



QUANTITATIVE
FINANCE
SOCIETY

Introduction to Macro Investing



Brain Teaser

What is the **expected value** of the **largest** of **four dice rolls**?



Solution: Brain Teaser

The expected value is ~ 5.25 .

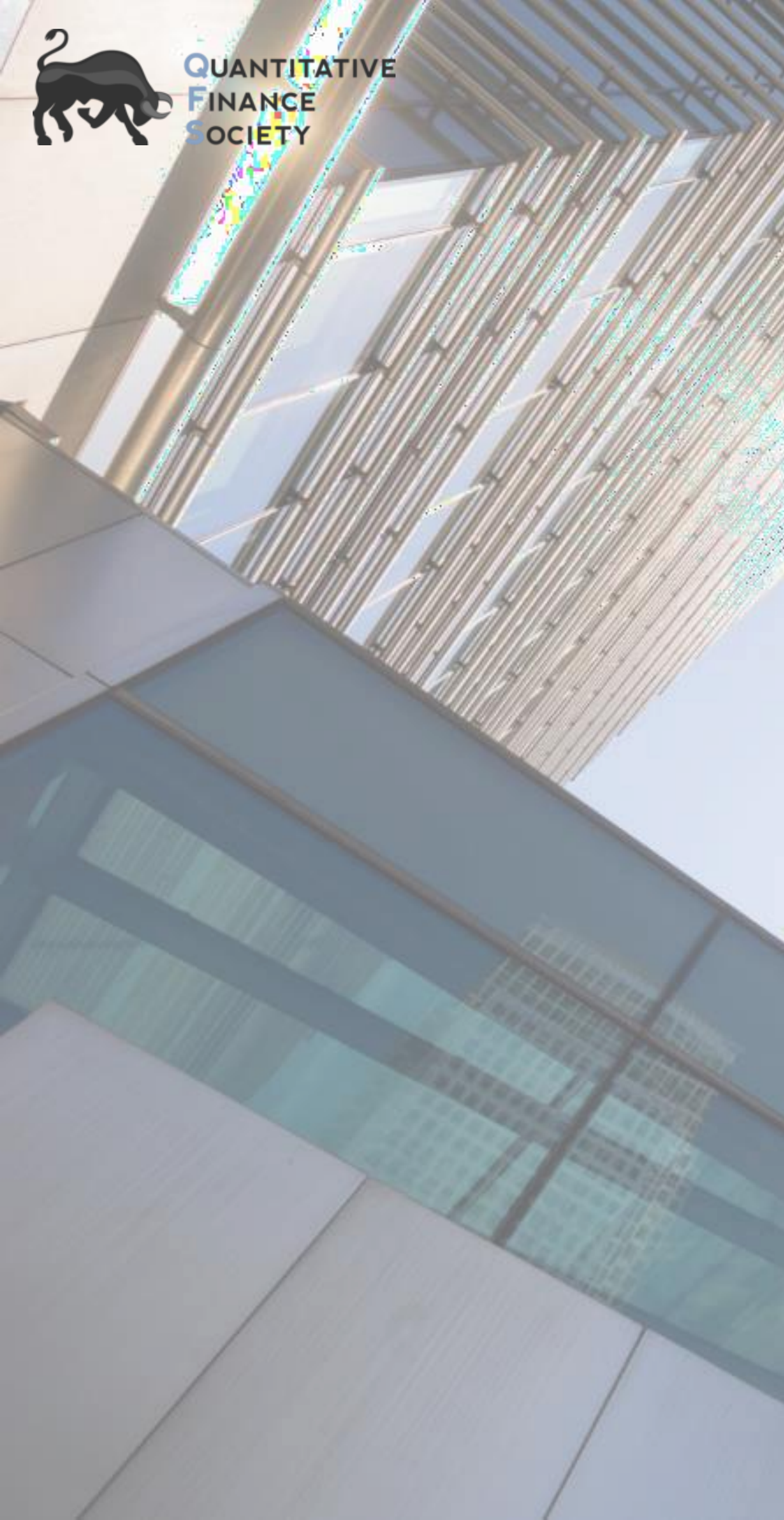
Let $P(X_i = x)$ be the **probability** that x is the **largest number in four rolls**. Thus, we have:

$$P(X_i = x) = P(X_i \leq x) - P(X_i \leq x - 1)$$

Thus, our probability is:

$$E[X] = \sum_1^6 x \frac{x^4 - (x - 1)^4}{6^4} = \frac{6797}{1296} \approx 5.24$$





Macro Investing

- ❖ Analyzing broad market trends, political events, and global economies
- ❖ Developing a view on how something should trade based on a well researched opinion
- ❖ Identifying potential mispricing's' in different asset classes and trading on it



Macro Investing Considerations

- ❖ What gives you **edge**?
- ❖ What is your time **horizon**?
- ❖ How do you want to **express** your trade?
- ❖ What are your trade **catalysts**?
- ❖ How much **movement is left** in your trade?
- ❖ How **liquid** is the market you're trading in?



