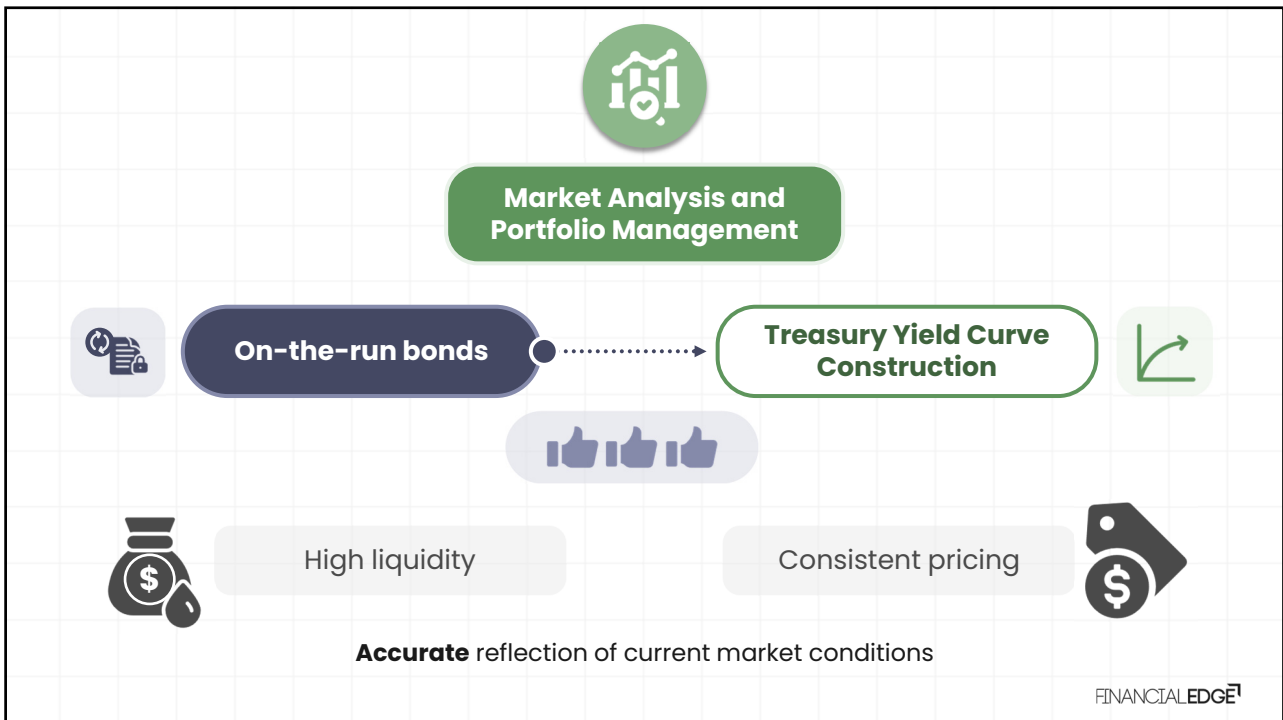












Government Bond Issuance

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Governments need to **raise funds**

Issuing bonds through **public auctions**



Offers securities



Investors

FINANCIALEDGE¹

1



Maturity

Bond issuance

Size

10-year Treasury bond issuance

Total face value of \$10 billion

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2

Issuer announces the **details of the issuance** and begins **collecting bids** submitted by **investors**



COMPETITIVE

The amount they want to purchase and the yield they're willing to accept

If the bid yield is **too high**, the **investor** might **miss out** on **receiving** any allocation in **the auction**

NON-COMPETITIVE



Only indicate the amount they want to buy (yield is not specified)

Guaranteed to receive the **full amount** they bid for (up to a specified limit)

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3

Allocation Process



Non-competitive bids are **filled first**



Final auction yield

After fulfilling all **non-competitive bids**, the remaining securities are allocated to **competitive bidders**



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1

2

3

All bids are **ranked** from **lowest** to **highest yield**



The **lower** the **yield** the investor is **happy receiving**



The **higher** the **price** they will be **paying**

The final or "high" yield of the auction also known as **"the stop"**

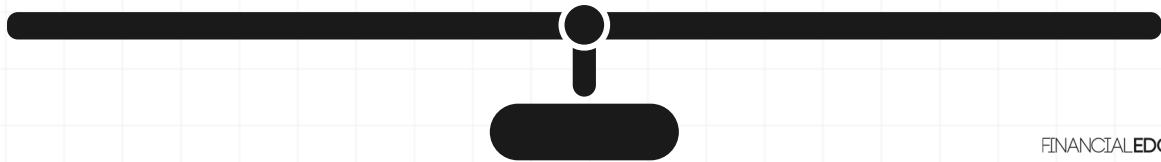
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Helps the government efficiently **raise funds** at the **lowest possible cost**

Large institutional investors

Smaller participants



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Government Bond Issuance – Illustration

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10Y US Treasury Issuance notional: 10 bn USD		
Yield	Demand (bn USD)	Aggregated demand (bn USD)
4.522%	3.4	3.4
4.523%	4.9	8.3
4.524%	2.5	10.8
4.525%	1.3	12.1
4.526%	1.1	13.2
4.527%	0.5	13.7

Treasury looks at the demand across the different yield levels



Total demand meets or slightly exceeds

Issuance amount of **\$10 billion**

FINANCIALEDGE¹

10Y US Treasury Issuance notional: 10 bn USD		
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Demand at 4.524%

\$2.5 billion

Moves the **cumulative demand** to:

\$10.8 billion

4.524% becomes the stop yield

FINANCIALEDGE¹

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Bids below the stop yield of **4.524%**

Demand reached **\$8.3 billion**

All competitive bidders whose bids are **accepted**

Receive the same yield as the stop yield: **4.524%**

FINANCIALEDGE¹

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Bids below the stop yield of **4.524%**

Dutch Auction



Buy the newly issued bonds at a **slightly lower price** than they were **willing to pay**

FINANCIALEDGE¹

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4.527%	0.5	13.7

Yield level would take the **total demand to:**

\$10.8 billion

(\$8.3 billion + \$2.5 billion)

Pro-Rata Allocation

\$1.7 billion out of **\$2.5 billion**
that was **demand**

Remaining unfulfilled
demand at 4.523%

FINANCIALEDGE¹

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Yields higher than the stop yield



Do not receive any allocation

FINANCIALEDGE¹

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4.525%	1.3	12.1
4.526%	1.1	13.2
4.527%	0.5	13.7

Coupons are typically set in increments

1/8

OR

0.125%

U.S. Government Bonds

Stop Yield

4.524%



Coupon

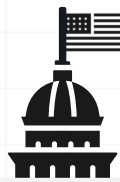
4.50%



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The When-Issued Market: US Treasuries

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The “**when-issued**” market plays a crucial role in the **bond issuance process**

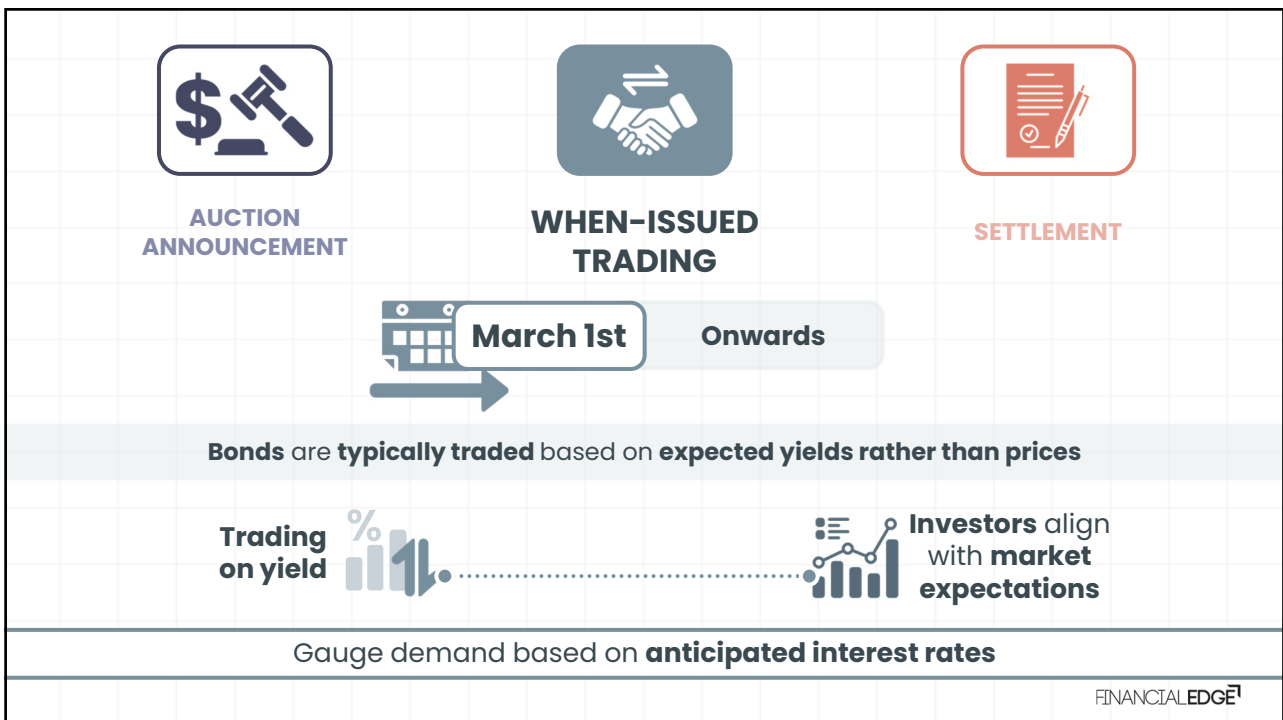
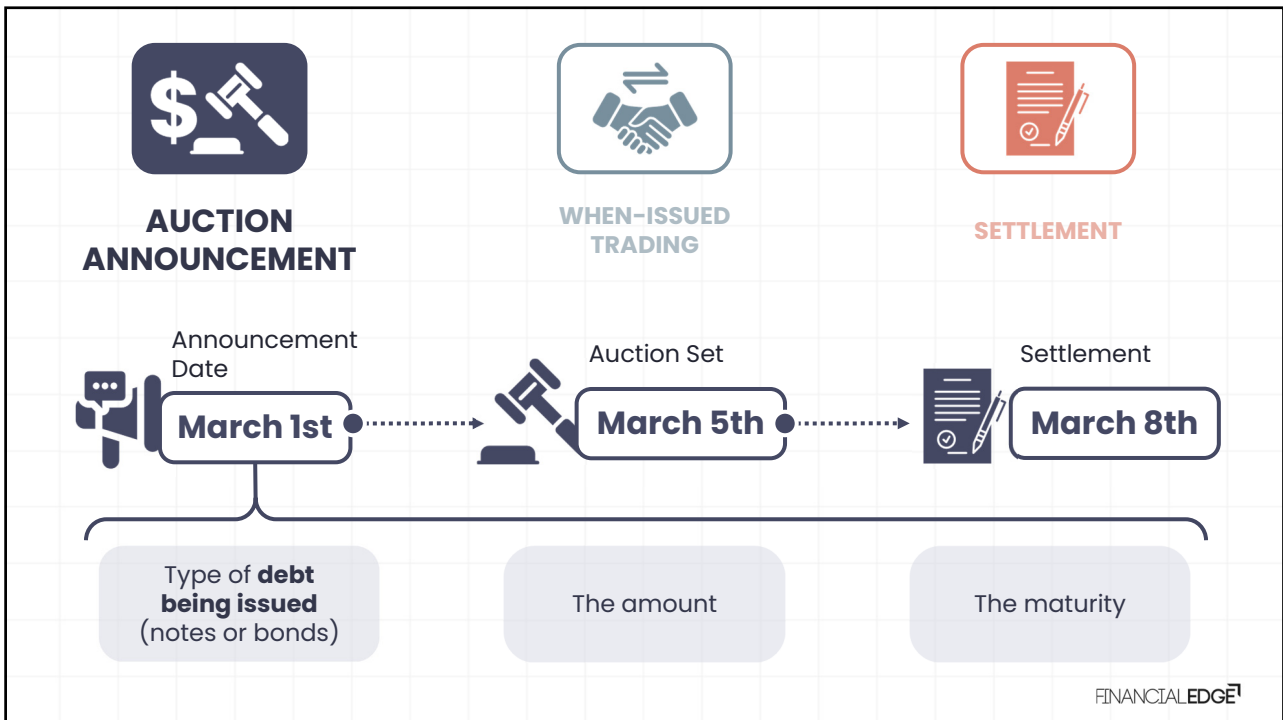


