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Efficient Frontier 101

What Is an Efficient Frontier?

It is a set of asset mixes that, for each amount of risk taken, have been created in an effort to achieve the best expected returns. It is calculated from assumed risks and returns of the available asset types and assumed correlations between those returns.

Why Is It Better for a Portfolio to Be on the Efficient Frontier?

A portfolio that falls on an efficient frontier is, in theory, expected to achieve the best return for an investor's desired level of risk.

How Is Risk Measured?

In determining an efficient frontier, risk for an investment is calculated using its standard deviation—how much its return is expected to vary from its average investment return. The higher the standard deviation, the riskier the investment is considered to be.

This narrow definition addresses volatility but does not capture other types of risk that might concern an investor, such as illiquidity risk, credit risk, and inflation risk.

How Can Investors Use an Efficient Frontier to Help Build Their Portfolios?

Key Takeaways

- There are many efficient frontiers, depending on the range of investment opportunities and the constraints imposed.
- An efficient frontier can help an investor understand the potential for the best return they may expect from their portfolio given the level of volatility they are willing to accept.
- After determining their efficient frontier, an investor still needs to apply common sense to building a portfolio because the numbers that underlie the calculations represent expectations, not certainties, about the future.

Creating an Efficient Frontier

There is an infinite number of portfolios that an investor could construct from the stocks, bonds, and other assets available. Each blend has an overall risk and overall return level. In this hypothetical graph of many portfolio blends, the pies farthest to the left and highest up are the ones with the potential for the expected risk/return tradeoffs. Connecting those "dots" forms an efficient frontier.

Connecting the Dots to Determine an Efficient Frontier

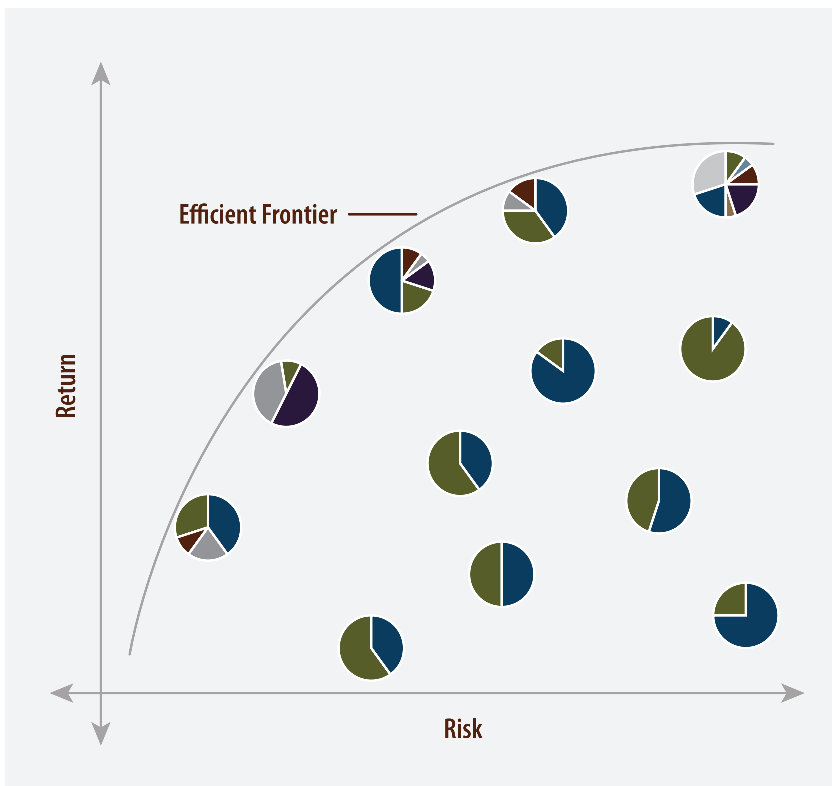


Chart is conceptual and does not reflect any actual returns or represent any specific asset classifications.

