

# Portfolio Optimization

## The Lazy Portfolio

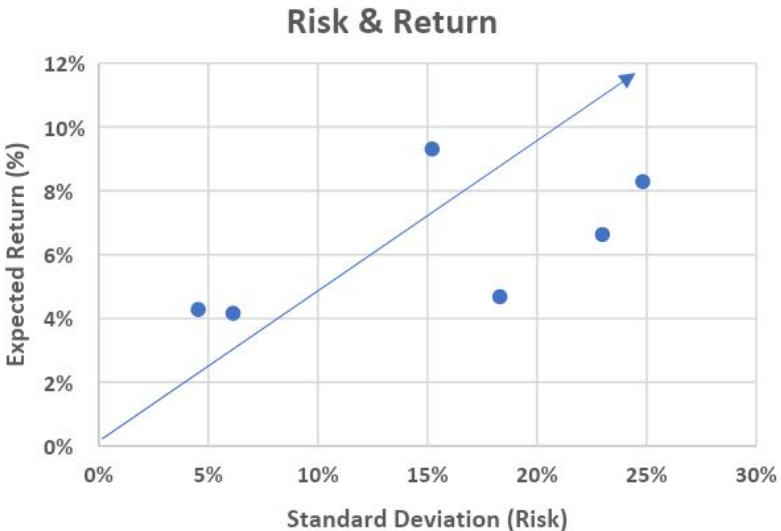
David Swensen, the renowned investment manager of Yale University’s Endowment Fund and author of *Unconventional Success*, is potentially most famous for his “Lazy Portfolio,” which the average investor could craft on their own. This portfolio is not only known for its enduring performance, but also for its simplicity and diversification. A sample of his suggested allocation is listed below:

Asset Class	Allocation
US Stock Market	30%
REIT (Real Estate Investment Trusts)	20%
Intl Developed	15%
Emerging	5%
TIPS (Treasury Inflation Protected)	15%
Intermediate Term Treasury	15%

Swensen’s lazy portfolio is a heavy dose of equities, both domestic and international, plus a sizeable allocation of real estate, and then the most secure forms of fixed income via two forms of treasuries. Historically, this portfolio allocation returns ~6.7% with a standard deviation of ~11.4% ([link](#)). These two figures are what most investors tend to focus on: “How much will I make, and how risky is my investment?” Standard deviation is a data-driven way to understand the underlying risk and volatility associated with an investment. If an investment has a high standard deviation, then it is likely a riskier asset and the investor should expect a higher return for the extra risk they are taking. Let’s look at the risk and return profile for *Lazy Portfolio*:

## Trade-offs: Risk vs. Return

Looking at chart to the right labeled “Risk & Return,” the investor can see that equities exhibit higher return expectations, but also come with a higher amount of risk, whereas fixed income (Treasury & TIPS) investments exhibit lower risk with lower return. An investor looking to avoid risk would likely allocate more of their portfolio away from equities and towards more fixed income, but would have to accept a lower expected return for their portfolio. The arrow on the chart depicts this relationship between Risk vs. Return, namely as risk grows, so should return. This line is typically referred to as the Security Market Line.



## Diversification

Looking at the chart again, some investors may ask “Why should I consider some of these asset classes such as REITs or international equities? The return for the risk does not look very favorable relative to US Equities.” The reason Swensen still includes these in the recommendation is that these asset classes do not all move in the same direction at the same time. They are hedges against one another. In other words, the recommended asset classes have varying degrees of correlation. This is best visualized by a correlation table as seen below.

