Macro Finance Homework 1

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Macro Asset Returns and Volatility

	Annualized Volatility (%)
Total Return for 10Y UST	7.717764
Income Return for 10Y UST	0.082110
Capital Return for 10Y UST	7.731066

	Annualized Volatility (%)
Total Return for Public Equity Market	7.717764
Income Return for Public Equity Market	0.147762
Capital Return for Public Equity Market	19.531878

Regarding asset volatility:

- Bonds have significantly lower volatility compared to equities
- Commodities is the riskiest asset class being observed (bigger and more diversified sample size)

For US government bond and equities, capital return volatility is the main driver for total return volatility

- Volatility of income return is low, because, across different years,
  - Coupon rate of US government bonds doesn't vary much
  - Dividend payments from companies don't change significantly
- Bond and stock prices fluctuate dynamically, due to:
  - Changing macroeconomic conditions (e.g., interest rates)
  - Shifts in sector trends
  - Changes in the company's underlying financial condition

For HY credit total return, it is difficult to differentiate income return and capital return

- Yield and prices of corporate bonds can change due to credit spreads tightening or widening
- Price return movements can solely reflect broad market/investor sentiment rather than the performance of the underlying companies

Asset Allocation > Security Selection

The tangency portfolio, constructed using Mean-Variance Optimization method, can provide a higher Sharpe Ratio of 0.71 vs Average Sharpe obtained by investing fully in any single asset class of 0.30

The MV Optimization method:

- Determines the appropriate weights and capital to be allocated for each asset class
- Diversify risk amongst asset classes
- Maximize the Sharpe Ratio (Risk-adjusted return)
- It is better to be correct in the asset allocation across asset classes, for the entire time horizon (2000 – 2025)

	Mean	Vol	Sharpe
Tangent Weights	0.033662	0.047343	0.711034

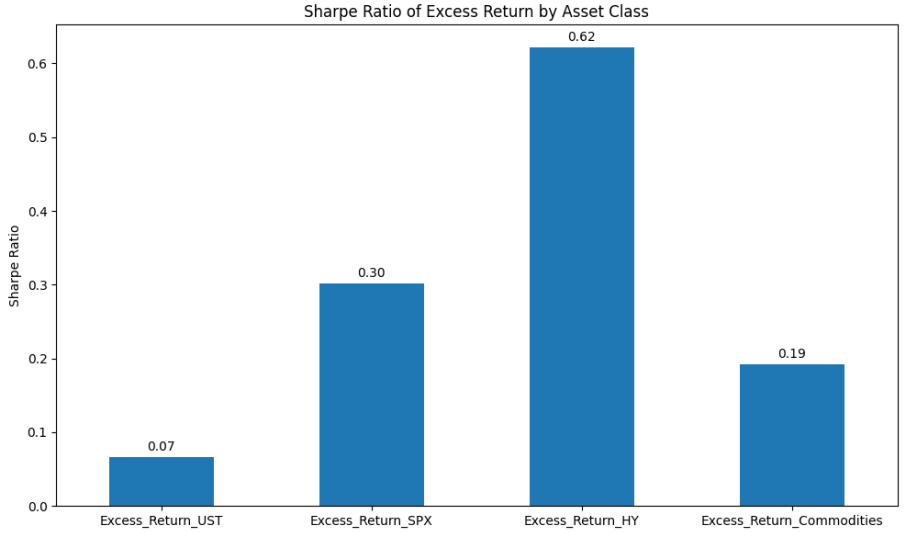
The Sharpe Ratio for the Tangency Portfolio (using MV Optimization): 0.71

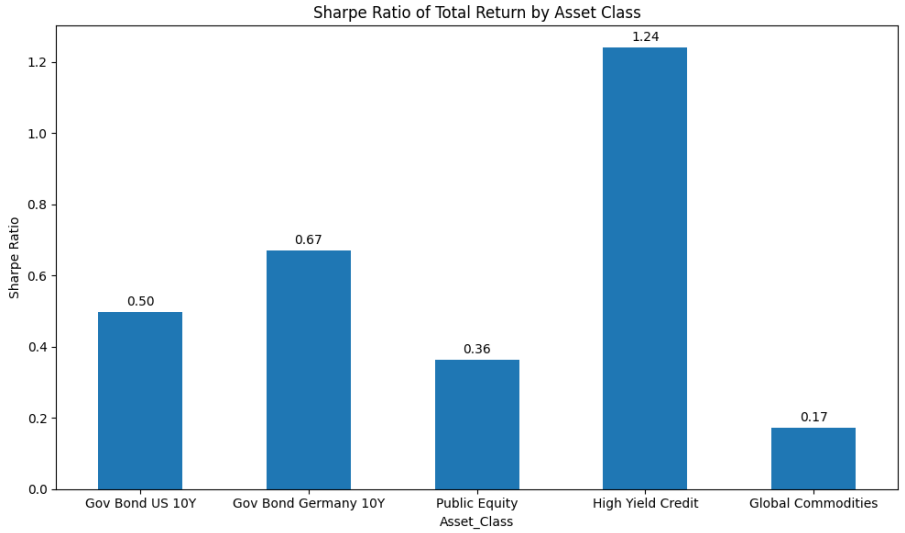
	Mean	Vol	Sharpe
Excess_Return_UST	0.005114	0.076849	0.066540
Excess_Return_SPX	0.058664	0.194745	0.301233
Excess_Return_HY	0.031716	0.051039	0.621407
Excess_Return_Commodities	0.044656	0.233162	0.191521

