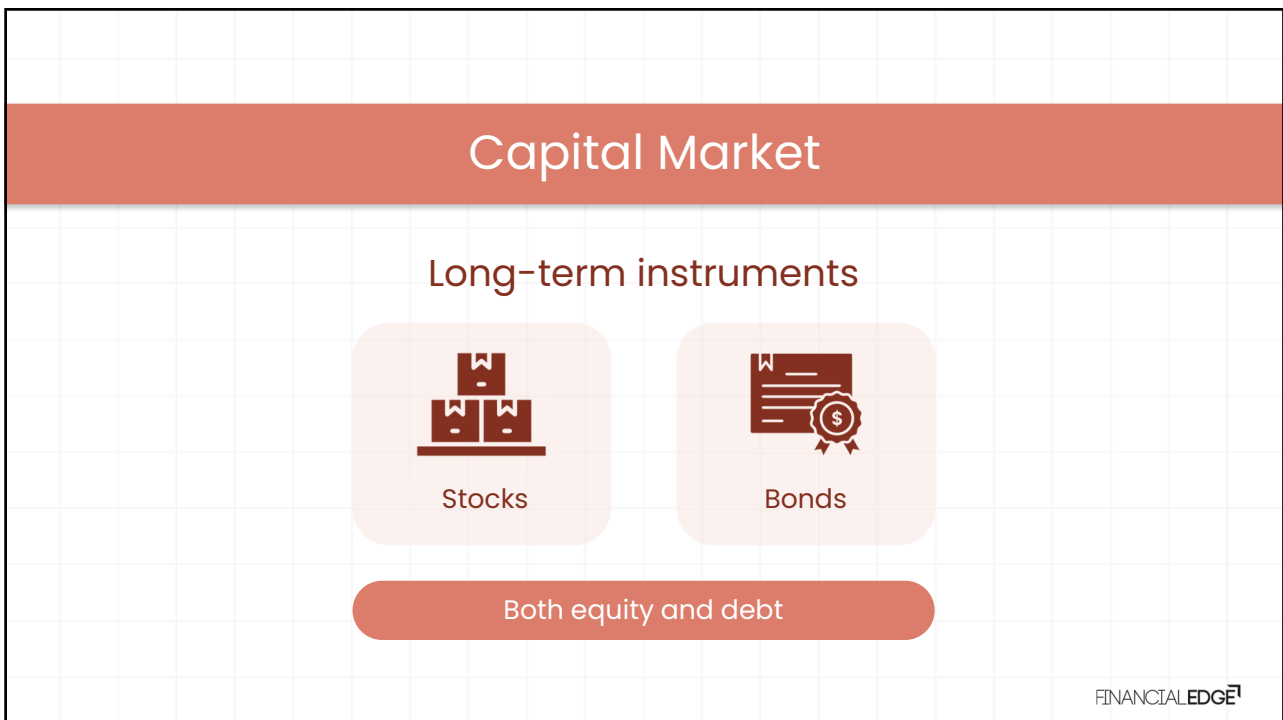
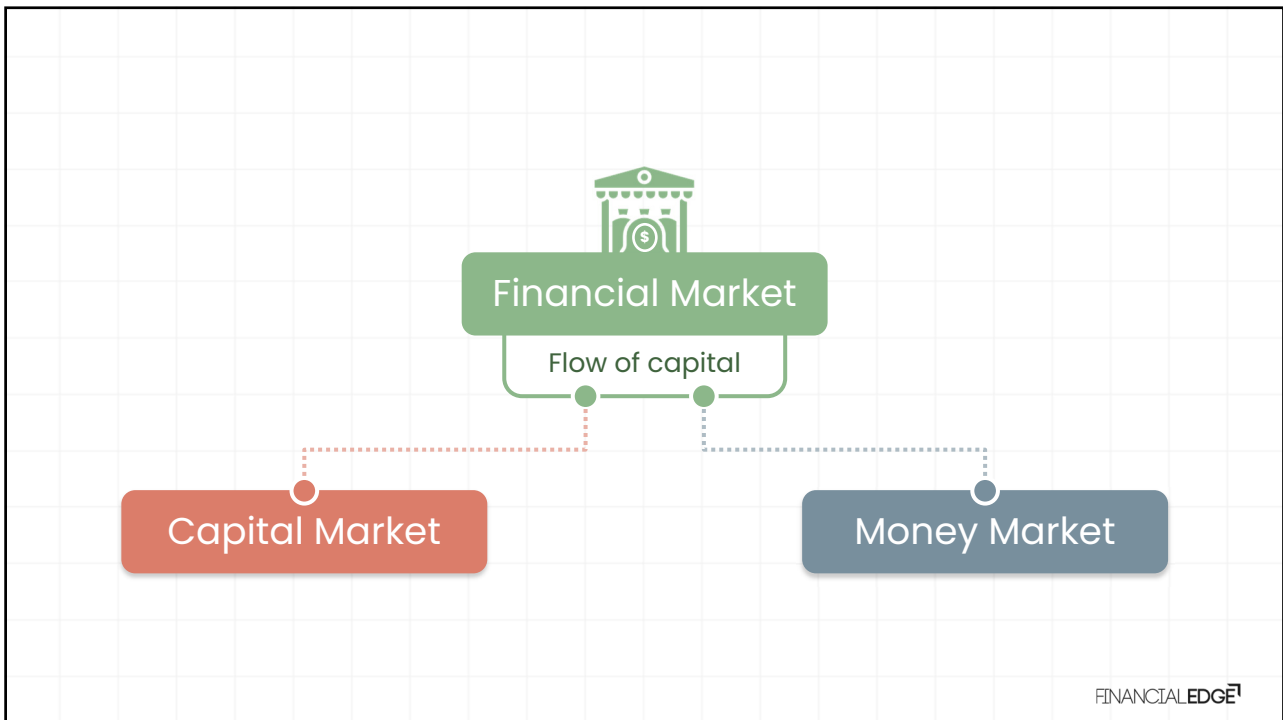


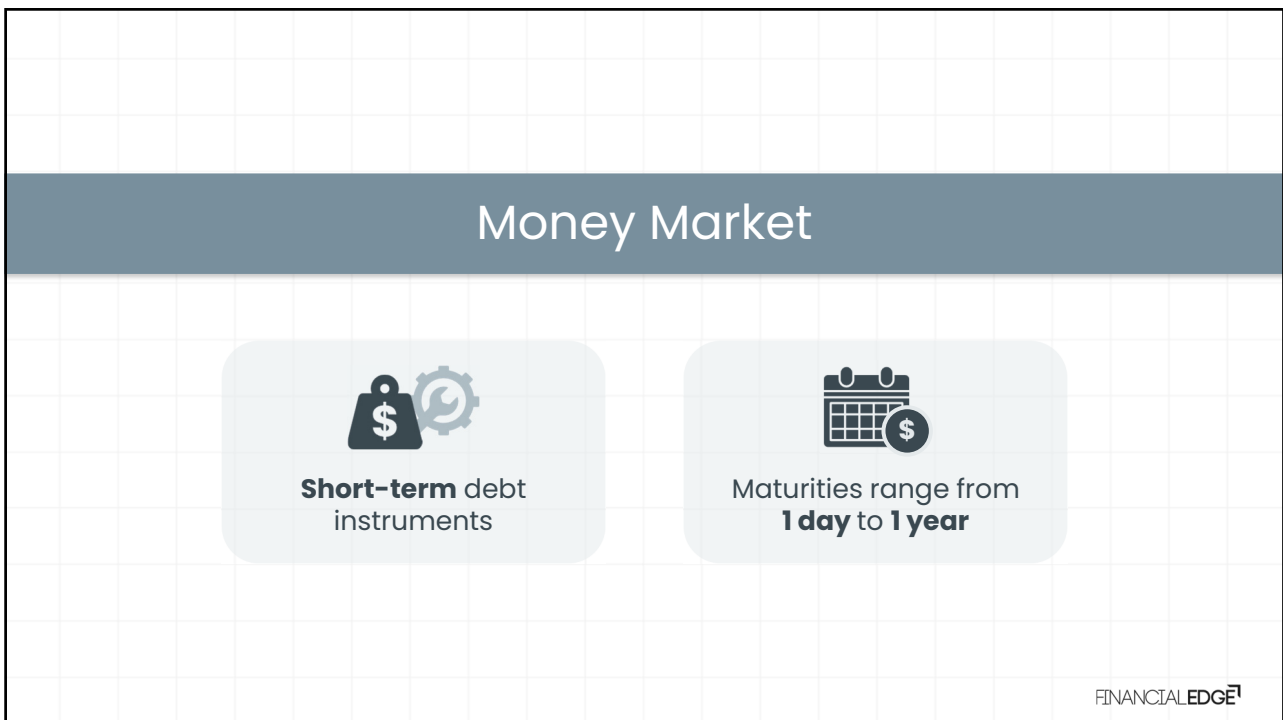
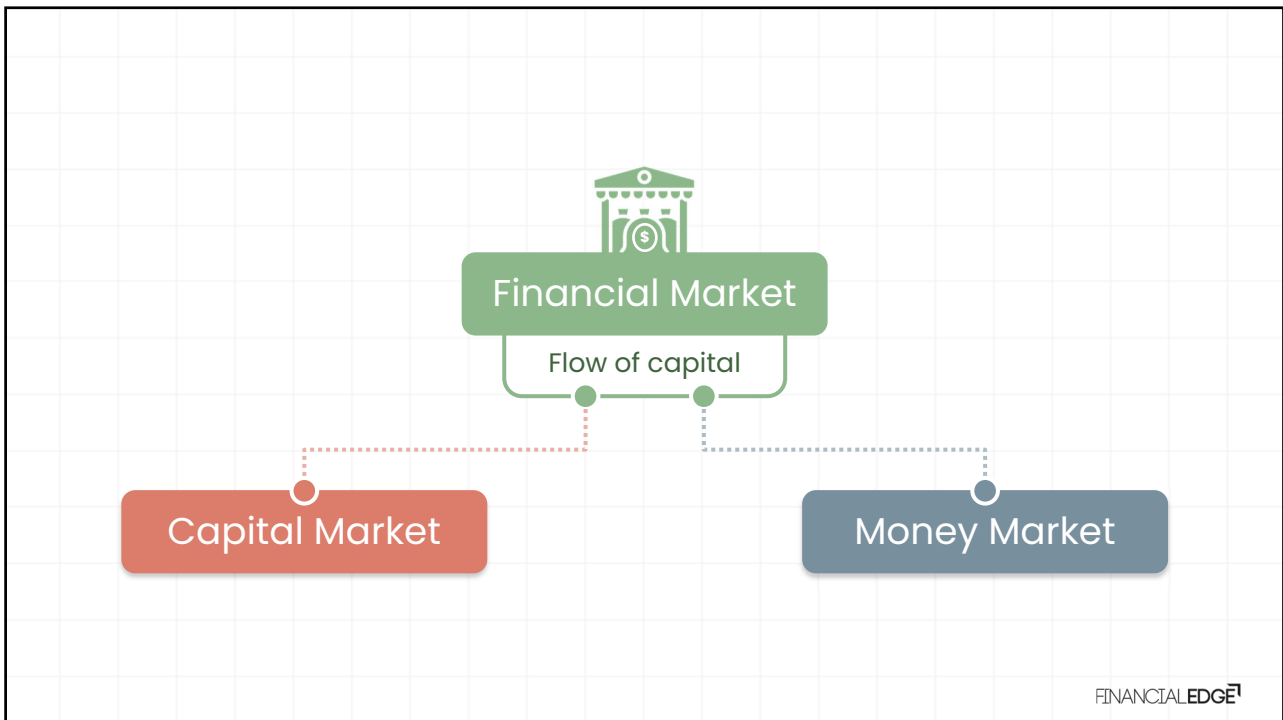


Money Market



Money Market Overview





Money Market Instruments

Pay interest at maturity



\$100 million USD
for **6 months**



Principal returned plus **interest**
at the end of the **6-month period**



Simple **interest**
calculations apply



Amount of interest = notional * interest rate * $\frac{\text{days}}{\text{basis}}$



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Day count conventions that
apply in **money markets**



ACT/360

Number of days between the start and
maturity of the investment is divided by 360

ACT/365

Divides the actual days by 365



\$100M invested at **5%** from 12/01/2024 to 12/02/2024

ACT/360

\$430,555.56

ACT/365

\$424,657.53

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Money Market Participants

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Who participates in the money markets?



Money markets - 'Plumbing' of the **financial system**



Financial
institutions



Businesses



Governments

Money markets maintain the **flow of liquidity**

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Why are **well-functioning money markets** so **essential**?

Short-term
borrowing

Cash
management

Short-term
investment



Banks



Non-financial
corporations



Governments



Mutual and
pension funds



Central banks

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Banks



Daily payment obligations

Hold a certain amount of **cash**
or **liquidity** as a **reserve**



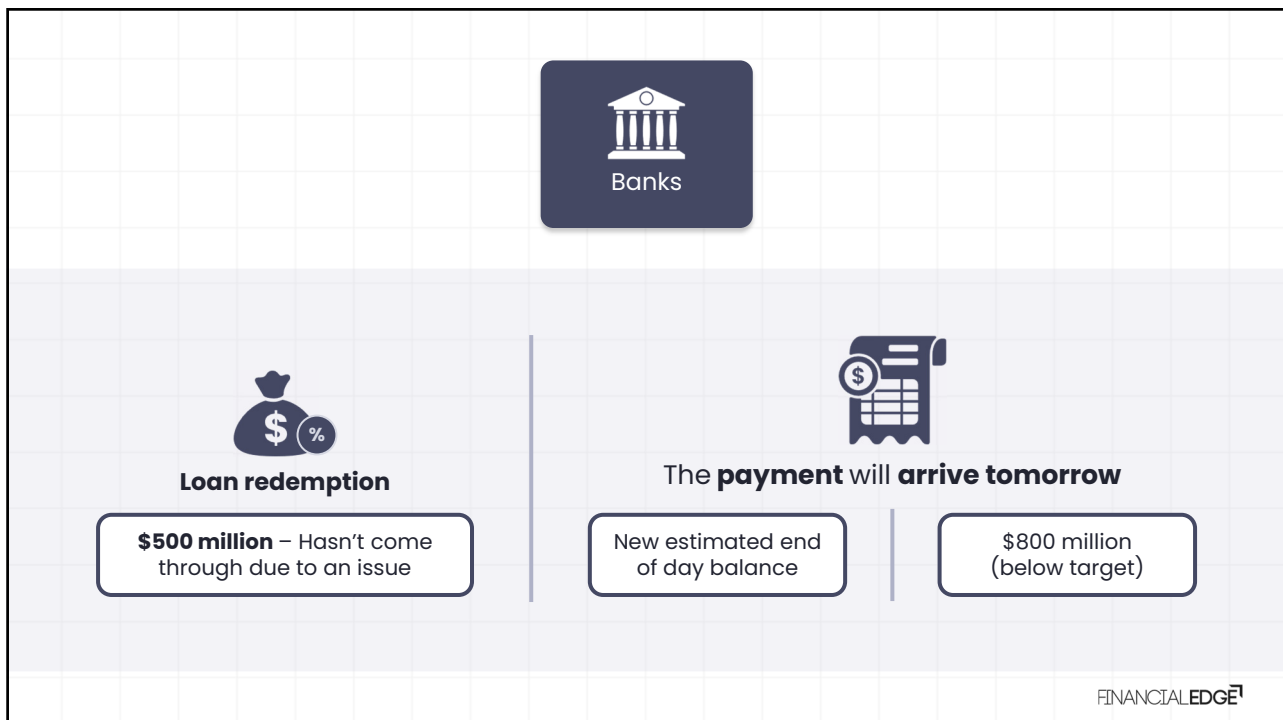
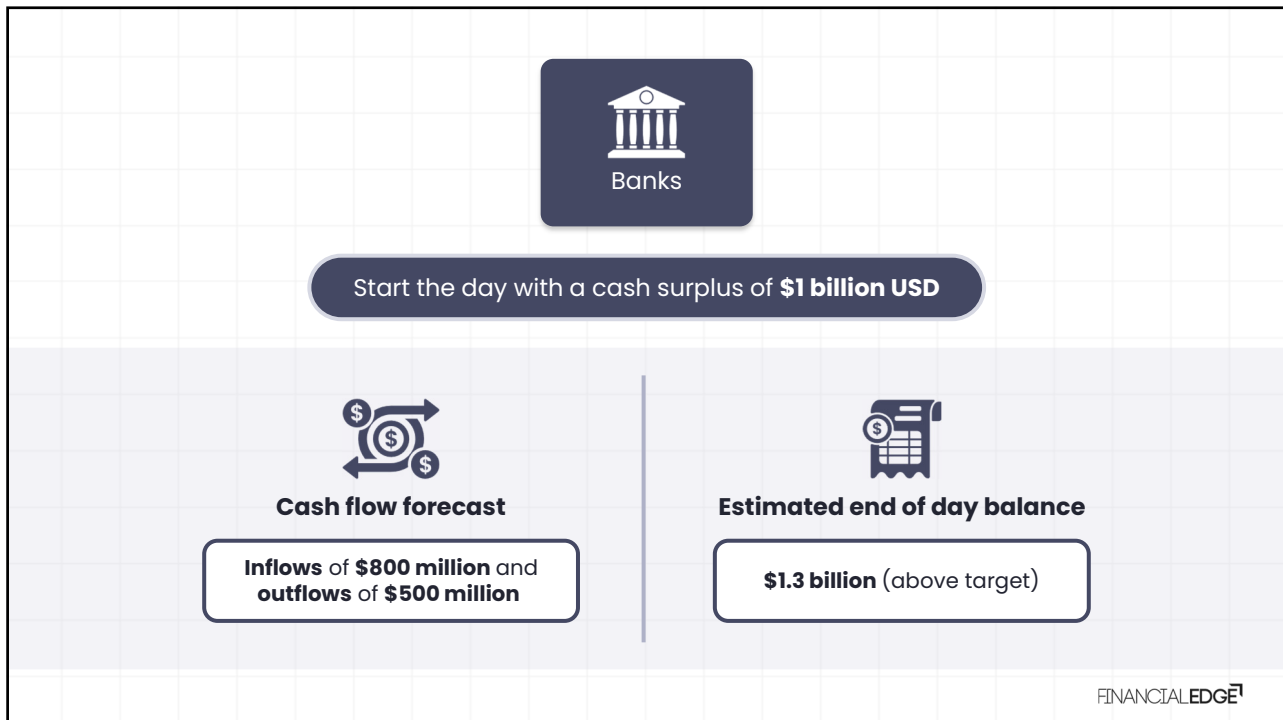
Keeping too much cash

Not ideal since it
earns **little return**

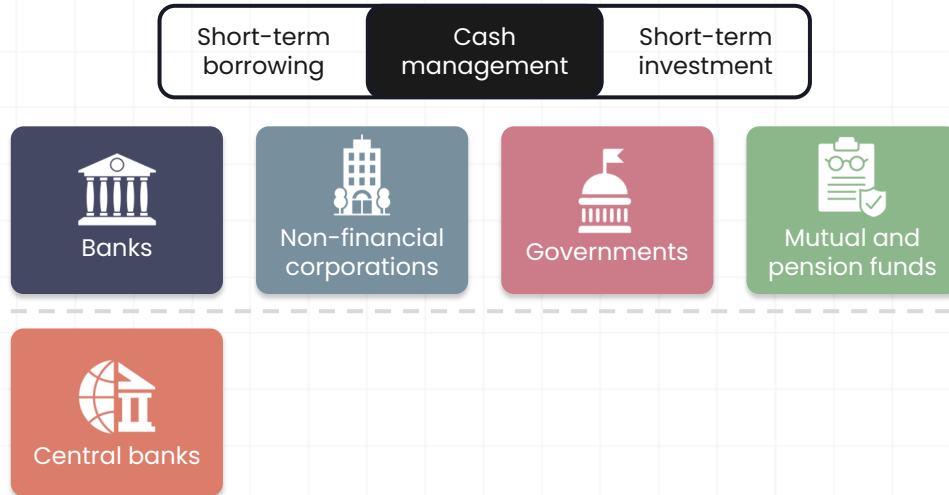


Hold as little as possible,
but as much as **necessary**

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Why are **well-functioning money markets** so **essential**?

FINANCIALEDGE⁷

Governments issue bonds

Preset schedule

Use **T-Bills** (T-Bills) to
fine-tune cash needs

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Why are **well-functioning money markets** so **essential**?

