

BOND INVESTMENT STRATEGY

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CONTENTS

Portfolio Construction


- Global Market Outlook
- Portfolio Distribution

Strategy

- Strategy
- Comparison
- Monte Carlo Simulation

Risk Considerations

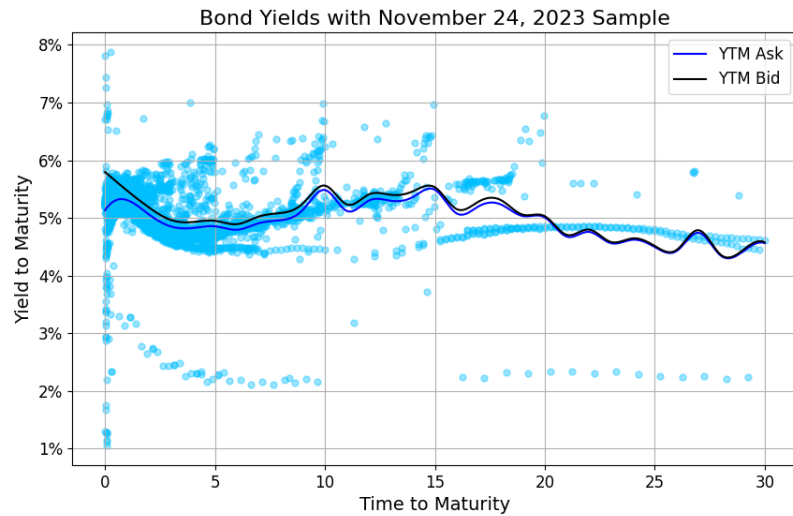
- Inflation and Interest Rate Risk
- Liquidity Risk
- Credit Risk
- Exchange Rate Risk
- Geopolitical Risk



PORTFOLIO CONSTRUCTION

GLOBAL MARKET OUTLOOK

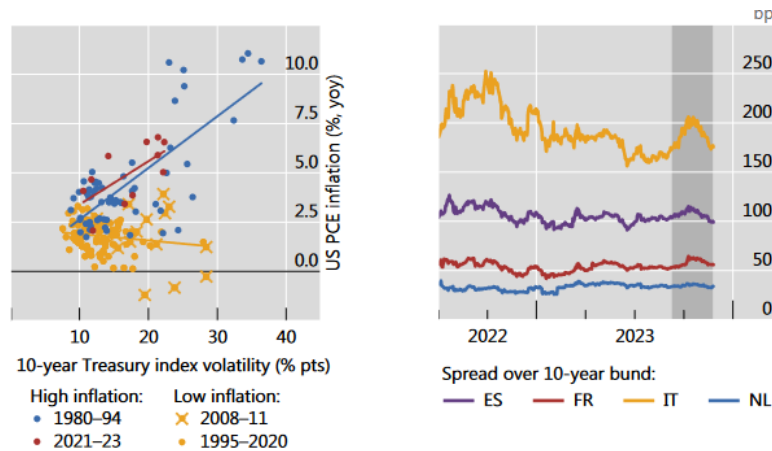
- Inflation ↓ ↔ Investor Sentiment ↑ ↔ Interest Rates ↓
- Political agenda: Red Sea conflict, Taiwan elections and China, Russia-Ukraine War...



