

# Efficient Frontier

How should my portfolio look like?

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19. September 2022

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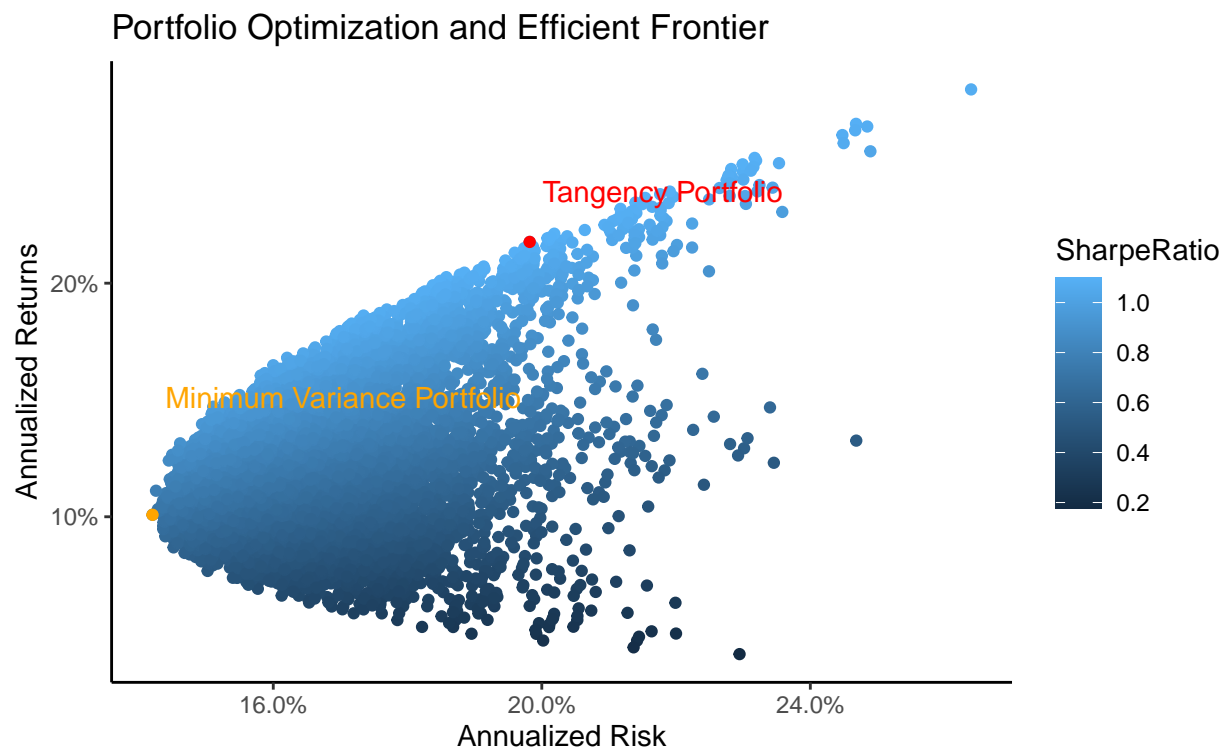
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# 1 Efficient Frontier

If you are thinking about investing in stocks, you will come across the term “efficient frontier”. The efficient frontier is the set of optimal portfolios that offer the highest expected return for a defined level of risk or the lowest risk for a given level of expected return. If you choose the portfolio with the lower risk or the higher expected return depends how risk-averse or risk-taking you are as an investor. In the example below I chose 8 shares for my portfolio. The following shares were used at the beginning: MMM, ALPA, GIS, SPGI, UPS, WMT, GE, PFE. You can replace the shares with any other shares you like. For more information visit <https://finance.yahoo.com/>. There you can also find the symbols of different shares.

In the picture below you can see the “Minimum Variance Portfolio” as well as the “Tangency Portfolio”. The “Minimum Variance Portfolio” gives you a relative low return, but you have a low risk. If you choose the “Tangency Portfolio” you can earn more money, but its riskier.

