ACHIEVING RISK IGNITION

NEWFOUND RESEARCH

"Taking less risk than is optimal is not safer; it just locks in a worse outcome.

Taking more risk than is optimal also results in a worse outcome, and often leads to complete disaster."

- Aaron Brown
Red Blooded Risk (2011)

INTRODUCTION

A principal concept in risk management is diversification: the act of spreading your investable capital across a variety of asset classes that are expected to behave differently in different market environments.

The common example would be a portfolio of stocks and bonds, with stocks serving as the engine of growth and bonds serving as the anchor of stability. Or, put another way, stocks fight the risk of lost purchasing power (inflation) while bonds fight the risk of capital loss.

A prudent wealth management plan will always have some consideration for risk management. In modern portfolio theory, inflation is fought by measuring *expected excess real returns* and capital loss is fought by measuring *portfolio volatility.*

The blend between risky and safety assets will ultimately be determined by balancing exposure to these two risks. This is usually done in one of two ways:

1. An expected excess real return target is selected and the portfolio is constructed to minimize volatility
2. A portfolio volatility target is selected and a portfolio is constructed to maximize expected excess real return

Using annual data from 1982 for the S&P 500 and a constant maturity 10-Year U.S. Treasury Bond index, Figure 1 constructs the "efficient frontier." The plot shows the return-to-volatility trade-off achieved.

There are two key details worth noting:

1. Despite stocks being more volatile than bonds, a portfolio of stocks and bonds can be less volatile than a portfolio of just bonds. In fact, it is not until about 30% of the portfolio is comprised of stocks that volatility begins to climb again. This is the benefit of diversification.
2. After 30% stocks, the curve becomes very flat. After this point in the curve, every extra percent of stock adds only approximately 4 basis points of excess real return and 11 basis points of volatility.

We can see in Figure 3 that stocks are a large driver of overall portfolio volatility. This is because stocks are so much more volatile than bonds. So when the portfolio holds only a 30% allocation to stocks, approximately 50% of portfolio volatility will be due to stocks.

Consider, for example, the worst 3 years for stocks over the period versus the worst 3 years for bonds:

FIGURE 2

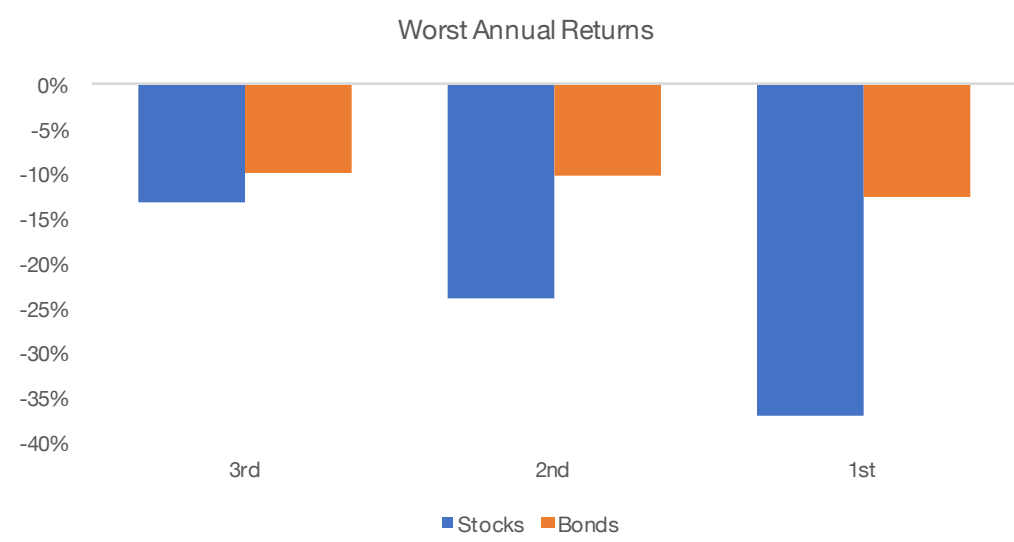


FIGURE 1

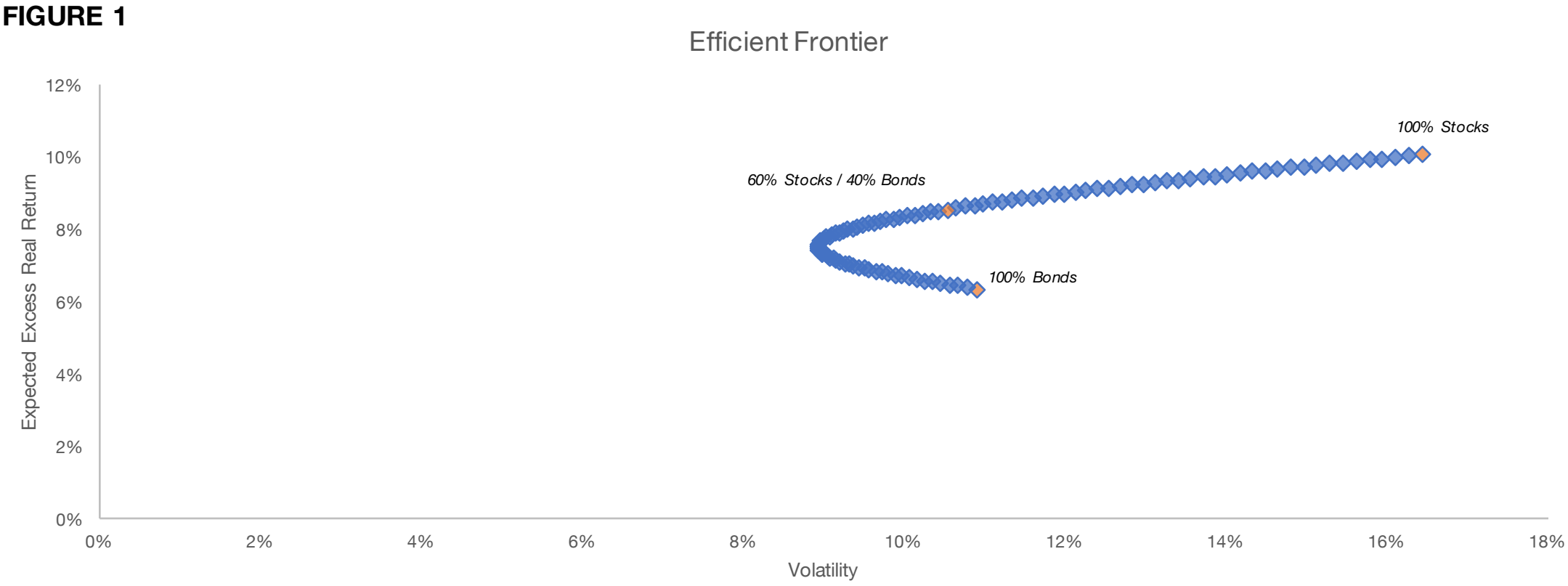
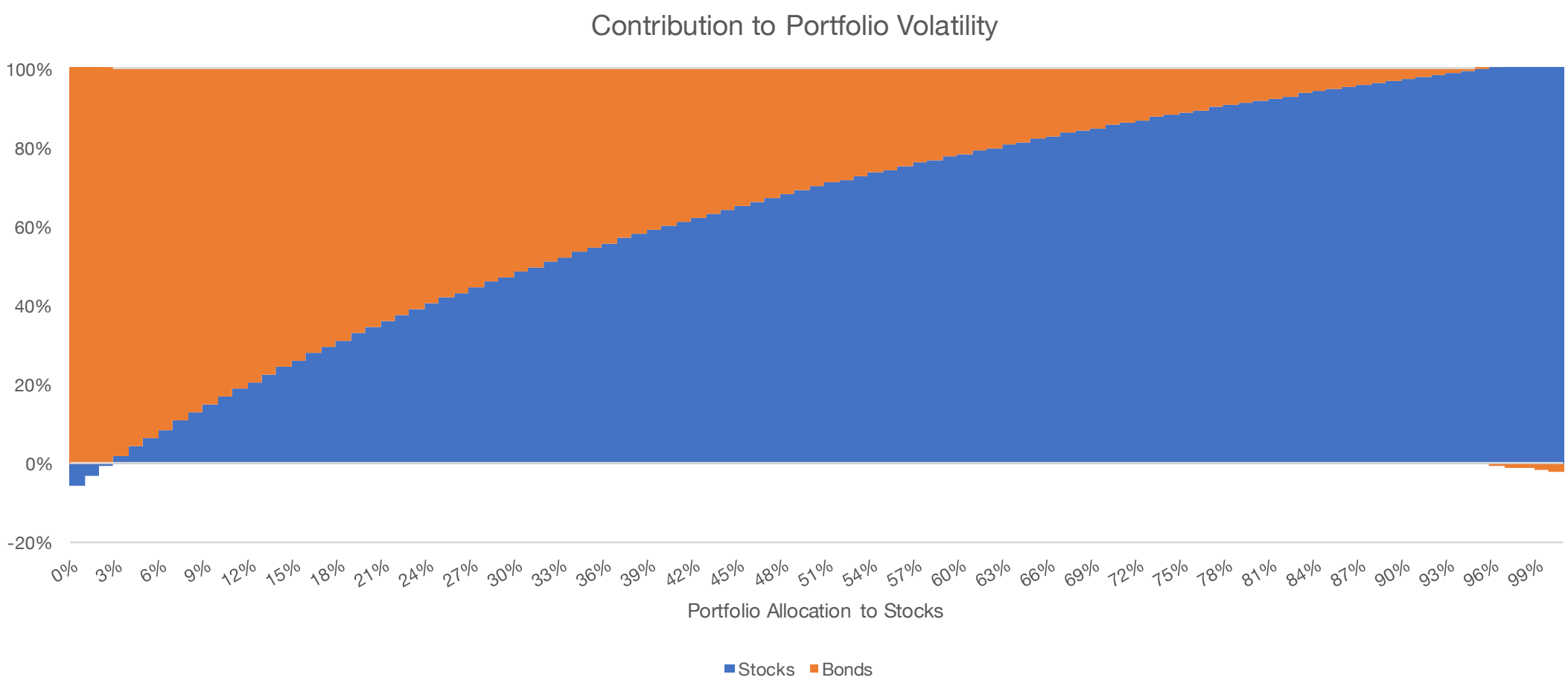


FIGURE 3



The conflict is that while stocks are the greatest driver of growth potential, they are also the most significant contributor of volatility.