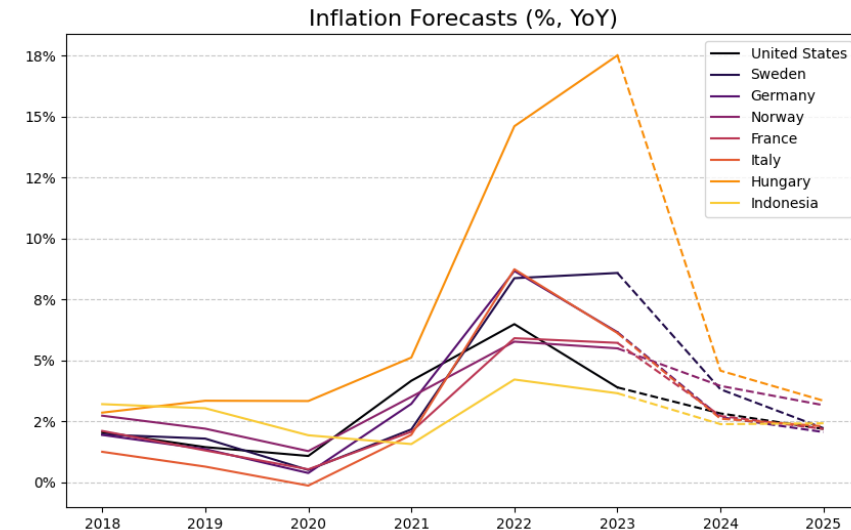
Data Source: Bloomberg Terminal Sample



Source: CNN Business



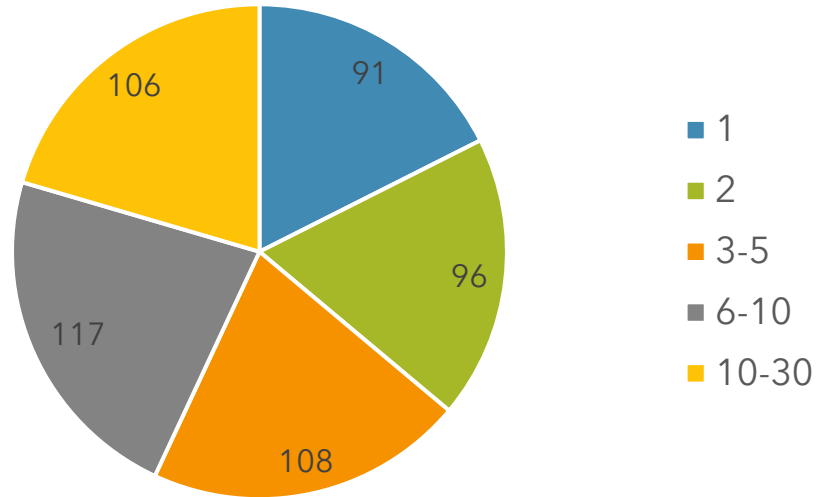
Source: Bank of International Settlements (BIS)



Data Source: OECD Economic Outlook, November 2023

PORTFOLIO DISTRIBUTION

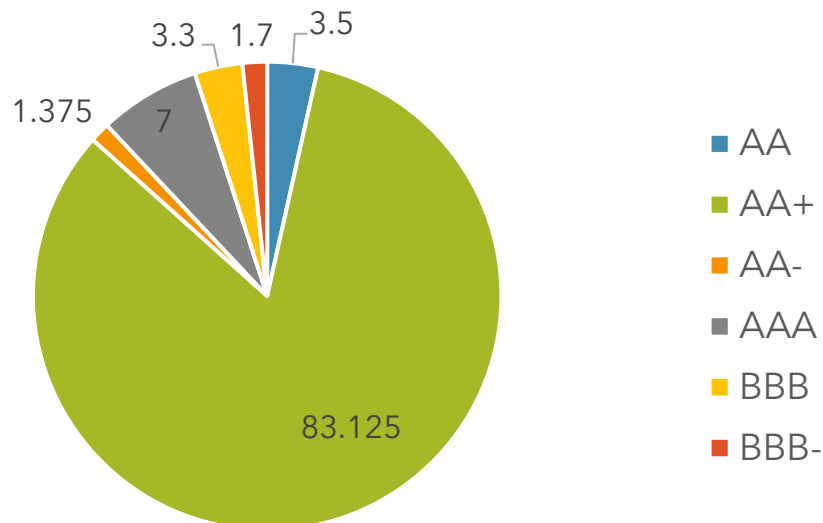
Time-to-Maturity



Bond Selection Criteria:

- Geographical Diversification (USA, Europe, EMs...)
- >80% is less than 10-years
- 1-yr US Treasury → discount & zero-coupon
- **Expectation:**
Steepening yield curve
→ decline in short-term rates

Credit Ratings



Summary:

- 75% → United States
- Time-to-Maturity : 4.38 years
- *Rating Distribution:*
AA+ : 83%
BBB & BBB- : 5%
- **Modified Duration:** 4.17
- **Convexity:** 42.58
- **DV01:** 0.2951