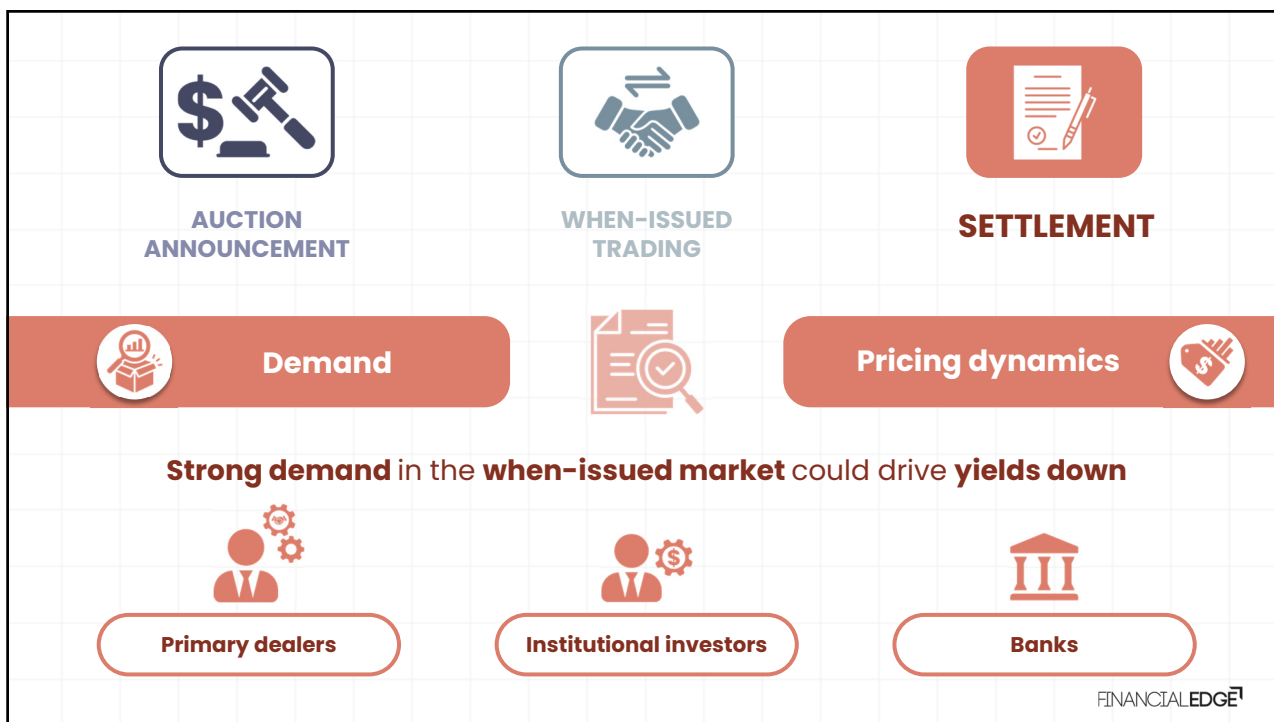
Establish pricing and expectations



Before **bonds** are **officially issued**

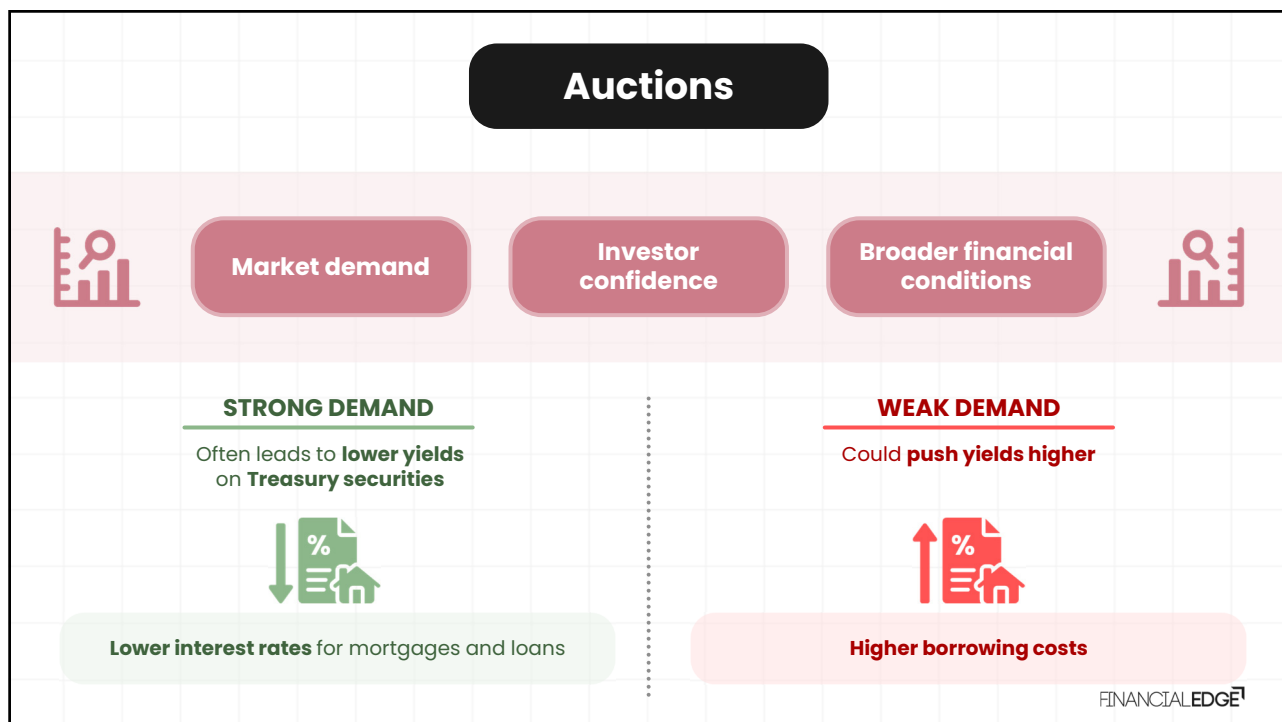
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Interpreting Auction Results

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Bid-to-cover Ratio



Yield/Stop

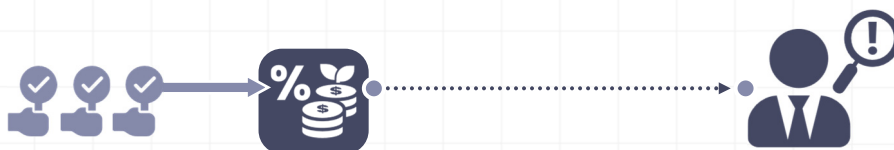


Tail Size



Primary Dealer Take up

Ratio of the **total amount** of **bids** received to the **amount of securities** offered in **the auction**



If **bids** were **concentrated** at higher yields

Signal that investors are **cautious** or require **additional compensation**

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Bid-to-cover Ratio



Yield/Stop



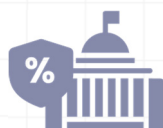
Tail Size



Primary Dealer Take up

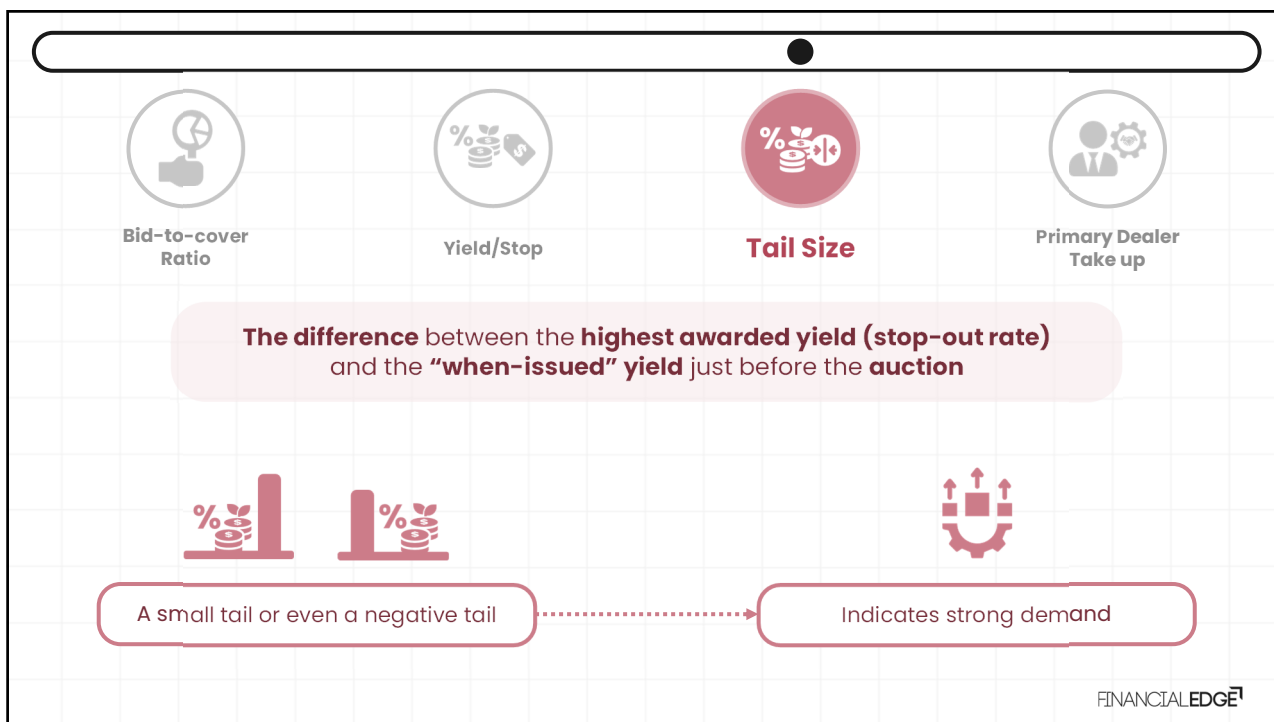
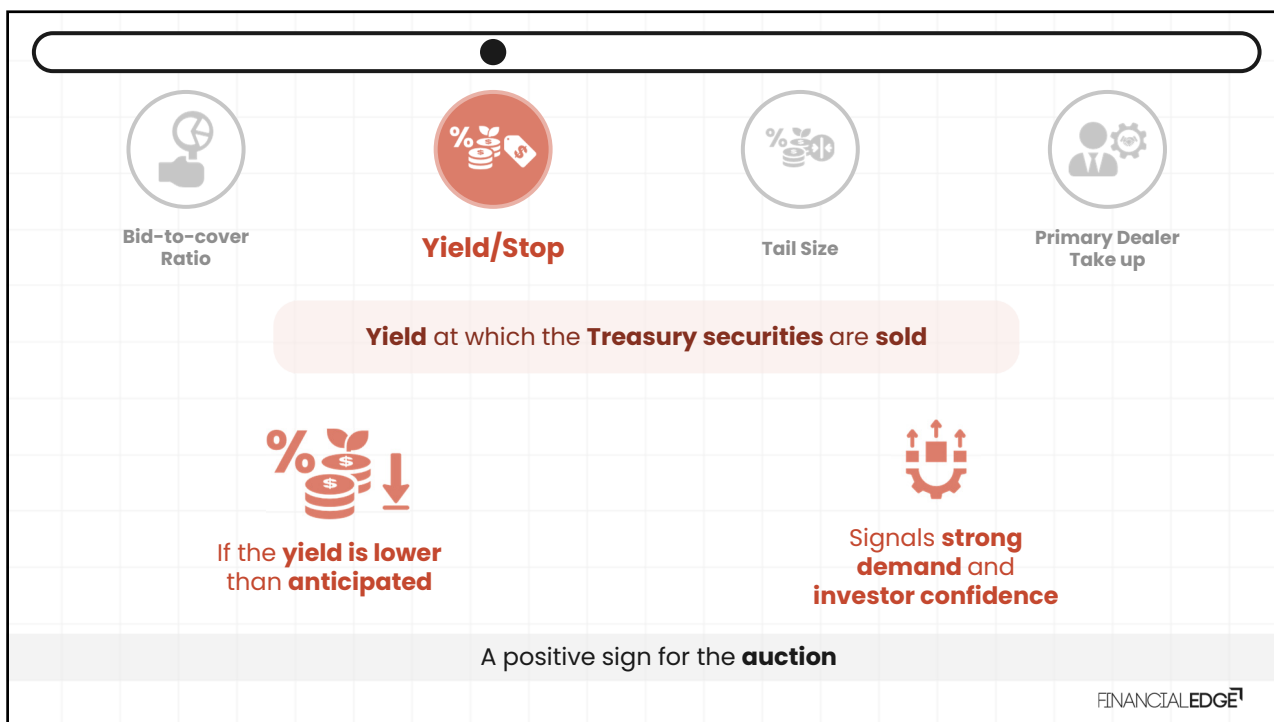
Ratio of the **total amount** of **bids** received to the **amount of securities** offered in **the auction**