A significant amount of this volatility occurs during extreme loss periods. Ignoring the worst 3 years of returns, volatility for stocks drops from 16.44% to 12.28%. Dropping the best 3 years, on the other hand, only results in volatility falling to 15.47%. Therefore, the percentage of our portfolio that we end up holding in safety asset like bonds is largely due to risk aversion towards negative tail events that only happen very rarely.

THE COST OF INSURANCE

What if stocks never crashed and years like 2008 never happened? How much more would we be willing to allocate our portfolio towards stocks to harvest their growth potential?

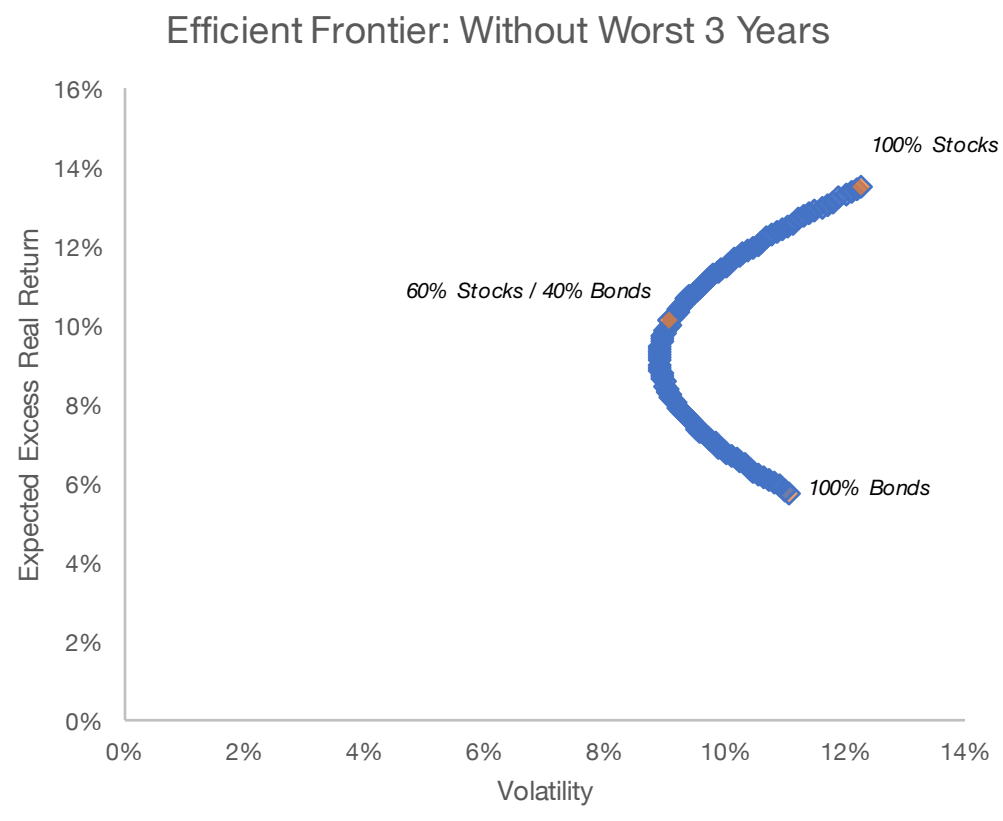
We can see in Figure 4 that if we remove the 3 worst years of stock returns from existence, the efficient frontier dramatically changes shape. Adding stocks actually continues to reduce portfolio volatility until a 45% allocation, and after the trade-off between expected excess real return and volatility is a very high 3-to-4 ratio.

Let's consider a hypothetical investor willing to hold a portfolio that exhibits 10% volatility. In the original frontier, the recommended allocation was 55% stock exposure and 45% bond exposure. However, in the new frontier, the recommended stock exposure jumps to 75%.

The implication is that the investor will drop his stock exposure by 20 percentage points simply because of a few outlier events. In doing so, he sacrifices 74 basis points of expected excess real return a year.

Those 74 basis points are an implicit *cost of insurance* he pays to reduce exposure to tail loss events in stocks.

FIGURE 4



ACHIEVING RISK IGNITION

We've shown that investors may carry a very heavy allocation to safety assets for the sole purpose of protecting against rare tail events in risky assets. The investor in our previous example was be willing to take less risk by allocating an extra 20% to bonds just to protect against a few rare loss years for stocks.

One loose interpretation of this is that the investor actually holds 80% of their portfolio in a riskier configuration (say 75% stocks / 25% bonds), but holds the other 20% of their assets in an insurance policy that protects against stock losses. The premium for the policy is 3.70% a year (20% x 3.70% = 0.74%).

Once we frame our allocation in this manner, we have to ask ourselves: isn't that insurance just a little too expensive? To paraphrase Aaron Brown, in the good years, taking less risk isn't optimal: it's just locking in a worse outcome.

Being under-allocated to stocks during market rallies means an investor misses out on growth opportunities when risk is low.

Conversely, when stocks are declining, being over-allocated to stocks is detrimental to capital. By not holding enough bonds or cash, an investor takes on too much risk in down markets.

Risk ignition is the concept of striking the right amount of risk: not so little that we lock in a worse outcome, but not so much that we risk blowing up.

A static allocation policy treats risk as being constant throughout time. The level that risk is estimated at will also be heightened due to just a few outlier events. Consider that removing just the worst three years of stock returns from the data set reduces stock volatility by over 400 basis points.