... A MORE COMPLETE PICTURE

Issuer / Bond	Coupon Rate	Yield-to-Maturity	Years to Maturity	Modified Duration	DV01	Portfolio Weight	Implied PD
United States Treasury Note/Bond	2.39%	4.742%	13.1	9.32	0.7140	29.8%	0.95%
United States Treasury Bill	0%	5.356%	1	0.92	0.9233	10%	0.95%
US Treasury Inflation Indexed Bonds	1.03%	2.285%	22.2	19.61	1.4730	0.8%	0.95%
Federal Farm Credit Banks Funding Corp	2.50%	5.056%	5.48	4.85	0.4262	18.3%	0.95%
Federal Home Loan Banks	2.50%	4.994%	4.96	4.40	0.3922	16.2%	0.95%
German Bonds (<i>Multiple Issuers</i>)	2.37%	4.186%	5.5	5.09	0.4546	5%	0.34%
French Bonds (<i>Multiple Issuers</i>)	2.38%	5.471%	3.1	2.86	0.2605	5%	0.48%
Swedish Bonds (<i>Multiple Issuers</i>)	2.78%	5.417%	1.9	1.57	0.1522	5%	0.29%
Norwegian Bonds (<i>Multiple Issuers</i>)	2.49%	4.893%	3.4	3.21	0.2934	5%	0.26%
Italian Bonds (<i>Multiple Issuers</i>)	4.73%	5.808%	5.5	4.63	0.4435	1%	1.67%
Hungarian Bonds (<i>Multiple Issuers</i>)	3.92%	5.757%	4.6	3.98	0.3716	1%	2.69%
Peruvian Bonds (<i>Multiple Issuers</i>)	4.16%	5.448%	4.2	3.77	0.3480	1%	1.38%
Indonesian Bonds (<i>Multiple Issuers</i>)	4.03%	5.674%	9.5	6.40	0.5648	1%	1.31%
Philippines Bonds (<i>Multiple Issuers</i>)	4.45%	5.039%	5.2	4.50	0.4247	1%	1.19%



STRATEGY

STRATEGY

- **No “callable” and “putable” bonds**
 - Anticipating interest rate cuts after 2024Q2
 - “callable”: cheaper re-financing for issuers → increasing reinvestment risk
 - “putable”: declining rates → less value of put option
- **Yield curve** starts steepening, but not fast → “riding the yield curve” with 2-yrs
- **<= US 1-yrs:** discount bonds → expected return: 5.43% (without coupons)
- **Geographical diversification:** United States, Europe, Peru, Philippines, Indonesia...

STRATEGY

- “Key interest rates are likely to fall significantly in 2024. However, this **does not necessarily mean that yields will fall** and prices on the bond markets will rise.”
- *Börse Frankfurt (on German bonds)*
- “The baseline view is for the **2yr to get to 3% and for the 10yr to get to 4%**, with the risk of an overshoot to the downside, as a call for 2024. The 30yr likely tracks the 10yr to a point, but is unlikely to get much below 4%, resulting in net 10/30yr steepening, likely targeting 30-50bp.”
- *Padhraic Garvey, CFA (ING Think)*
- “Yields for emerging market [...] Even without duration gains, there may still be reward available from an increase in the value of an investment over time.”
- *Allianz Global Investors, “2024: a strong year for emerging market debt?”*