Short-term
borrowing

Cash
management

Short-term
investment



Banks



Non-financial
corporations



Governments



Mutual and
pension funds



Central banks

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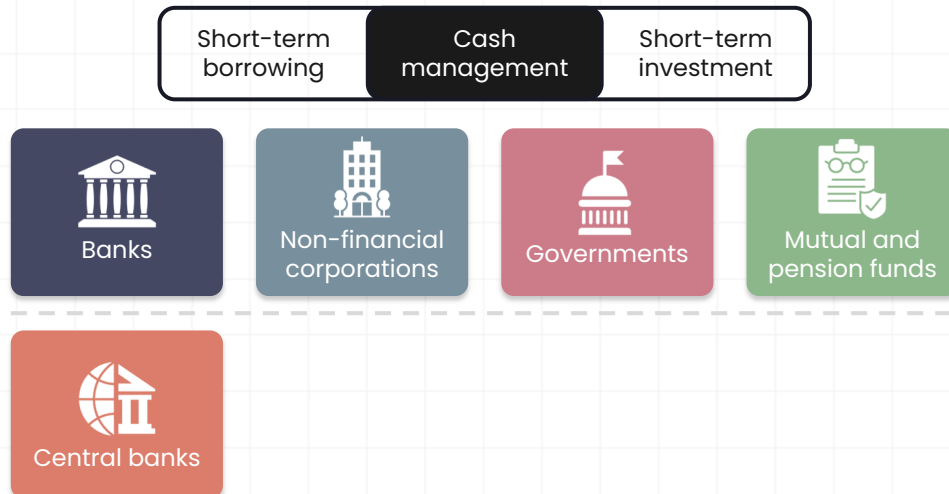
Mutual and
pension funds



Short-term investment

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Why are **well-functioning money markets** so **essential**?

FINANCIALEDGE⁷

Monetary policy

A central bank sets **short-term interest rates** or **conducts open market operations**

The effects are **transmitted through money markets** to influence broader **financial conditions**

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Why are **well-functioning money markets** so **essential**?

Short-term
borrowing

Cash
management

Short-term
investment



Banks



Non-financial
corporations



Governments



Mutual and
pension funds



Central banks

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Money market rates serve as a reference
rate for **various financial instruments**

Influence payments on:



Loans



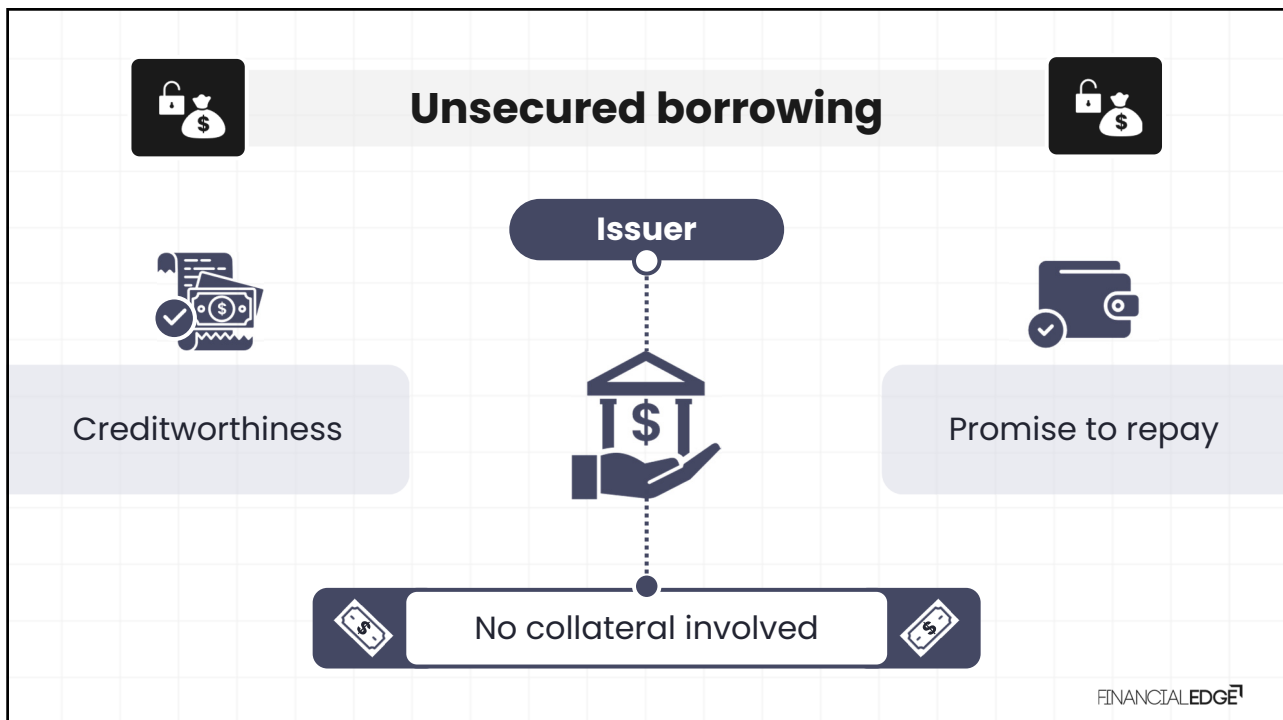
Mortgages






Interest rate derivatives







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Unsecured Money Market Cash Products

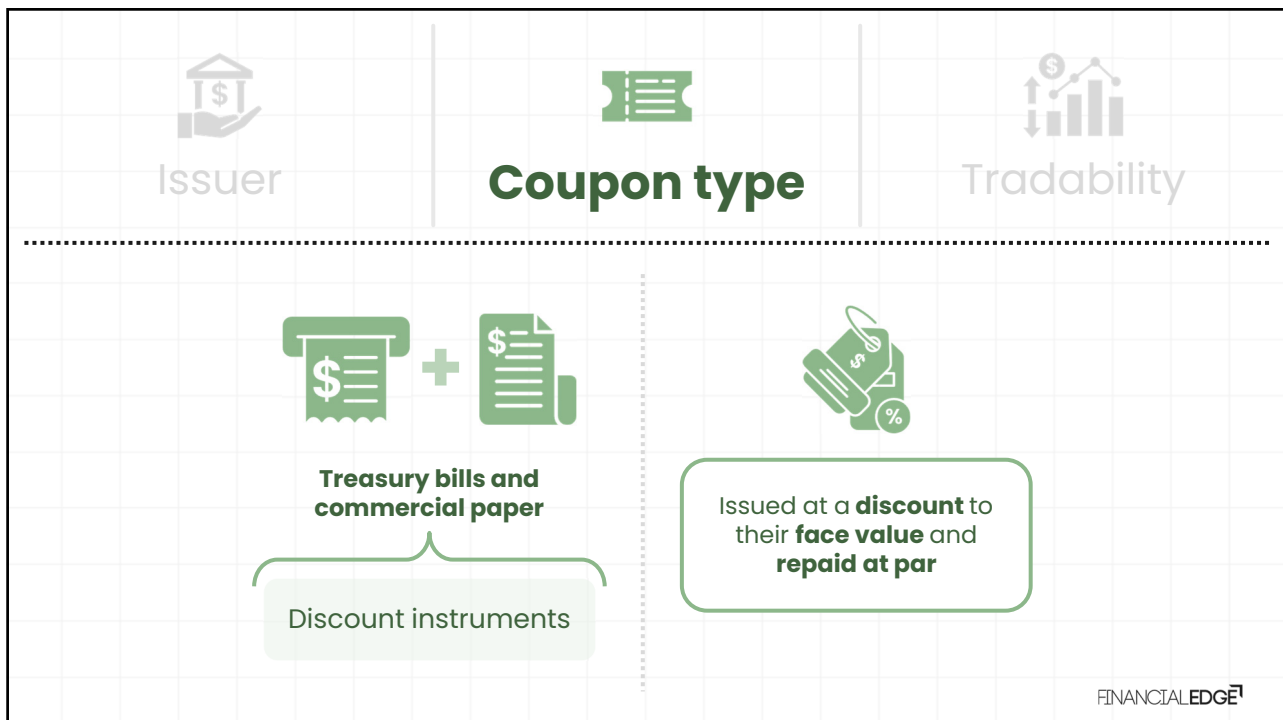
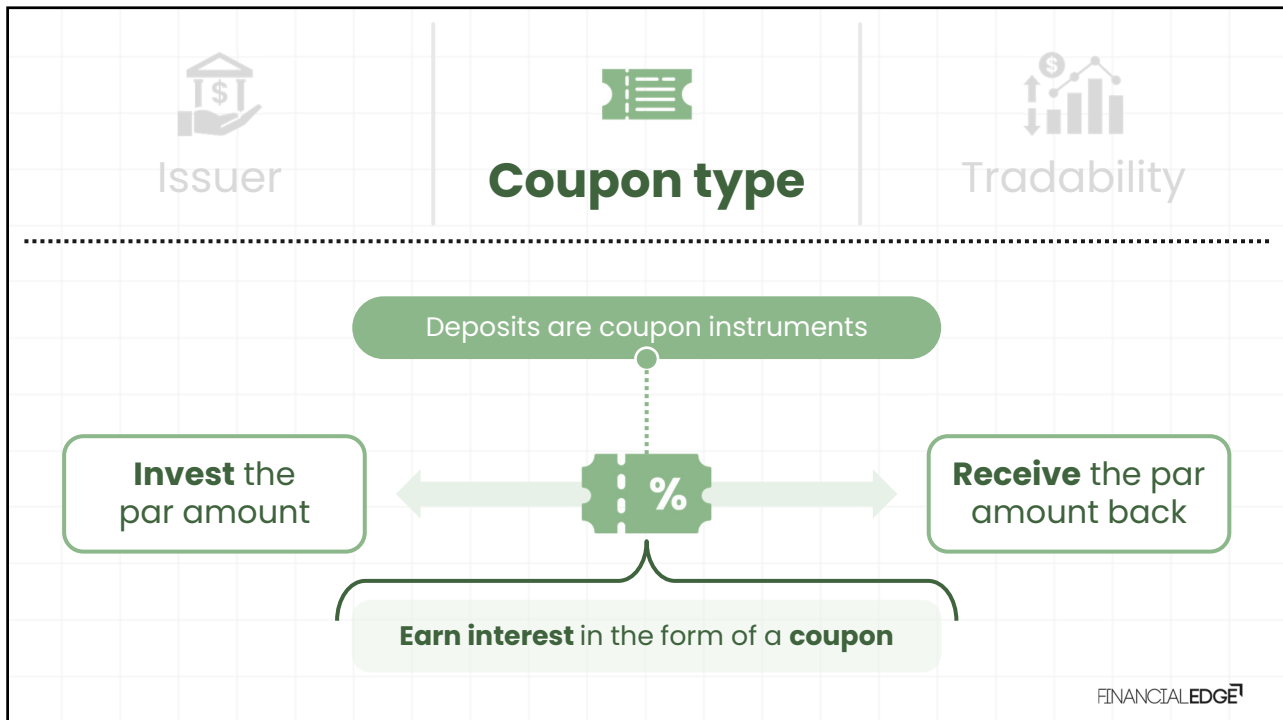
FINANCIALEDGE⁷

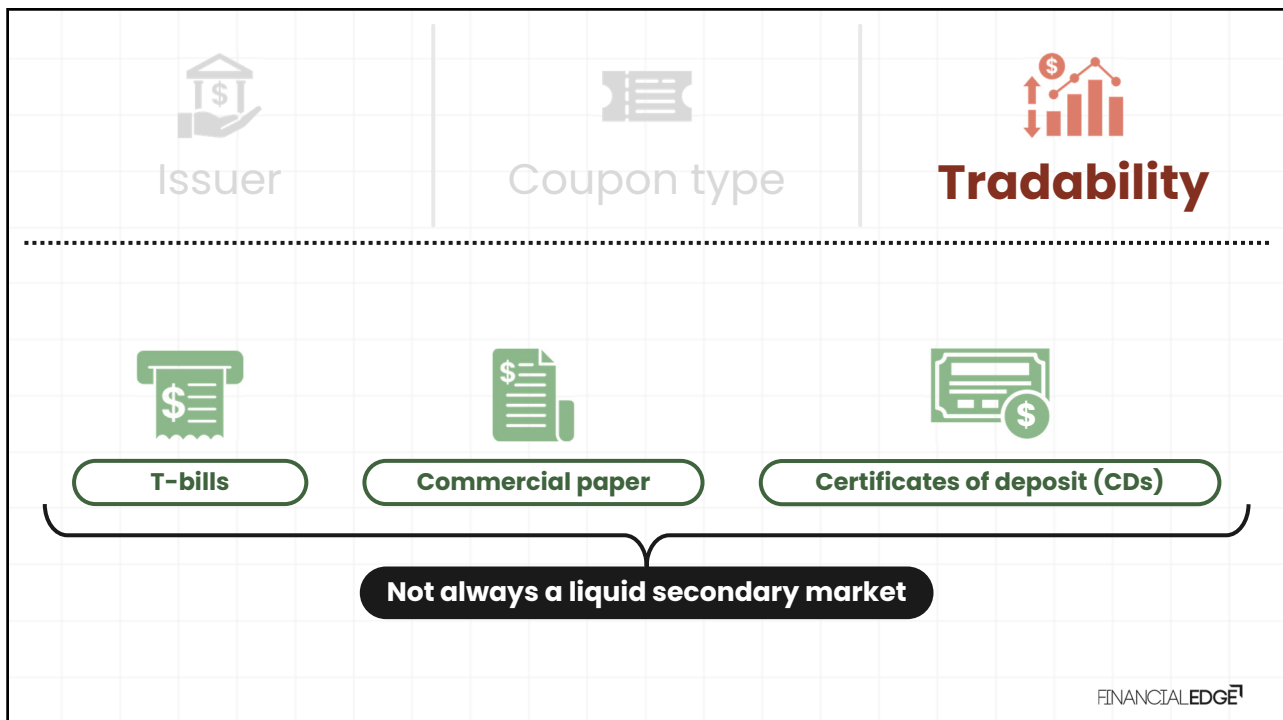
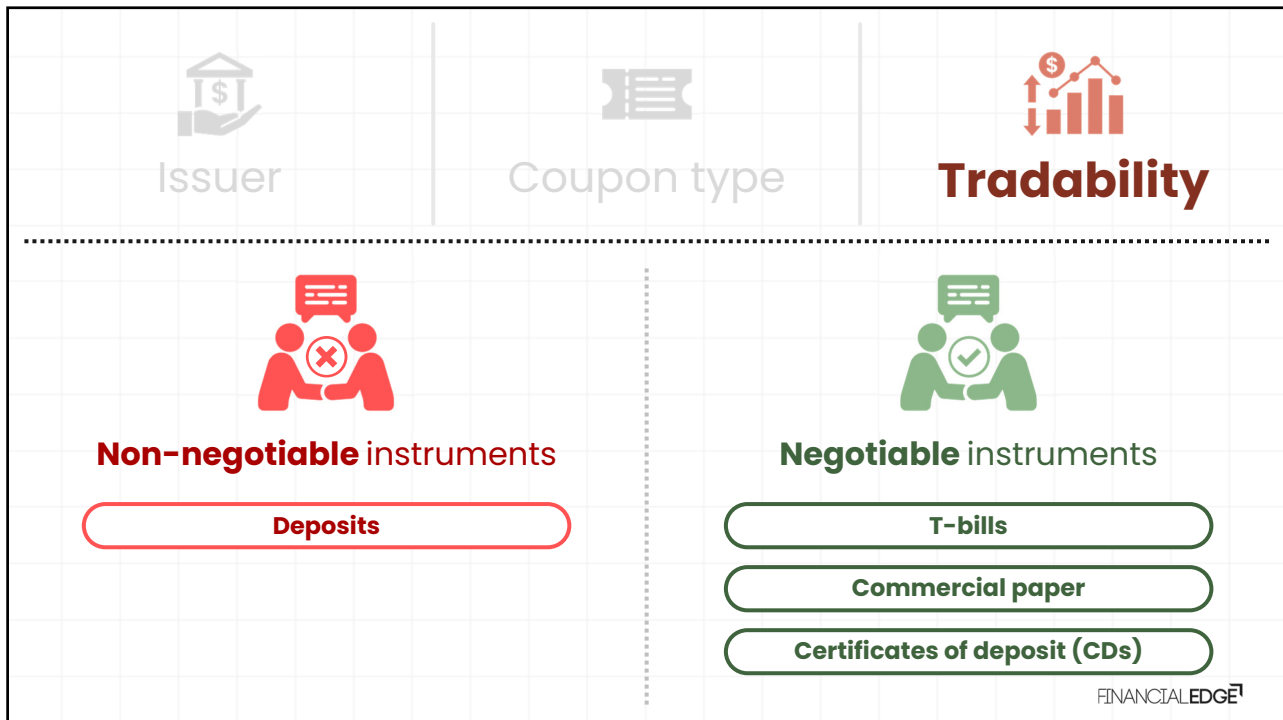
 Issuer	 Coupon type	 Tradability

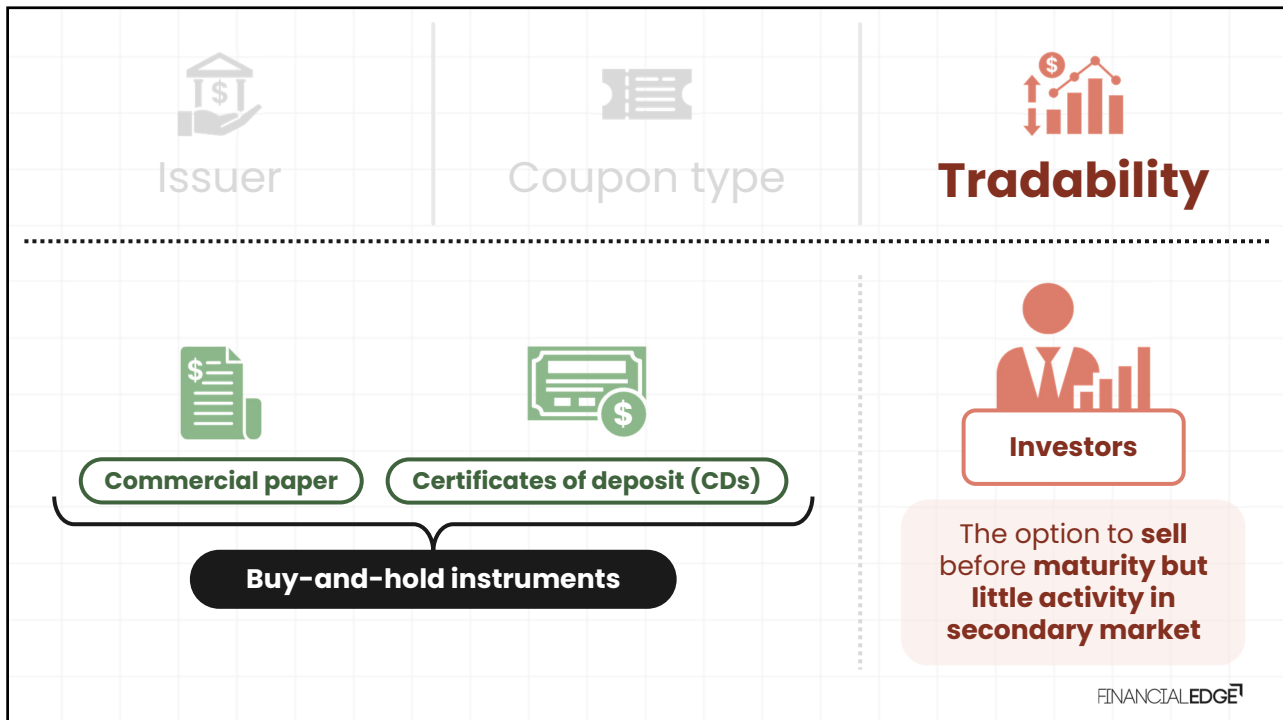
FINANCIALEDGE⁷

 Issuer	 Coupon type	 Tradability
 Deposits are bank-issued instruments	 T-bills are issued by governments	 Commercial paper (CP) is issued by corporations

