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## Managing, Balancing, and Targeting Risk For Improved Investor Outcomes

*The Intelligent Investor*, written by Benjamin Graham, is considered by many, including Warren Buffet, to be the greatest book ever written about investing. In it, Graham notes that “The essence of portfolio management is the management of risks, not the management of returns.” Somehow, many in the investment community have retreated from this tried and true axiom that Graham so succinctly stated over 70 years ago. Today’s focus in the investment management world has clearly become more a search for return than the management of risk. Investment risk is rarely managed in a systematic, comprehensive fashion, despite the many benefits that can be derived from doing so. Although diversification remains a key component in multi-asset portfolios, the emphasis in most cases is on diversifying returns, not risk. Portfolios that are dollar-diversified are often in reality highly risk-concentrated and therefore lack the important benefits of risk-based diversification.

A key to improving investor outcomes is found in the dynamic management, balancing, and targeting of risk. This brief paper illustrates how actively managing risk at multiple levels – the market, the asset class, and the portfolio level – can result in increased returns, both absolute and risk-adjusted, and decreased uncertainty and risk of loss. Virtually any portfolio can benefit from these tried and true concepts. In this paper we present the concepts necessary for effective risk management (and therefore efficient portfolio management) and include examples of the many benefits of taking a dynamic approach to risk management.

## The Different Faces of Risk

In this paper we will show that active risk management and risk balancing results in more consistent performance across many different potential economic and market environments. We look at some of the many different types of risk, including volatility, fluctuations in volatility, and drawdown or event-driven risk. We further show that traditional dollar-based diversification results in significant concentration risk when compared to a truly risk-balanced approach.