COMPARISON

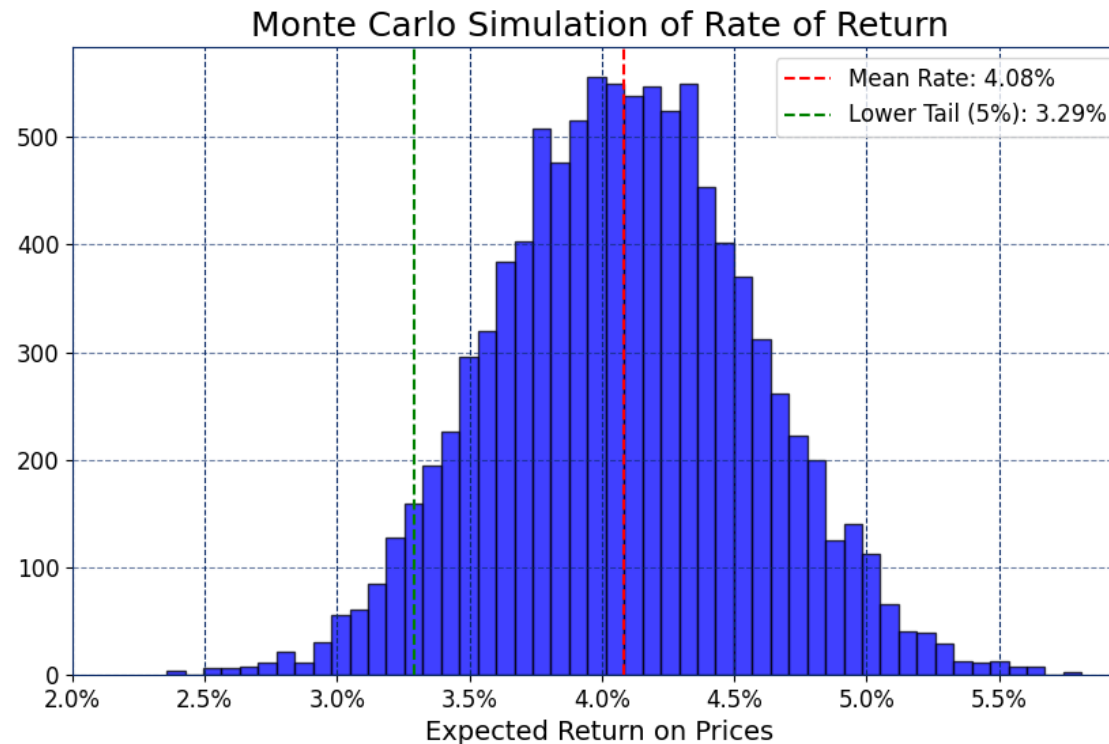
- Similar yield-to-maturity level with Bond ETFs
- On average:
 - higher credit rating compared to counterparts
 - lower coupon rate → interest rate expectations → duration gains

Bond Fund	YTM	Weighted Price	Weighted Coupon	Avg Credit Rating (surveyed)	Modified Duration
JPMorgan Government Bond I	5.08	88.79	2.90	AAA	-
iShares Core Total USD Bond ETF	4.80	92.16	3.43	A+	6.11
Vanguard Total Bond Market Index ETF	5.00	92.85	3.21	AA	-
Vanguard Total International Bond ETF	5.29	93.87	2.26	A+	-
Schwab Short-Term US Treasury ETF	5.10	96.88	2.48	AA	1.88
PIMCO Diversified Inc Instl	7.87	87.06	4.96	BBB+	5.07
TankX Bond Portfolio Proposal	4.97	92.98	2.07	AA+	4.17

Data Source: Morningstar

MC SIMULATION FOR INTEREST RATE CHANGES

- Expected Return: 4.08%
- **Important Restrictions:**
 - Assumes a **uniform distribution** of rate changes within range of -100 bps and +50 bps
 - No coupon payments and does **not** consider exchange rate volatility



TECHNICAL ANALYSIS FOR SHORT-TERM YIELD MOVEMENTS



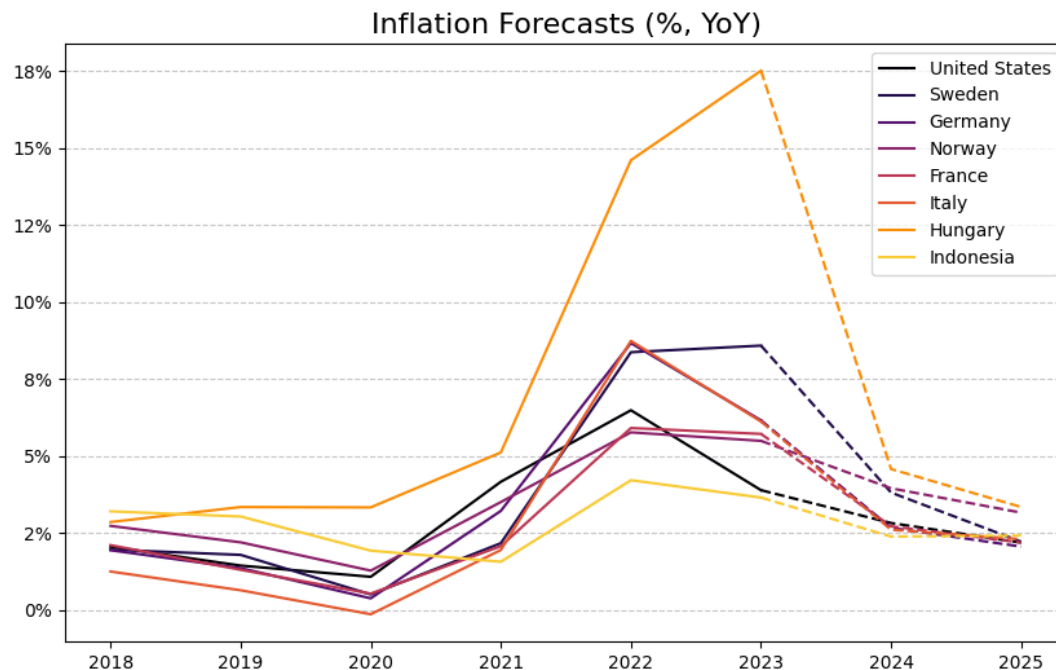
- **Further Investigation:**
Using Python's `mplfinance` and `yfinance`, could the US yield movements be predictable?
- **Trend Indicator:** Moving Averages...
- **Mean-Reversion:** Bollinger Bands...
- **Momentum Indicators:** ADX, RSI...