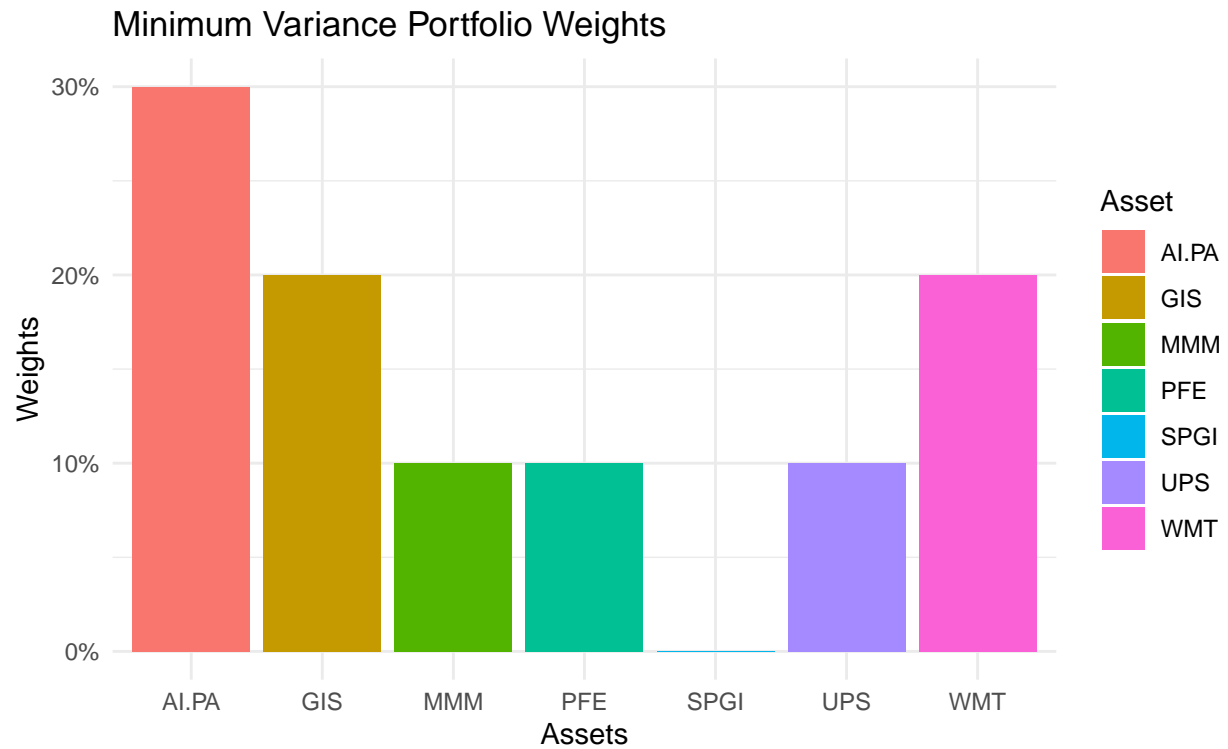


## 2 Minimum Variance Portfolio

The details for the portfolio with the lowest risk are shown below. It is the portfolio with the lowest variance.

Table 1: Minimum Variance Portfolio - Weights, Return, Risk and Sharpe Ratio

Al.PA	GIS	MMM	PFE	SPGI	UPS	WMT	Return	Risk	SharpeRatio
0,3	0,2	0,1	0,1	0	0,1	0,2	0,1008417	0,1420182	0,7100617



### 3 Tangency Portfolio

The details for the portfolio with the highest sharpe ratio are shown below. The Sharpe ratio seeks to characterize how well the return of an asset compensates the investor for the risk taken. When comparing two assets, the one with a higher sharpe ratio appears to provide better return for the same risk, which is usually attractive to investors.

Table 2: Tangency Portfolio - Weights, Return, Risk and Sharpe Ratio

ALPA	GIS	MMM	PFE	SPGI	UPS	WMT	Return	Risk	SharpeRatio
0,1	0	0	0,2	0,6	0	0,1	0,217664	0,1981989	1,09821