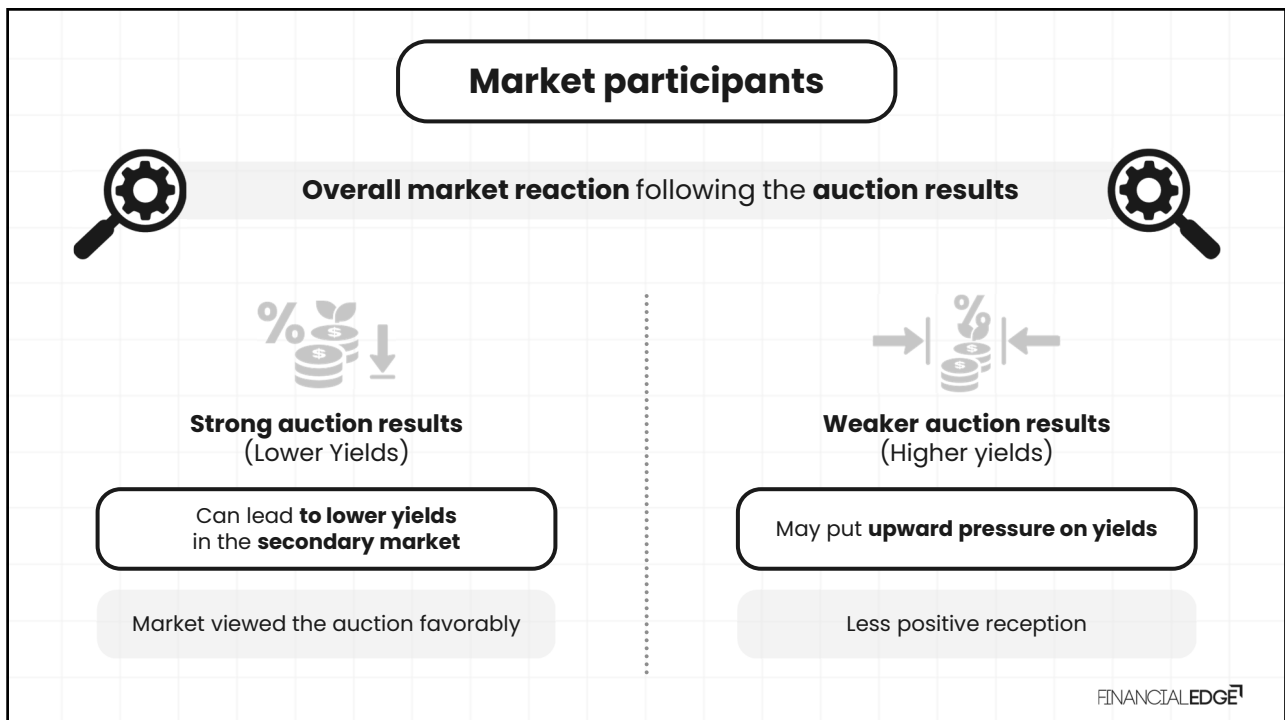
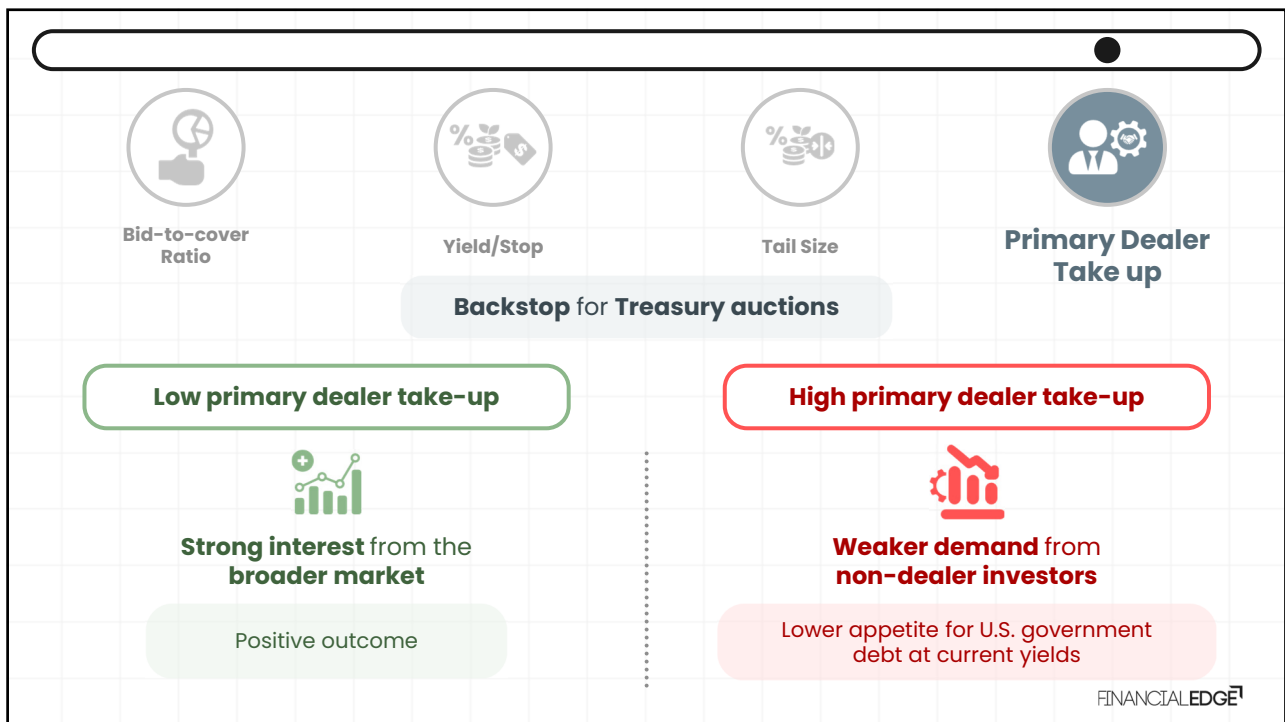
Bid-to-cover ratio of 2 or higher is considered **strong**



Robust interest in U.S. government debt

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Separate Trading of Registered Interest and Principal of Securities (STRIPS)

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Type of Treasury investment that breaks down **traditional bonds**



Individual **component cash flows**

Zero-coupon security



Flexibility for precise financial planning

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Separating or “stripping” existing U.S. Treasury securities

T-Notes



T-Bonds



STRIPS

Separate Trading of Registered Interest and Principal of Securities

Individual coupon payment and final principal payment become **separate securities**

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T-Notes



10-year Treasury Note is stripped

20 individual
coupon payments

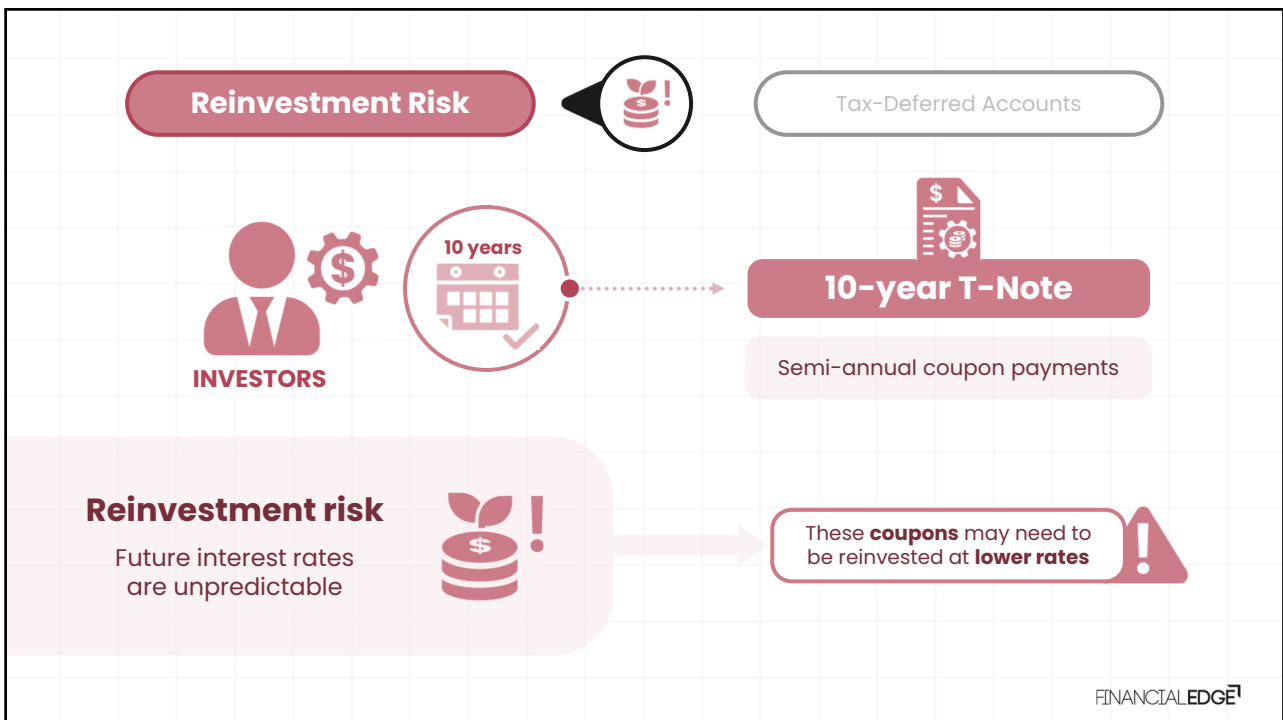
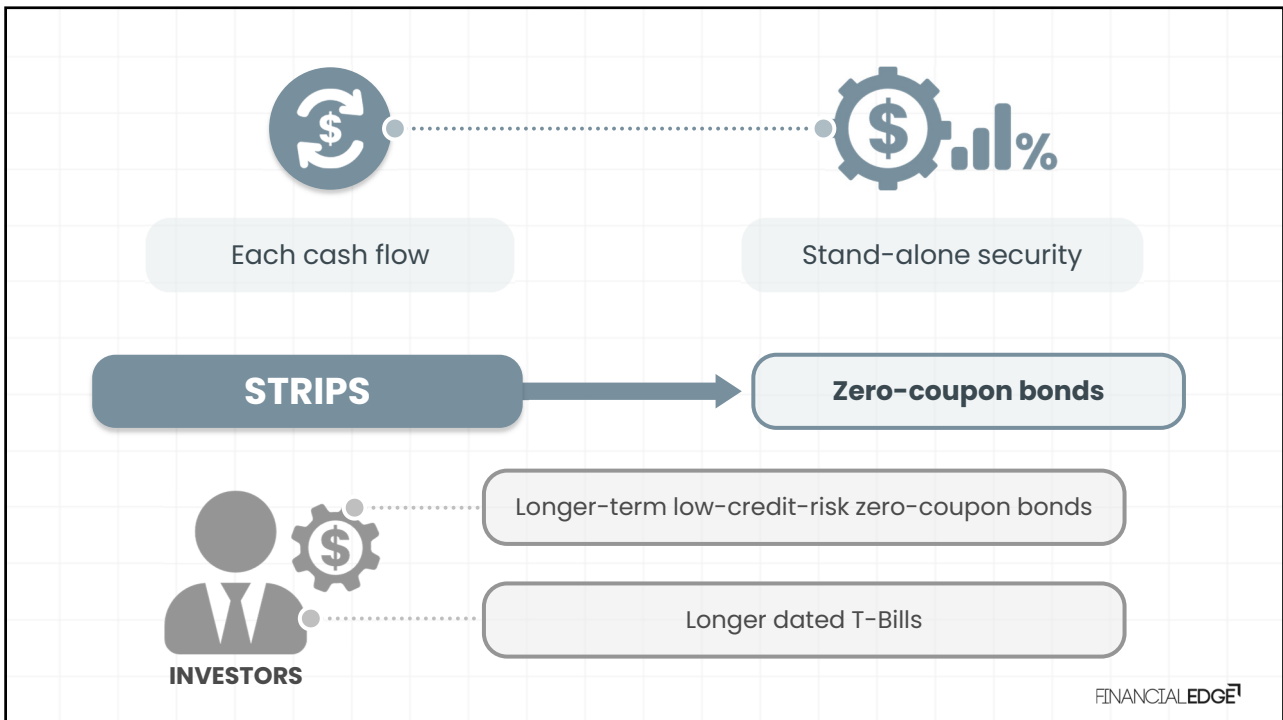