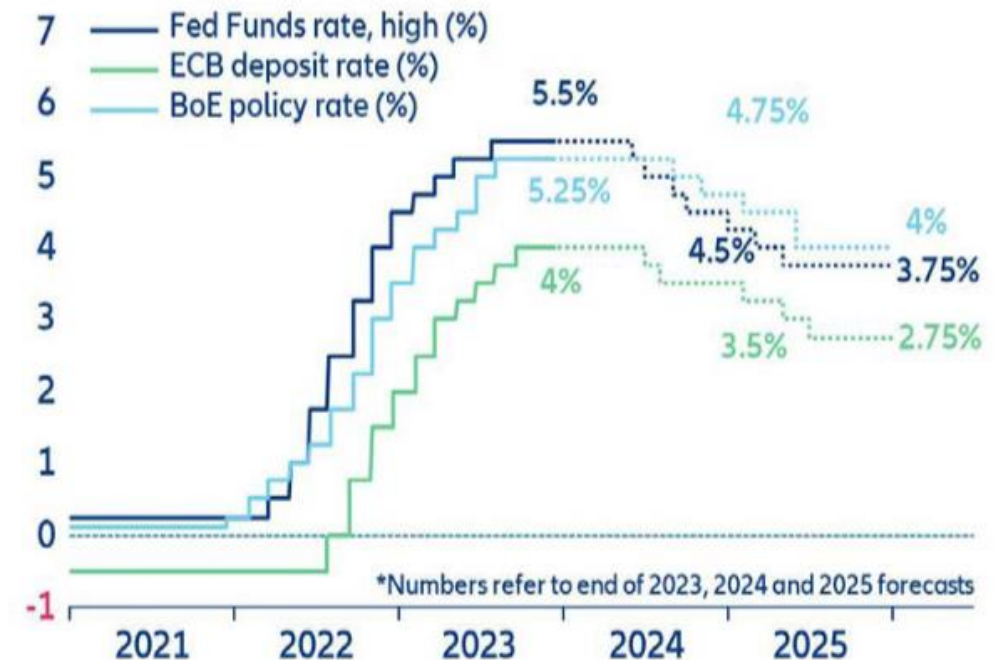
RISK CONSIDERATIONS

INFLATION AND INTEREST RATE RISK

- Even though risks persists, **inflation started to cool down**
- Starting from 2024Q2, interest rate cuts may start
- **Expectation:** decline of the yields of shorter-terms, advantage with duration gains