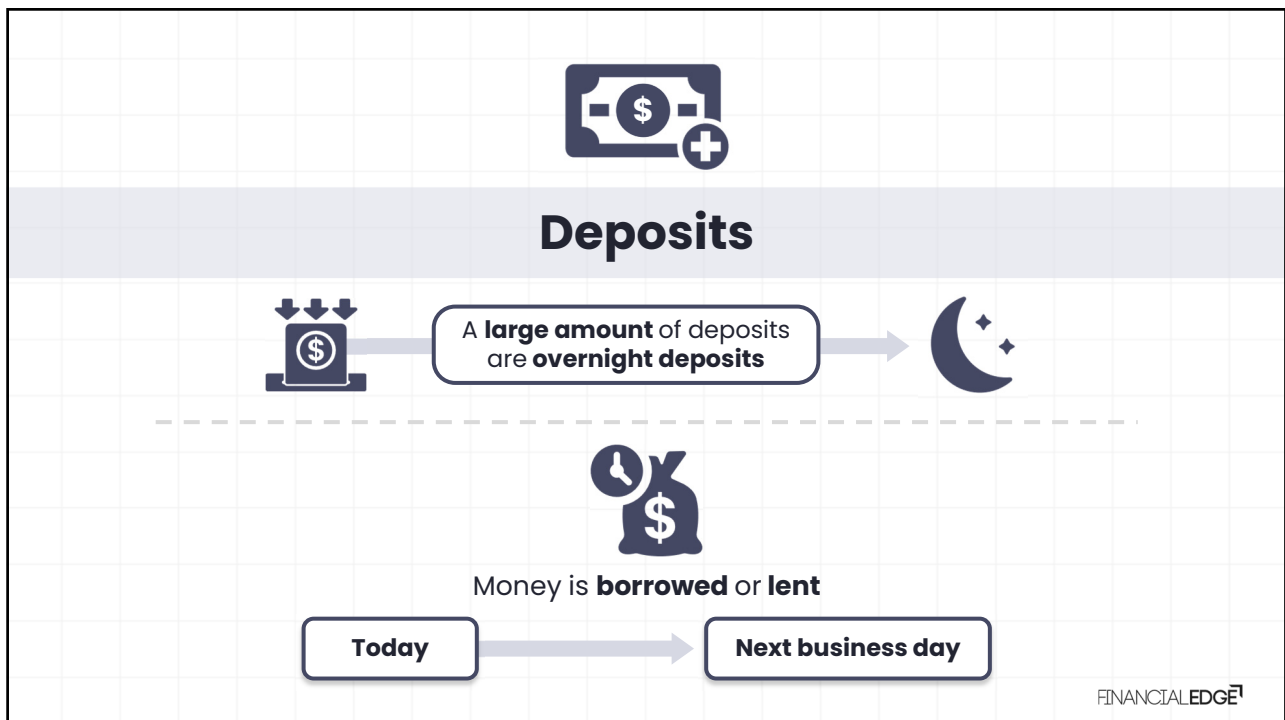
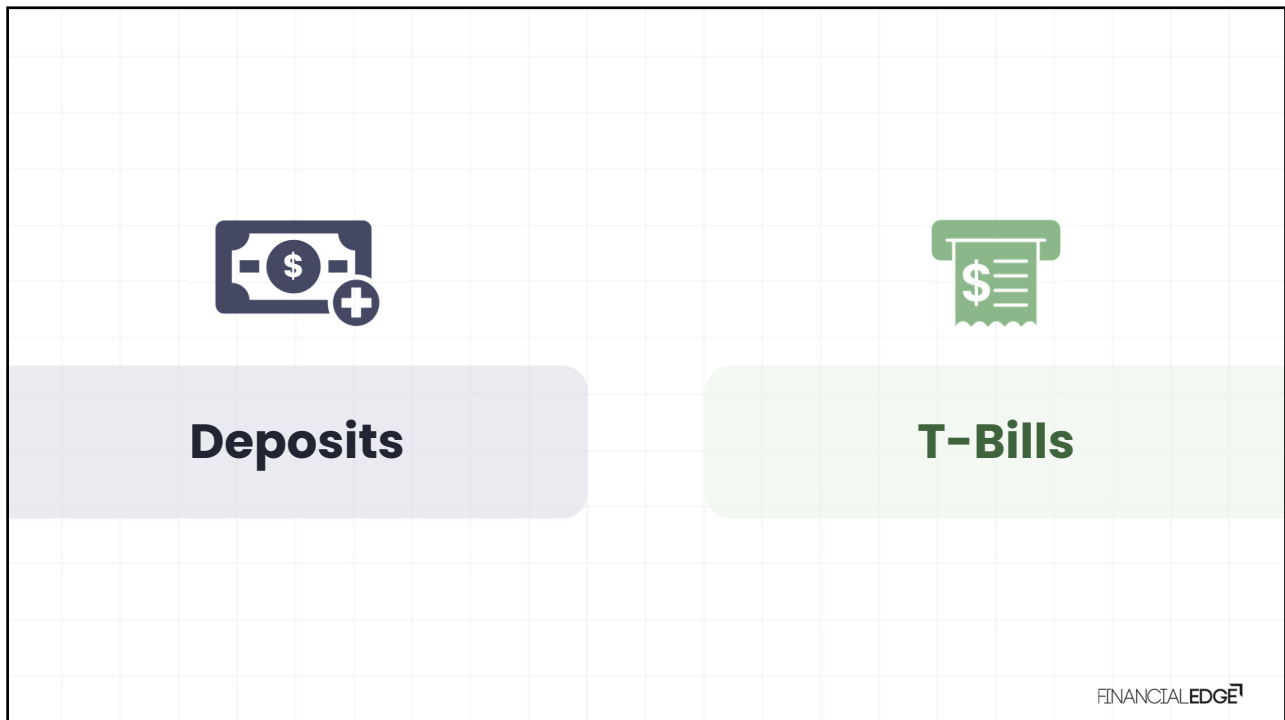
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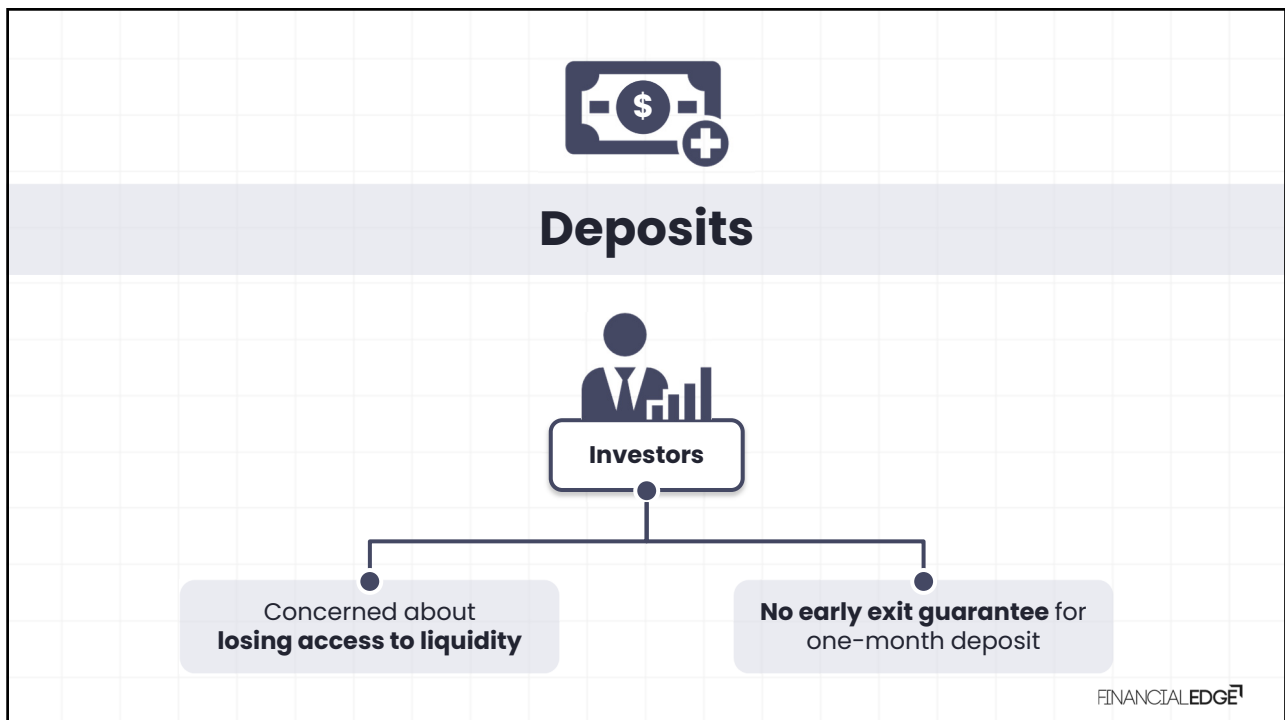
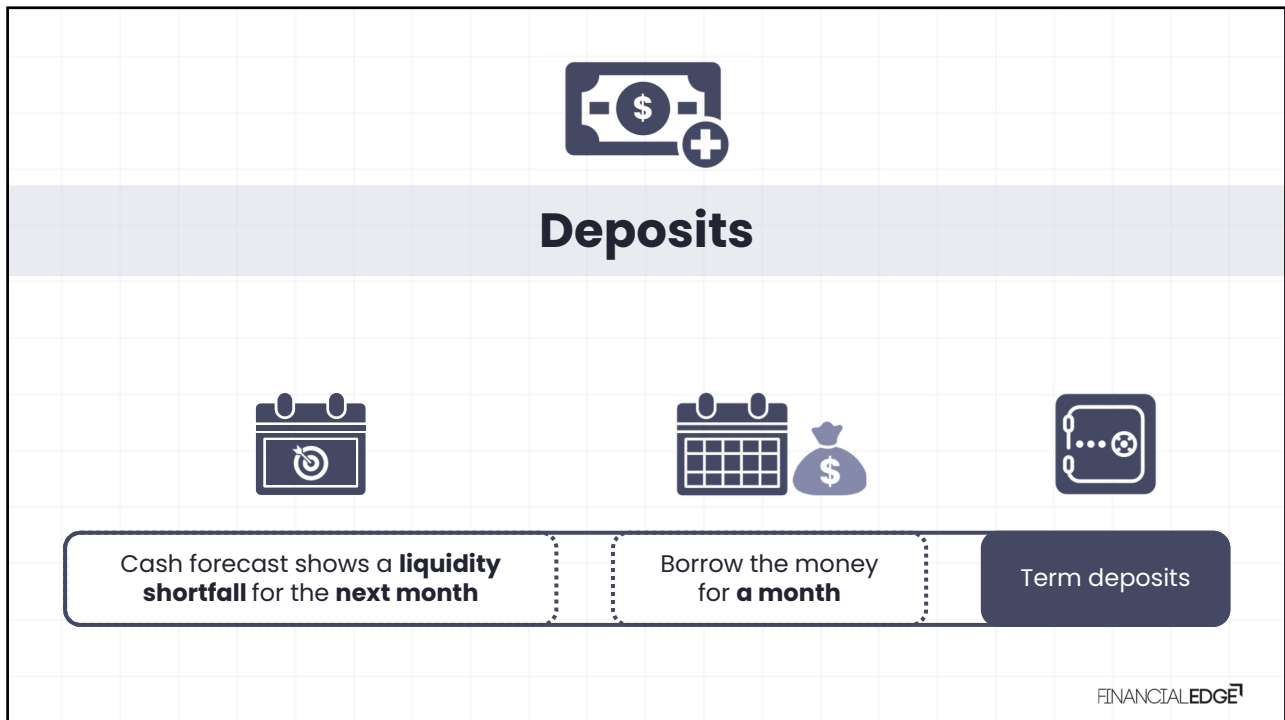






Deposits and CDs







Certificates of Deposits (CDs)



Receipts that acknowledge the **deposit**

Redemption date

Maturity

Interest to be paid



More liquid and easier to **convert into cash**



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Certificates of Deposits (CDs)



Sell CD



At what **price**?

1

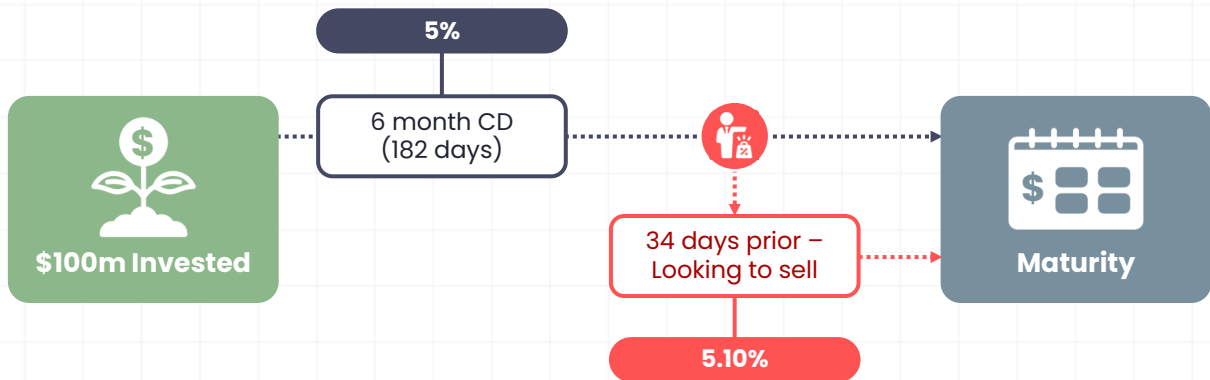
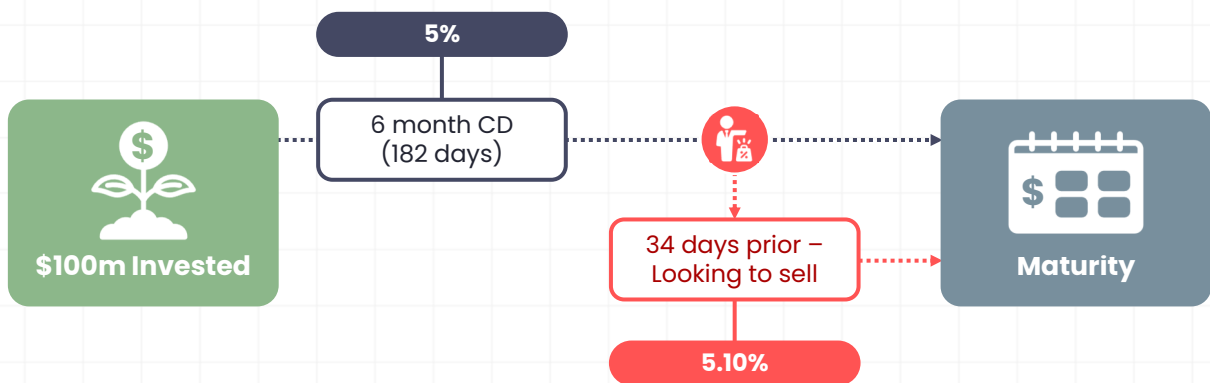
Calculate the
future payment



2

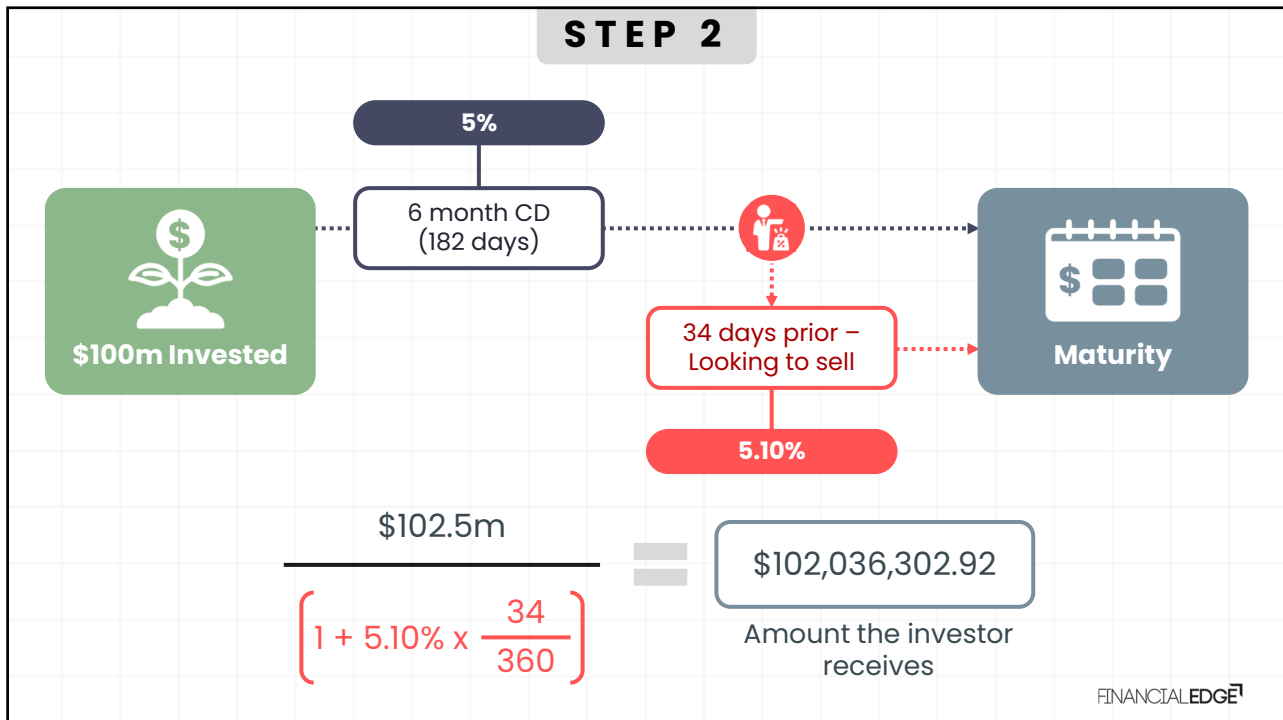
Discount that payment
back to today

FINANCIALEDGE⁷

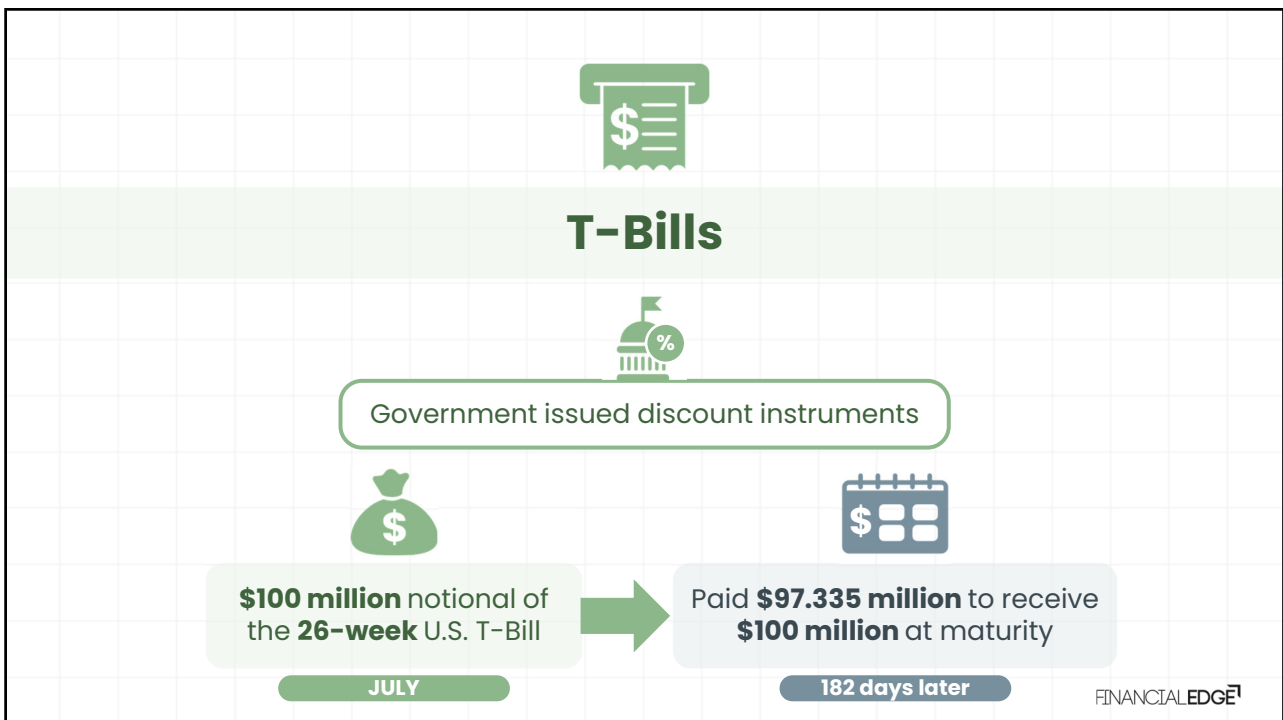
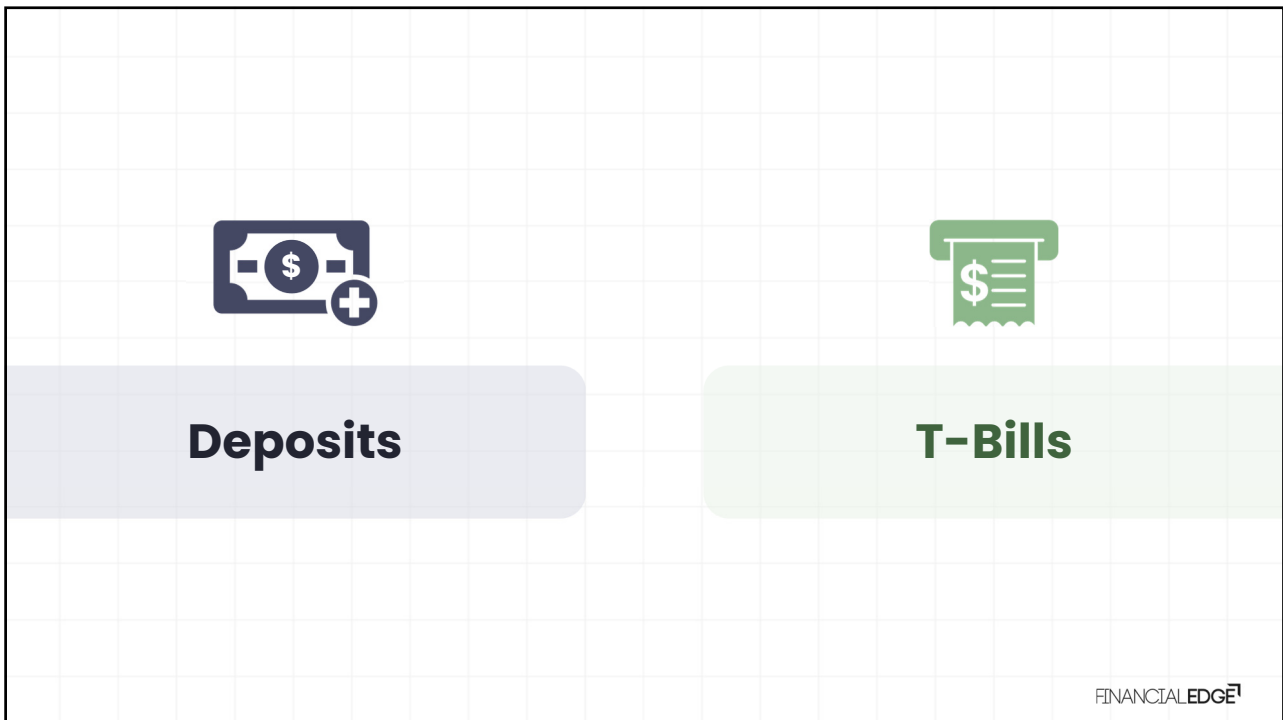
Example:FINANCIALEDGE⁷**STEP 1**

$$\boxed{\$100\text{m}} \times \left[1 + 5\% \times \frac{182}{360} \right] = \boxed{\$102.5\text{m}}$$