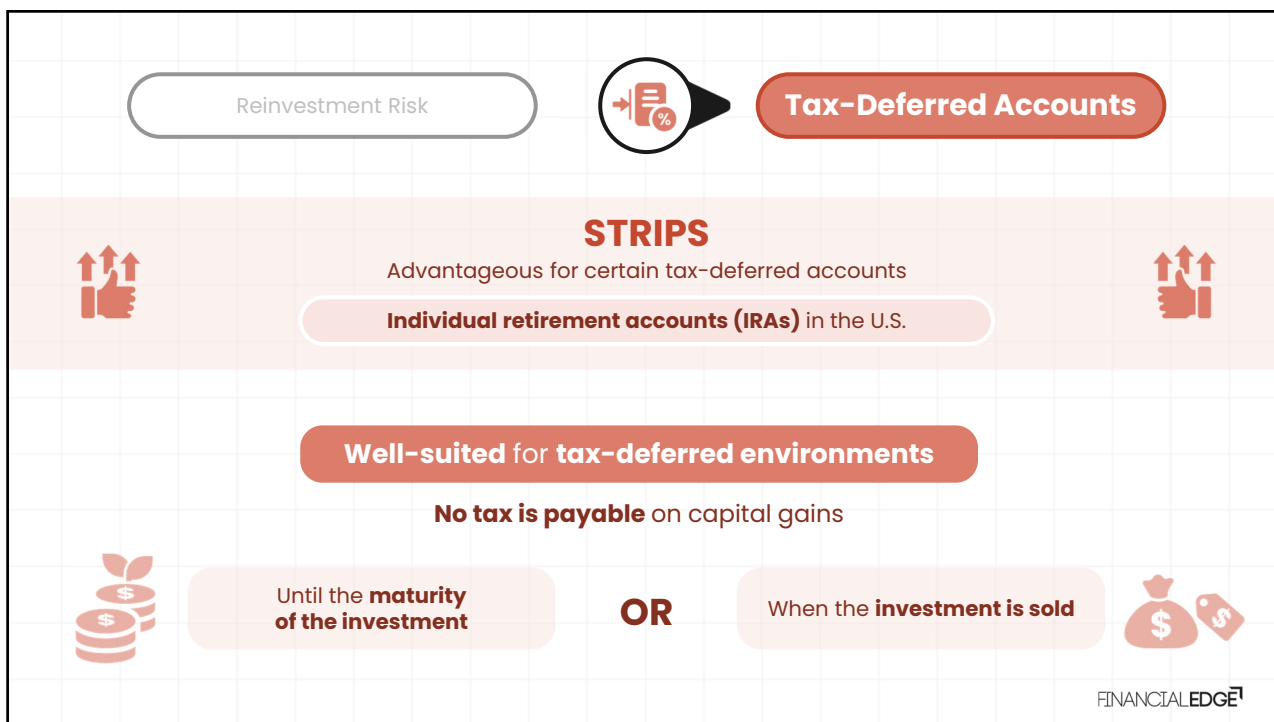
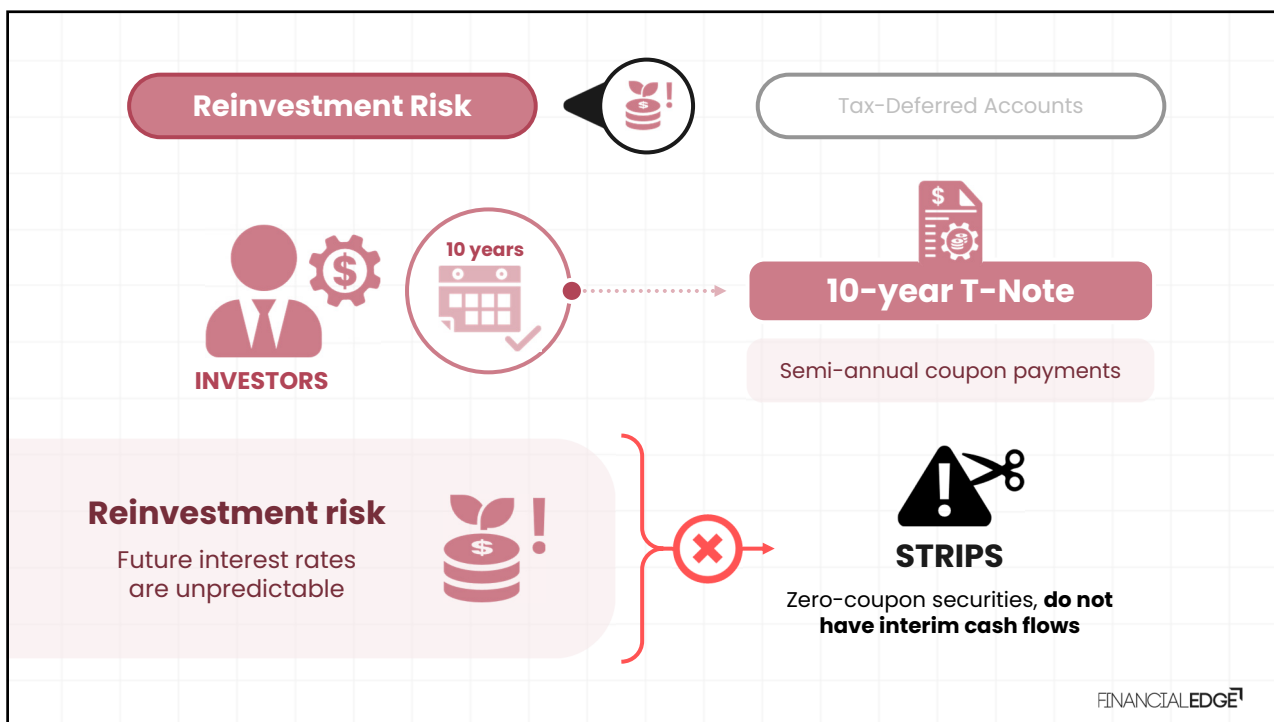
A **single** redemption
payment at maturity

21 cash flows

Traded independently

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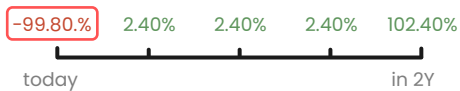


The Treasury Stripping Process – The High Level

FINANCIALEDGE¹

STRIPPING PROCESS

2-year U.S. Treasury security with a 4.80% coupon, paid semi-annually



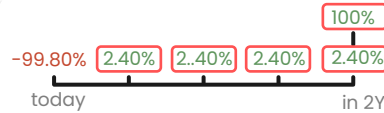
Each coupon payment

Principal amount at maturity

Separate
zero-coupon security

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STRIPPING PROCESS

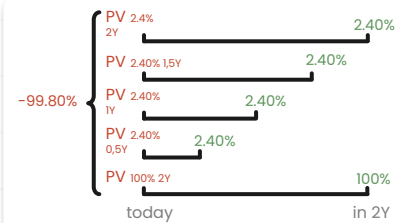
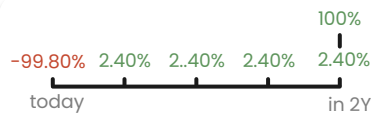
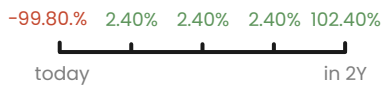


A bank first purchases this **eligible government bond**

Each coupon payment and the **principal amount** is now treated as an **independent zero-coupon bond**

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STRIPPING PROCESS



Stripped components can now be sold by the bank individually, to different investors

Range of zero-coupon securities across different maturities

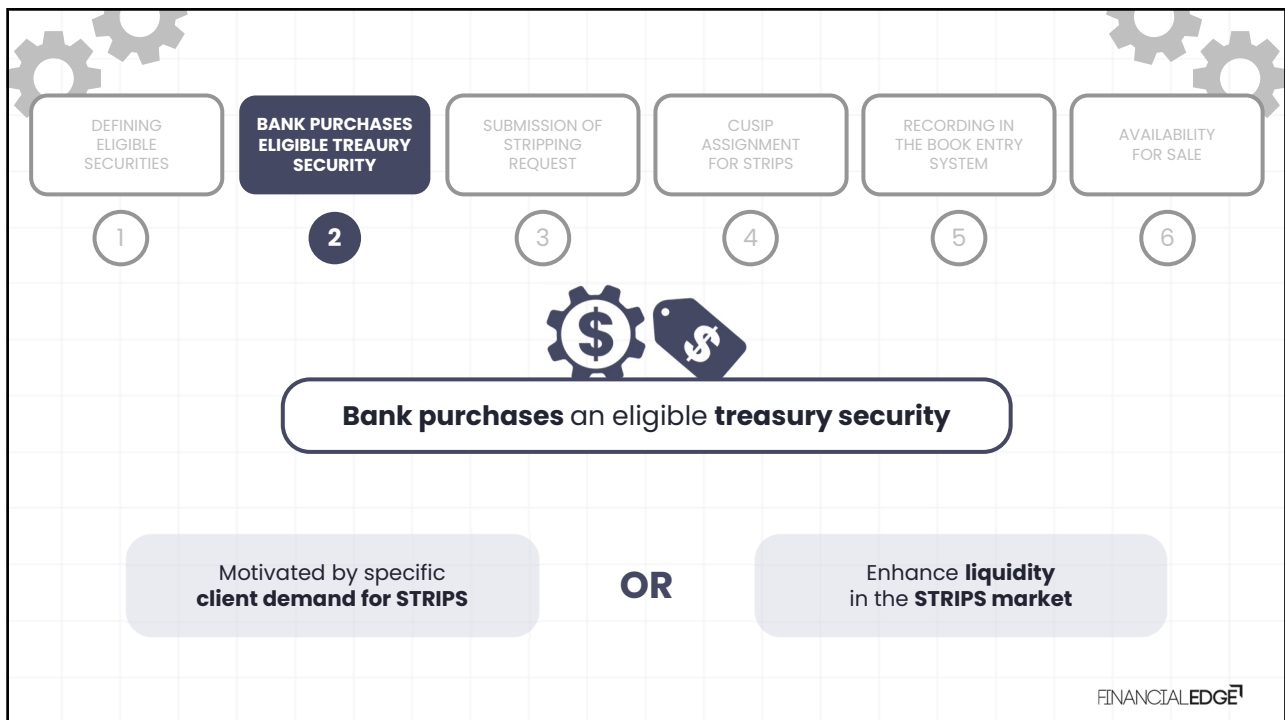
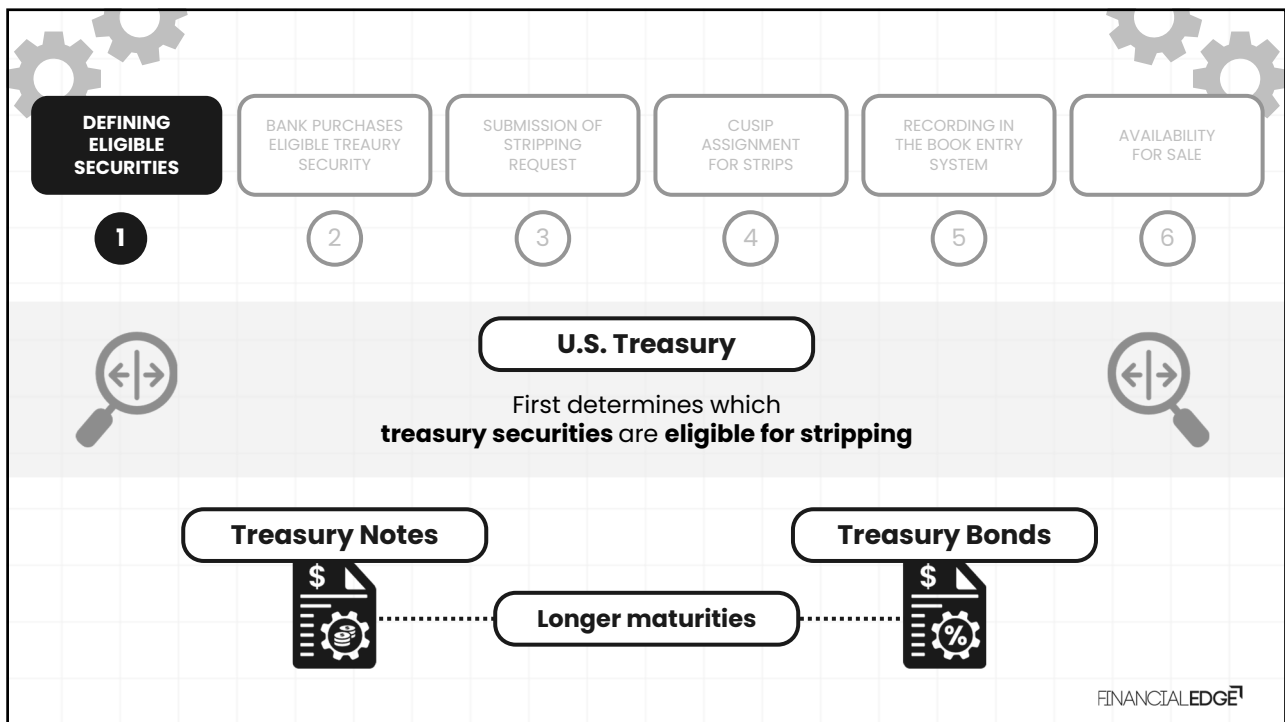