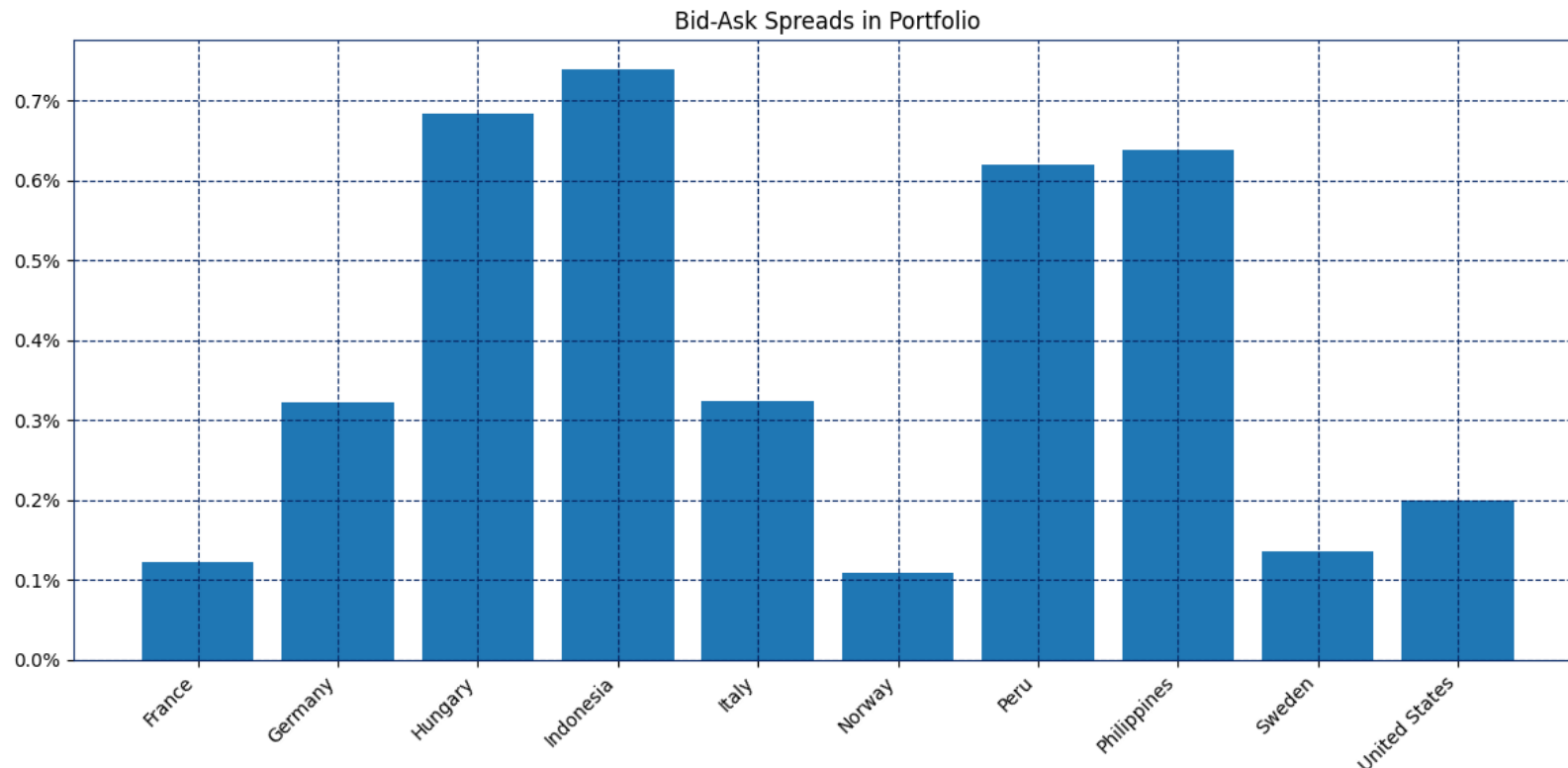
Data Source: OECD Economic Outlook, November 2023



Source: Allianz SE, Global Economic Outlook 2023-25

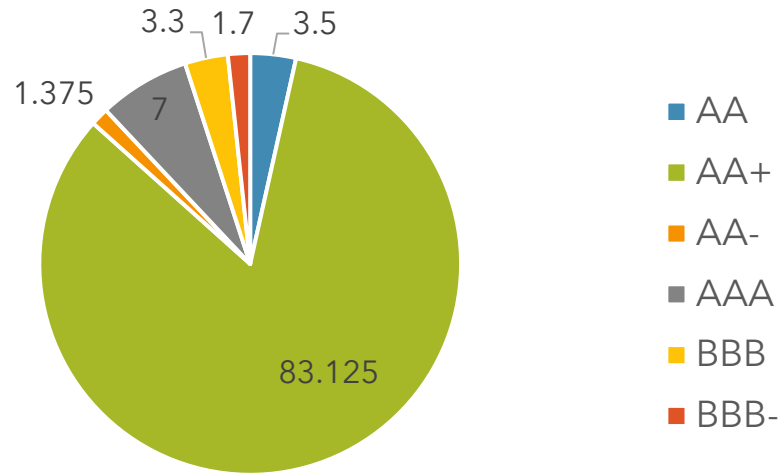
LIQUIDITY RISK

- Given the cross-sectional nature of data, the liquidity proxy is: **Bid-Ask Spread**
- Selected method for the liquidity proxy is: $\frac{\text{Bid Price} - \text{Ask Price}}{\text{Bid Price}} \times 100$
- Average bid-ask spread of the portfolio: **0.29%**
- Average bid-ask price difference is: **2.63\$**