FINANCIALEDGE⁷



Treasury Bills (T-Bills)



Example:

Quoted by interest rate

182-Day T-Bill**5.175%**

Last

5.175%

Bid

5.165%

Ask

Return for
T-Bill BuyerFINANCIALEDGE⁷**Example:**

Quoted by interest rate

182-Day T-Bill**5.175%**

Last

5.175%

Bid

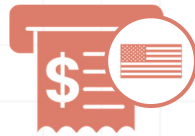
5.165%

Ask



Issuing country

Different
methodologies are
used **to convert the
quoted return into
the actual price**FINANCIALEDGE⁷



US T-Bills

Discount Quote



$$\text{Price} = \text{FV} - \left(\text{FV} * \text{discount rate} * \frac{\text{days}}{\text{basis}} \right)$$

FV = Face Value

Quoted **return is earned** on the amount you will **receive at maturity**FINANCIALEDGE⁷

Other T-Bills

Yield Quote



$$\text{Price} = \frac{\text{FV}}{1 + \text{yield} * \frac{\text{days}}{\text{basis}}}$$

FV = Face Value

Return is paid on the **present value**FINANCIALEDGE⁷



Same rate quoted for **both types of T-bills**

Discount Quote



Face value

$5\% \times 100$ (Face Value)

Lower quoted rate

Yield Quote




Present value

$5\% \times 98$ (Present Value)

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US T-Bill Auction Results

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4-Week (28-Day)

8-Week (56-Day)




Tuesdays

Auction



Thursdays

Issue date



26-week T-Bill auction

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For Immediate Release
March 11, 2024


CONTACT: Treasury Auctions
202-504-3550

TREASURY AUCTION RESULTS

Term and Type of Security	182-Day Bill
CUSIP Number	912797KK2
High Rate ¹	5.100%
Allotted at High	76.61%
Price	97.421667
Investment Rate ²	5.308%
Median Rate ³	5.080%
Low Rate ⁴	4.990%
Issue Date	March 14, 2024
Maturity Date	September 12, 2024


Source: www.treasurydirect.gov






13-Week (91-Day)

26-Week (182-Day)




Mondays

Auction



Thursdays

Issue date



26-week T-Bill auction

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Source: www.treasurydirect.gov





26-week T-Bill auction



Term and Type of Security

182-day
(26-week) T-Bill

The **type** and
duration of the
security being
auctioned

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26-week T-Bill auction



CUSIP Number

(Committee on Uniform
Securities Identification
Procedures)

Every **bond or stock**
in the **U.S.** and
Canada has its own
CUSIP number

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26-week T-Bill auction



High rate

Highest accepted
yield

Rate is the **discount**
from **face value**

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26-week T-Bill auction



Allotted at high

Portion of the bids at
the highest rate that
were **successful** in
securing the T-Bills

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26-week T-Bill auction



Price

Price corresponding
to the **high rate**
(5.100%)

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26-week T-Bill auction



Investment rate

Equivalent yield on
a **coupon-bearing**
security

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26-week T-Bill auction



Median rate

The middle of
all accepted
competitive bids

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26-week T-Bill auction



Low rate

The **lowest
accepted yield** (or
discount rate) at
the **auction**

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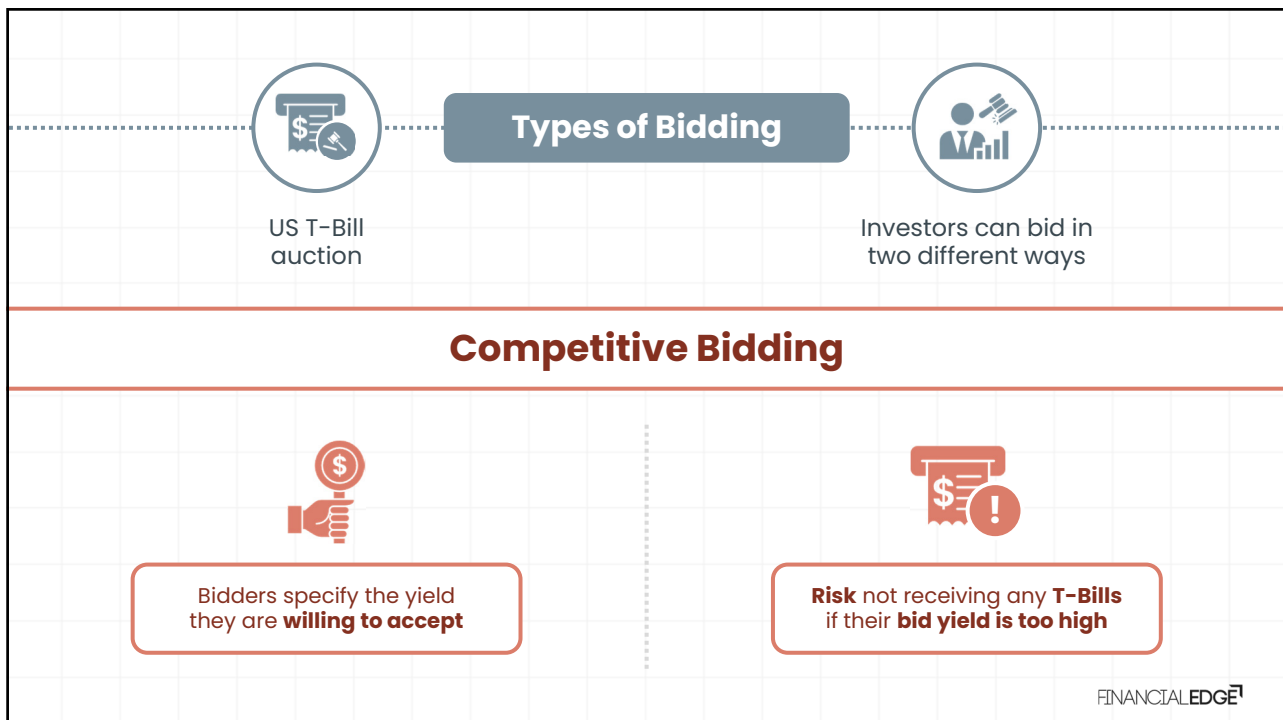
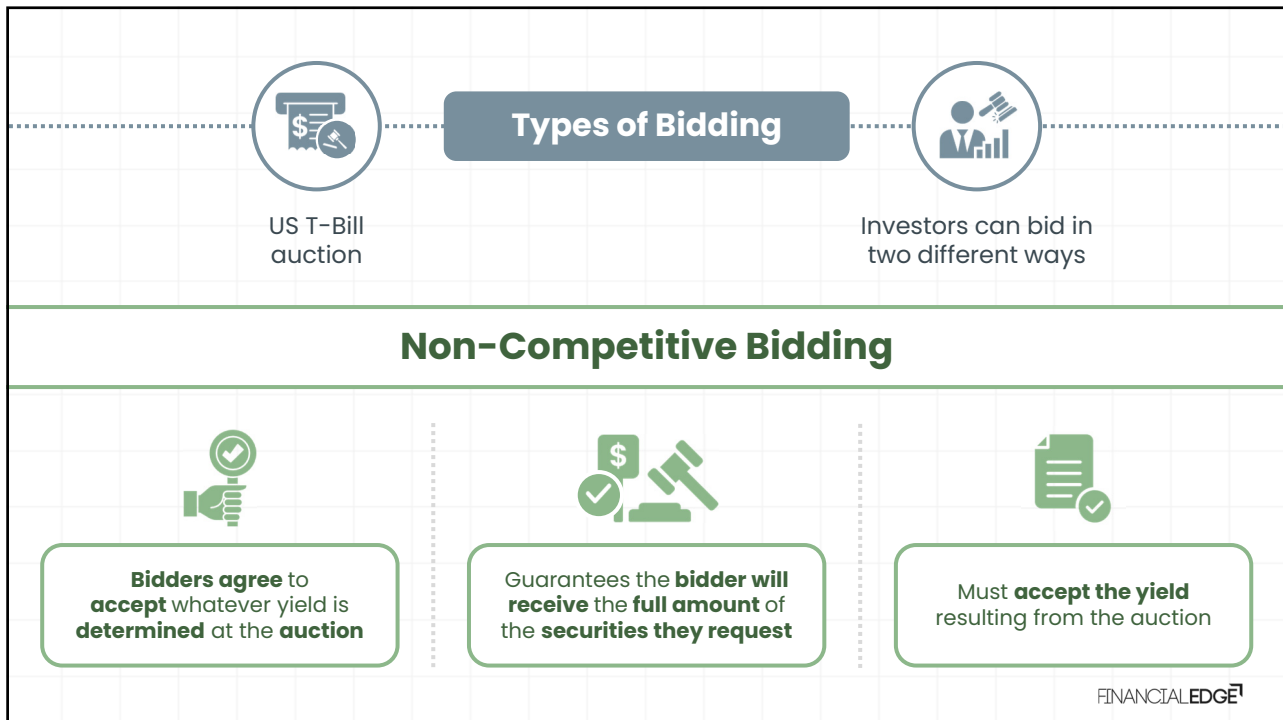
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26-week T-Bill auction



U.S. Treasury

Fills all non-competitive bids and then allocates the highest competitive bids

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Commercial Paper (CP)

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Commercial Paper (CP)

Short-term debt unsecured instrument


Large corporations

Accounts receivable

Inventories

Short-term liabilities

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Commercial paper is usually issued at a **discount**, meaning that **investors pay less** than the **face value** and receive the **full amount at maturity**




Issued by firms

The highest short-term credit ratings

Moody's

S&P Global

FitchGroup

Commercial paper



Typically offers a slightly **higher interest rate** than T-Bills



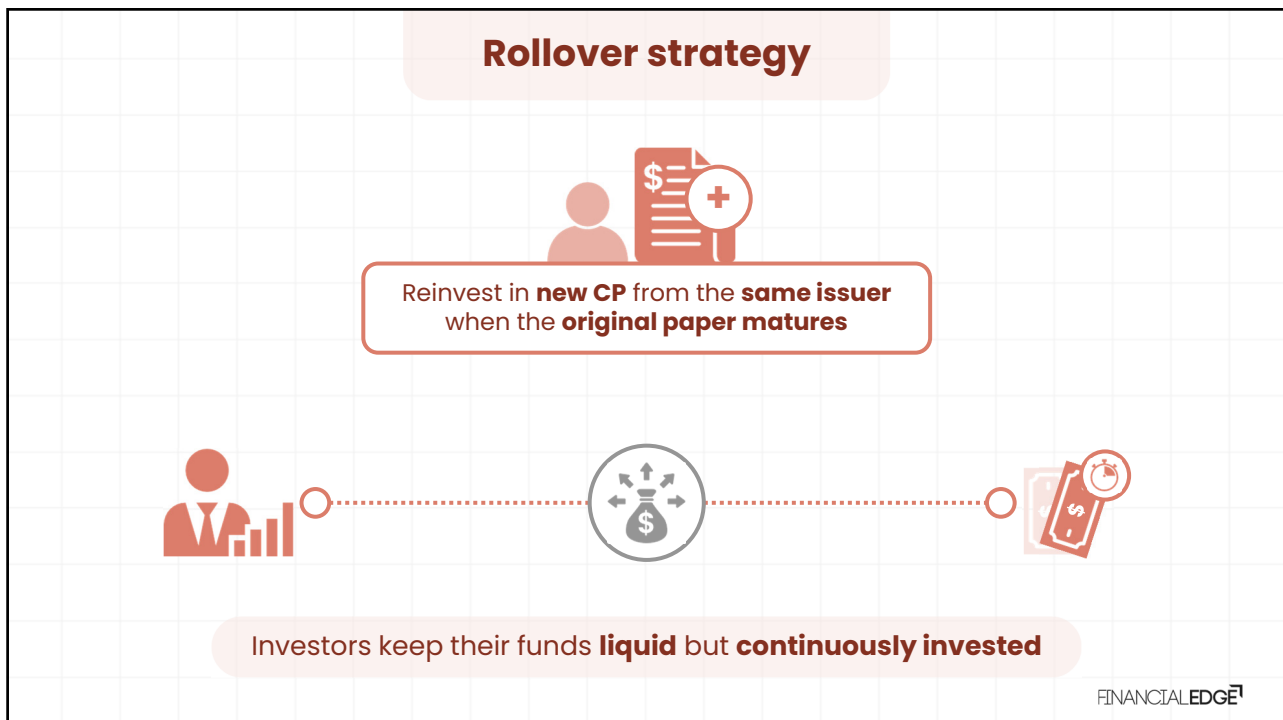
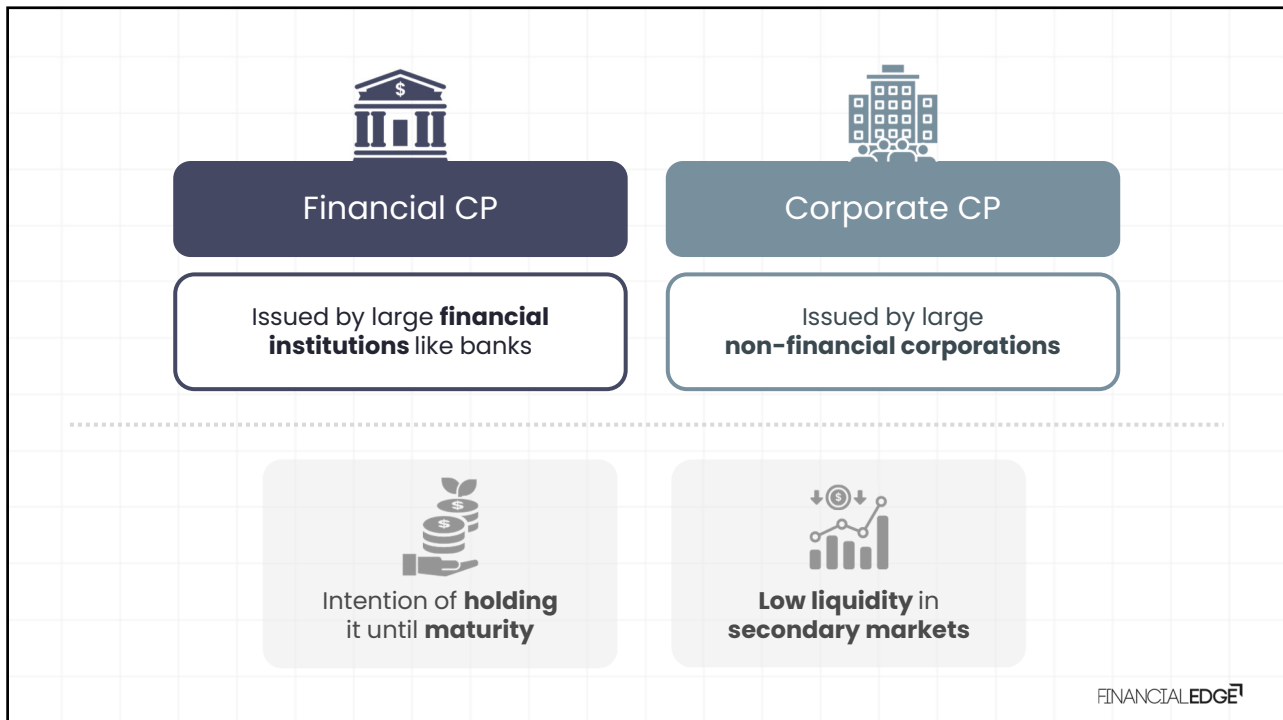
High ratings are crucial

Mutual funds

Pension funds

Typically invest only in high-quality debt instruments

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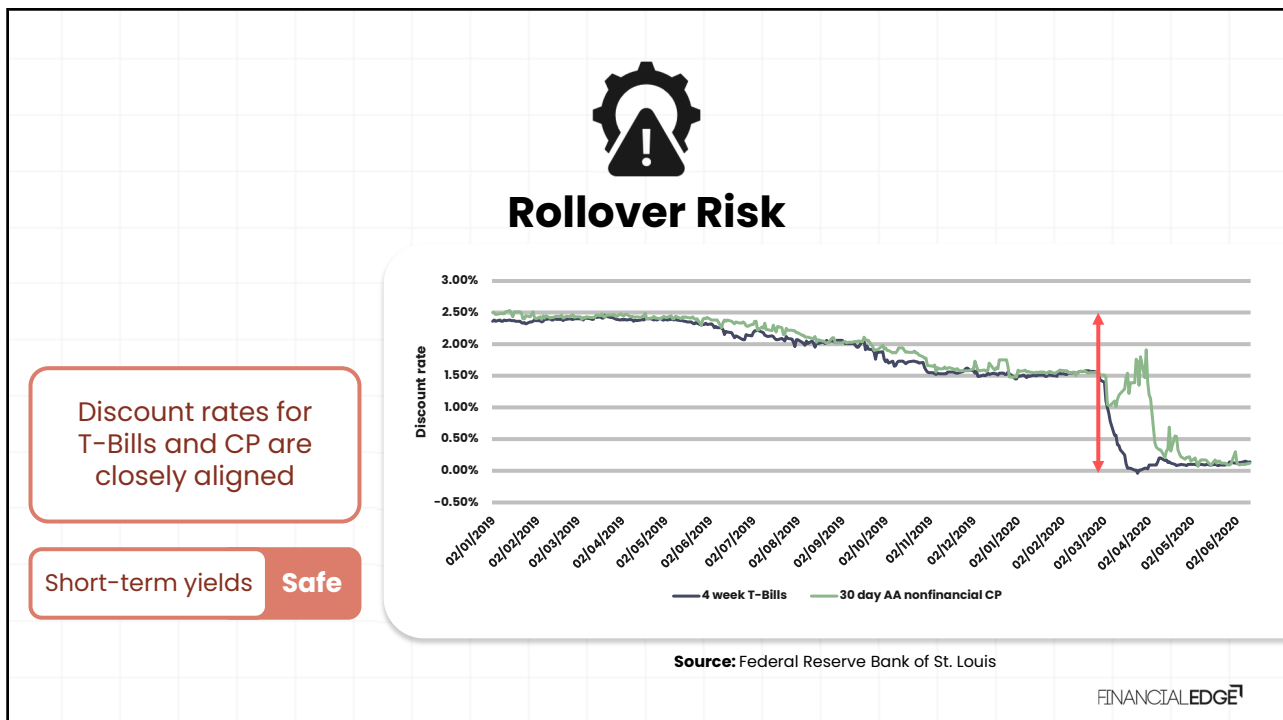
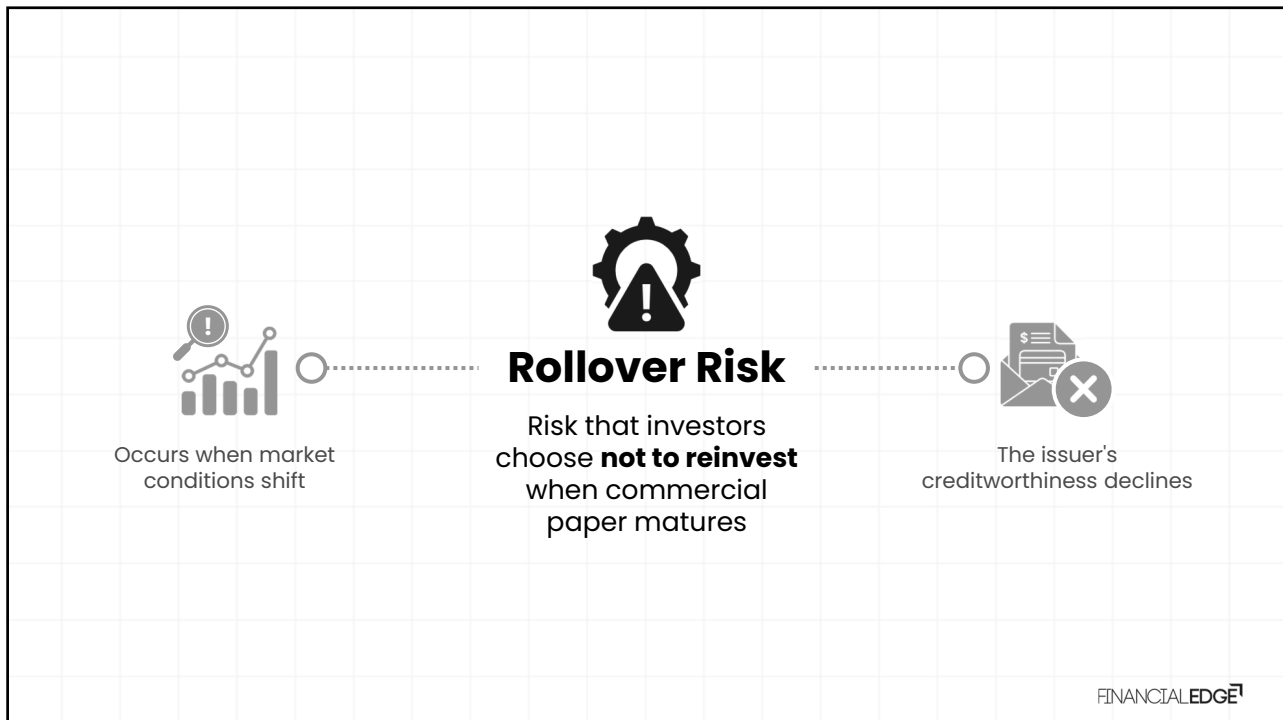
Issuers