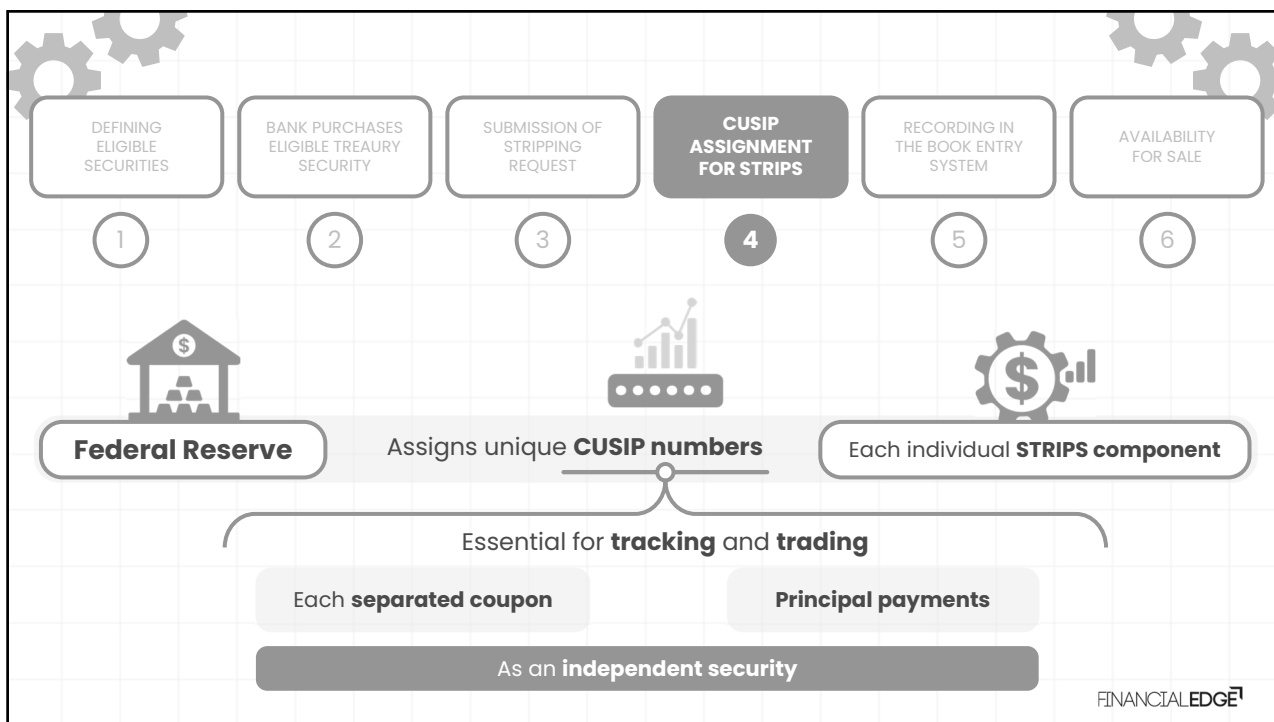
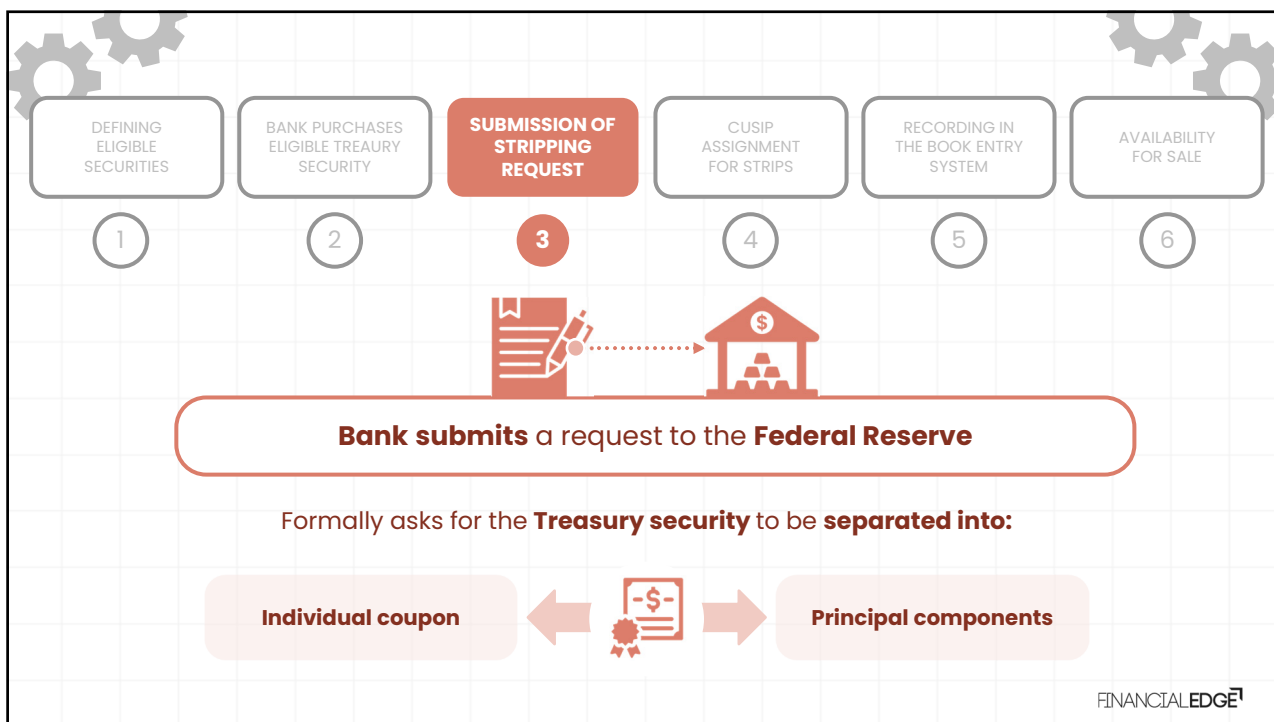
Sum of the **prices** of all these **zero-coupon bonds**

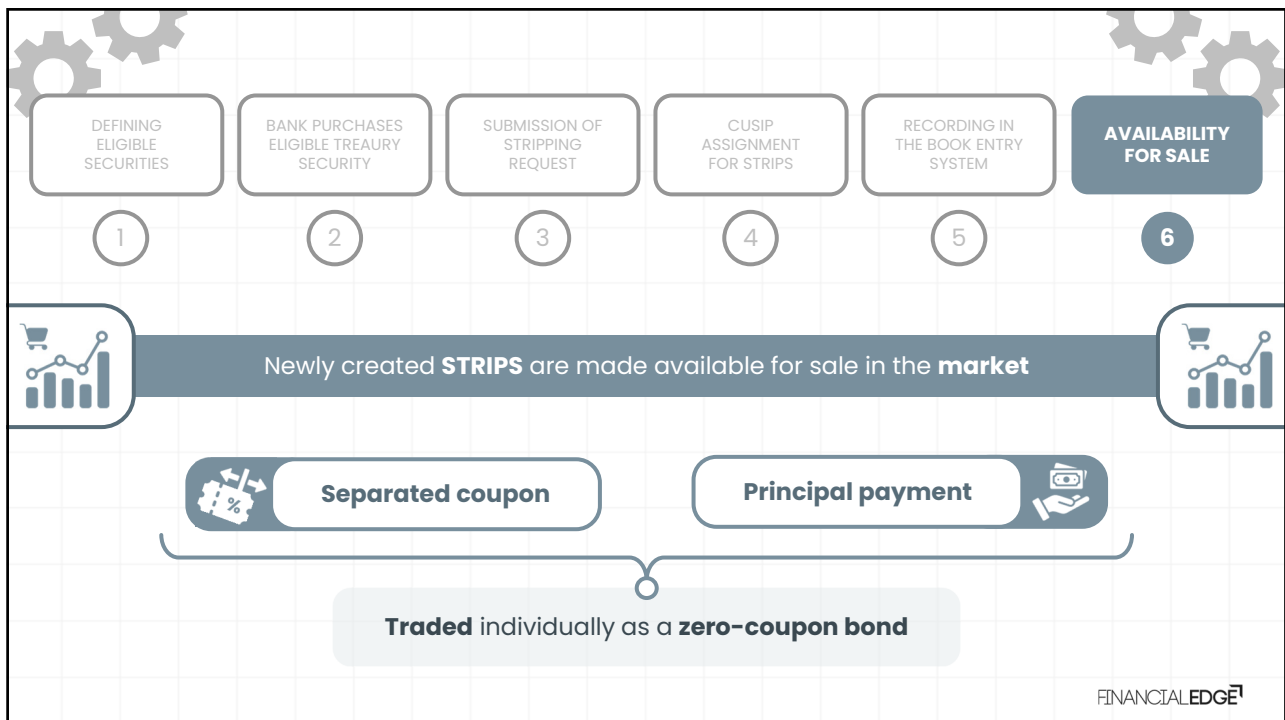
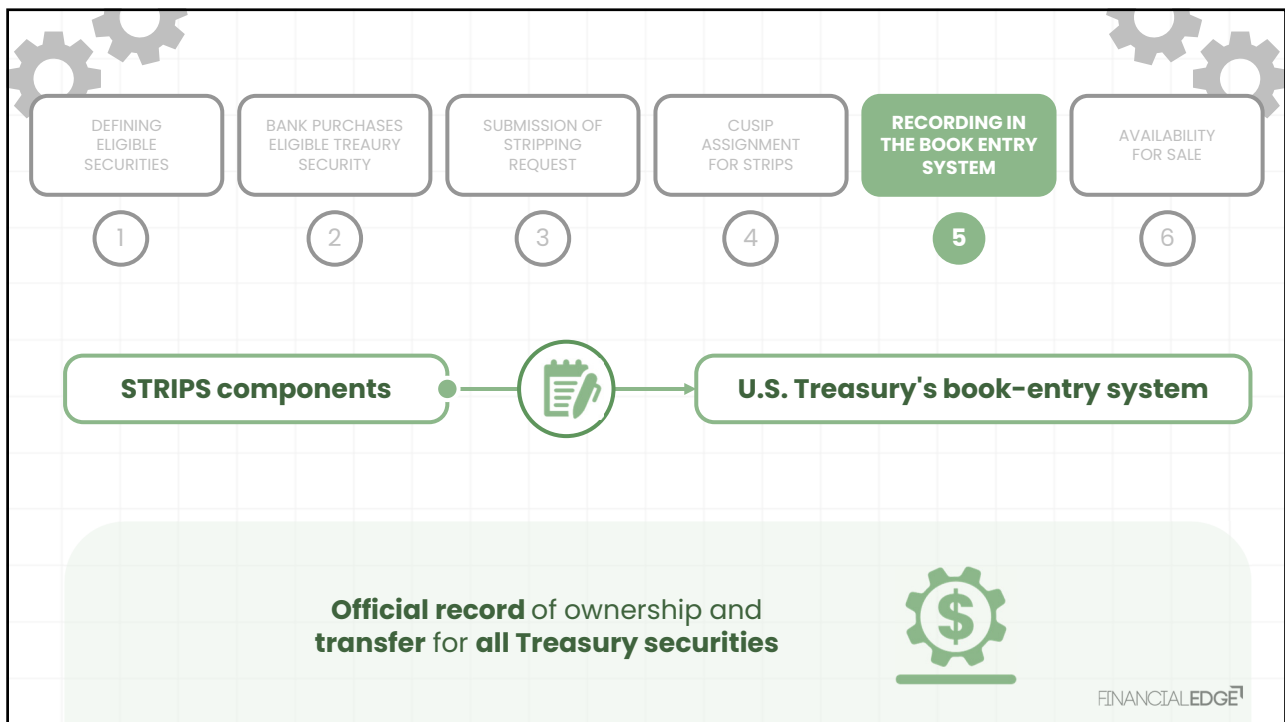