Macro Asset Classes

- ❖ Fixed Income Products (Bonds)
- ❖ FX Products
- ❖ Rates Products
- ❖ Derivatives
- ❖ Commodities
- ❖ Equity Indices



Interest Rates

- ❖ **Central Banks set interest rates** for interbank borrowing (which flows into broad borrowing costs)
- ❖ Hawkish vs. Dovish
- ❖ What is the Neutral Rate?
- ❖ How many cuts will the Fed enact in the rest of 2024?

The **Fed** has a **mandate** to “**achieve maximum employment and keep prices stable**”



Fixed Income Products (Bonds)





Bond Terminology

- ❖ Face Value
- ❖ Principal
- ❖ Coupon
- ❖ Yield
- ❖ Premium
- ❖ Discount
- ❖ Par



Fixed Income Price Drivers

- ❖ Relationship between **bond price** and **yield**
- ❖ Indicator of **capital flows** in a country
- ❖ Moves on **economic data**, **geopolitical events**, **central bank policy** changes
- ❖ Good reflection of **“risk”** priced into a country

Time Value of Money

Is \$100 worth in your pocket more valuable today or a year from now? Why?

$$\text{Present Value} = \sum_1^T \frac{\text{Cash Flow}}{(1+r)^t}$$

$$\text{Bond Price} = \frac{\text{Principal}}{(1+YTM)^T} + \sum_1^T \frac{\text{Coupon}}{(1+YTM)^t}$$

$$\text{Perpetuity} = \frac{\text{Cash Flow}}{1 - \frac{1}{1+r}}$$

Zero-Coupon Bonds

- ❖ **Zero-Coupon Bonds**, or “Zeroes,” are bonds that **do not pay a coupon** and **pay a single cash flow** equal to face value at maturity.
- ❖ We can use **Zeroes** and the **no-arbitrage principal** to **determine the price** of a coupon bond.

$$\text{Present Value} = \frac{\text{Cash Flow}}{(1 + r)^T}$$

Duration

- ❖ Three Definitions:
 - ❖ **Percent change** in the **price** of a bond given a **1% interest rate** change.
 - ❖ **Average maturity** of cash flows, **weighted** by **present value**.
 - ❖ **Holding period** over which a bondholder will be **compensated** for his/her **investment**.

- ❖ When **rates rise**, bond prices go **down** (and vice versa):
 - ❖ Future cash flows are discounted more.
 - ❖ Lower coupon bonds are worth less relative to higher coupon bonds.

Duration (cont.)

- ❖ Zero Duration (we take the derivative):

$$Price_{zero} = \frac{1}{\left(1 + \frac{r}{2}\right)^{2t}}$$

$$Dollar\ Duration_{zero} = -1 \cdot \left(\frac{-t}{\left(1 + \frac{r}{2}\right)^{2t+1}} \right)$$

Note: Dollar Duration is additive – you can find the overall duration of a portfolio.

Convexity

- ❖ Measure of the **curvature** of the value of a bond as a function of interest rates.
- ❖ Correction for the fact that the **price-rate function is non-linear**.

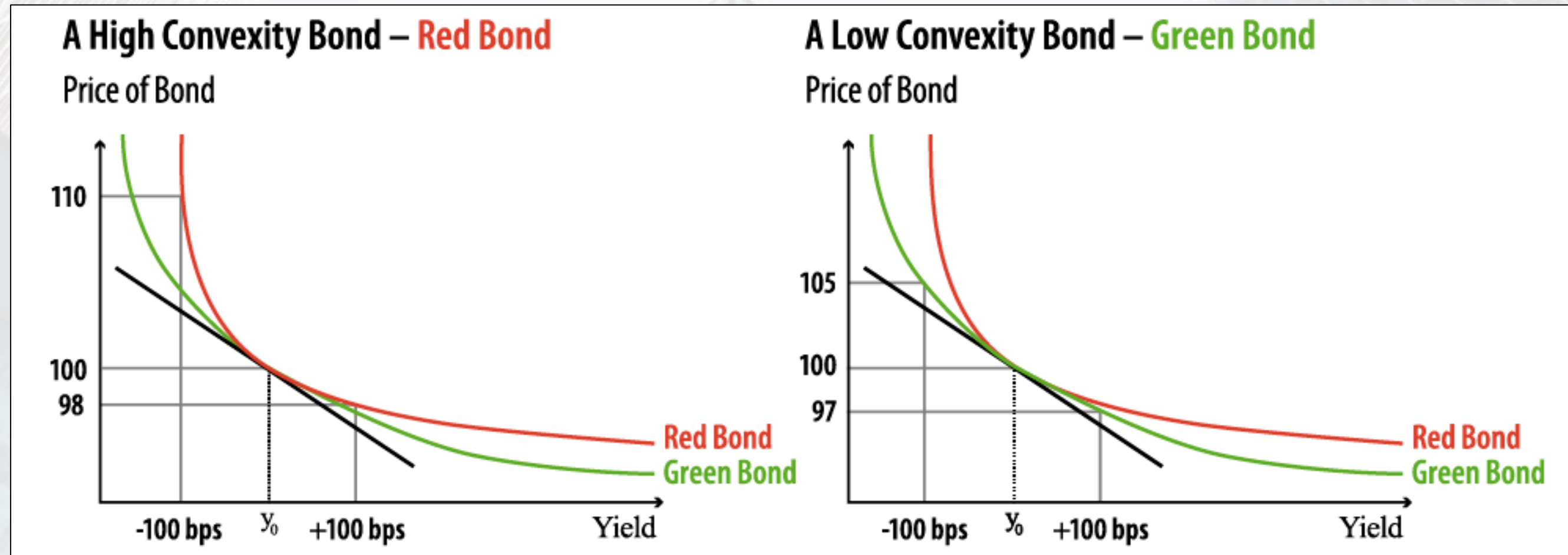
Via Taylor Series:

$$\Delta bond_{price} \approx f'(x_0) \cdot (x - x_0) + \frac{1}{2} \cdot f''(x_0) \cdot (x - x_0)^2$$

Dollar Convexity (Zero):

$$d_t''(r_t) = \frac{t^2 + \frac{t}{2}}{\left(1 + \frac{r_t}{2}\right)^{2t+2}}$$

Convexity (cont.)



Law of One Price & U.S. Treasuries

- ❖ Two assets which offer the same cash flows must sell for the same price.
- ❖ In the U.S., **government bonds** can be “**stripped**” into various cash flows to be traded as zeroes – STRIPS program

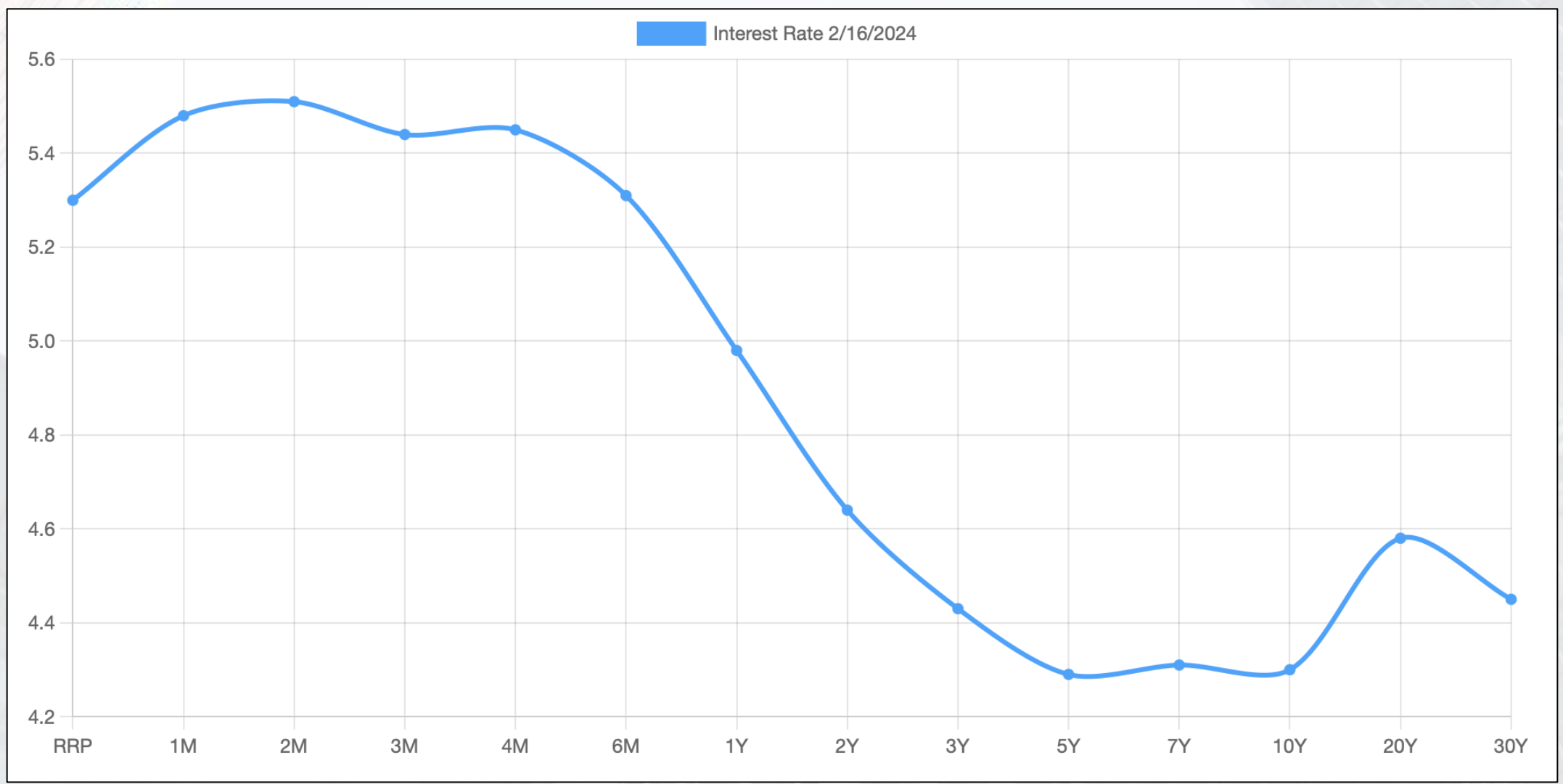
Limits to Arbitrage:

- ❖ Transaction costs
- ❖ Capital constraints
- ❖ Barriers to trading across markets

U.S. Treasuries Usages

- ❖ **Repo Lending/Borrowing** – (treasuries serve as **collateral**)
- ❖ **Regulated Holdings** (e.g., banks, pension funds, etc.)
- ❖ **Speculation**

U.S. Yield Curve



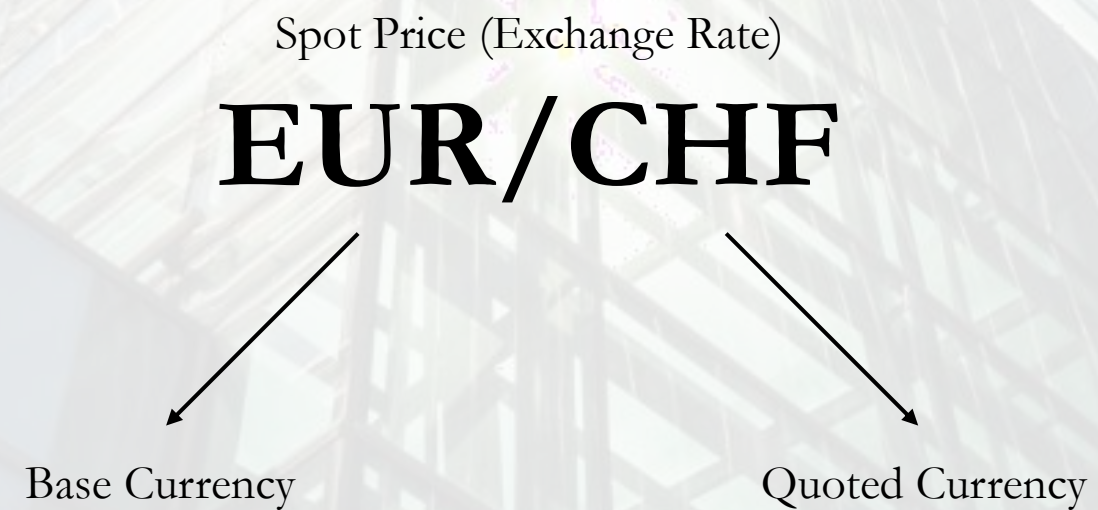


FX Products



Forex Pairs

- ❖ **Largest, most liquid market** in the world (daily traded value is over \$5 trillion)
- ❖ Forex Pairs are **traded in pairs**
- ❖ **Value is relative** from **one currency** to another / **account for carry**



FX Price Drivers

- ❖ Supply and Demand
- ❖ Importance of currencies: Use **currencies** to trade a lot of **other ideas**
- ❖ Risk-Off Currencies: Currencies that perform well in environments where investors/traders are **more focused on protecting capital**
- ❖ Risk-On Currencies: Currencies that tend to outperform when **risk appetite is high**