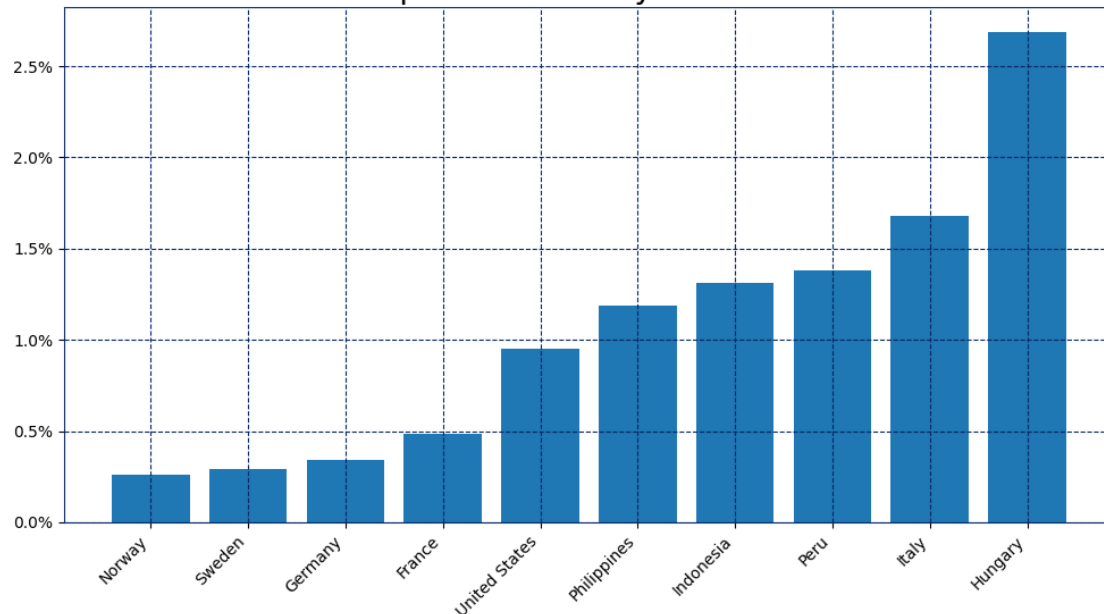
CREDIT RISK

Credit Ratings

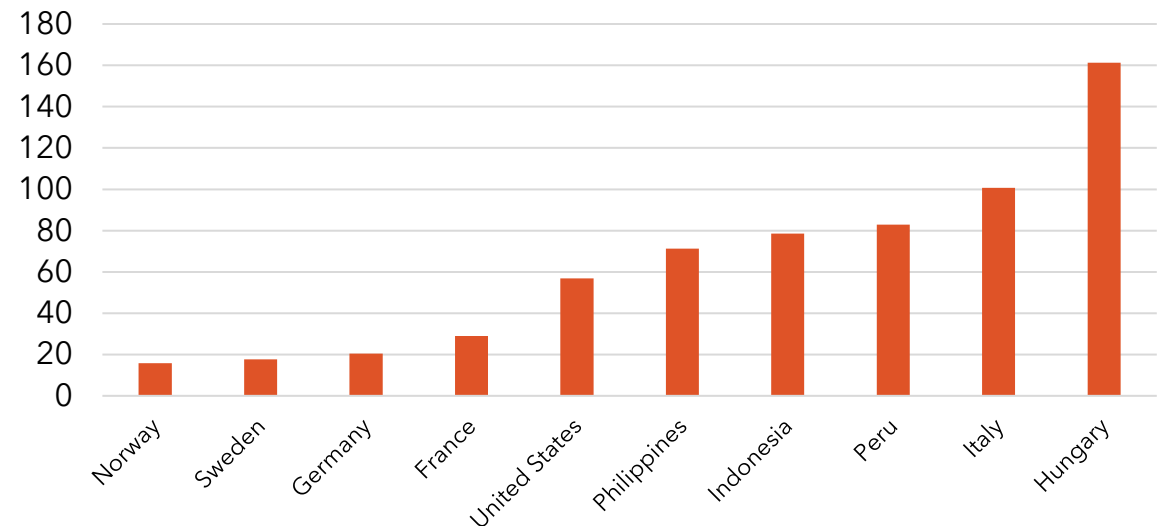


- **High credit rating:** AA+ \geq 90%
- Except Hungary, no implied PD above 2%
- Due to time constraints, the missing parts:
 - “Negative basis trade” opportunities
 - Credit risk hedging using CDS