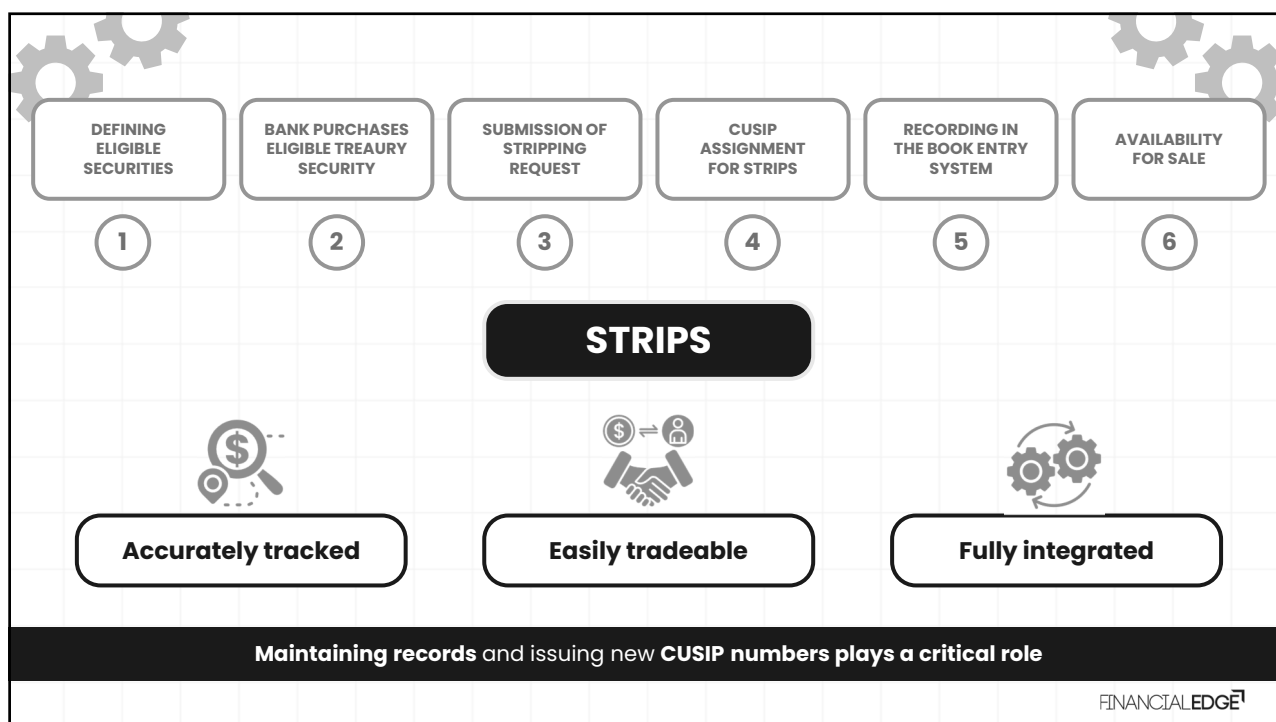
Price of the **original coupon bond**

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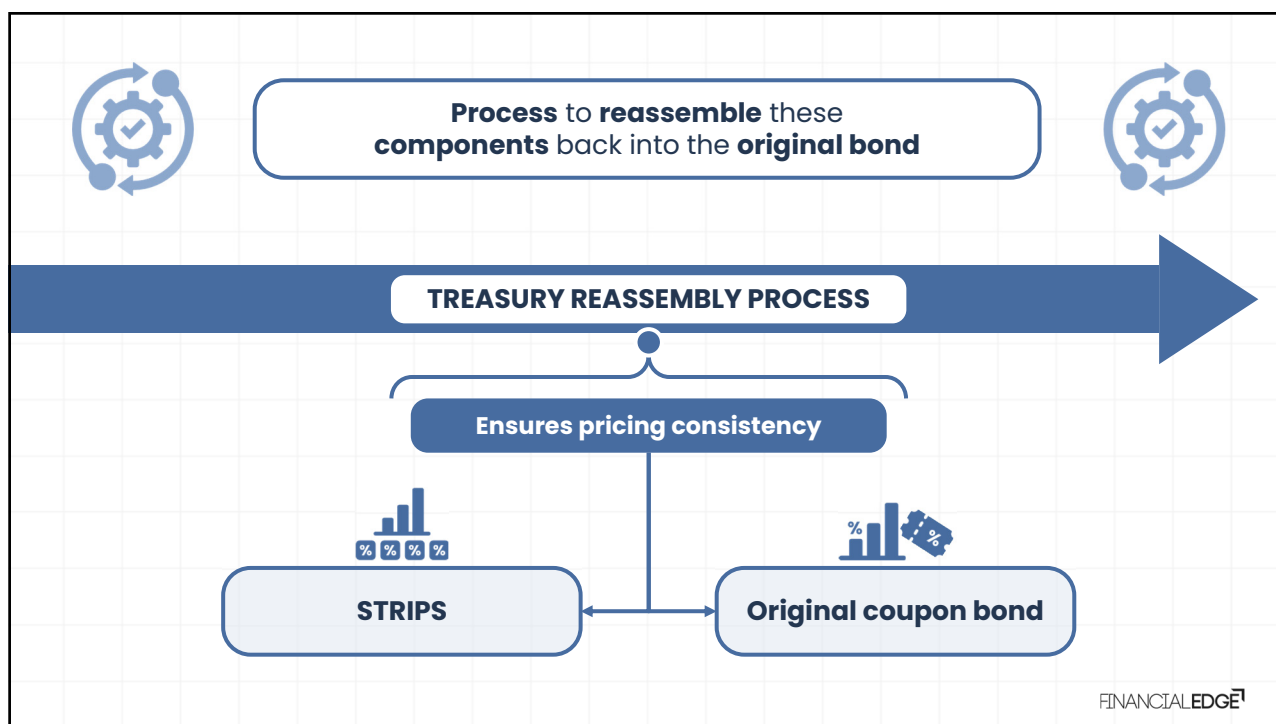


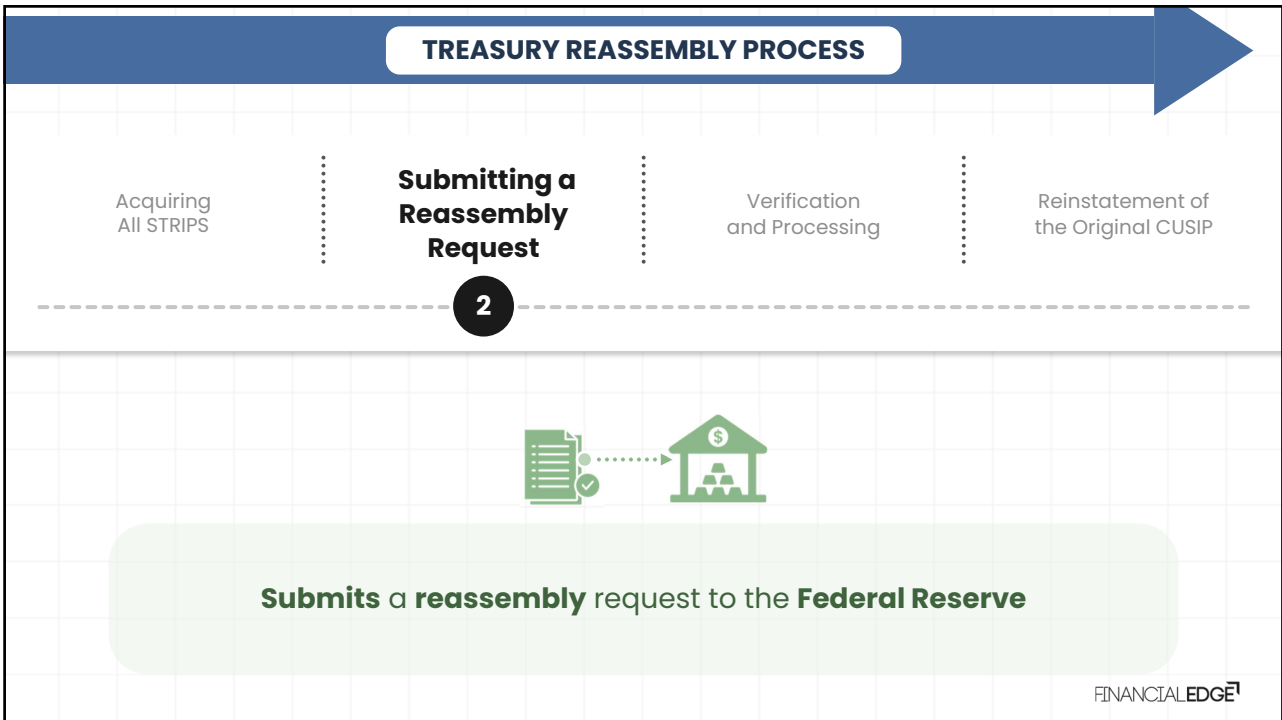
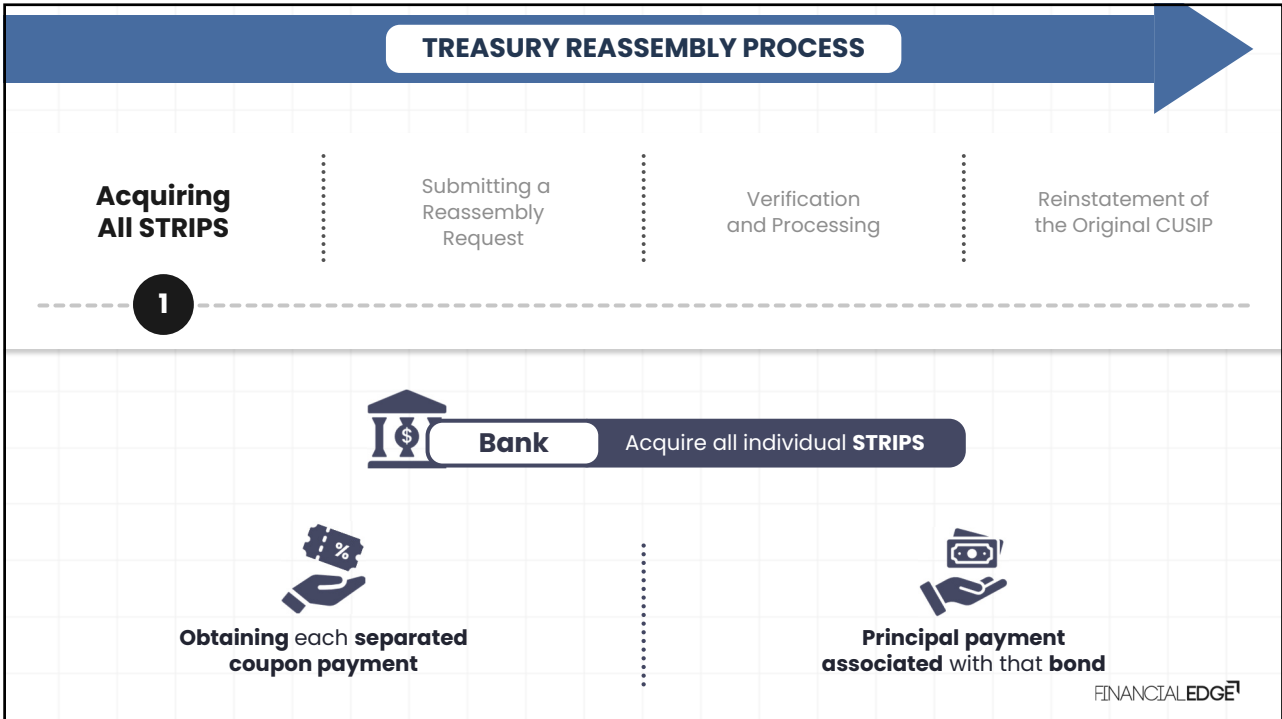