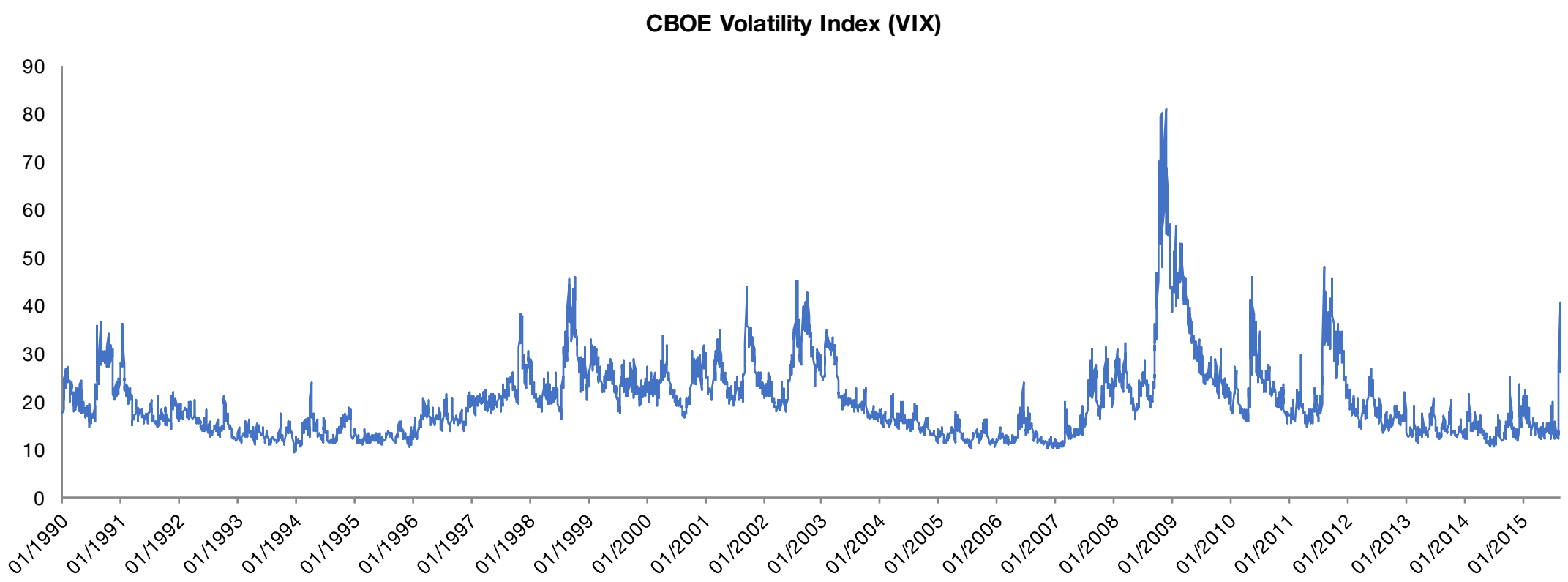
Risk, however, is not static throughout time – nor do most investors believe it to be. This is demonstrated by the CBOE Volatility Index (VIX), a measure of estimated forward 30-day volatility in the S&P 500.

An investor targeting a portfolio with 10% volatility carries around an extra 20% in bonds simply due to a few rare tail events that have happened in stocks.

The cost of this allocation to bonds is a decrease in expected annual excess real return of 74 basis points.

The VIX shows us that risk in the market is time varying. There are periods of both extreme calm and extreme turmoil. A static allocation tries to find middle ground between both but ultimately excels in neither.

FIGURE 6



If risk is time varying, then an ideal process would allow us to de- and re-risk in the face of volatility changes. In calm environments we would underweight our exposure to safety assets, increasing our portfolio's growth potential. Then as risk rises, we could overweight safety assets to dampen volatility and downside potential.

One such approach is to use signals generated from a time-series momentum process (see our white papers *The What & Why of Momentum-Based Active Risk Management* and *Using Momentum to Manage Downside Risk*).

We will construct a tactical portfolio that invests in stocks when momentum is positive and in bonds when momentum is negative. Momentum will be measured using a price-minus-moving-average cross over system between the S&P 500 and its 200-day moving average.