Implied Probability of Default

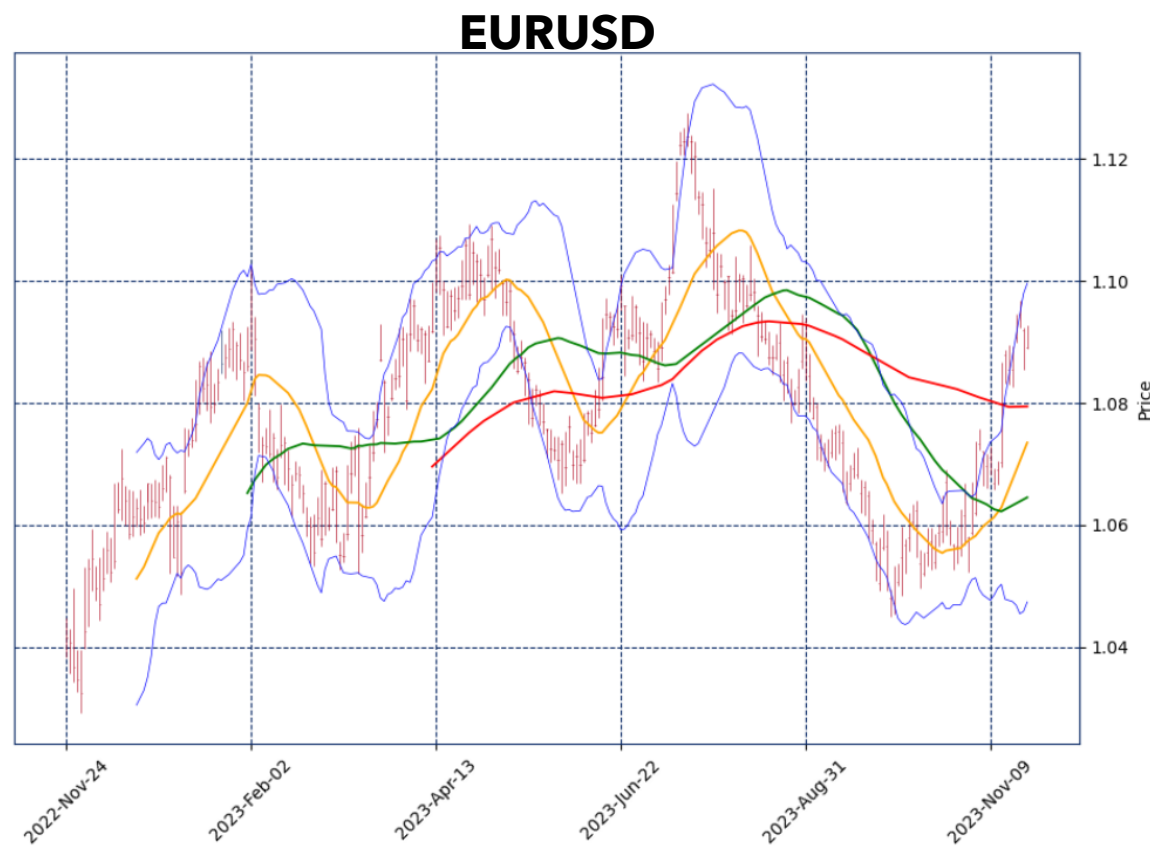


5-yr CDS Spreads



EXCHANGE RATE RISK

- 7.57% of total amount of money invested in Euro-denominated bonds
- For portfolio metrics, values are converted to USD using EURUSD on November 24, 2023
- **Simulations must consider exchange rate volatility**



GEOPOLITICAL RISK

- Avoid **Chinese** and **Middle Eastern** bonds
- Rising political and military tensions → increasing financial volatility → unforeseeable risks
- In a nutshell, no additional risk without proportionately additional reward

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