Refinanced as it matures by issuing **new CP** to replace the **maturing debt**

Rollover dependency

Rollover Risk



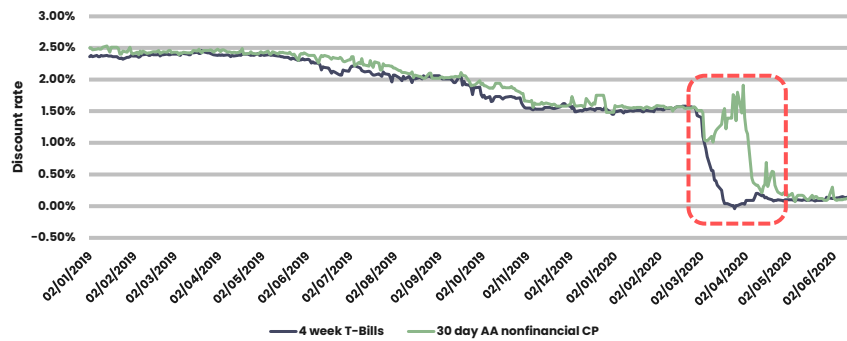


Rollover Risk



4-week T-Bills **fell**

30-day AA CP **spiked**



Source: Federal Reserve Bank of St. Louis

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Investors



Highly concerned about the potential
economic impacts of COVID-19

Lockdowns

Supply chain disruptions

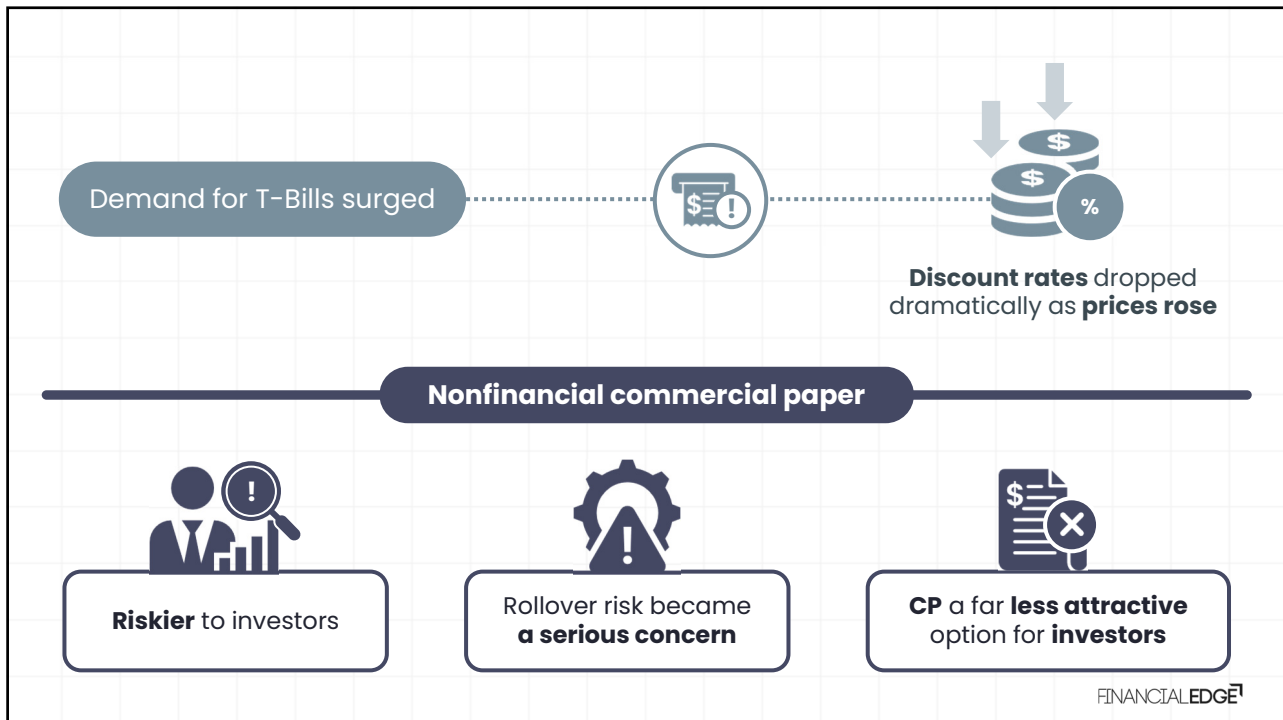
Declining corporate revenues

Invest into the
safest assets available

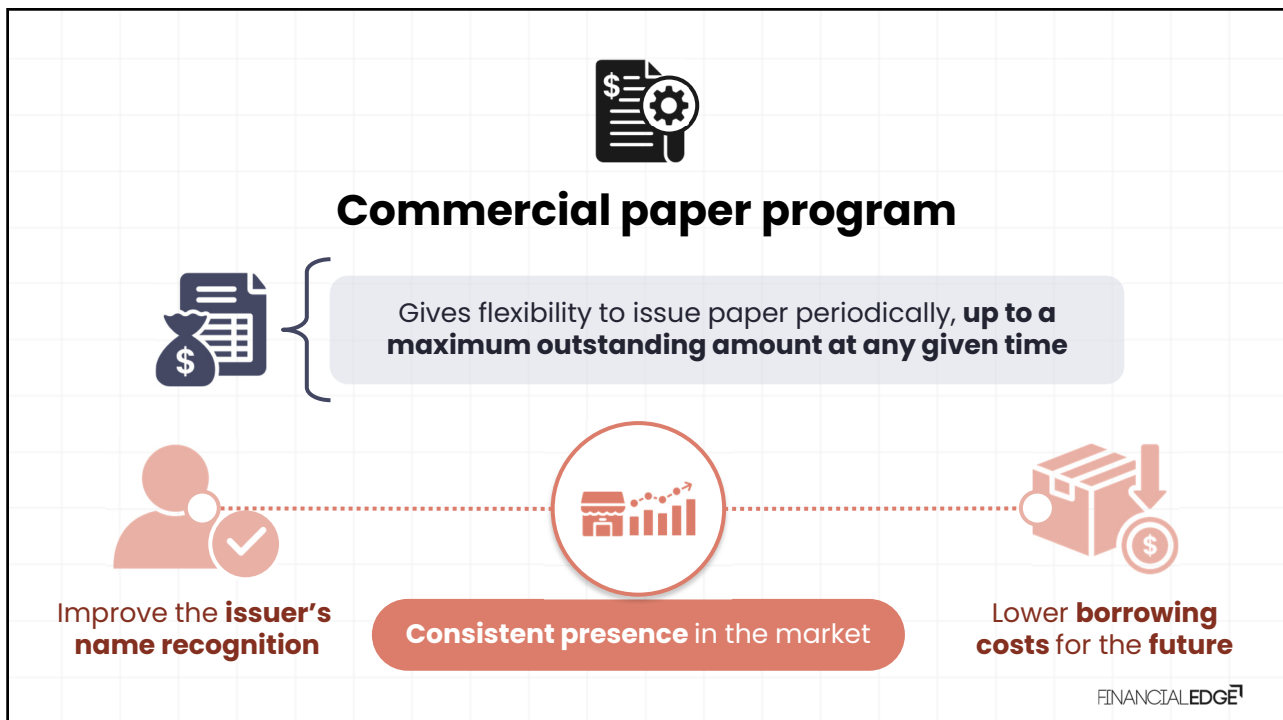
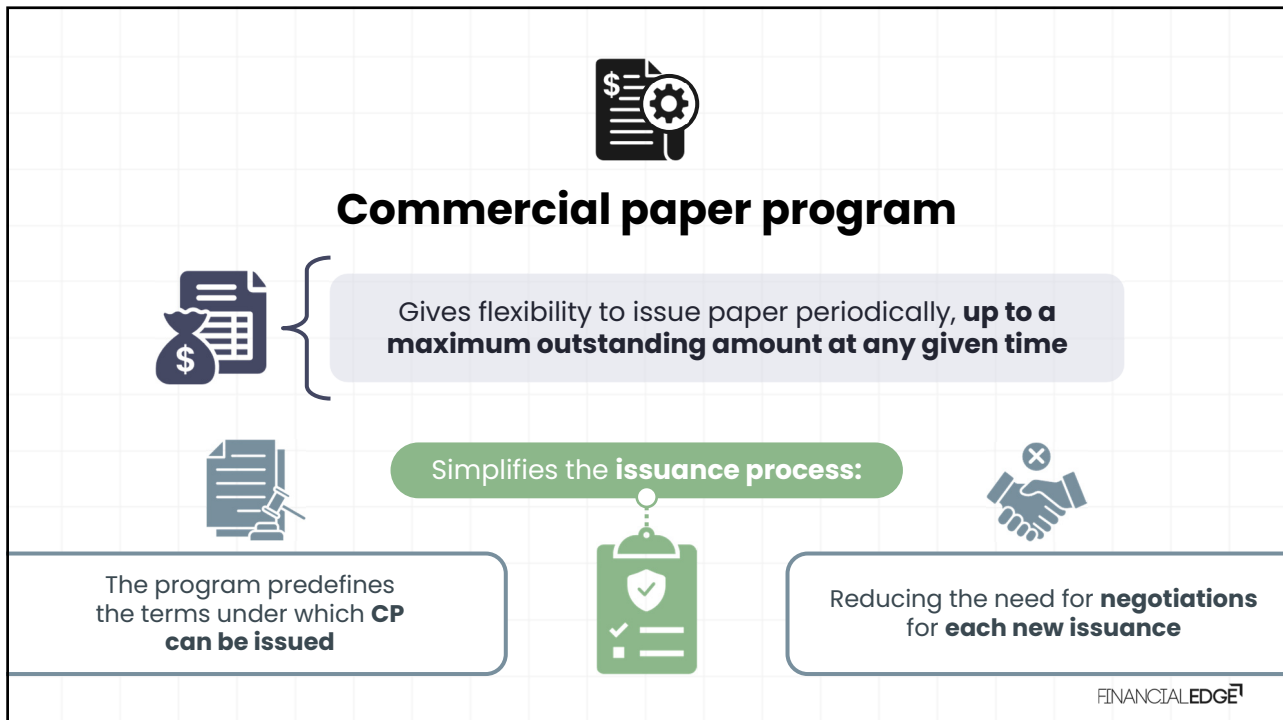


U.S. Treasury securities are
considered virtually **risk-free**

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Commercial Paper (CP) Issuance





Commercial papers are money market instruments



Maximum maturity

12 months



US CP maturities cap

270 days

No registration requirements

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Simplified issuance process

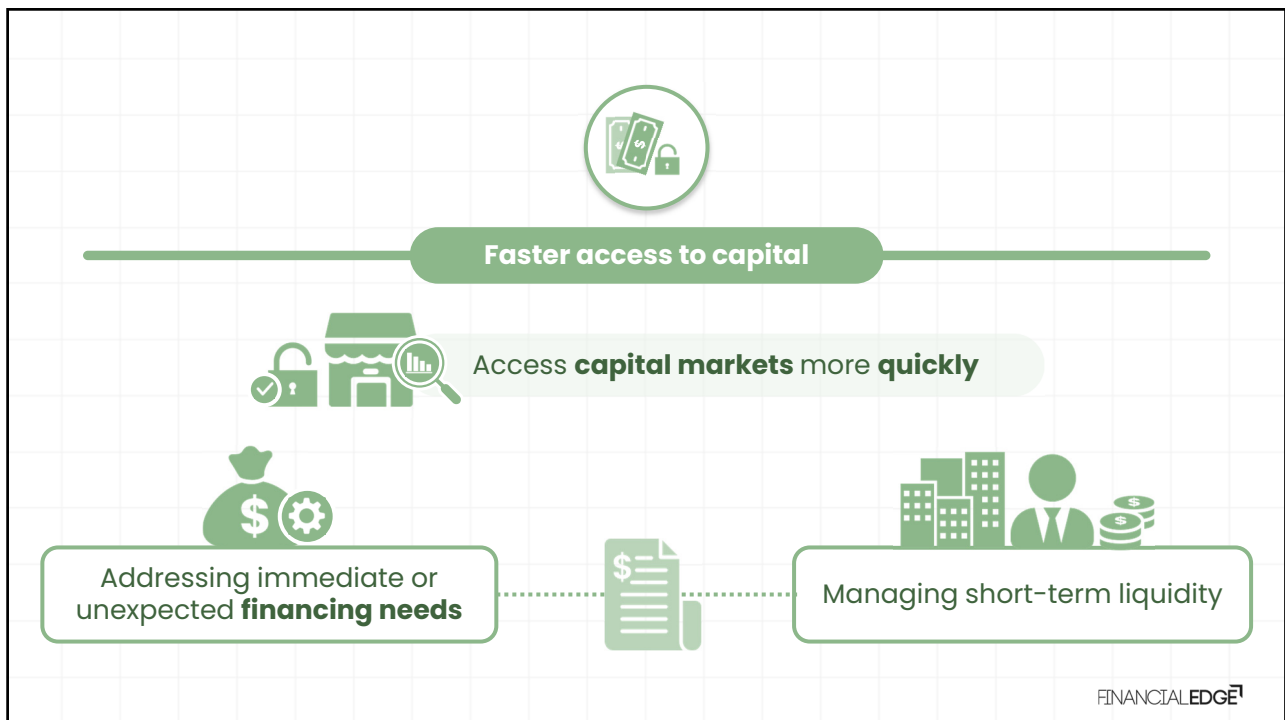


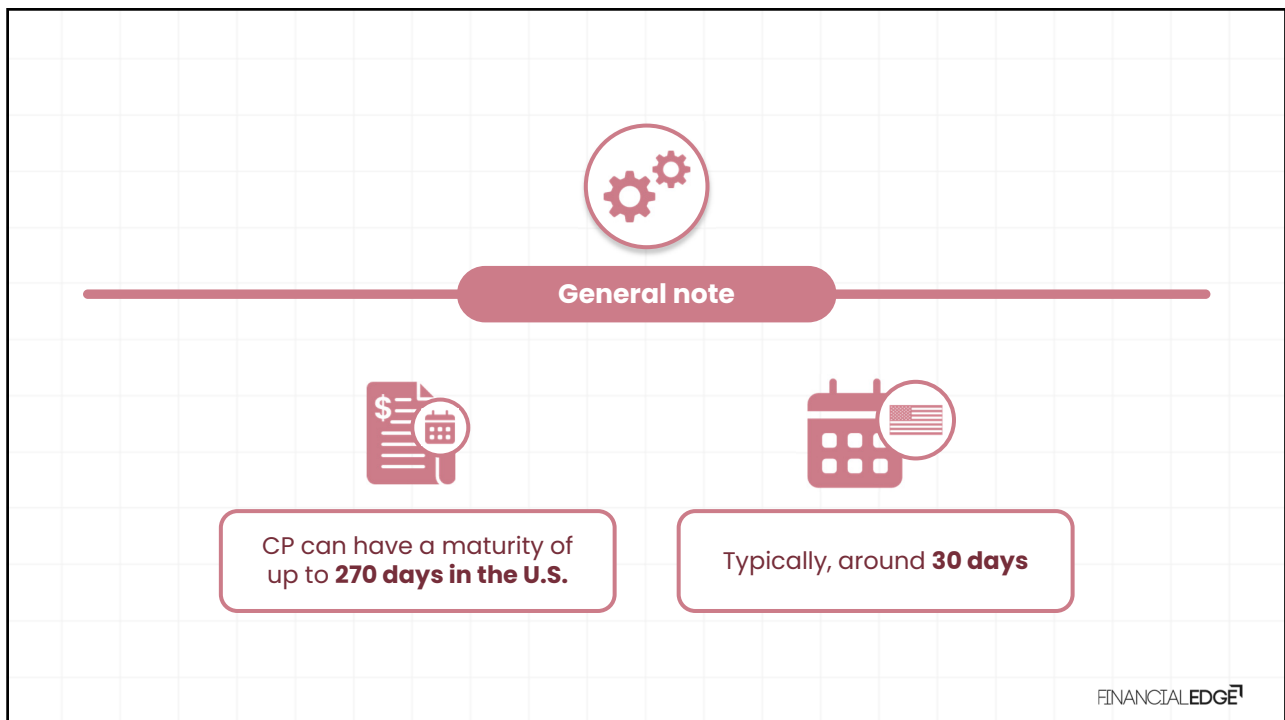
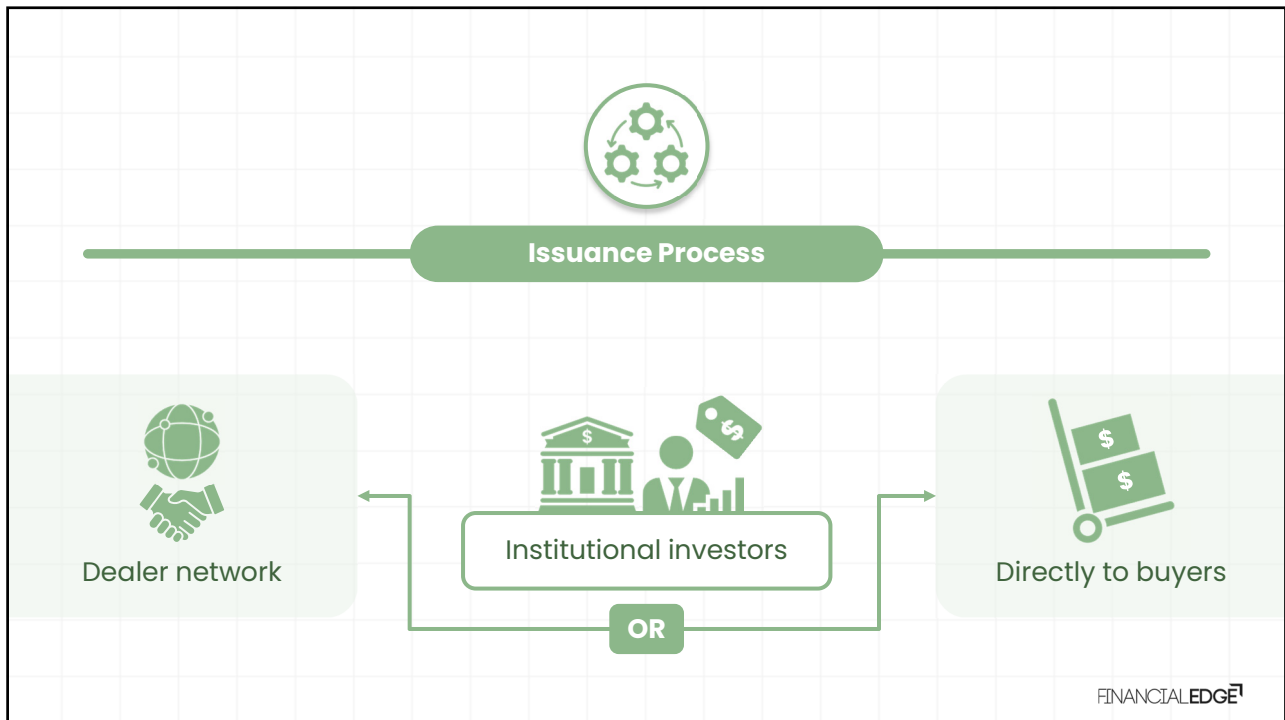
Issuers can avoid the comprehensive and **time-consuming process...**



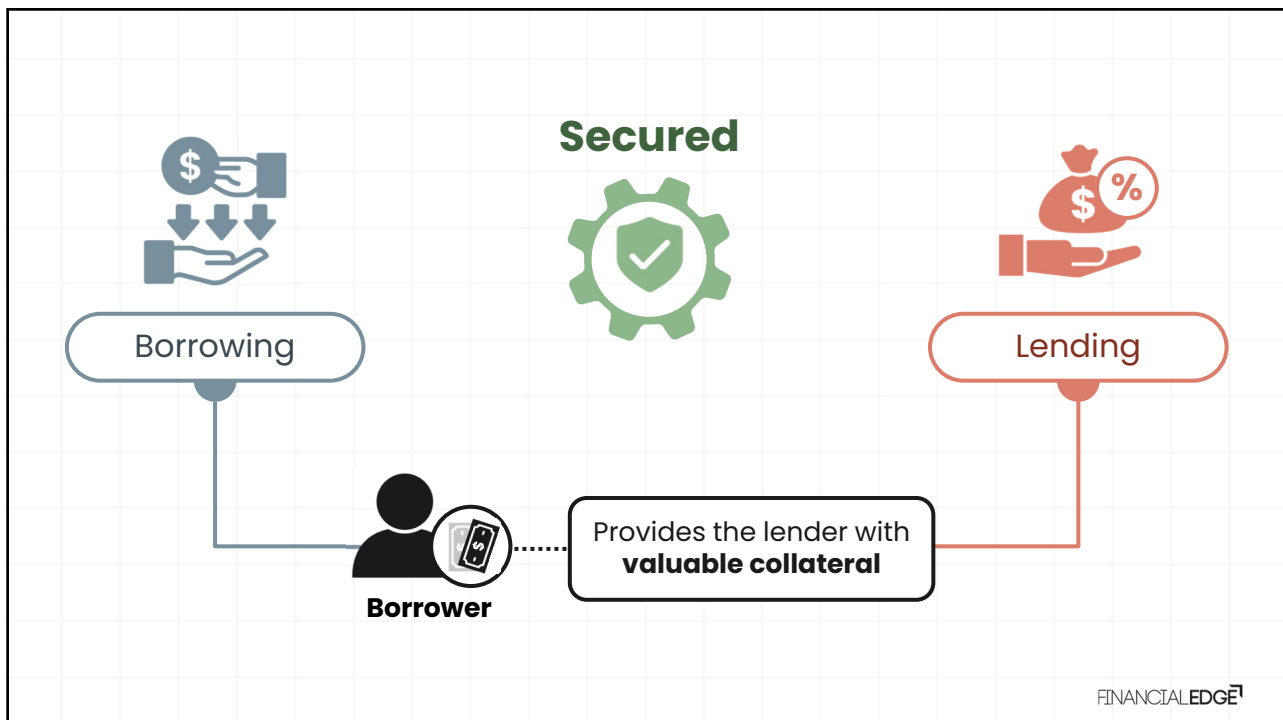
...of registering the securities with the **Securities and Exchange Commission (SEC)**