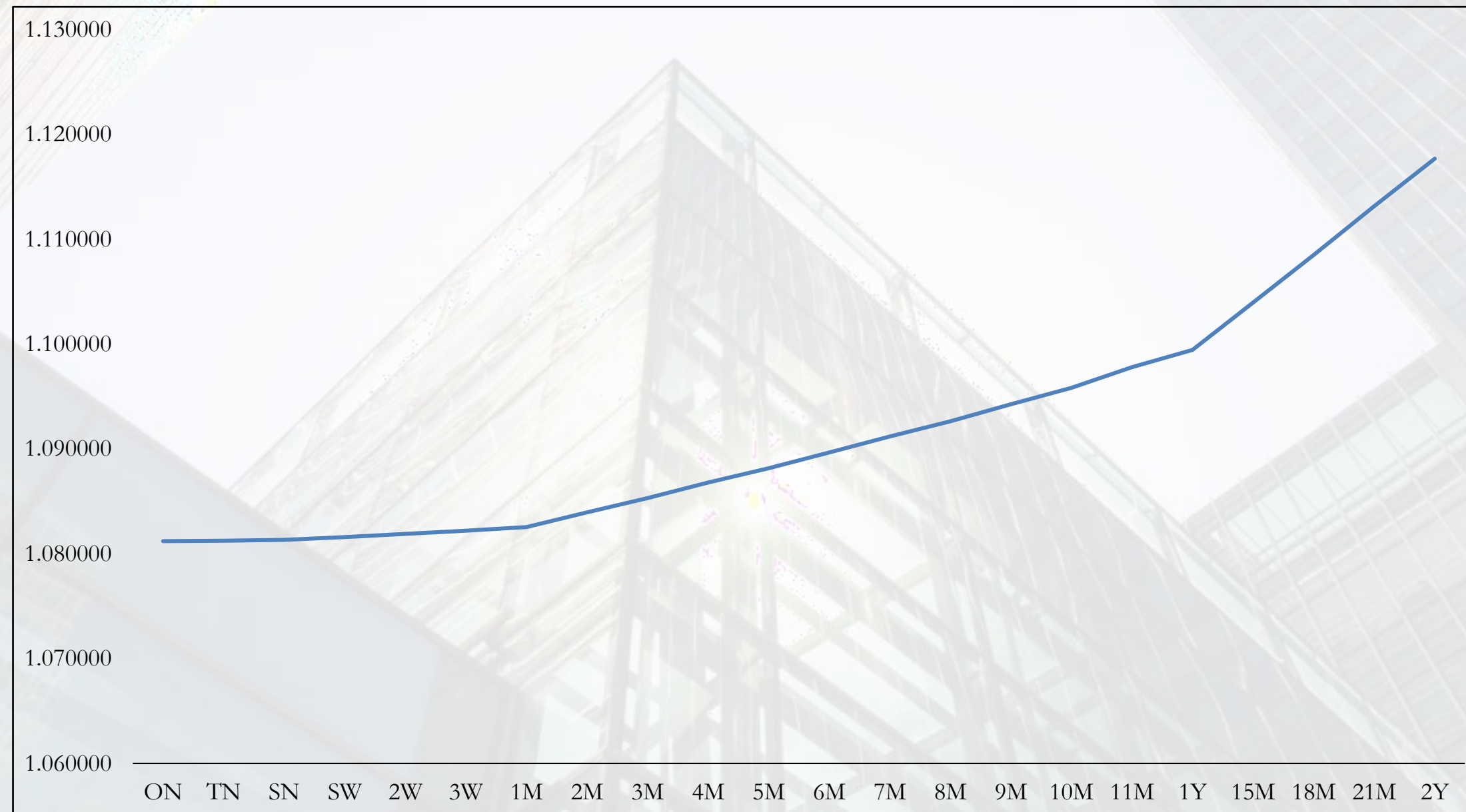
FX Forwards

- ❖ **Time** is an **additional dimension** traders think about
- ❖ **Forwards** are an agreement to **buy/sell** some amount of currency in the **future at an agreed rate**
- ❖ The **shape** of the forwards curve is roughly **governed by CIRP/UIRP**

CIRP & UIRP

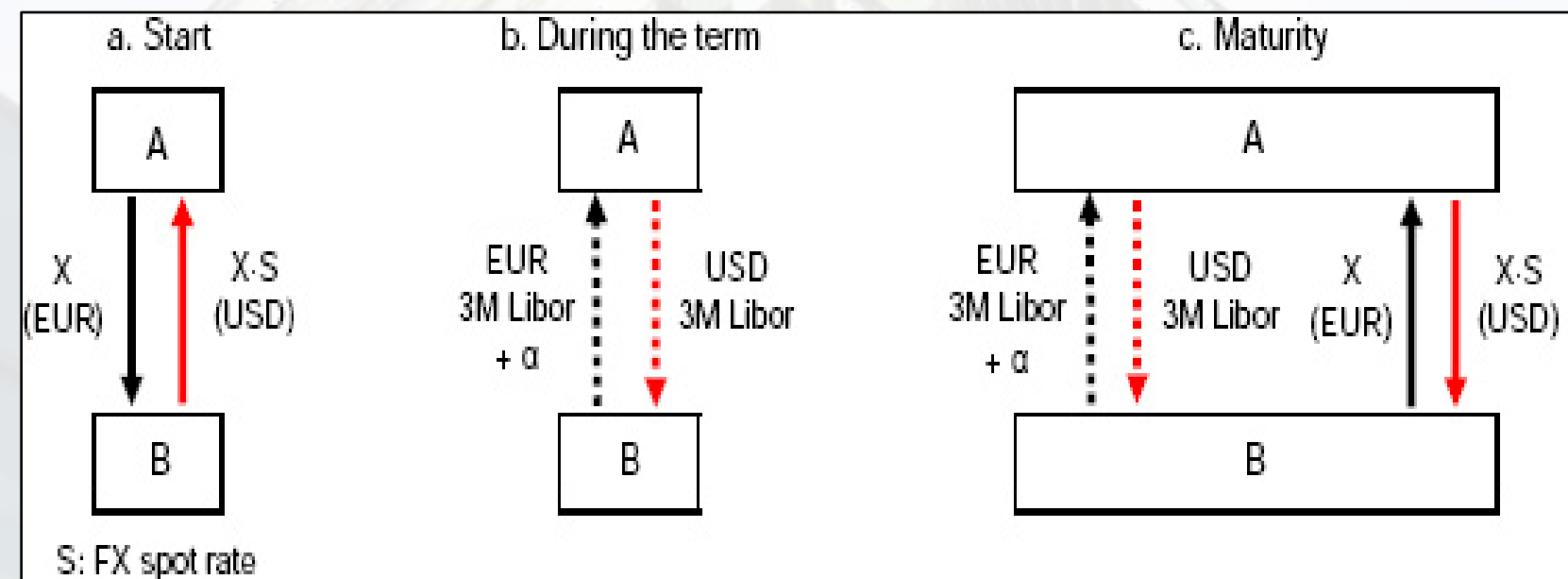
- ❖ What is carry?
- ❖ Covered Interest Rate Parity (CIRP):
 - ❖ $\frac{F}{S} = \frac{1+r}{1+r^*}$
- ❖ Uncovered Interest Rate Parity (UIRP):
 - ❖ $F_0 = S_0 \frac{1+r}{1+r^*}$
- ❖ Do CIRP and UIRP hold in real life? Why?