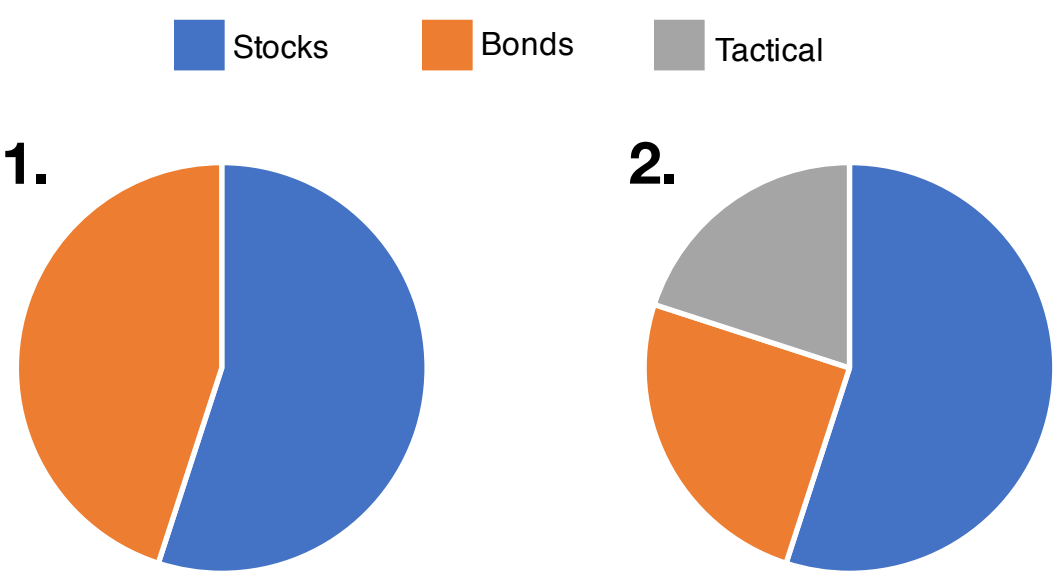
Starting with a 55% stock / 45% bond portfolio, we will create a new portfolio that is 55% stock / 25% bond / 20% tactical. In positive momentum environments, this will tilt the portfolio to be 75% stock / 25% bond. In negative momentum environments, this will tilt the portfolio to be 55% stock / 45% bond.

This process is designed to help the portfolio achieve **risk ignition** by increasing our risk profile when stocks are climbing and decreasing our risk profile when stocks are falling. Ideally, in doing so, we can reclaim the expected excess 74 basis points of return without incurring undue volatility.

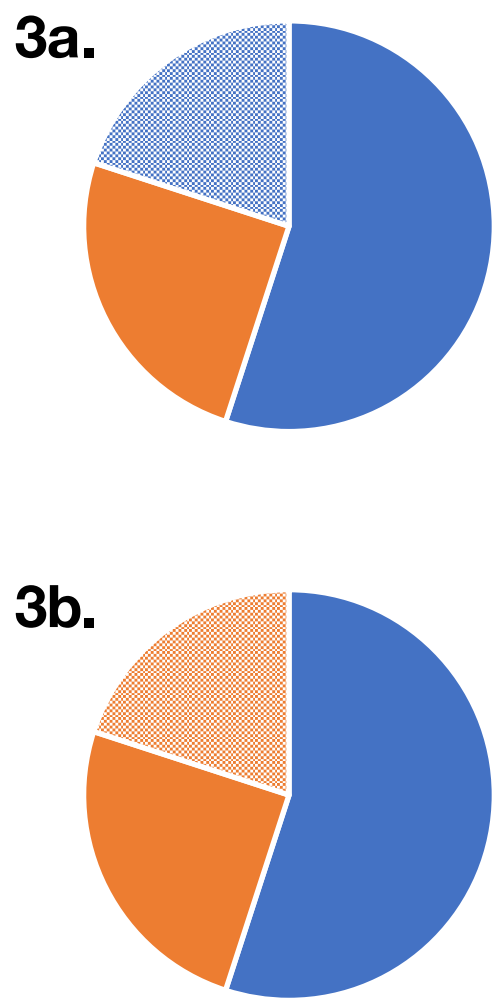
In our simple example, we can see that the portfolio with the tactical sleeve exhibits returns in excess of the 75% stocks / 25% bonds portfolio while exhibiting a drawdown inline with the 55% stocks / 45% bonds portfolio.

	55% Stocks / 45% Bonds	**75% Stocks / 25% Bonds**	**55% Stocks / 25% Bonds / 20% Tactical**
Annualized Return	7.85%	8.39%	8.73%
Annualized Volatility	9.36%	11.77%	10.52%
Max Drawdown	27.91%	41.35%	29.31%

FIGURE 7



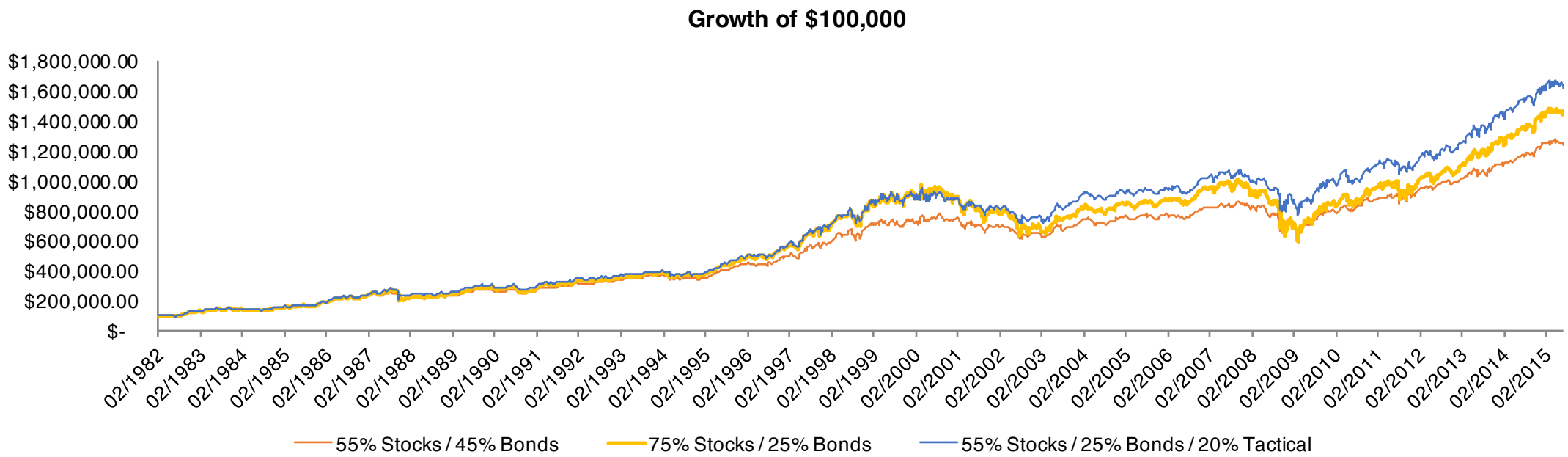
When extreme tail-loss scenarios for stocks are considered, investors can end up carrying around large amounts of safety assets. Instead, an investor may consider allocating some safety asset allocation towards a tactical strategy that has the ability to de- and re-risk depending on the market environment. In this case, a 55/45 portfolio is re-configured to be a 55/25/20 portfolio.