The Average Sharpe Ratio for a Portfolio Consisting of One Asset Class: 0.30

US HY Credit is a desirable asset to hold

- Whether we are looking at total returns or excess returns, the risk-adjusted return for US HY Credit is evidently quite high
- Rationale: HY credit has a high return (6.34% for total and 5.12% for excess return) but a low volatility (~5%)
- Investors are basically getting a higher return despite taking in lower risk as compared to other asset classes
- This results in an extremely high Sharpe Ratio:
  - 0.62 for excess return
  - 1.24 for total return

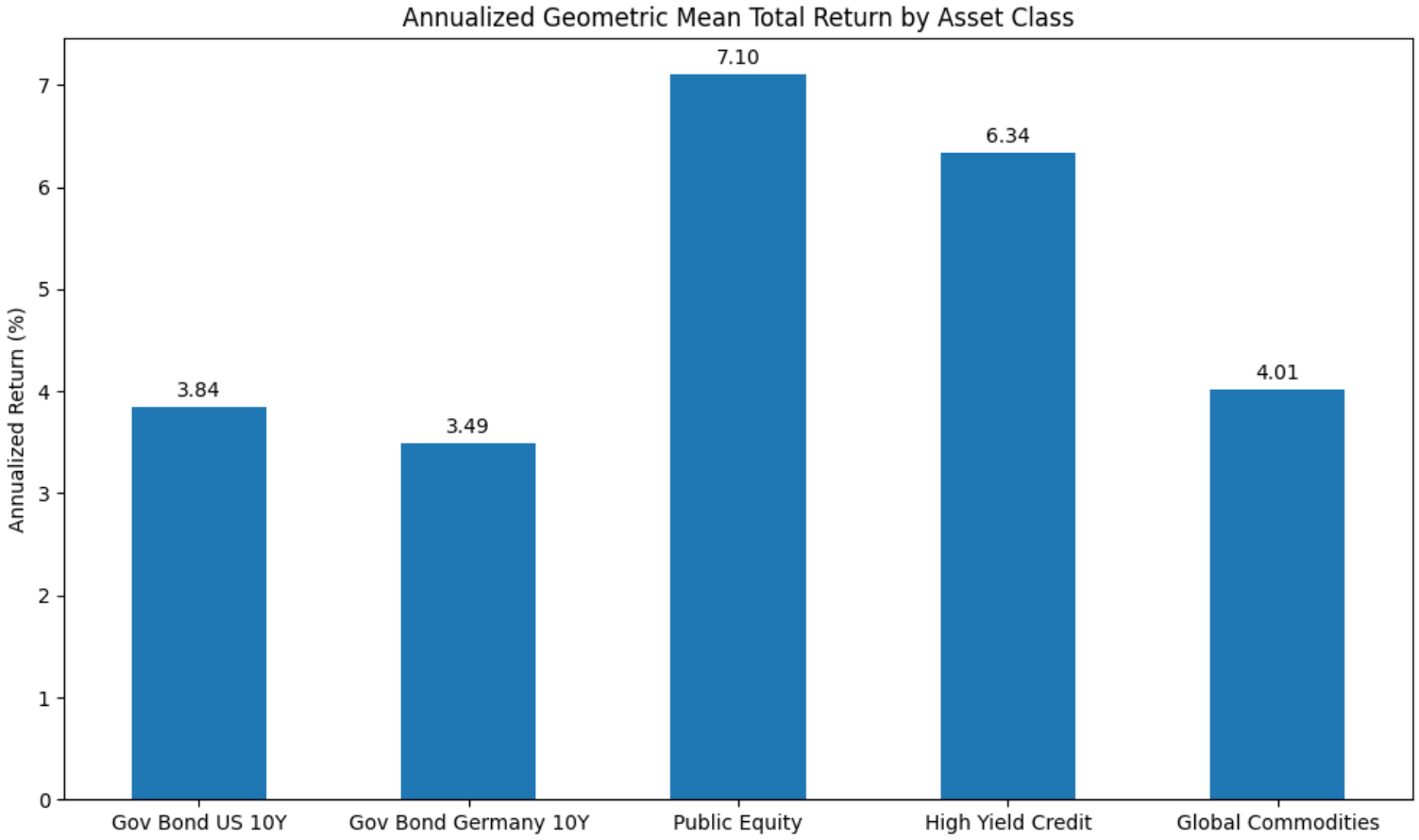




Thank you

Appendix

Annualized Mean of Total Return by Asset Class



Annualized Volatility of Total Return by Asset Class