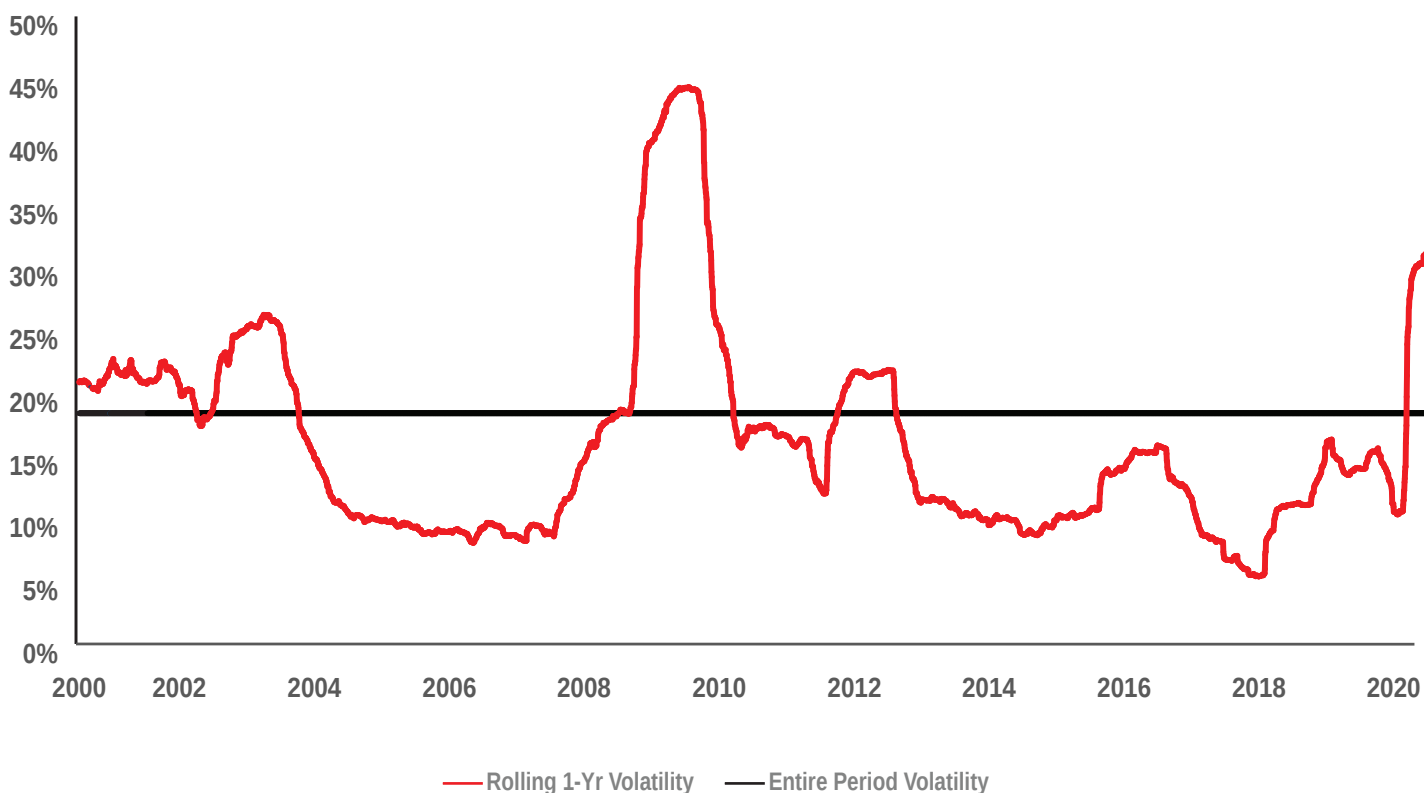
## Managing Individual Market Risk

The dynamic management of risk can best be viewed as a bottom/up process. It starts with individual markets, then moves up to the asset class level, and finally the multi-asset class portfolio. Individual market risk is rarely managed in traditional asset management. The risk of a particular market or asset is generally deemed to be its average volatility over an extended period of time. For instance, the S&P 500 index, as represented by the SPY ETF, had average annualized volatility of 19.71% over the 20 years ending June 2020. The problem is, volatility (and therefore risk) fluctuates significantly over shorter time

periods. **Exhibit 1** shows the rolling 1-year volatility of the S&P 500 over the 20-year period along with the entire period volatility. These short-term fluctuations in volatility are something traditional asset management rarely takes into account. This so-called volatility-of-volatility creates significant risk that is rarely managed by investors.