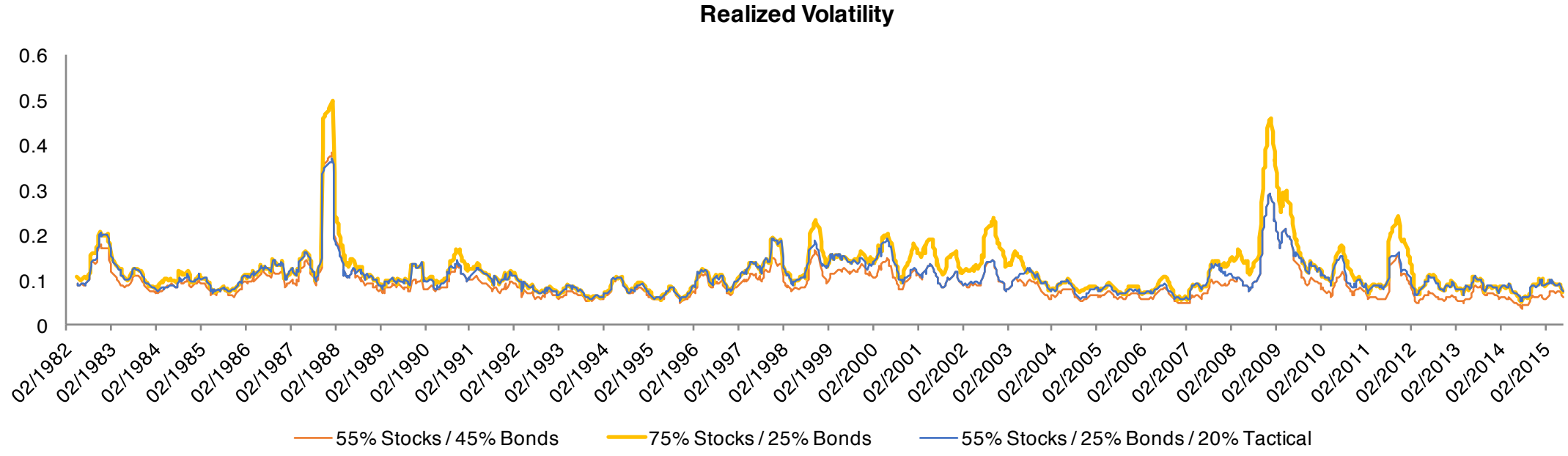


In bullish years, the model can tilt more aggressively towards stocks – as far as a 75/25 – and decrease the drag from holding safety assets.

In bearish environments, the model can tilt back towards the default risk profile allocation: a 55/45 split.

FIGURE 8





CONCLUSION

We've shown that using historical averages for portfolio construction often leads to putting a large emphasis on rare market events. While these events are important to the overall performance over the period, they are not the norm.

Static allocations implicitly assume that risk is constant over time when, in fact, risk can vary significantly from one period to the next. Constructing a portfolio around historical averages may lead to too much or too little risk if the future does not end up looking like the past.

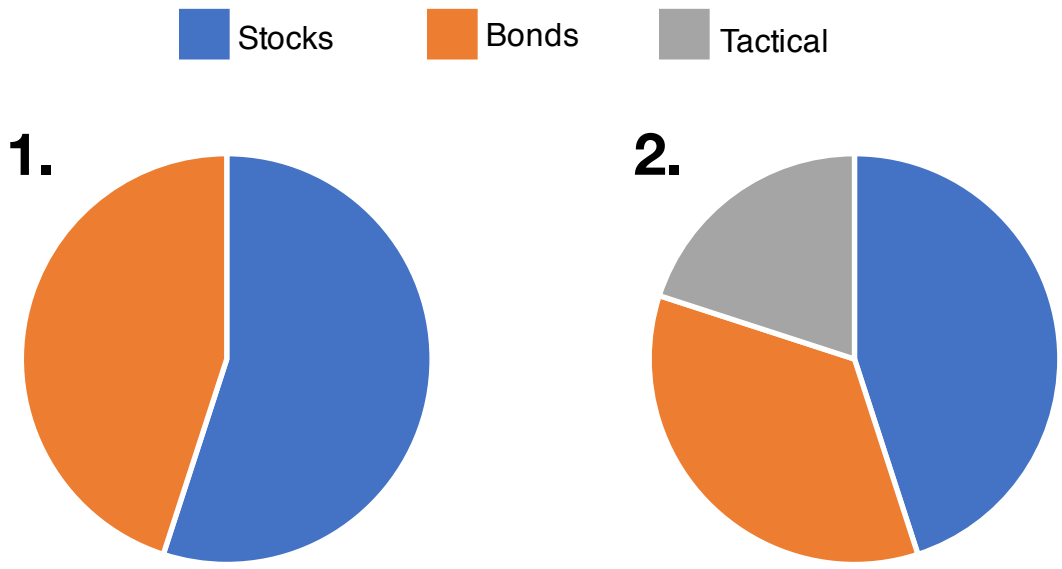
After the dot-com crash and the global financial crisis, investors may be more risk averse than ever, maintaining permanently de-risked portfolios and sacrificing growth potential. **Risk ignition** with tactical strategies can help them re-allocate towards a more aggressive strategic portfolio without necessarily sacrificing capital safety.