Improving a Portfolio

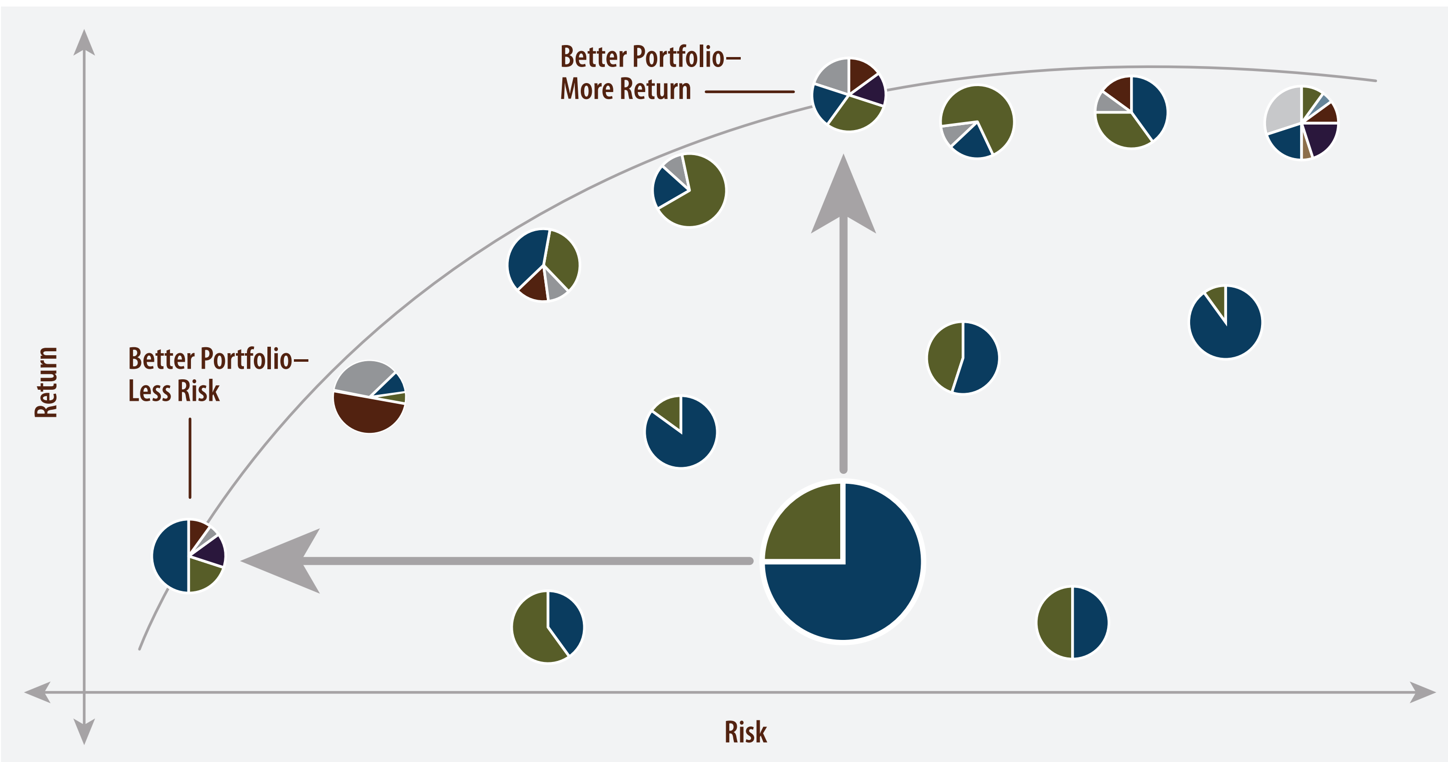
Let's say an investor's portfolio is the larger pie in the conceptual chart below. Clearly, it is not efficient. An investor has the potential opportunity to reduce risk, improve return, or both.