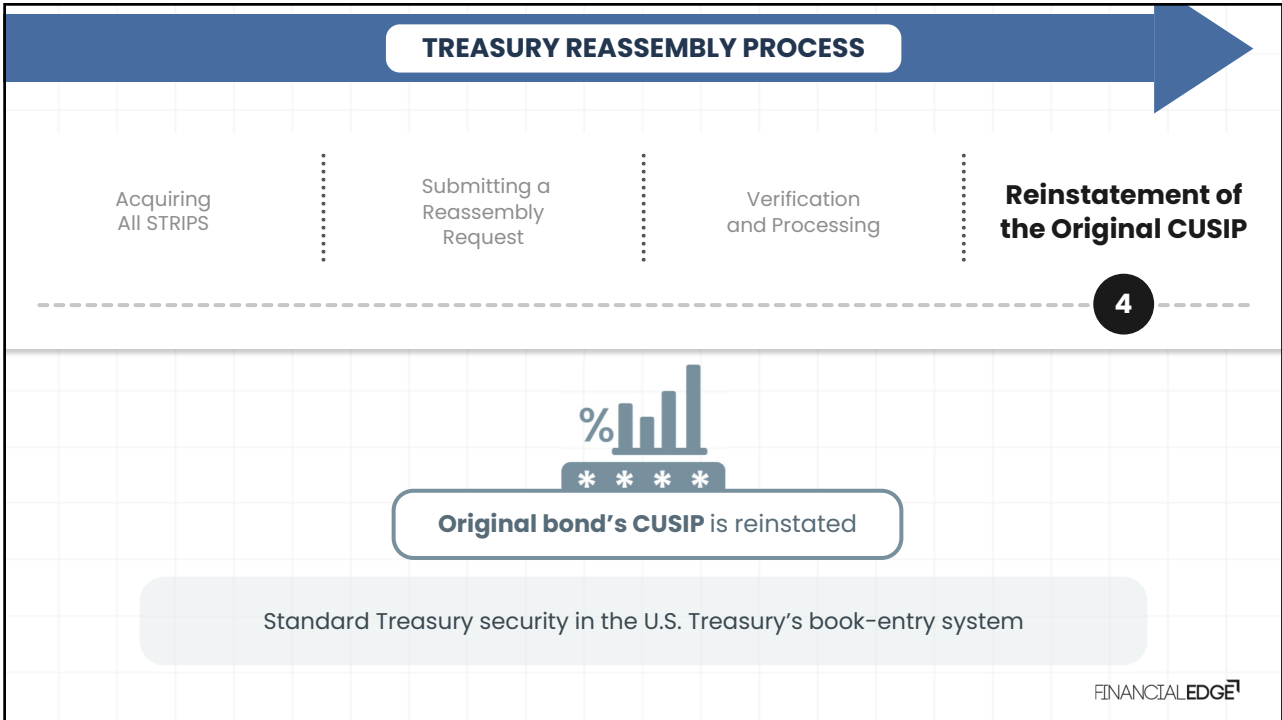
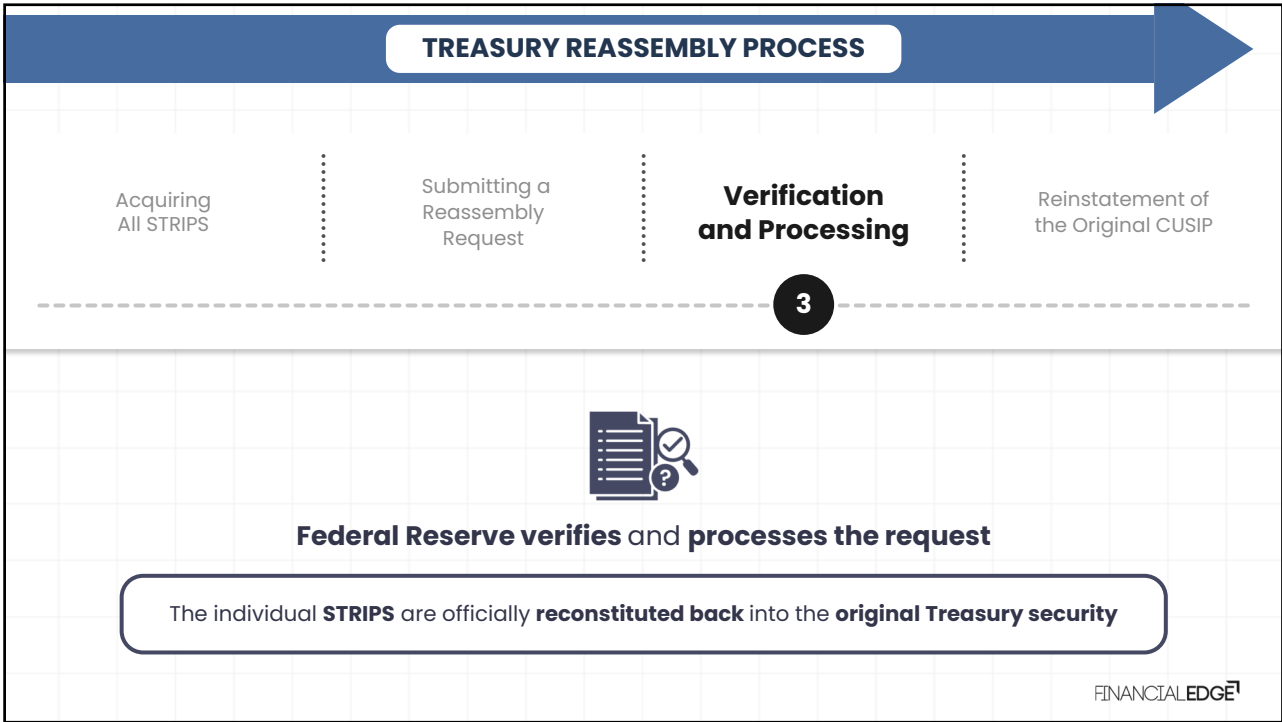
The Treasury Stripping Process – The Details

Reassembling Separate Trading of Registered Interest and Principal of Securities (STRIPS)

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Treasury Inflation-Protected Securities (TIPS)

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U.S. Treasury Bills

Notes

Bonds

STRIPS



Lack direct **inflation protection**



No guarantee of what **future inflation** will be on the **date a bond is purchased**



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Treasury Inflation-Protected Securities (TIPS)

TIPS are an **attractive option for investors** looking to **safeguard their investments**

Initial maturities of:

5

10

30



Years

Long-term inflation protection by adjusting their face value based on changes in the **Consumer Price Index (CPI)**

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"Principal-linked" bonds

Fixed coupon rate

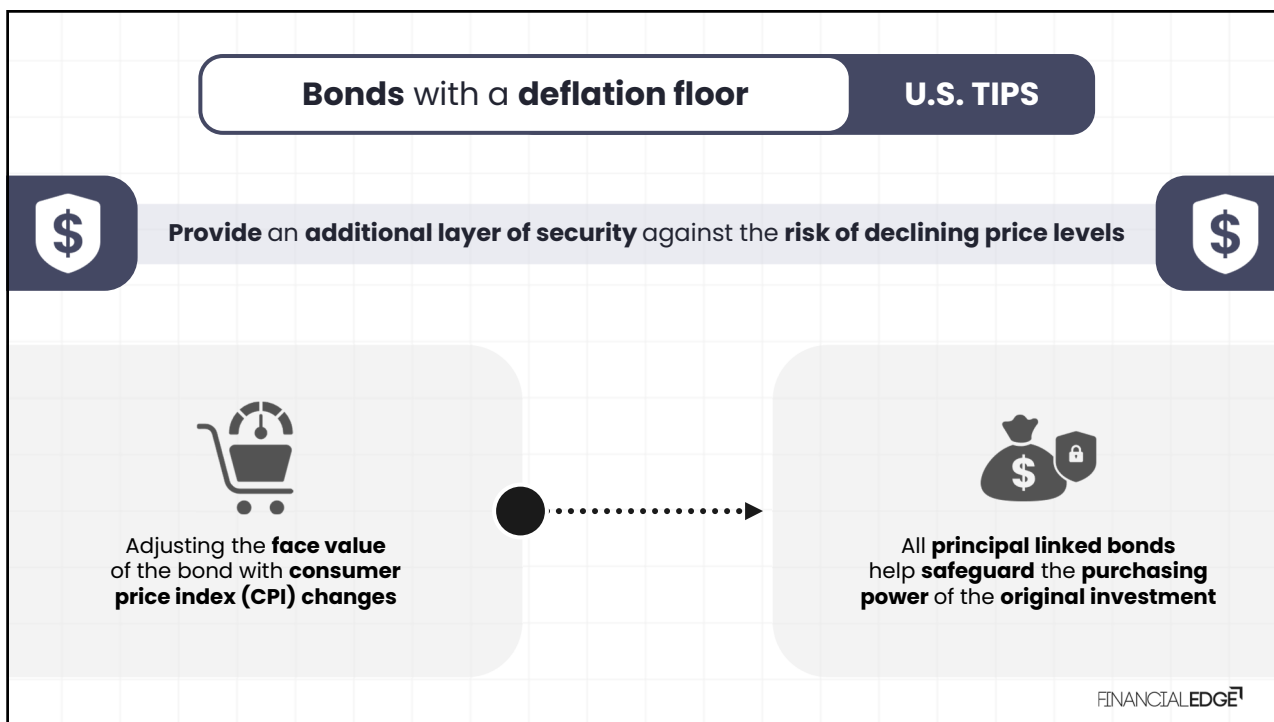
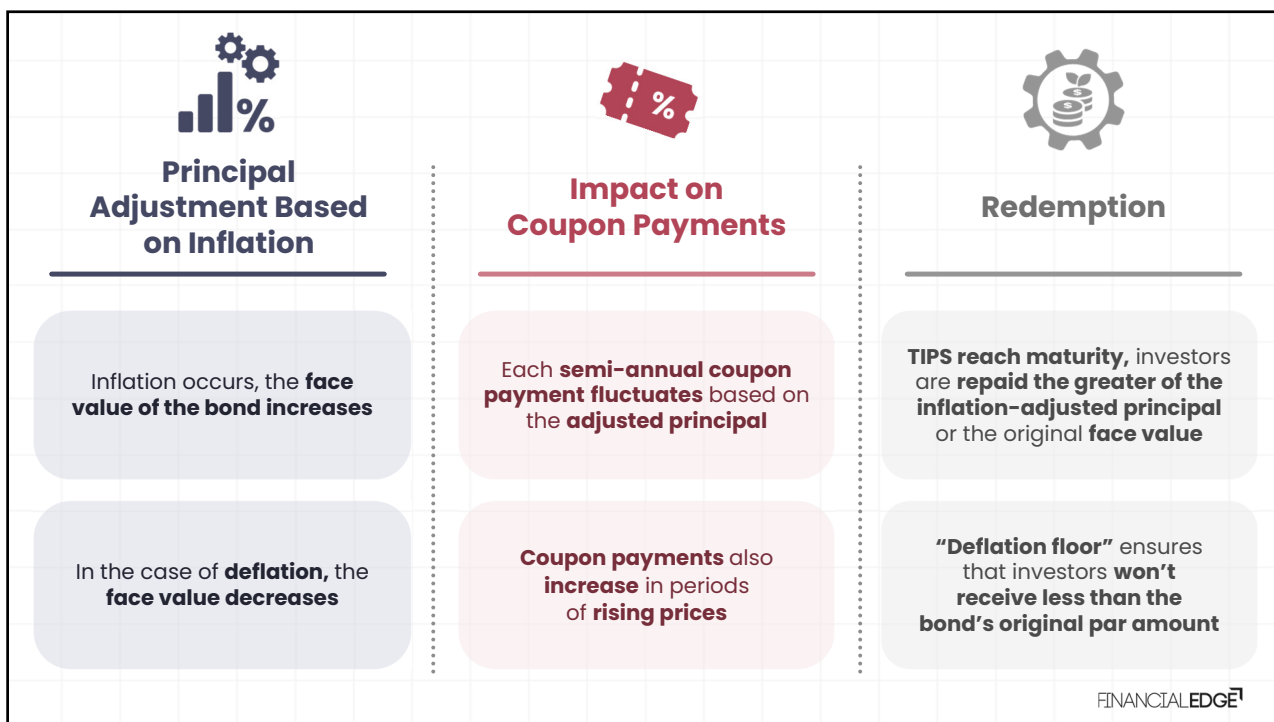


Inflation Adjustment
Second source of income



Adjustments to the bond's principal, based on changes in the **Consumer Price Index (CPI)**

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Inflation Linked Bonds – Simplified Cash Flow Example

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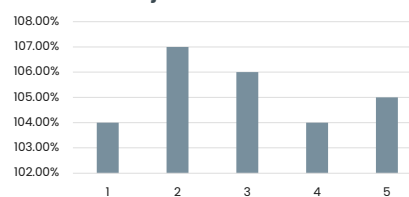
5Y principle linked inflation linked bonds, fixed annual coupon of 2%

Year:	CPI:	Implied YoY Inflation:	Principal:	Adjusted annual payment:
0	100		100.00%	
1	104	4.00%	104.00%	2.0800%
2	107	2.88%	107.00%	2.1400%
3	106	-0.93%	106.00%	2.1200%
4	104	-1.89%	104.00%	2.0800%
5	105	0.96%	105.00%	2.1000%

Inflation measurement

Payment adjustments

Adjusted face value



Adjusted coupon



5-year principal inflation-linked bond that pays a fixed coupon of 2%

FINANCIALEDGE¹

5Y principle linked inflation linked bonds, fixed annual coupon of 2%

Year:	CPI:	Implied YoY Inflation:	Principal:	Adjusted annual payment:
0	100		100.00%	
1	104	4.00%	104.00%	2.0800%
2	107	2.88%	107.00%	2.1400%
3	106	-0.93%	106.00%	2.1200%
4	104	-1.89%	104.00%	2.0800%
5	105	0.96%	105.00%	2.1000%

Year 1

Consumer Price Index (CPI)

104

Principal

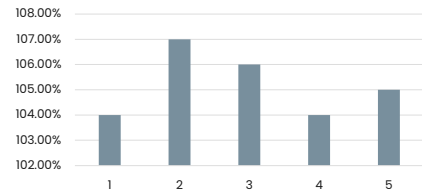
104%

First-year Coupon Payment

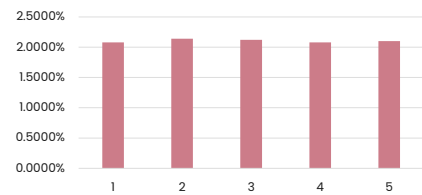
2.08%

104% x 2%

Adjusted face value



Adjusted coupon



FINANCIALEDGE¹

5Y principle linked inflation linked bonds, fixed annual coupon of 2%

Year:	CPI:	Implied YoY Inflation:	Principal:	Adjusted annual payment:
0	100		100.00%	
1	104	4.00%	104.00%	2.0800%
2	107	2.88%	107.00%	2.1400%
3	106	-0.93%	106.00%	2.1200%
4	104	-1.89%	104.00%	2.0800%
5	105	0.96%	105.00%	2.1000%

Year 2

Consumer Price Index (CPI)