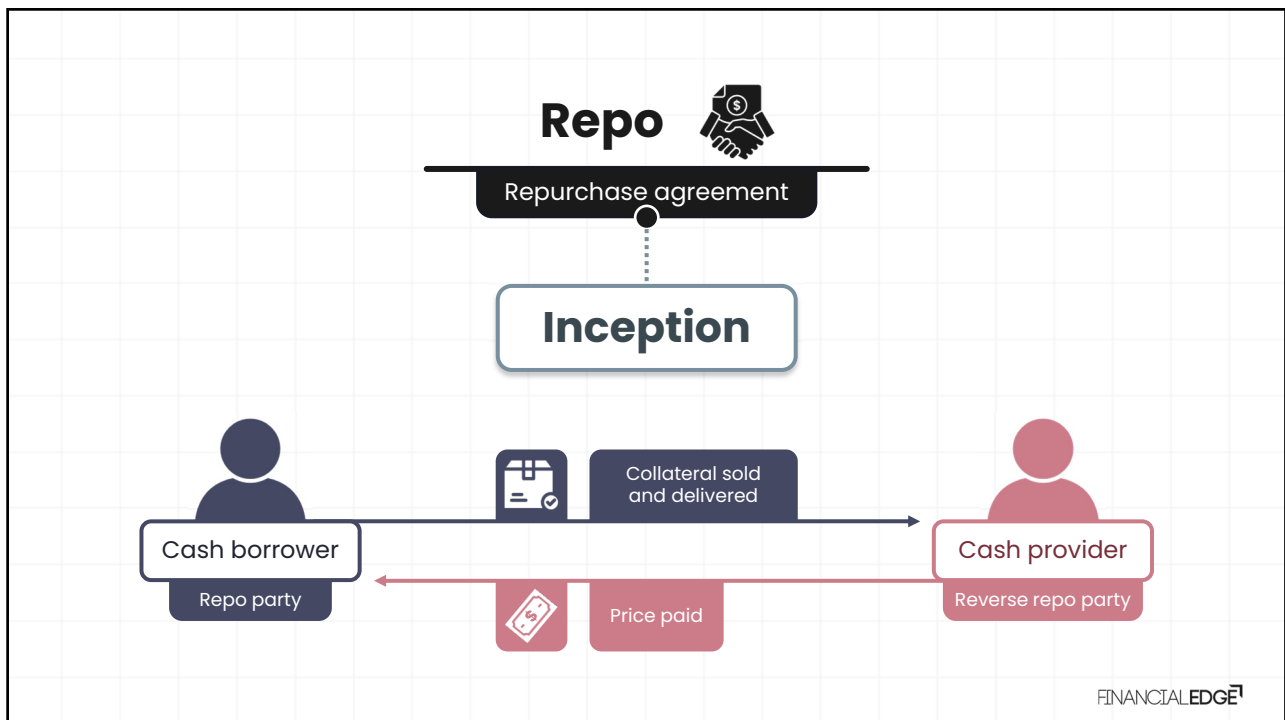
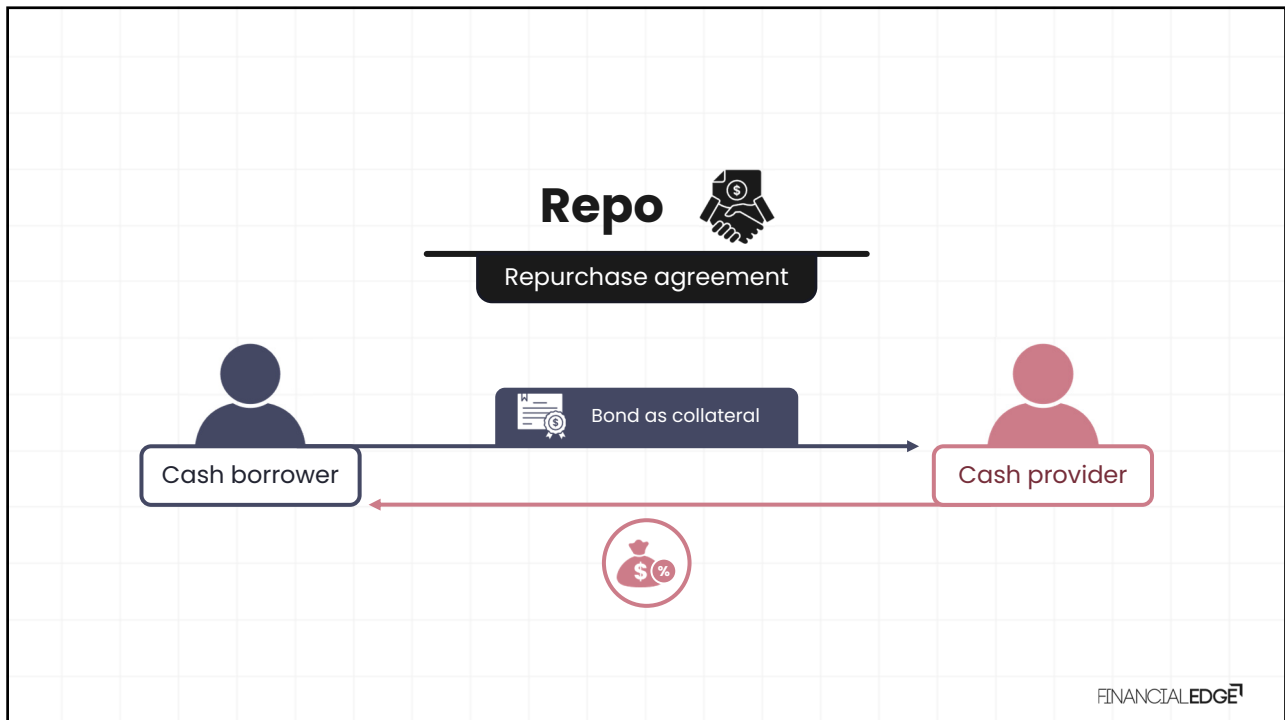
FINANCIALEDGE⁷

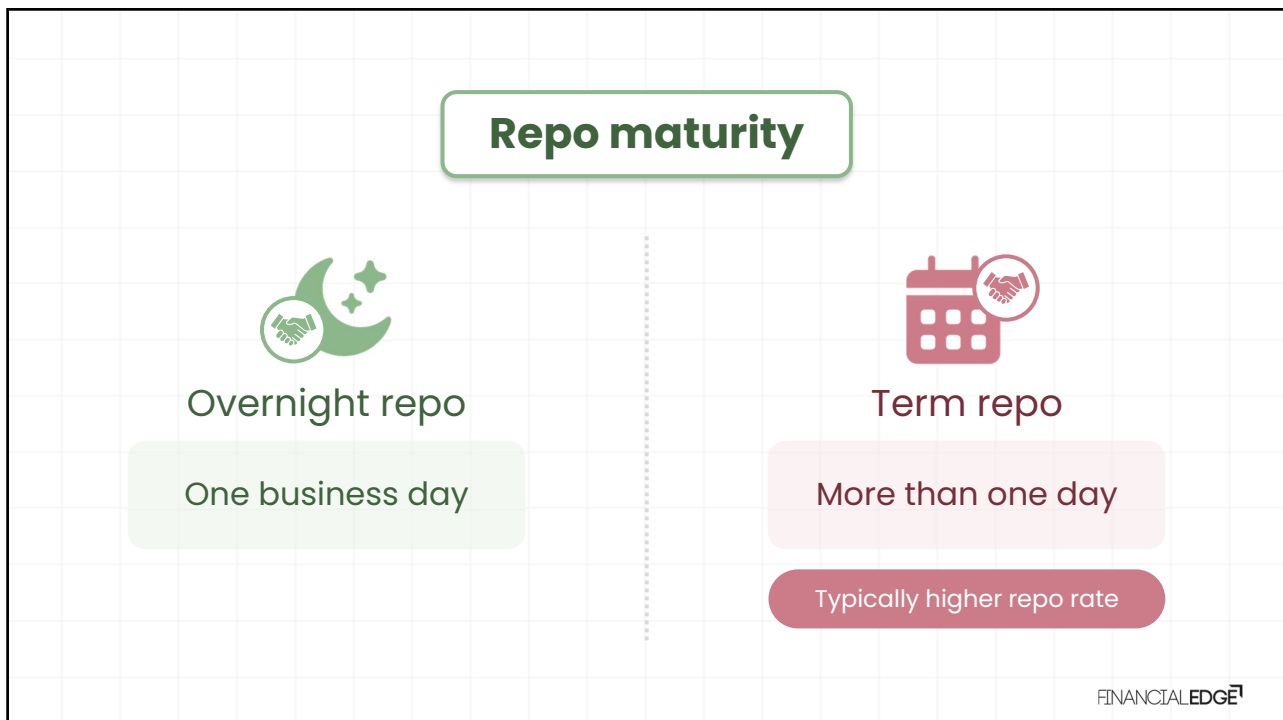
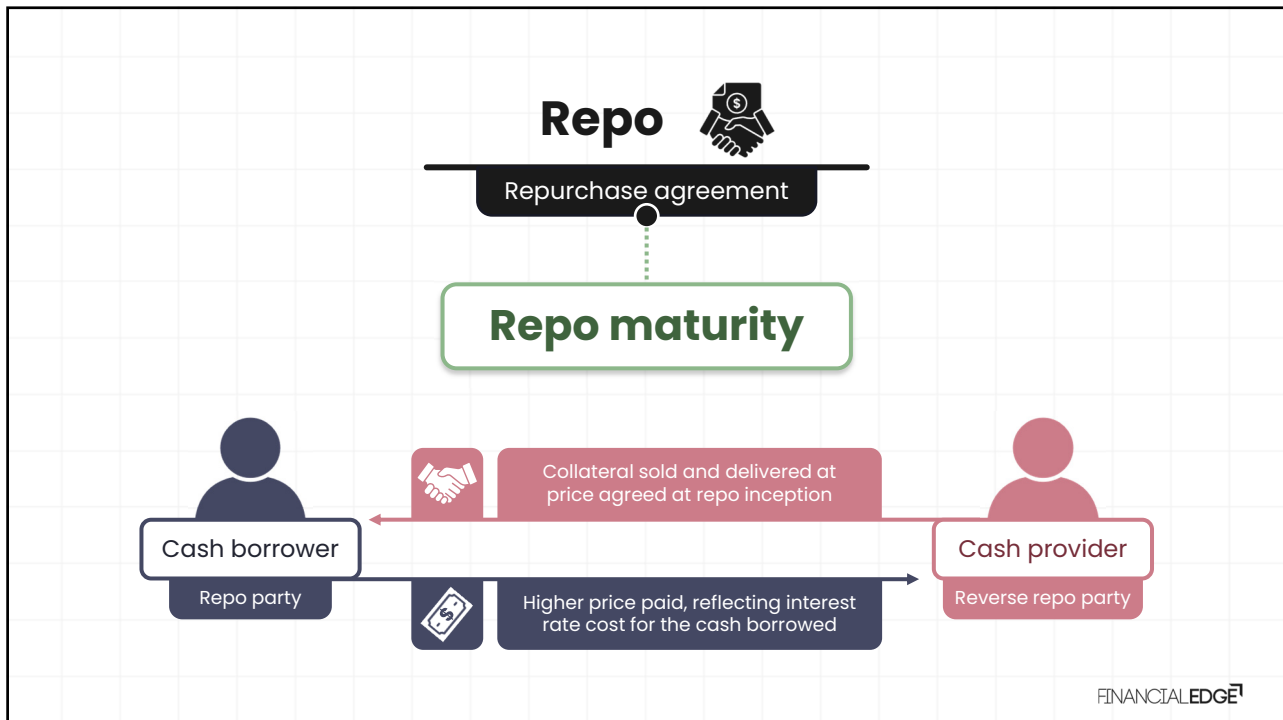




Repo

FINANCIALEDGE⁷



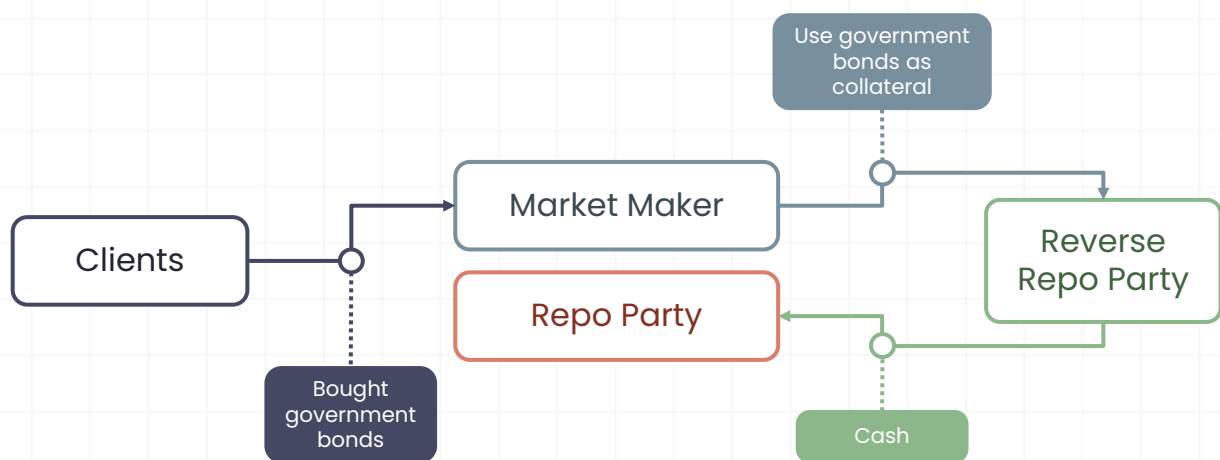


Repo and Reverse Repo Usage

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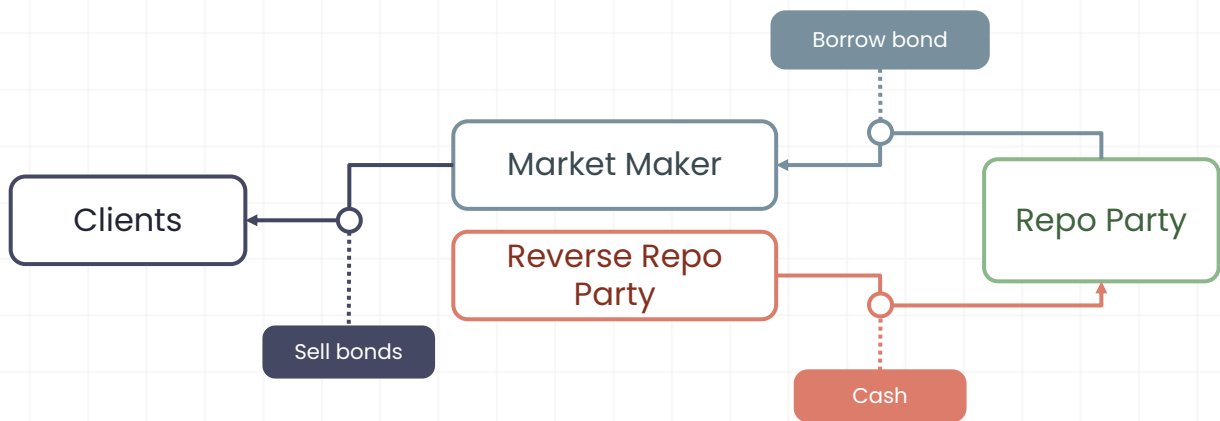
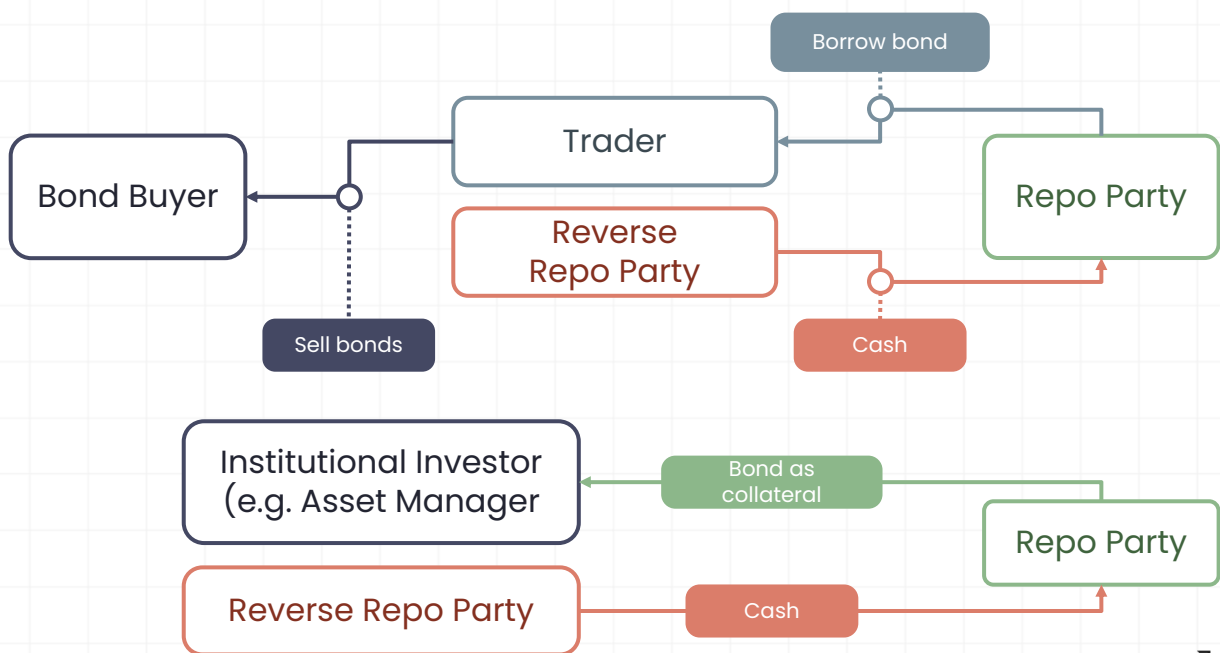
Why is Repo so Important?