How to reduce risk? The efficient frontier may indicate that an investor is taking more risk than they need to for the return they might receive. A likely cause is lack of diversification. Diversification may typically lower portfolio volatility, pushing the portfolio to the left. Possibly, the portfolio does not include asset classes, such as global equities or real assets, that can work as diversifiers.

How to increase return? The portfolio may possibly exclude higher-return assets because the investor does not wish to assume the higher risk. But riskier assets don't necessarily add up to a riskier portfolio, as long as they are sufficiently diversified. The efficient frontier indicates that better returns could be possible, hypothetically, for an investor's chosen volatility level.

In short, the model portfolios on the efficient frontier have sought to mitigate risk through diversification. They still have market risk and other inherent risks that can't be diversified away. But the key point is that these portfolios are not taking risk that they don't have to take because avoidable risk is not compensated by increased return.

Reduce Risk or Increase Return Potential?



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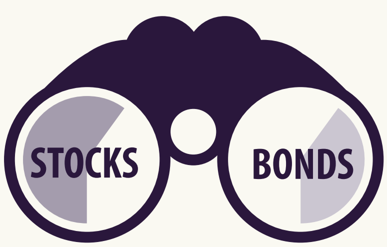
Looking Beyond Treasury Bonds May Help Reduce Risk



In order to potentially mitigate risk, an investor may think an all-bond portfolio is the answer. However, an efficient frontier for stocks and 30-year U.S. government bonds for the 1979-2018 period indicated that a hypothetical 33-percent stock/67-percent 30-year U.S. government bond portfolio offered significantly less risk and better returns than an all-bond portfolio. In fact, a hypothetical 70-percent stock/30-percent 30-year U.S. government bond portfolio would have achieved better returns for about the same amount of risk as the 100-percent 30-year U.S. government bond portfolio.[1]

[1] Morningstar Direct and Wells Fargo Investment Institute, 2019. For illustrative purposes only. Stocks represented by the S&P 500 Index and bonds by the 30-year U.S. Treasury bond. Return and risk based on monthly returns and their standard deviations over a 40-year period (January 1, 1979–December 31, 2018). An index is unmanaged and not available for direct investment. Hypothetical results do not represent actual trading, and the results achieved do not represent the experience of any individual investor. Different investments offer different levels of potential return and market risk. Please see page 4 for a description of the risks associated with investing in stocks and bonds. **Hypothetical and past performance is no guarantee of future results.**

The Family of Efficient Frontiers

Opportunities and constraints determine an efficient frontier.

An efficient frontier based on expected returns for a portfolio consisting of four major asset groups (stocks, bonds, commodities/real estate, and alternative investments) may offer better opportunities than a three-asset-group frontier that excludes alternative investments. This is why we consistently advocate wide global diversification. Conversely, the prudent constraints that we impose make the opportunities appear less attractive—although, as explained below, they are key to risk management.

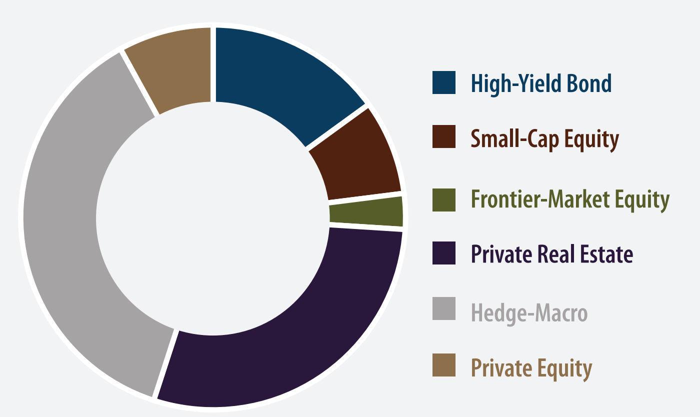
The investment process starts with determining where a portfolio lies along the efficient frontier. An investor's attitude toward capital loss, volatility, and liquidity needs will help determine their desired risk level.