107

Principal

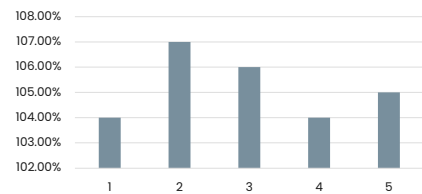
107%

Second-year Coupon Payment

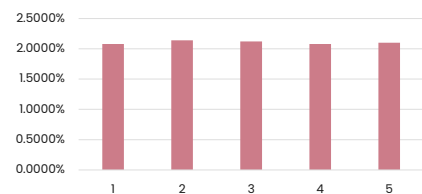
2.14%

107% x 2%

Adjusted face value



Adjusted coupon



FINANCIALEDGE¹

5Y principle linked inflation linked bonds, fixed annual coupon of 2%

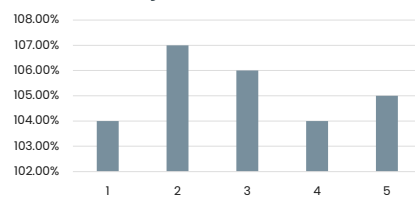
Year:	CPI:	Implied YoY Inflation:	Principal:	Adjusted annual payment:
0	100		100.00%	
1	104	4.00%	104.00%	2.0800%
2	107	2.88%	107.00%	2.1400%
3	106	-0.93%	106.00%	2.1200%
4	104	-1.89%	104.00%	2.0800%
5	105	0.96%	105.00%	2.1000%

Years 3 and 4

Deflation causes the **adjusted principal** to decrease

At **maturity** investors will receive at least the **bond's original face value**

Adjusted face value



Adjusted coupon



FINANCIALEDGE¹

5Y principle linked inflation linked bonds, fixed annual coupon of 2%

Year:	CPI:	Implied YoY Inflation:	Principal:	Adjusted annual payment:
0	100		100.00%	
1	104	4.00%	104.00%	2.0800%
2	107	2.88%	107.00%	2.1400%
3	106	-0.93%	106.00%	2.1200%
4	104	-1.89%	104.00%	2.0800%
5	105	0.96%	105.00%	2.1000%

In year 5

Consumer Price Index (CPI)

105

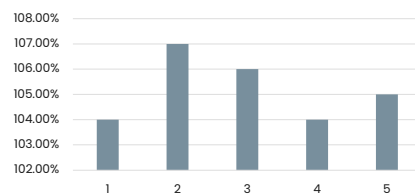
Principal

105%

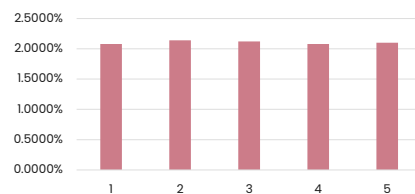
Fifth-year Coupon Payment

2.10%

Adjusted face value



Adjusted coupon



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Treasury Inflation-Protected Securities (TIPS) – The Real Yield

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REAL YIELD



Return that **investors** receive **above inflation**



TIPS

Real yield that's **effectively locked** in at the time of purchase

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Future inflation can simply be assumed to be zero

REAL YIELD ON TIPS

Real risk-free rate



Various risk premia

TIPS

U.S. government bonds

Low credit risk

Investors may demand **compensation** for:

Locking in funds over longer terms

Term premium

Challenges in trading TIPS due to lower market liquidity compared to nominal Treasuries

Liquidity premium

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How is the “**Real yield**” calculated?

Real yield on a TIPS bond

Yield-to-maturity (YTM) formula

FINANCIALEDGE¹

For our example **bond** the **real yield** at the time was **2.146%**

Real Yield calculation

TIPS - market price

98%

Inflation-adjusted principal

100%



Bond's fixed coupon payments



Investors are effectively **purchasing the bond** at a **lower price** relative to its **adjusted principal**

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Break-Even Inflation

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Break-even Inflation Rate

YIELD

Regular **non-inflation linked Treasury bond**

REAL YIELD

Comparable **TIPS bond**



Inflation rate

Investor would be **indifferent between:**

Holding a **nominal Treasury bond**

Holding a **TIPS**



FINANCIALEDGE¹

Nominal yield of 4% Feb 2054 Treasury:

4.502%

Real yield of Jan 2054 TIPS:

2.146%

Break-Even Inflation:

2.356%



Bond markets expects:

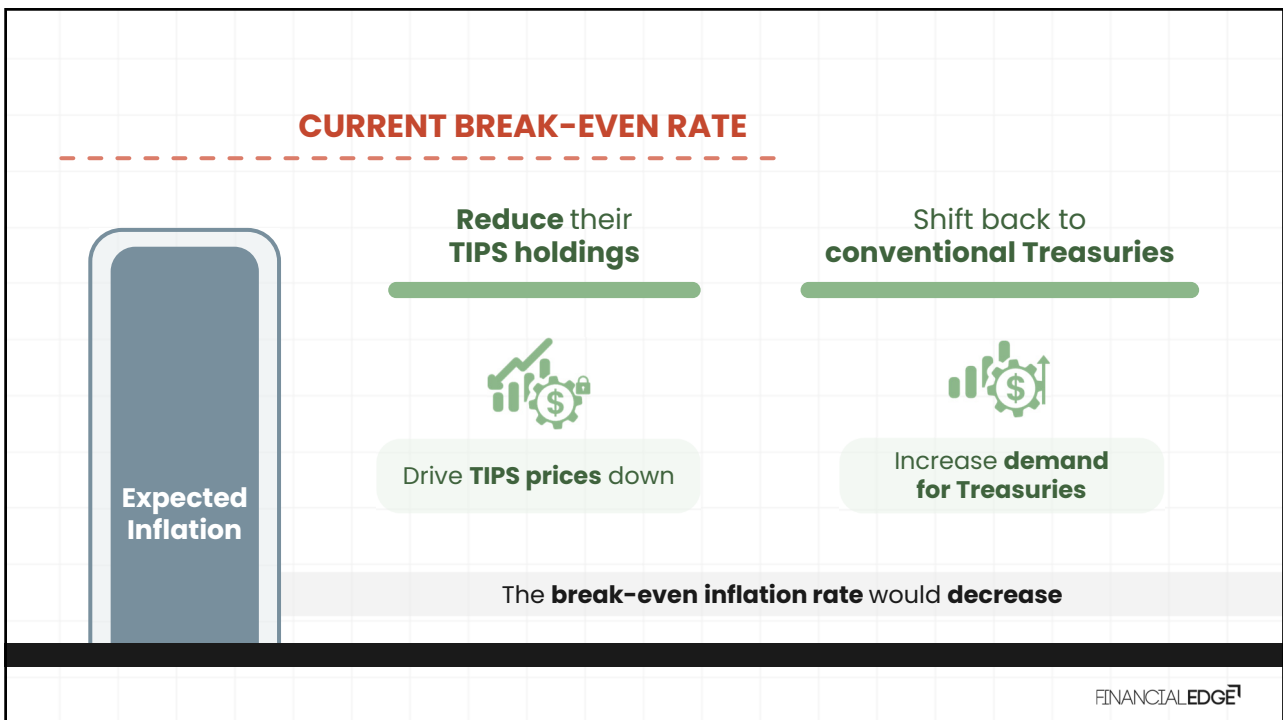
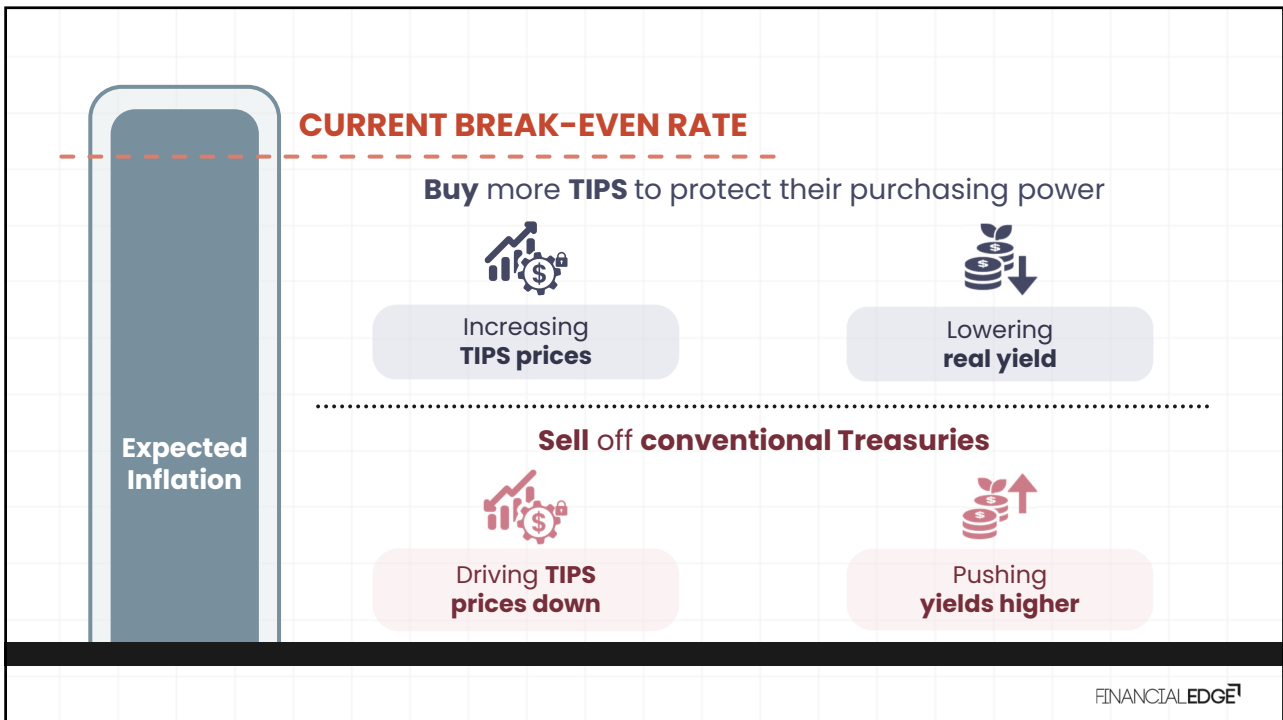
Inflation to be **2.356%**

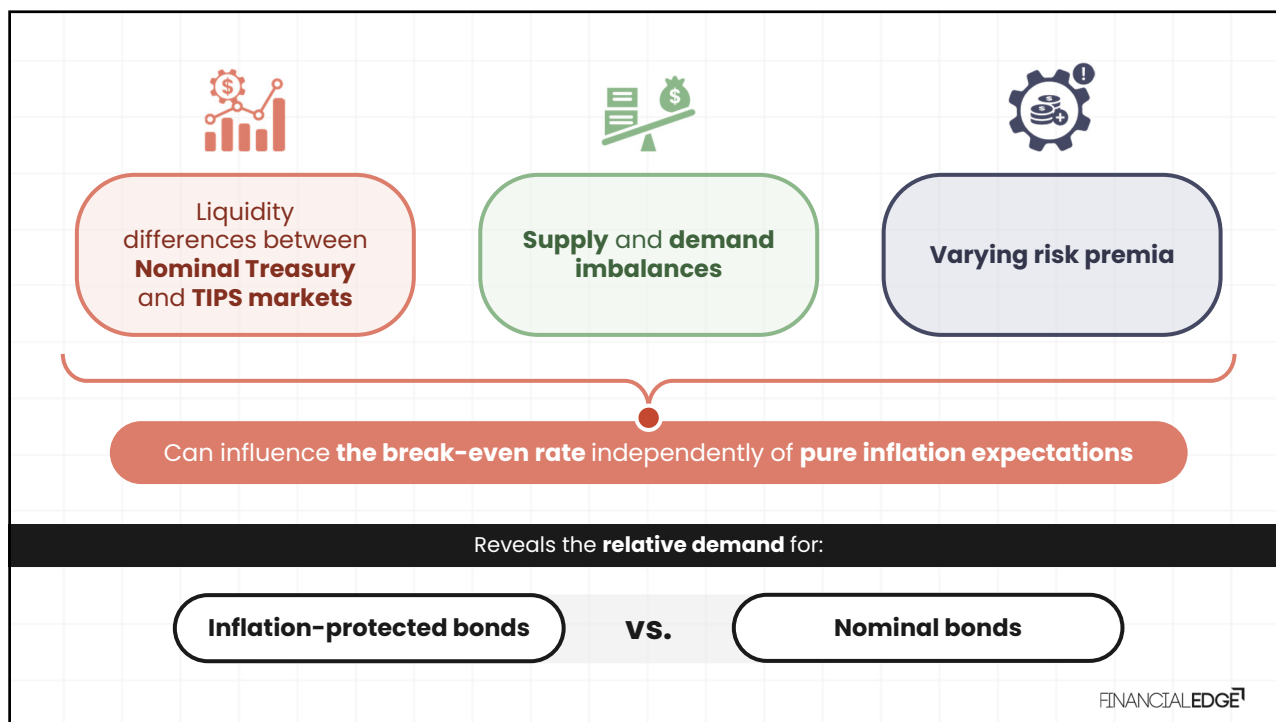
Over the time to maturity on the **bonds**

If expected inflation were zero

Nominal yield on the fixed coupon bond would be **2.146%**

FINANCIALEDGE¹





Non-US Government Bond Market Examples