EUR/USD Forward Curve

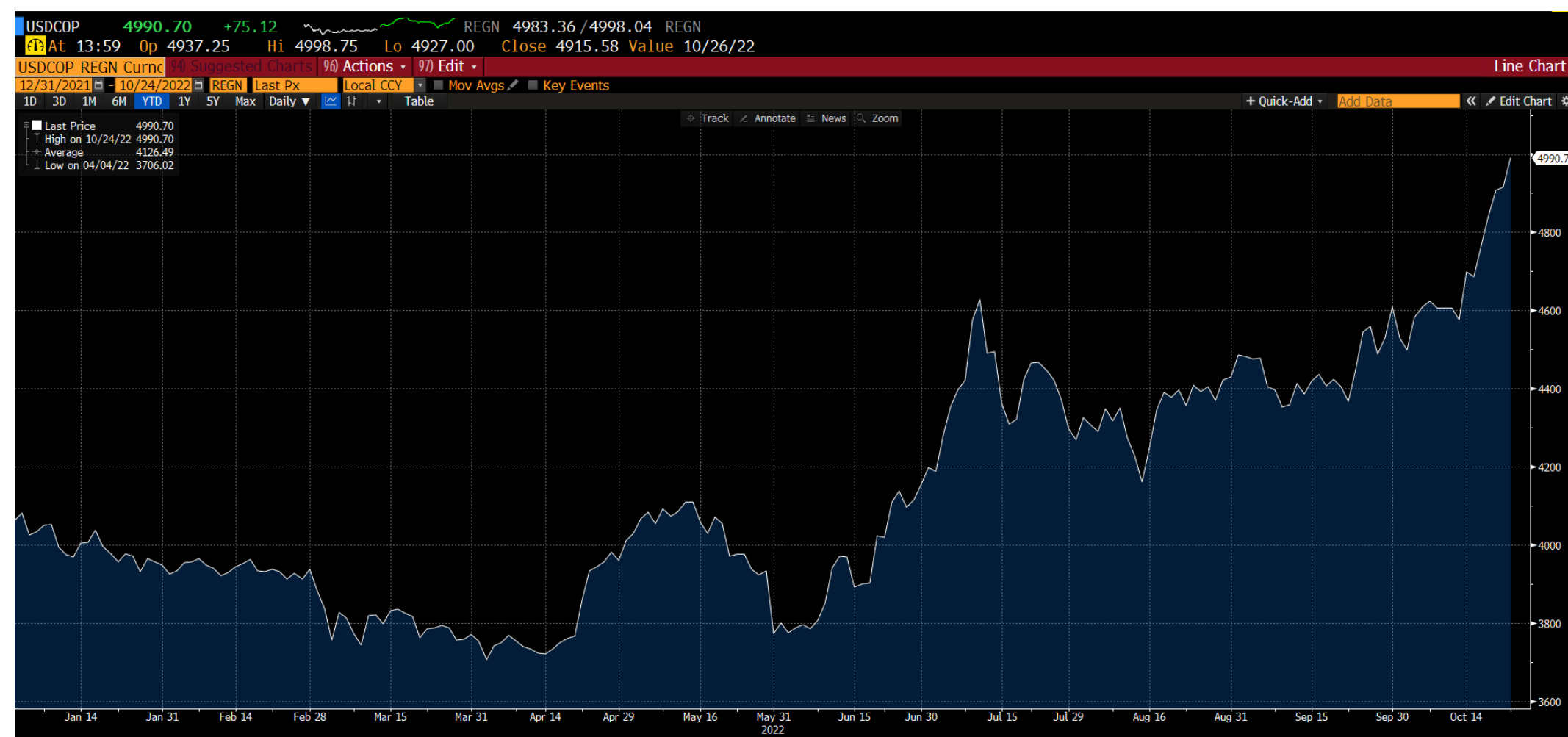


Alternative FX Products

- ❖ Cross Currency Basis Swaps (XCCY): exchange of principal and interest payments, denominated in different currencies, by two different parties
- ❖ Non-Deliverable Forwards (NDF): used to express view on a market with capital constraint