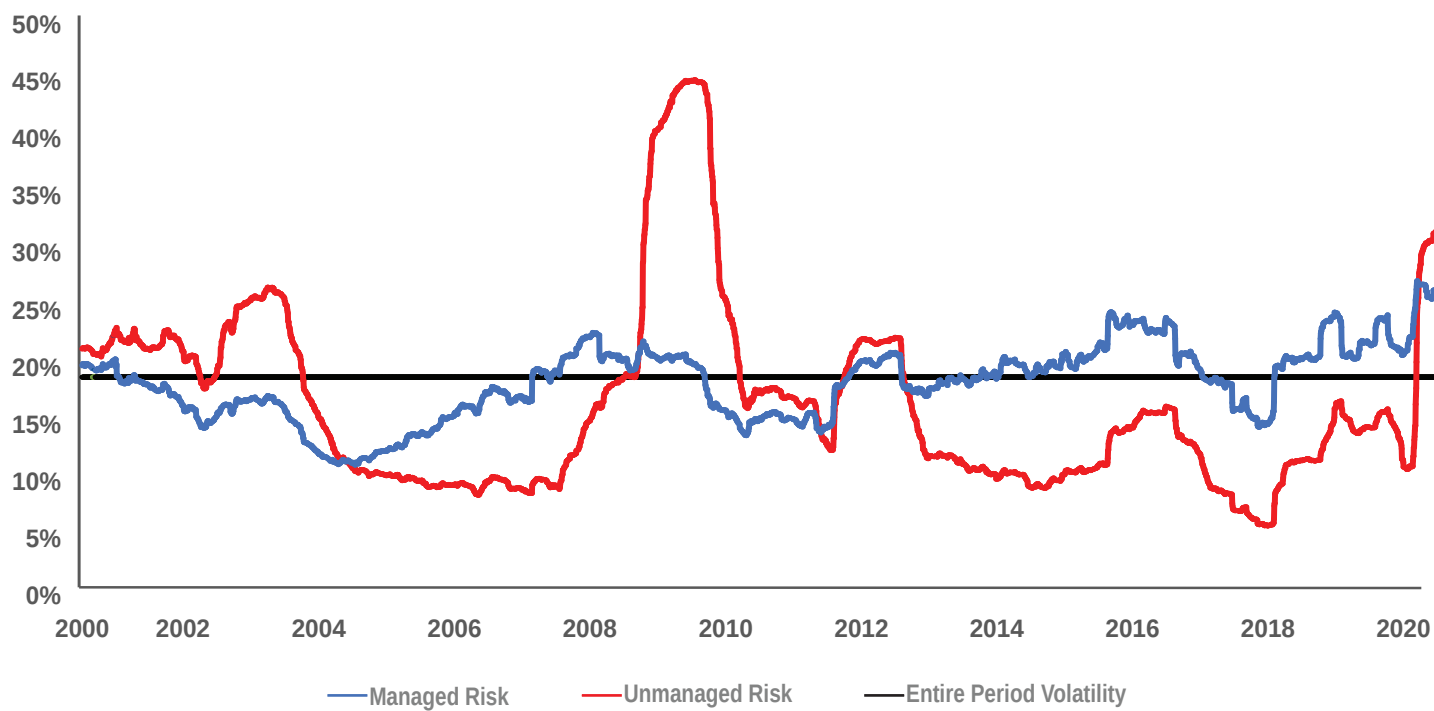
There is a relatively straightforward solution to this problem, and that is to use time-series volatility management to decrease uncertainty and improve predictability and consistency. The concept of risk budgeting is to maintain a predetermined, constant level of risk as opposed to a constant dollar allocation to any particular asset. When using a risk budgeting approach, rising volatility would result in a smaller number of shares held, while falling volatility would call for a larger number of shares. **Exhibits 2-4** show the impact of volatility-adjusting the position size of an asset to maintain relatively constant risk. Clearly, dynamically adjusting position size based on changes in short-term volatility outperforms a one-time dollar allocation to the S&P 500 at the start of the 20-year period.