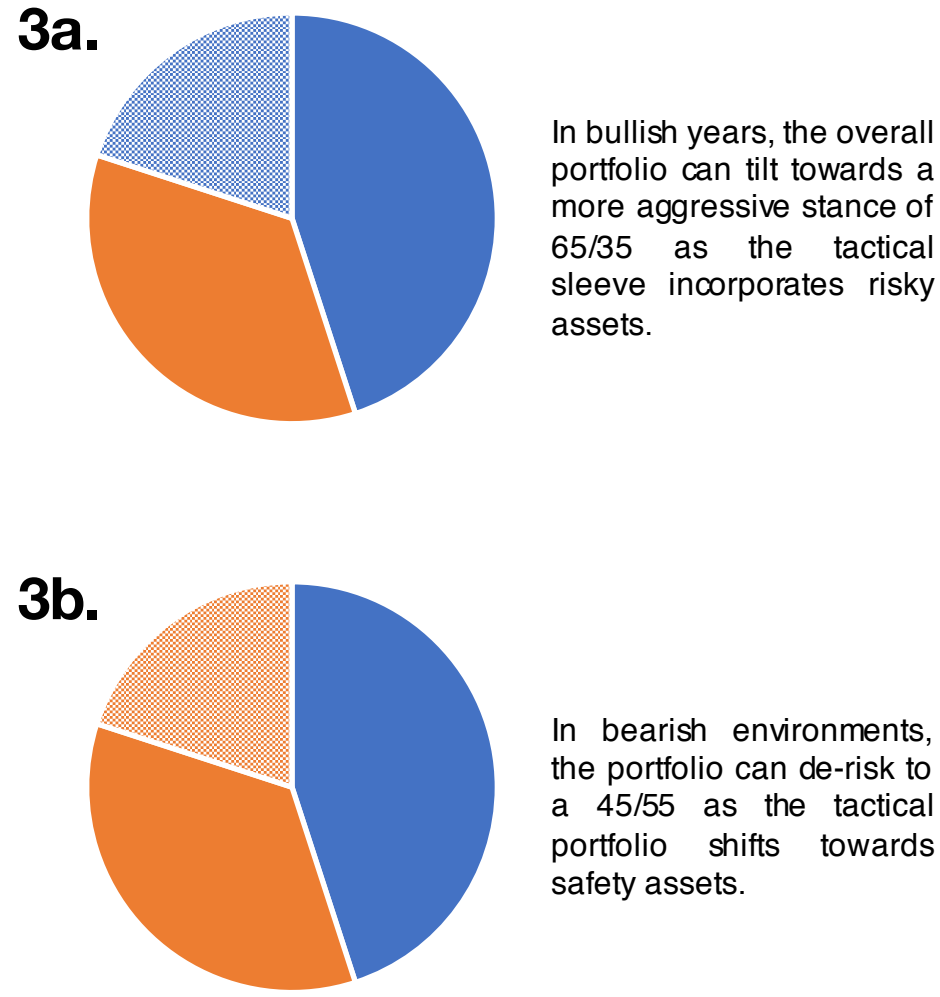
By focusing on risk ignition, we can tailor our portfolios to take more risk when growth opportunities exist in the market and de-risk to protect capital during times of market stress. As the market changes, our allocations may shift, but our methodology always remains in line with our goals.

Having a risk management plan in place is always a good idea, but that plan must not have so much cost, either explicit or implicit, as to detract from the overall goal of the portfolio. After all, if we are expecting rain, it is prudent to carry an umbrella with us, but we would not use it until the sky becomes cloudy.

APPENDIX: OTHER MEANS OF USING TACTICAL

FIGURE 9: "Pivoting the Portfolio"