Long USD/COP



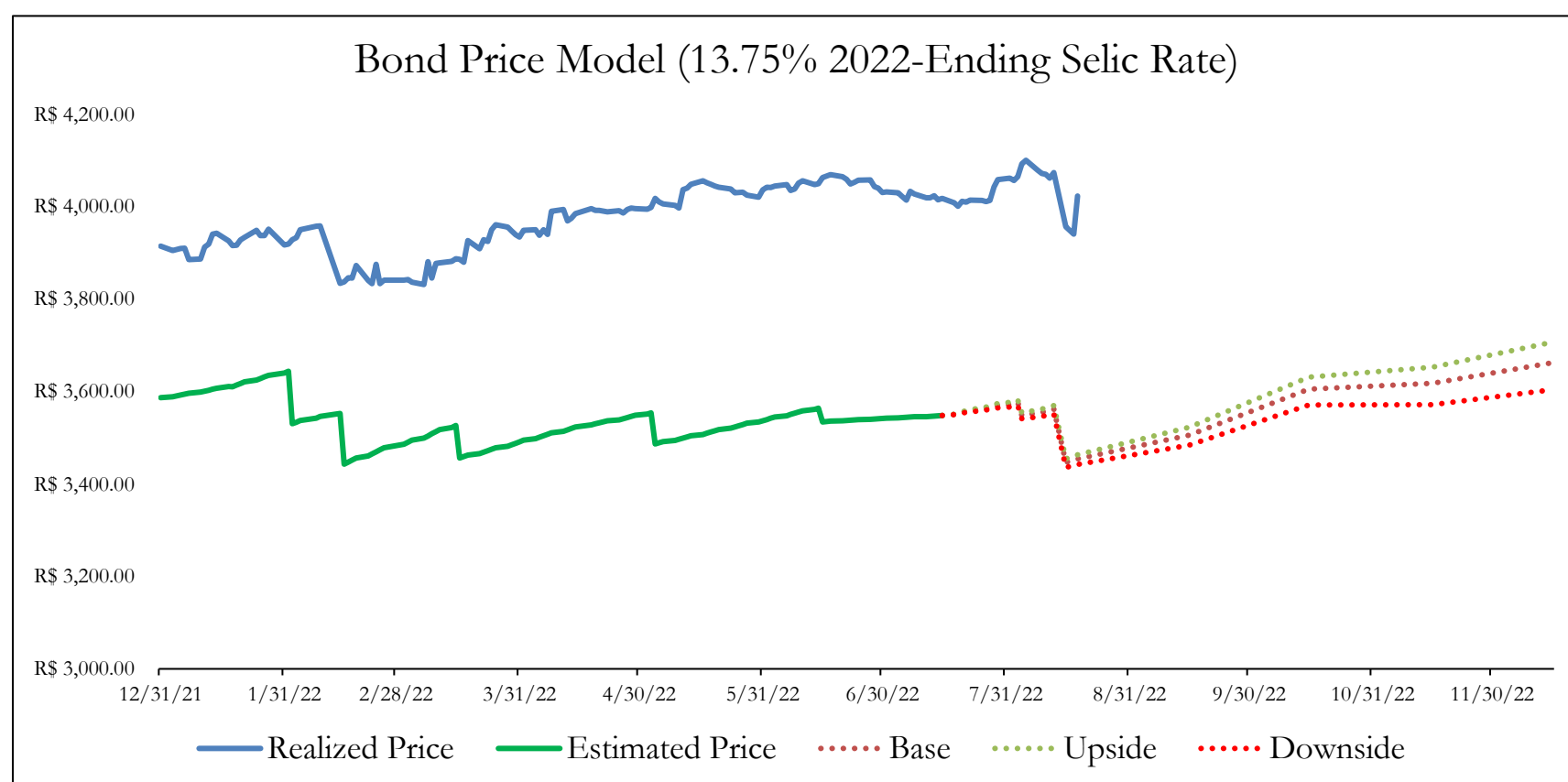
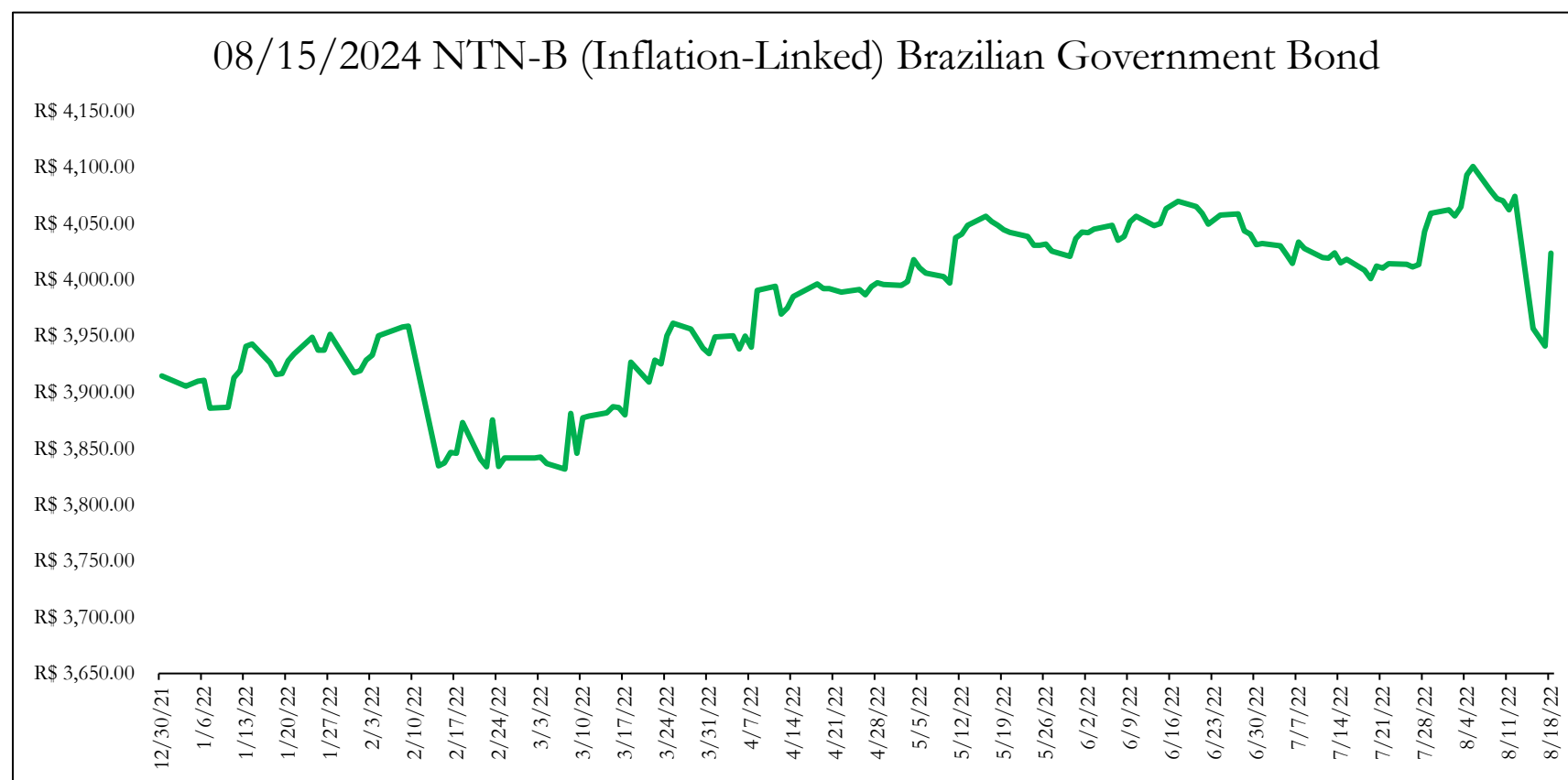
Key Points:

- ❖ **COP** has weakened due to President Gustavo Petro's **left-leaning policies** (e.g., tax reforms, wage increases, etc.)
- ❖ The **Banco de la República (BanRep)** will remain **dovish** as it remains under political pressure from Petro.
- ❖ **Foreigners** will continue to **hedge Colombian COLTES bonds** via **short COP** positions.

Recommendation:

- ❖ Recommend a **long position in USD/COP**

Long the 2024 NTN-B (Inflation-Linked) Brazilian Government Bond



Key Points:

- ❖ Brazil faces **runaway** and **de-anchoring inflation expectations** as the BCB plans to end its hiking cycle.
- ❖ The 2022 General Election has prompted incumbent President Jair Bolsonaro to **accelerate populist spending policies**.
- ❖ **Local investors** have and will continue to rebalance their portfolios away from risky assets (equities, fixed-coupon bonds) and **into floating notes** as they seek to hedge against continued inflation and economic risks

Recommendation:

- ❖ As such, I recommend a **long position** in the **Real-denominated 08/15/2024 NTN-B (Inflation-Linked) Brazilian Government Bond**



Links

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Get in Touch

Feel free to reach out to us over Facebook or email if you have any questions

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