Table 1

Asset	US	REIT	Intl Developed	Emerging	TIPS	Interm Treasury
US Stock Market	100%	66%	88%	80%	2%	-33%
REIT	66%	100%	63%	56%	25%	-1%
Intl Developed ex-US Market	88%	63%	100%	87%	14%	-21%
Emerging Markets	80%	56%	87%	100%	20%	-18%
TIPS	2%	25%	14%	20%	100%	74%
Interm Treasury	-33%	-1%	-21%	-18%	74%	100%

Swensen’s portfolio illustrates that diversification is a key factor in generating a consistent return. There needs to be a mix of assets that will not always move in the same direction. For example, the three equity assets (US, Intl Developed, & Emerging) are all strongly correlated to one another at 80+%. This means that if one of those equities goes up ~10%, the others would also go up 80% of the time. The same would apply for the downside. While equities are positively correlated to each other, equities are not as strongly correlated to REITs at only 50%-60% probability of moving in the same direction. In some cases, equities can even be inversely or show zero correlation, such as with TIPS and Intermediate Treasuries. If an investor were to have their entire portfolio allocated to just equities, the positive years would be very strong, but the down years would be difficult to bear.

## REITs and Leverage

Swensen’s advocacy for REITs is common amongst the [Boglehead](#) community, which advocates for a low touch, low cost index portfolios approach. Many registered investment advisors (RIAs) see REITs as an easy way to allocate their clients’ portfolios into real estate without having to buy an individual property that the investor or advisor would then have to manage. However, one key aspect often overlooked by the RIA community is that most REITs use significant amounts of leverage. Leverage behaves like a double-edged sword, amplifying both positive returns and negative ones alike. This helps explain why REITs are so volatile when looking at them on the “Risk & Return” chart. Historically, REITs exhibit an expected yield of ~8%, but with significantly higher volatility.

There are options available outside of REITs that can generate returns similar to REITs, along with the reduced correlations, but without the volatility. For example, a well-managed mortgage fund, which invests in a portfolio of senior mortgages, could be expected to produce an expected return of ~8% in today’s market, without relying on any form of leverage. The lack of leverage would mean that the fund would have to be operated efficiently to keep investor funds actively invested in order to avoid decreasing investor returns due to idle cash. However, investors can rest assured that their returns will be subject to less volatility, provided the investor can withstand the reduced liquidity.

Given where the REIT is located on the Risk & Return chart (Figure 1), it can be argued that REITs do not make effective use of their leverage. A rational investor would expect that the riskier an asset is, the higher the expected return. For example, the US Stock Market appears to be effectively using its leverage with a higher expected return than Treasuries, but with a commensurate amount of increased risk. A way to express this tradeoff between risk and return is commonly described as the Sharpe Ratio.

The Sharpe Ratio is defined as  $S_{\alpha} = \frac{r_x - R_f}{\sigma_x}$ , where:

- $r_x$  is the expected return on the investment
- $R_f$  is the risk-free rate of return
- $\sigma_x$  is the standard deviation of the investment

Applying this formula to REITs, we can see that the asset class has a low Sharpe Ratio relative to US Stocks and Treasuries. If it were not for its unique correlation characteristics, many investors would likely choose to disinvest altogether and focus on just Treasuries and US Stocks. This is actually an approach popularized by the Boglehead community in such variants of the “Lazy Portfolio” as the “Two Asset Portfolio” and “Three Asset Portfolio” ([Link](#)).

## Optimizing Risk-Adjusted Return

Let’s look back at our chart that examines the tradeoffs of risk versus return. Comparing the typical REIT with a mortgage fund, the two asset classes exhibit similar expected return, but considerably different risk profiles. The mortgage fund’s Sharpe Ratio is much more efficient than that of REITs, while also maintaining the lack of correlation to other asset classes.

Reducing an investor’s risk in just one asset class can have significant benefits for a diversified portfolio.

Substituting a typical REIT with our hypothetical mortgage fund, the typical Swensen Portfolio can now yield the same expected yield, but with considerably less risk. Looking at the chart, the investor can see that the both the mortgage fund and a REIT investment have an expected return of ~8%, but a REIT has almost double the risk of the Socotra Fund due to the aforementioned use of leverage. When the Lazy Portfolio swaps these two assets, the overall portfolio’s risk profile decreases by almost 20%, while still maintaining a well-diversified portfolio that is not all directly correlated.