Depending on the desired risk level and where the portfolio lies on the efficient frontier, a more widely diversified allocation may be appropriate to help generate return or mitigate risk. The resulting allocation could include hedge funds or private capital. Some of these investments require investors to meet certain income and net worth requirements. For an investor not meeting those requirements, a portfolio diversified among stocks and bonds may be recommended. An investor with constraints, such as a need for cash or a concentrated holding that can't be sold, might have to invest in a less-diversified portfolio.

In the graph below, all the frontiers are constrained, which means there are limits on the amount invested in each asset class that can be included. Some efficient frontiers are more constrained than others. A completely unconstrained portfolio could look more attractive than any of the constrained ones for short time periods—but we caution that this is true only in theory.

An unconstrained optimized portfolio at a risk level typical of "balanced" portfolios might look like the chart below:

An Unconstrained Portfolio Isn't Necessarily a Good Portfolio



Hypothetical allocation shown for illustrative purposes only.

The unconstrained portfolio, while it may have an attractive risk/return profile on paper, is not advisable. It may be heavily focused on asset classes that we recommend only in small doses. It may be entirely devoid of such bread-and-butter asset classes as large-cap stocks and investment-grade bonds. Unless we could be highly certain of the risks and returns for each of the asset classes—which we can't—it would be highly imprudent to invest in an unconstrained portfolio. Consequently, we apply prudent constraints to our process of optimizing portfolios. For example, even in an aggressive portfolio, we would not recommend that small-cap or emerging-market stocks dominate an equity portfolio.

Which Efficient Frontier Is Best?