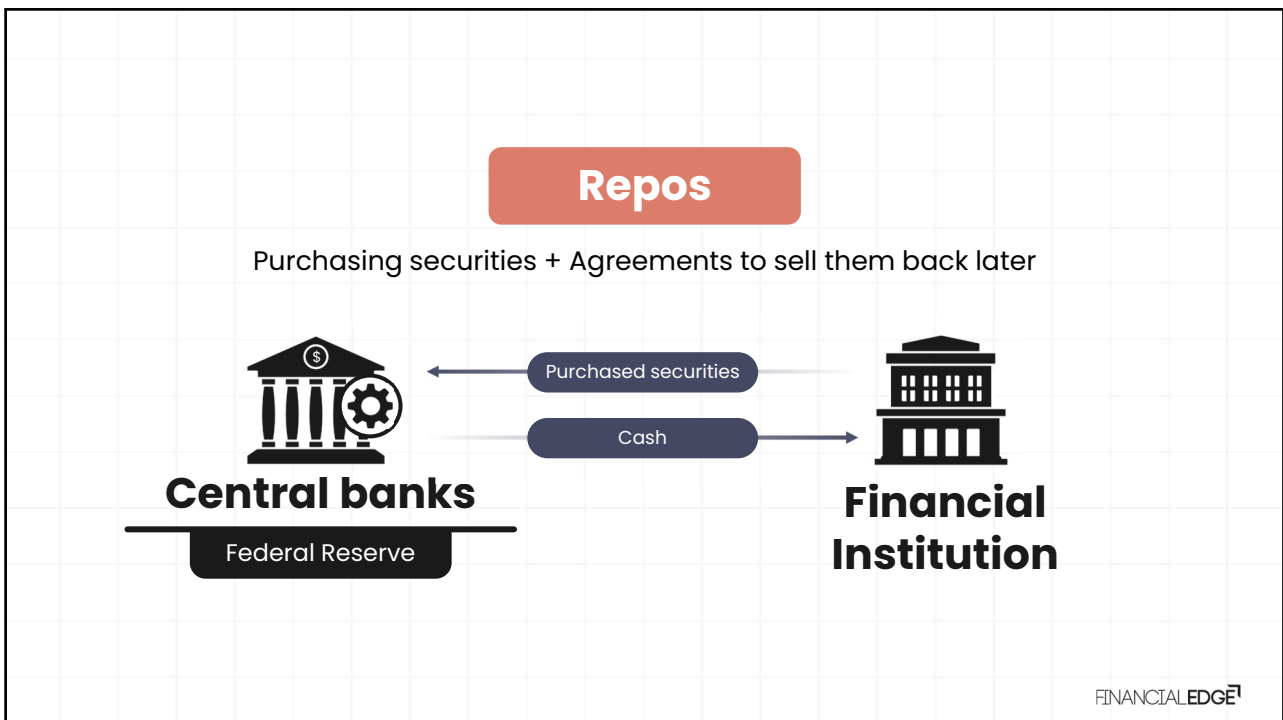
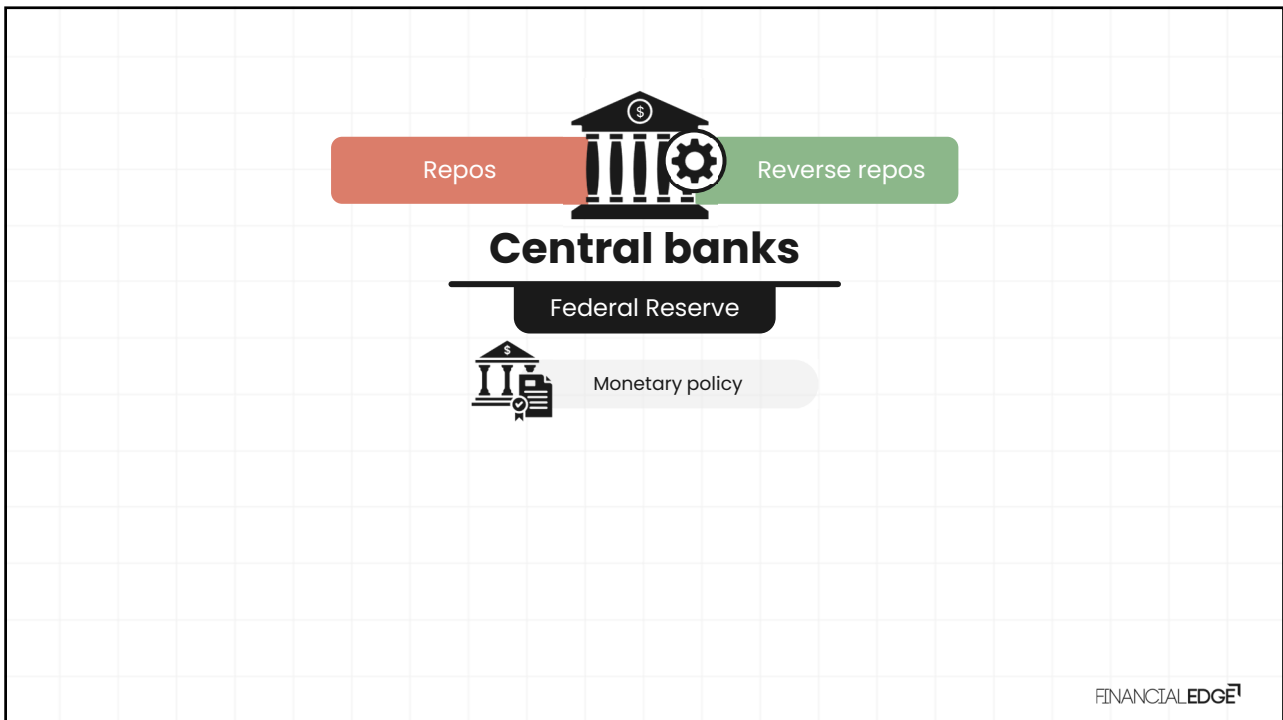
Repos provide market participants with access to low-cost, secured financing to purchase securities

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Why is Repo so Important?

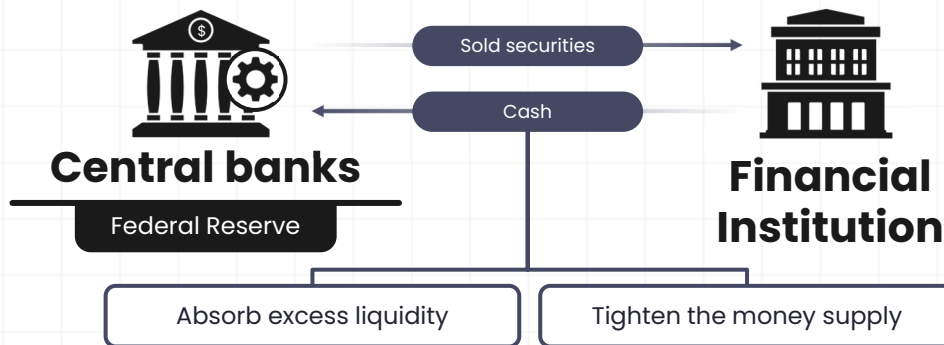
Repos provide market participants with access to low-cost, secured financing to purchase securities

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Reverse Repos

Selling securities + Agreements to sell them back later

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SOFR

Secured overnight financing rate



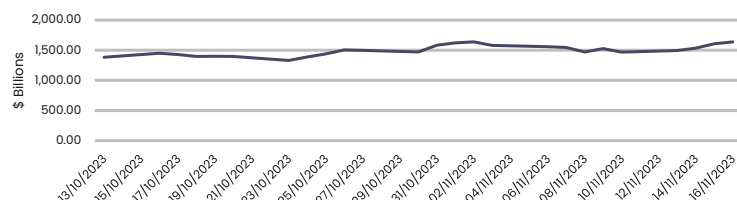
Cost of **borrowing**
cash overnight

US Treasury securities

\$1.3 trillion - \$1.6 trillion

Per day

Daily USD Secured overnight financing rate
(SOFR) volume



Source: New York Fed

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Money Market Benchmark Rates

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Benchmark Rates



Indication of **interest rates** being **paid by participants** within the **money markets**



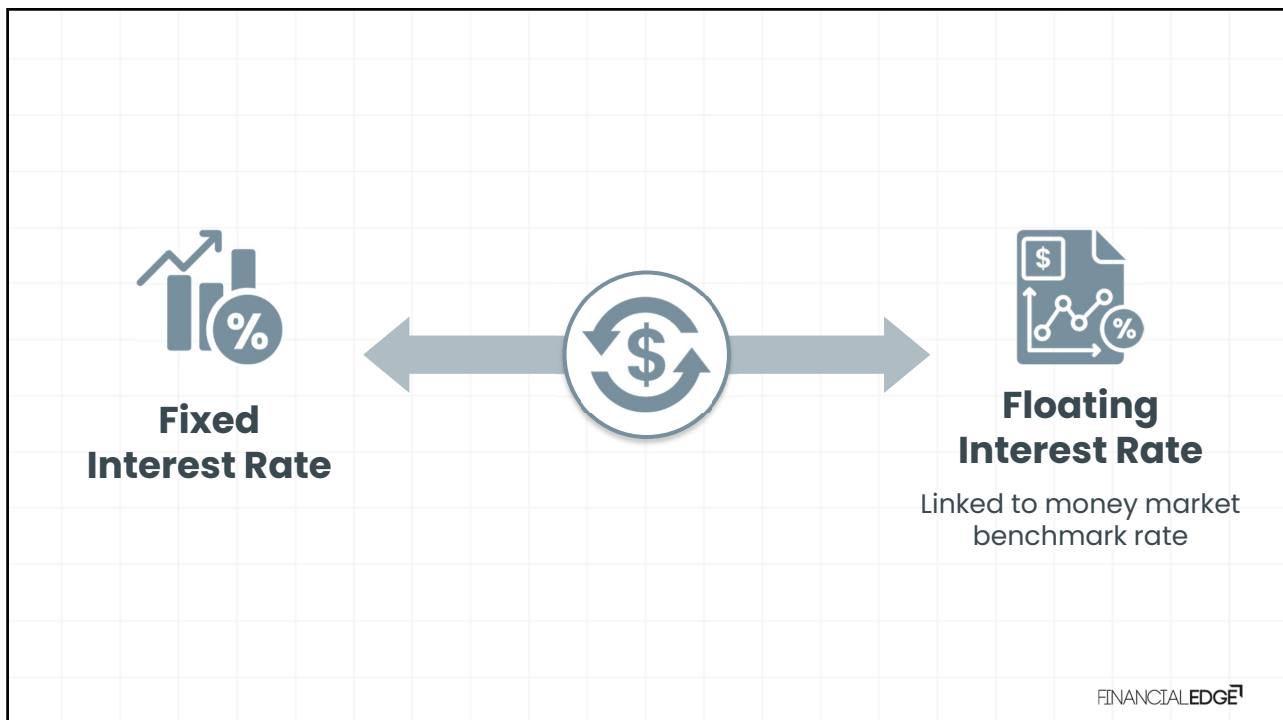
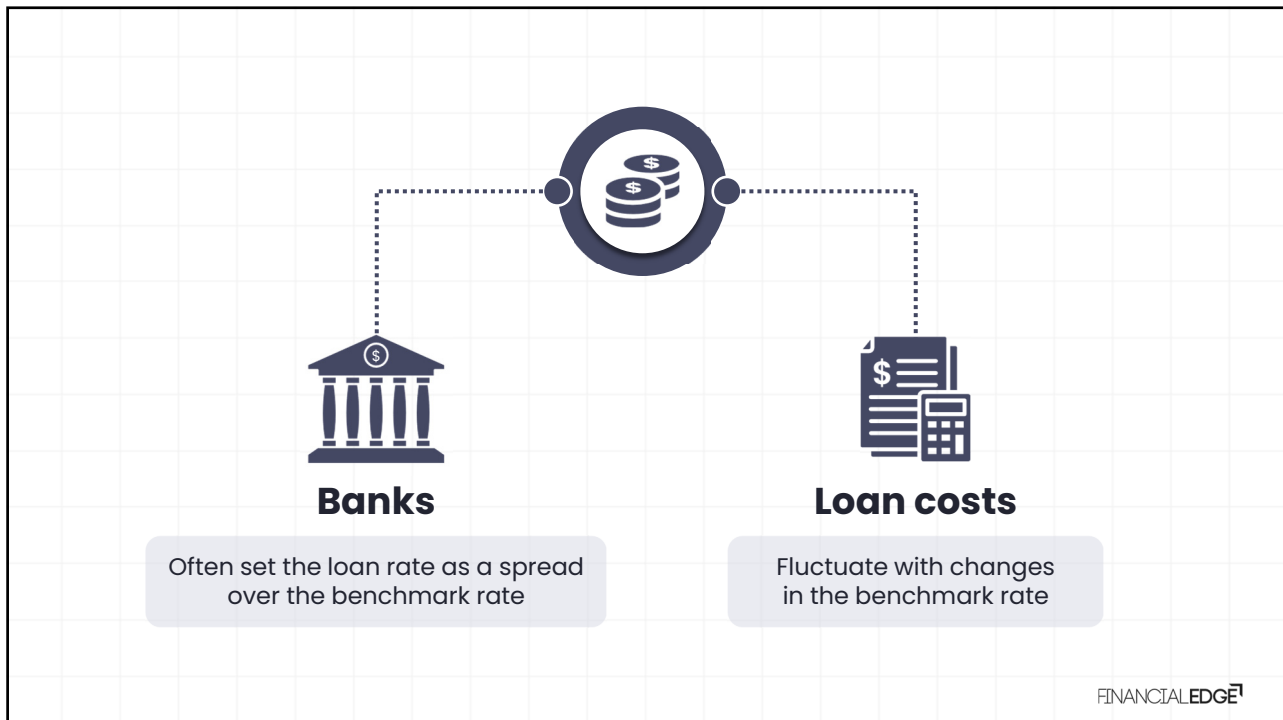
Publicly
accessible



Updated
regularly

General level of **borrowing costs** in a **specific market**

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Giving their importance, money market benchmark rates must be



Transparency



Trust



Representativeness

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IBORs

Interbank Offered Rates

2017

\$370 trillion of financial instruments were linked to **IBORs**



LIBOR

Most famous IBOR rate

After LIBOR scandal

LIBOR was phased out and **replaced by other benchmarks**

EURIBOR

The term **money market benchmark rate** for **Eurozone**

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Term rates

Lending periods

1-month

3-months

6-months



Borrowing or lending for a fixed **period**

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Overnight rates

Money is **lent or borrowed**

Today



Next business day



Loans are **very short-term**, they typically involve **very low credit risk** for the lender

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Overnight rates

Risk-Free Rates (RFRs)



Low risk and short
lending periods



Reliable benchmark for
short-term borrowing costs

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IBORs

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Interbank Offered Rates (IBORs)

LIBOR

EURIBOR



Based on **surveys of leading banks**

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LIBOR scandal

Late 2000s

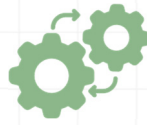


Transparency



Reliability

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Switch to waterfall methodology



Level 1

Transaction based

Level 2

Transaction derived

Level 3

Expert judgement

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LIBOR was officially phased out

No longer exists as a benchmark

EURIBOR

In use



Euro-denominated loans



Mortgages



Derivatives in the Eurozone

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Eurozone



Banks regularly **lend and borrow** from one another



Large portion of the money market



Unsecured



Creditworthiness of the borrower

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Interbank market for **loans of different maturities** is robust

1 month

3 months

6 months



Transactional data to support the calculation of **EURIBOR**

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EURIBOR



Was adapted and complies with the Benchmark Regulation (BMR)



Transparent



Representative



Real transactions

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LIBOR currencies

Regulatory and liquidity changes following the global financial crisis



Secured lending
markets

Repos

Risk-free benchmarks

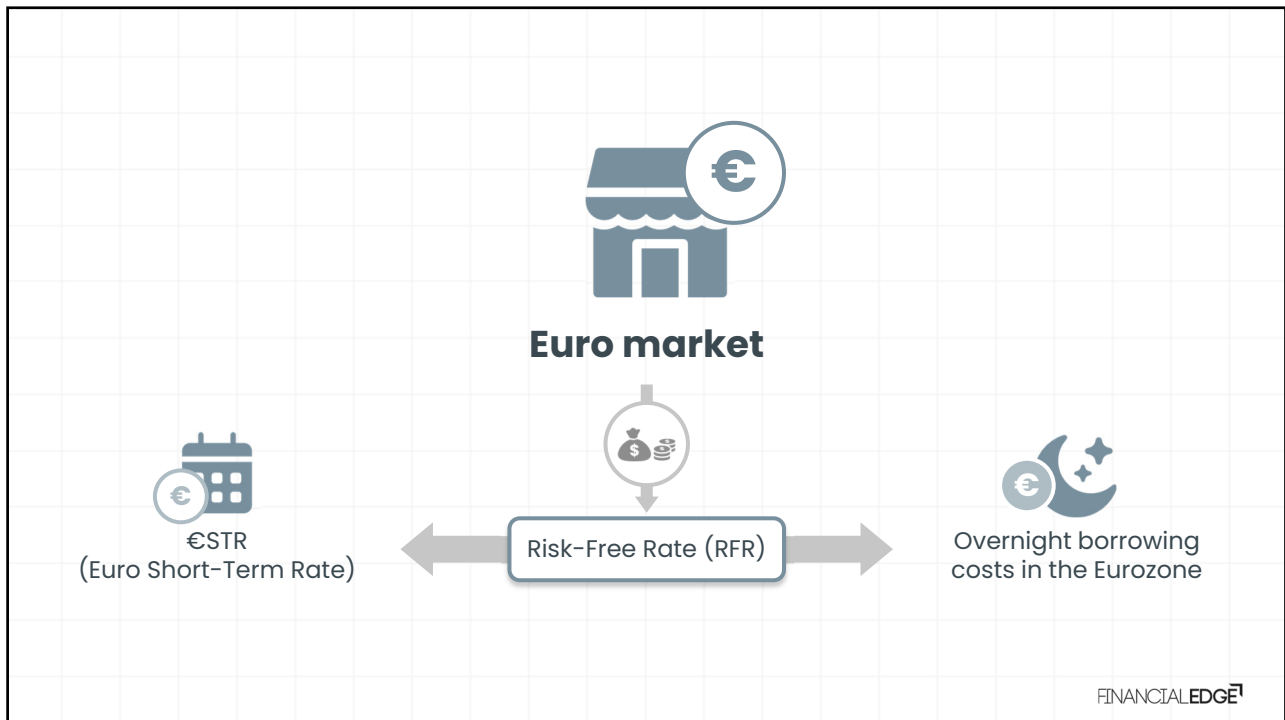
SOFR (USD)

SONIA (GBP)

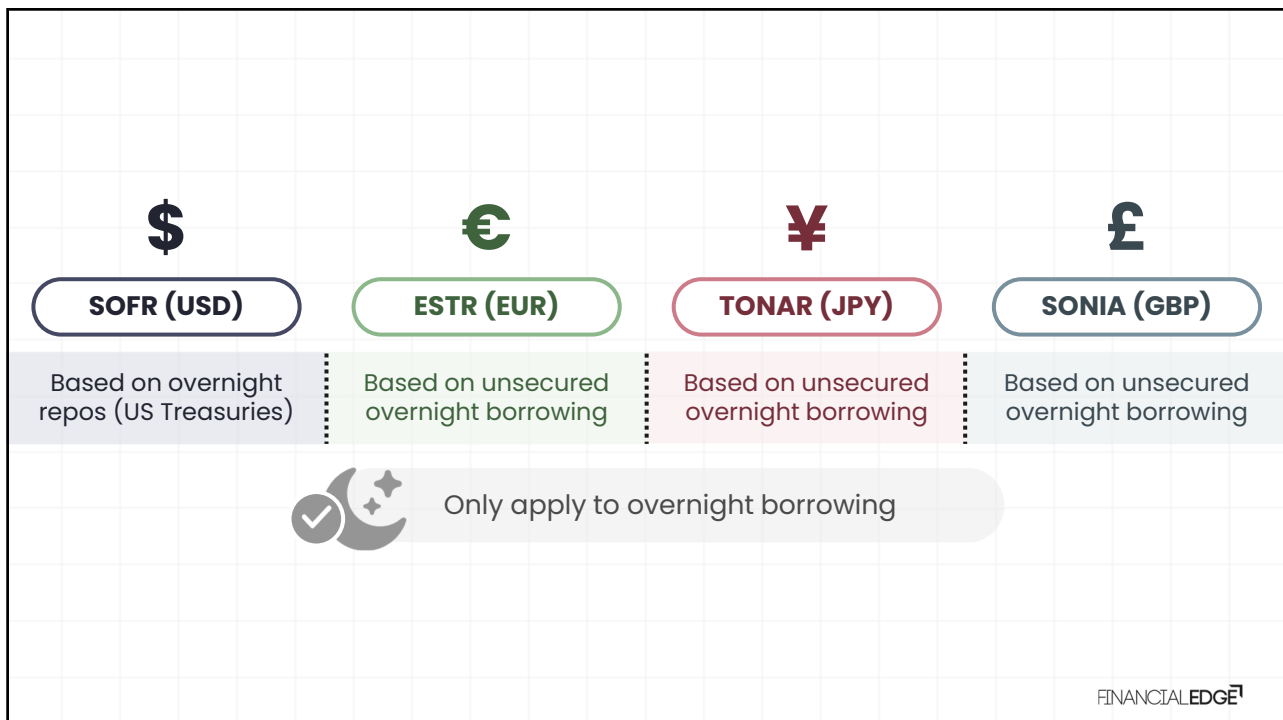
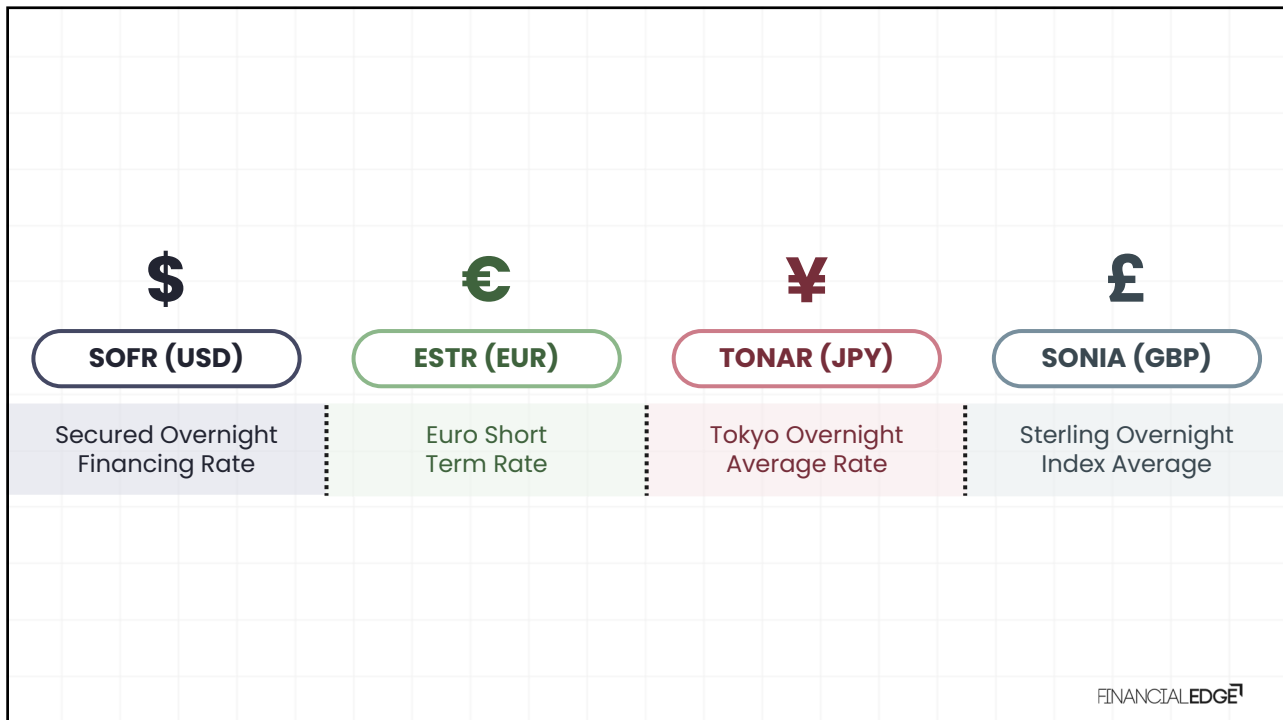