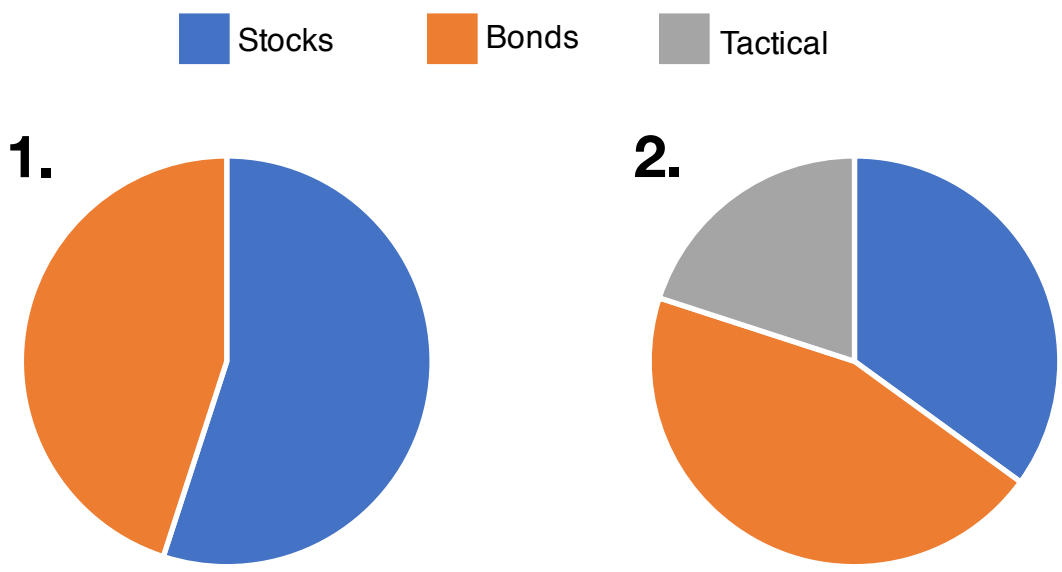


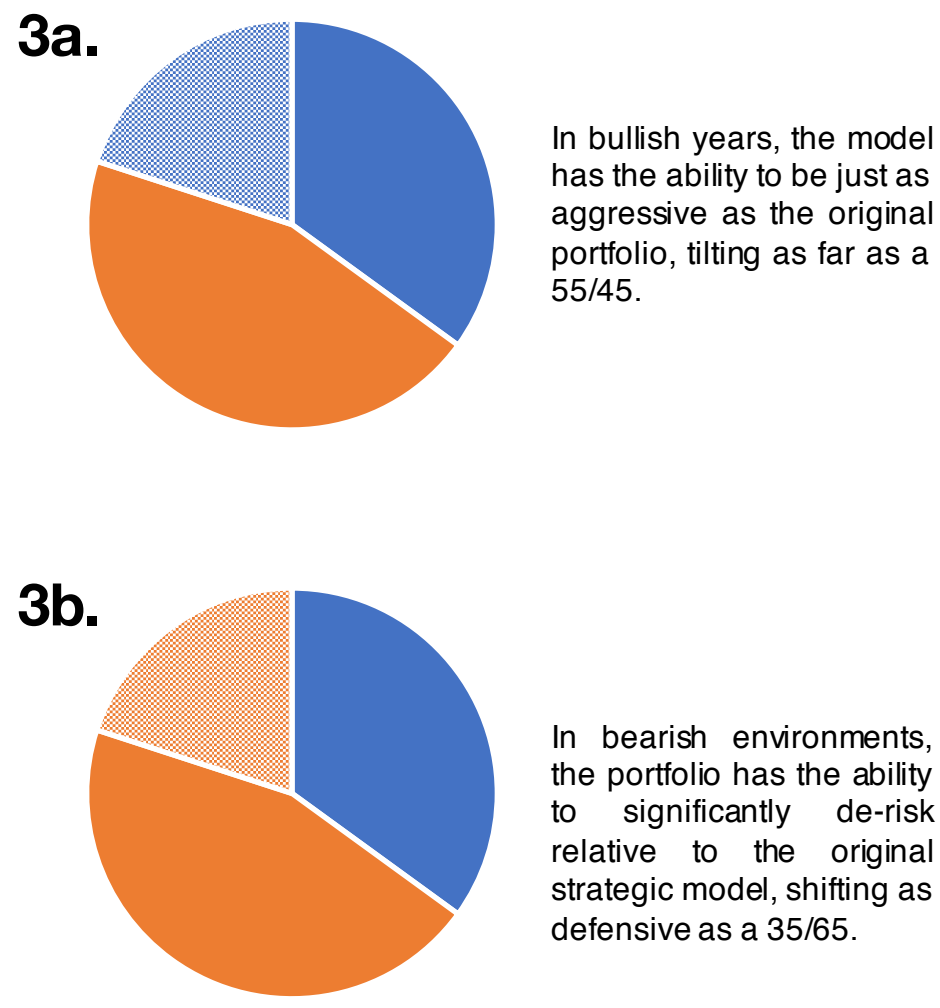
For investors who may be more risk averse, a "pivot" method can be utilized, where an equal amount of risky and safety assets are allocated towards a tactical strategy. In this example, a 55/45 portfolio becomes a 45/35/20 portfolio.

In bullish years, the overall portfolio can tilt towards a more aggressive stance of 65/35 as the tactical sleeve incorporates risky assets.

In bearish environments, the portfolio can de-risk to a 45/55 as the tactical portfolio shifts towards safety assets.

FIGURE 10: "Hedged Equity"





This scenario is the opposite of Figure 7. In this case, an investor is carrying around *too* much exposure to risky assets than is prudent for his financial plan. In this case, a 55/45 becomes a 35/45/20. The tactical sleeve can now be thought of as a "hedged equity" sleeve.

In bullish years, the model has the ability to be just as aggressive as the original portfolio, tilting as far as a 55/45.

In bearish environments, the portfolio has the ability to significantly de-risk relative to the original strategic model, shifting as defensive as a 35/65.

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