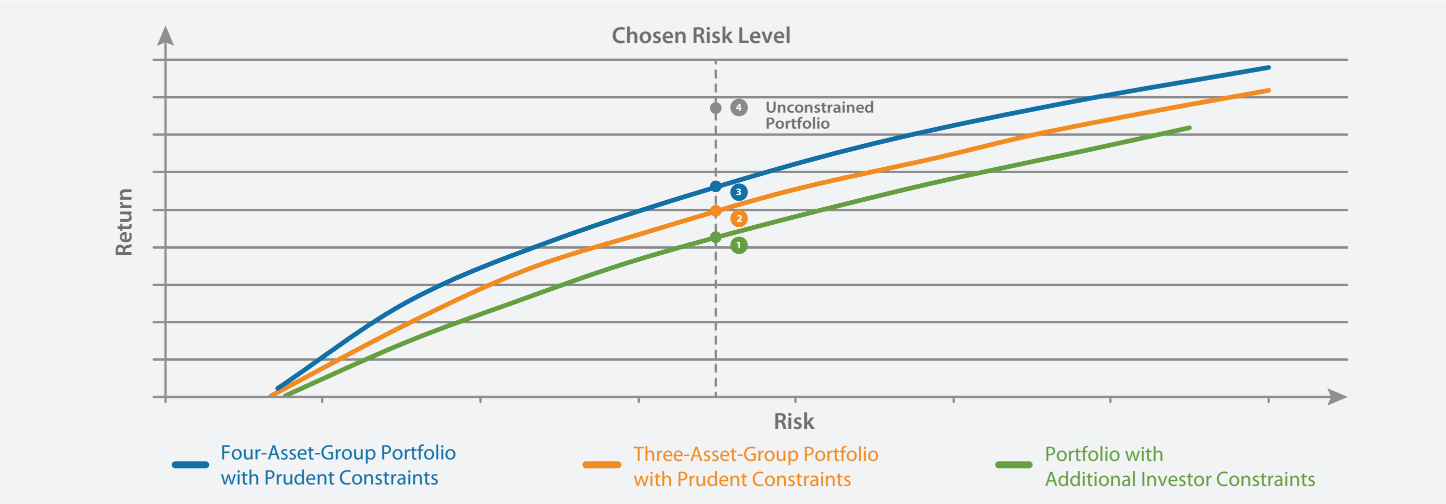


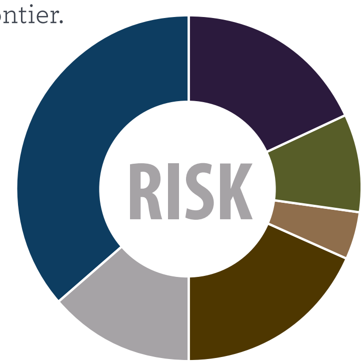
Chart is conceptual and does not reflect any actual returns or represent any specific asset classifications. There are no guarantees that a four asset class portfolio with prudent constraints will outperform any other portfolio with more or less assets classes, or constraints.

Beyond the Efficient Frontier

The concept of the efficient frontier was a revelation back in the 1950s, enabling investors to see beyond the risk and return of individual assets to the risk and return of diversified portfolios. Still, the analysis is historical, and it measures risk solely by volatility. History can tell us only what has happened; it cannot capture the range of things that might happen in the future.

At times, we have seen volatility erupt in areas of the market where relative calm had previously prevailed. Asset prices were crushed because the assets were too illiquid or too highly leveraged or too exposed to some sector or too vulnerable in some other way. Investors who looked only to history were blindsided when the environment shifted and awakened dormant risks.

True portfolio diversification is really about diversifying the sources of risk. We don't recommend minimizing all risks in a portfolio because that would mean giving up all potential return, but we do encourage paying attention to the sources of risk when it comes time to construct a portfolio according to the strategic mix chosen from the efficient frontier.



Three Steps for Getting Started

In summary, having a portfolio that's on an efficient frontier can help optimize return for the desired level of risk. To help ensure the portfolio is on an efficient frontier, an investor can start by:

1. Working with an investment professional to review their investment objectives
2. Having a written plan for working toward their objectives
3. Making sure their investments are allocated to match their investment plan

Down the road, an investor may need to adjust their plan due to life events (marriage, birth, death, divorce) that may lead to a change in investment objective. Also, an investor may want to review their portfolio periodically with an investment professional and rebalance investments when necessary to stick with their plan over time.

Asset allocation and diversification are investment methods used to help manage risk. They do not ensure a profit or protect against market loss. All investing involves risks, including the possible loss of principal. There can be no assurance that any investment strategy will be successful. Investments fluctuate with changes in market and economic conditions and in different environments due to numerous factors, some of which may be unpredictable.

Each asset class has its own risk and return characteristics which should be evaluated carefully before making any investment decision. **Stocks** are subject to market risk, which means their value may fluctuate in response to general economic and market conditions, the prospects of individual companies, and industry sectors. Investing in **foreign securities** presents certain risks not associated with domestic investments, such as currency fluctuation, political and economic instability, and different accounting standards. This may result in greater share price volatility. These risks are heightened in emerging markets. **Bonds** are subject to market, interest rate, price, credit/default, liquidity, inflation and other risks. Prices tend to be inversely affected by changes in interest rates. **Government securities** are guaranteed as to payment of principal and interest by the U.S. government if held to maturity and are subject to interest rate risk. **Real assets** are subject to the risks associated with real estate, commodities, and other investments and may not be suitable for all investors. **Alternative investments,** such as private equity and hedge funds, trade in diverse complex strategies that are affected in different ways and at different times by changing market conditions. Strategies may, at times, be out of market favor for considerable periods with adverse consequences. The use of alternative investments includes the risk of investment loss, including the loss of the entire amount invested. While investors may potentially benefit from the ability of alternative investments to potentially improve the risk-reward profiles of their portfolios, the investments themselves can carry significant risks.

S&P 500 Index is a market capitalization-weighted index composed of 500 widely held common stocks that is generally considered representative of the U.S. stock market.

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