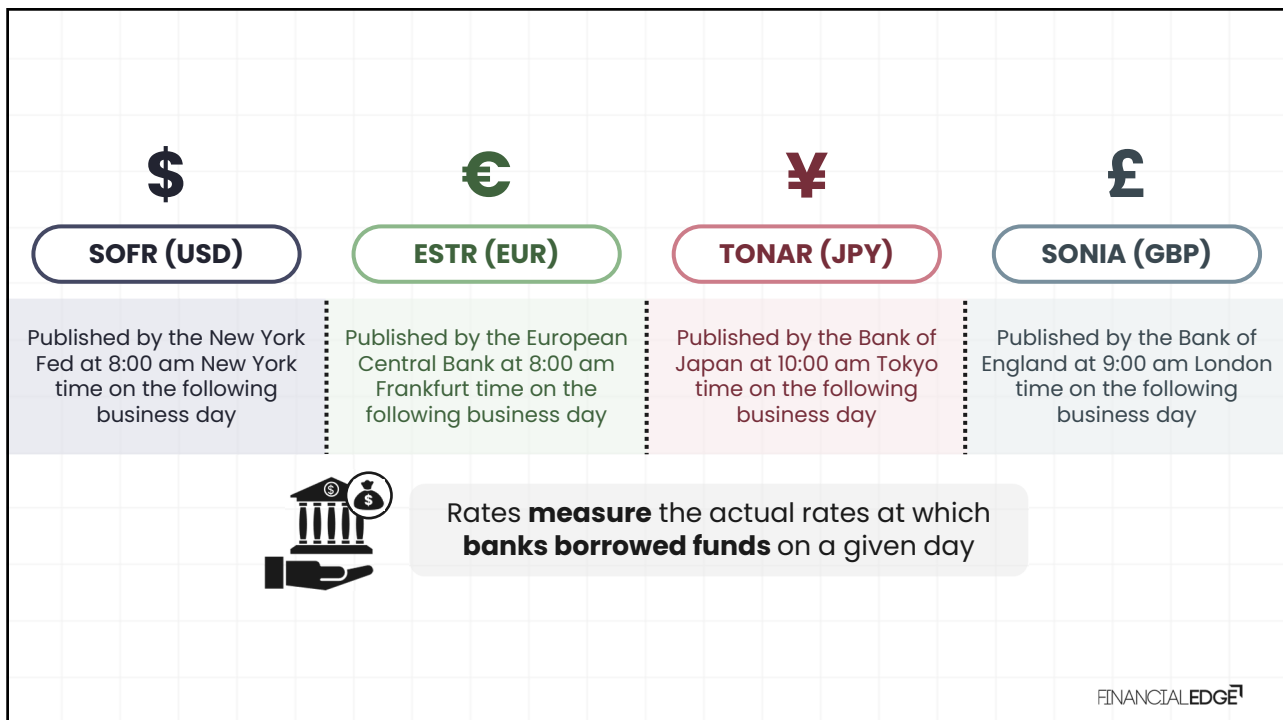
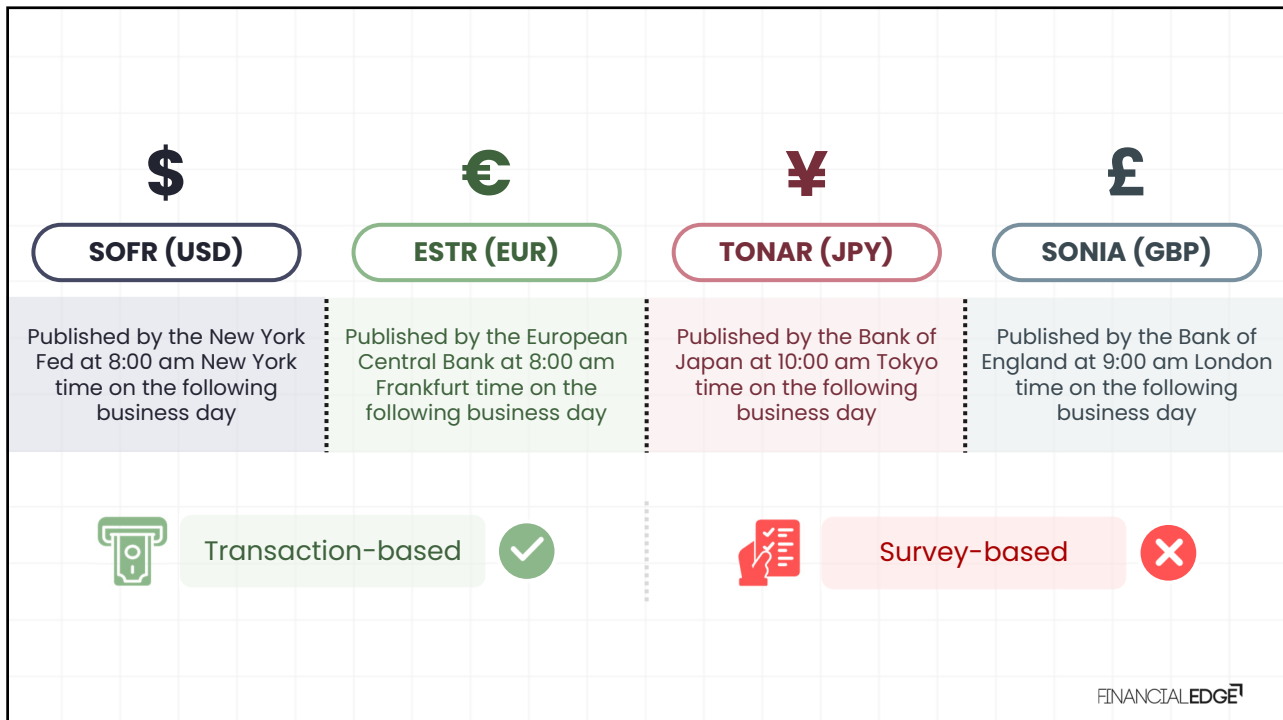
Overnight borrowing costs

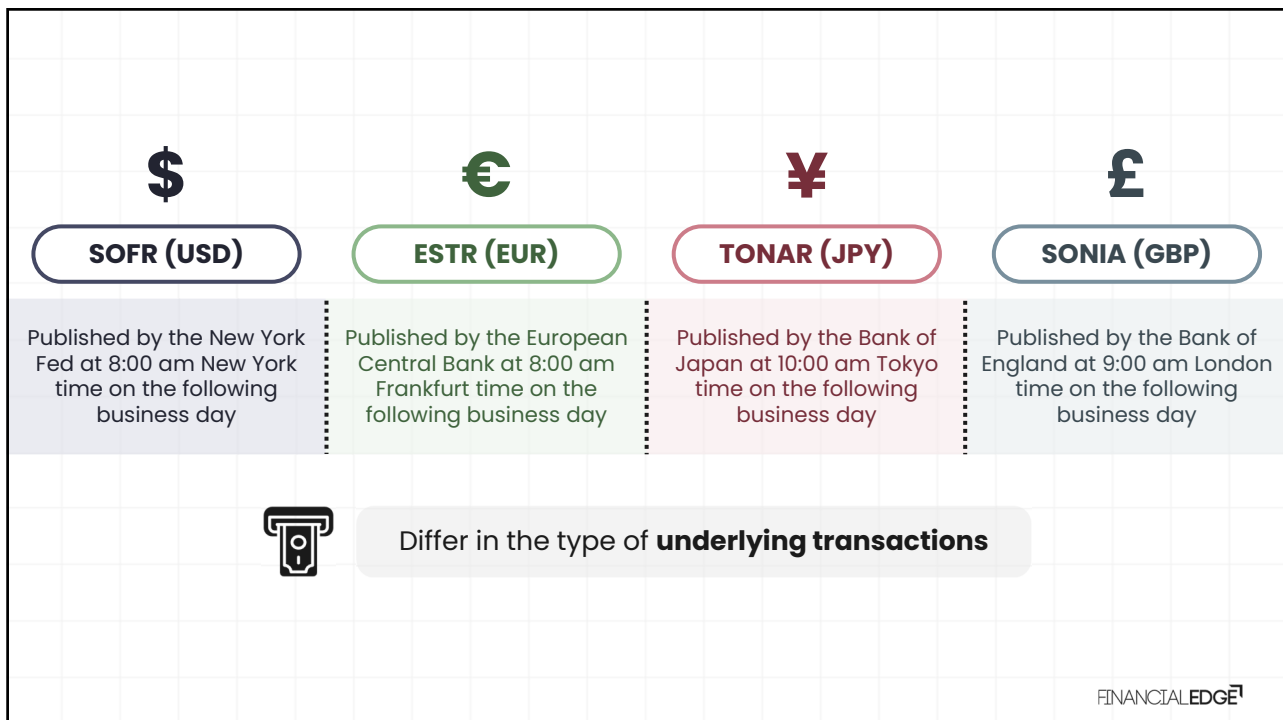
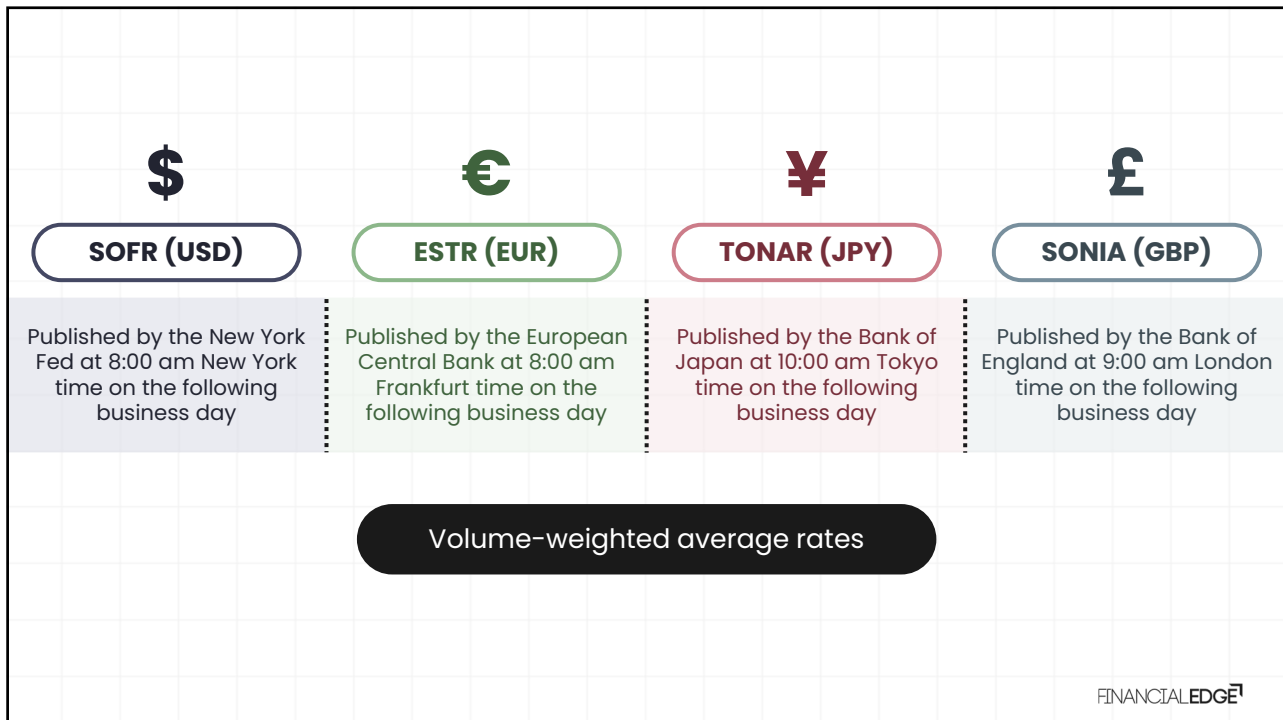
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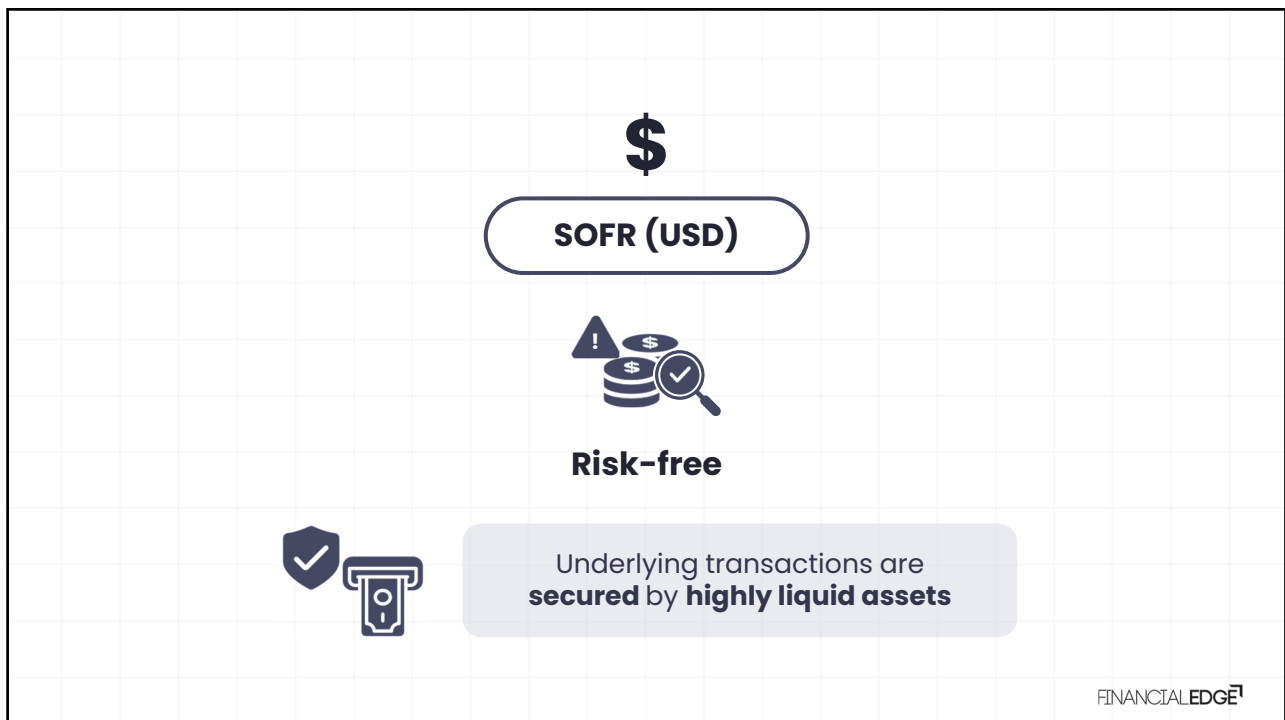
Near Risk Free Rates (RFRs)







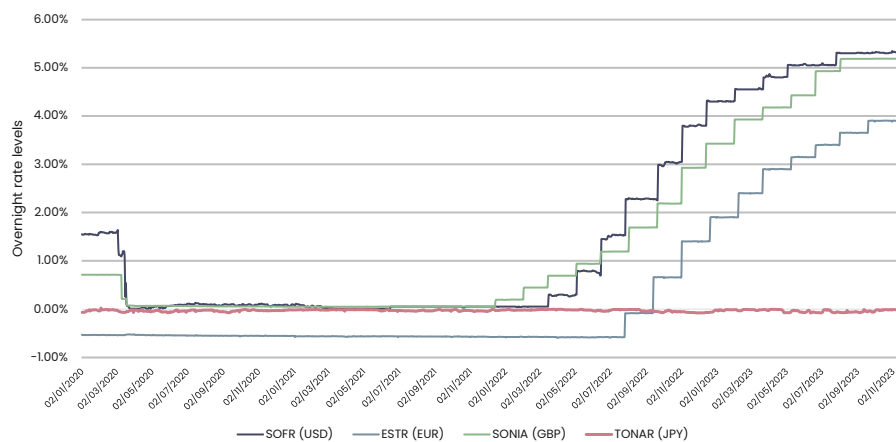
\$	€	¥	£
SOFR (USD)	ESTR (EUR)	TONAR (JPY)	SONIA (GBP)
Secured overnight financing rate	Euro Short Term Rate	Tokyo Overnight Average Rate	Sterling Overnight Index Average
Based on overnight repos (US Treasuries)	Based on unsecured overnight borrowing	Based on unsecured overnight borrowing	Based on unsecured overnight borrowing
Published by the New York Fed at 8:00 am New York time on the following business day	Published by the European Central Bank at 8:00 am Frankfurt time on the following business day	Published by the Bank of Japan at 10:00 am Tokyo time on the following business day	Published by the Bank of England at 9:00 am London time on the following business day

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The Link Between Central Bank Rates and RFRs

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Relationship between **central bank rates** and the **new Risk-Free Rates (RFRs)**

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Central bank rates

Represent rates that central banks charge commercial banks for **overnight loans**



Central bank raises its benchmark rate

Borrowing money becomes more expensive for banks



Banks pass higher costs to their clients

Mortgages

Business loans

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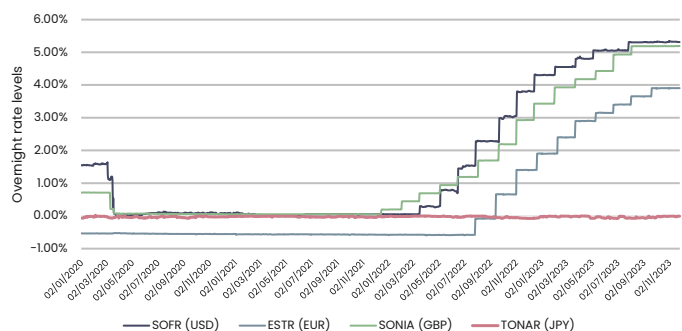
U.S. Federal Reserve

Rate hikes in 2022



Inflation

Raised its **benchmark multiple times** over the course of the year

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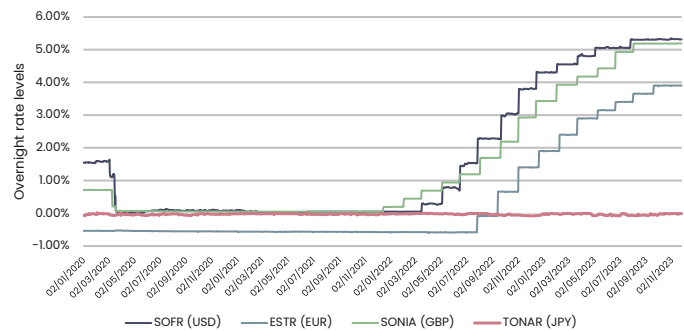
SOFR (Secured Overnight Financing Rate)

Increased



Higher borrowing costs

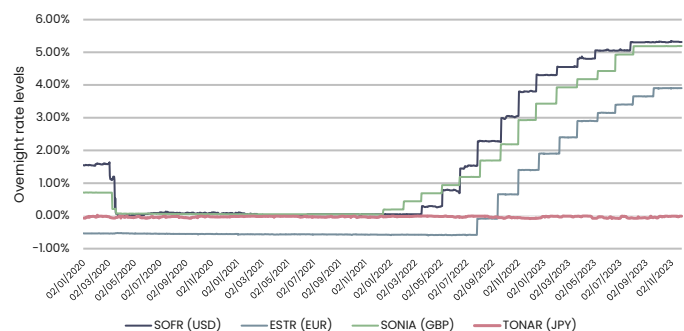
Strong link between **central bank policy** and **RFRs**
(risk free rate)

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Central bank rates

Overnight loans

RFRs (risk free rates) are
also overnight rates

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How do **central bank rates** influence **longer-term rates**?



Longer-term rates

Average of future **short-term (overnight) rates**

1 month term rate



Average of **overnight rates**
over the next month

Affects **short-term borrowing costs** directly



Central bank raises its overnight rate

May also change **longer-term borrowing costs** via a change in expectations



Central banks changing the
current **overnight rate**



Short-term borrowing costs



Longer-term interest rates

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