**Exhibit 1** Rolling annualized 1-year volatility for the S&P 500: 20 years ending June 2020

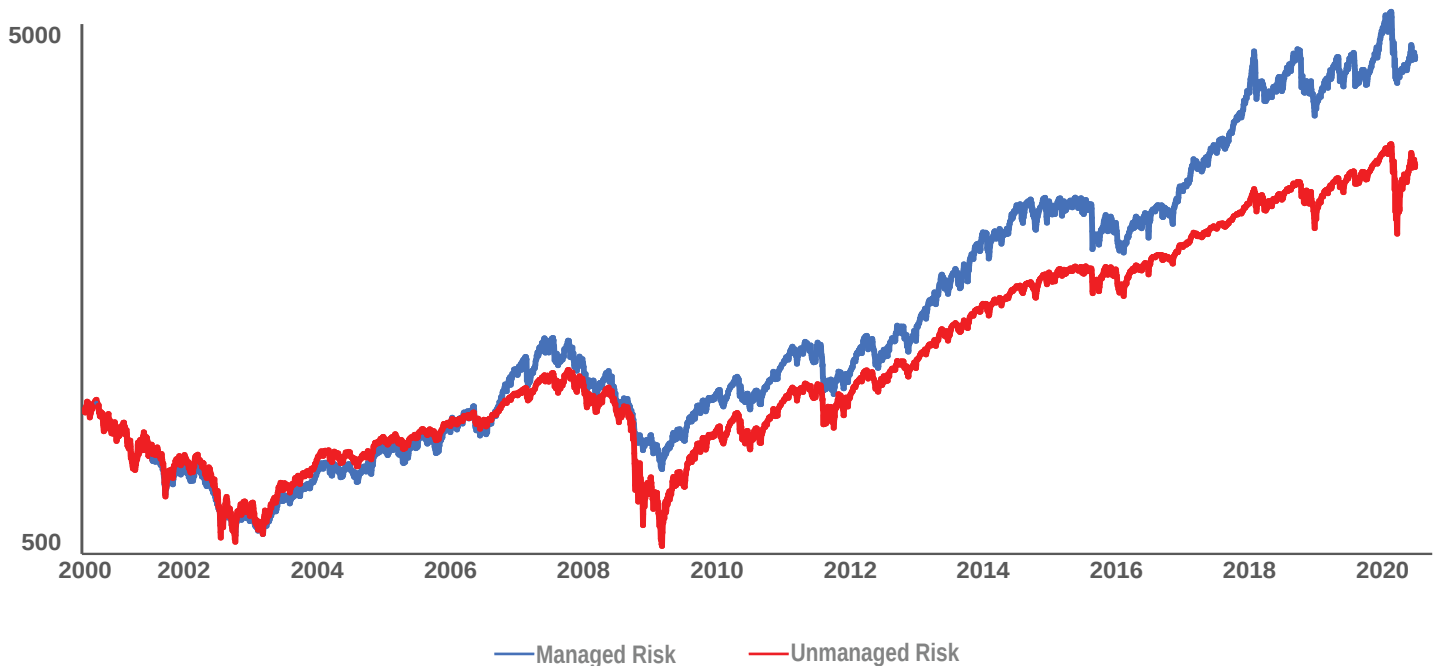


## Managing, Balancing, and Targeting Risk

**Exhibit 2** Rolling annualized 1-year volatility for the S&P 500 with unmanaged risk versus a risk managed approach: 20 years ending June 2020



**Exhibit 3** Compounded return for the S&P 500 with unmanaged risk versus a risk managed approach: 20 years ending June 2020



## Managing, Balancing, and Targeting Risk

**Exhibit 4** Statistics for the S&P 500 with unmanaged risk versus a risk managed approach: 20 years ending June 2020

	Managed Risk	Unmanaged Risk
Return (%)	8.42	5.83
Volatility (%)	19.71	19.71
Max 1-yr volatility (%)	28.16	45.70
Max Drawdown (%)	46.20	55.19
Ret/Vol entire period	0.43	0.30
Ret/Max DD	0.18	0.11

### Balancing Asset Class Risk

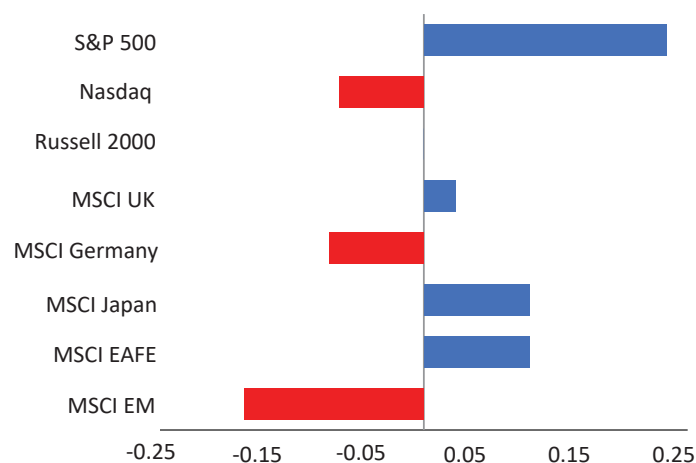
The next step in building an efficient portfolio using this dynamic risk management process is to balance risk within each asset class. Although markets within the same asset class tend to have somewhat similar volatility over time, there are often material differences in short-term volatility that should be accounted for properly. In addition, in the shorter term, different assets within the same asset class might respond differently to idiosyncratic economic or political events. The table in [Exhibit 5](#) shows 20-year volatility of some of the major stock indices as represented by ETFs (please note that the MSCI EAFE ETF began in August 2001 and the MSCI Emerging Markets ETF began in April 2003, so both contain slightly less than 20 full years). These indices produced meaningfully different volatility profiles over this 20 year period. An equal dollar allocation approach would assign equal weight to each index, regardless of its realized volatility. However, a static risk weight approach, an interim step to a dynamic risk weight approach, that had the benefit of knowing the realized volatilities could have accounted for this and generated the equal static risk weights shown in [Exhibit 5](#) that would properly balance and diversify the markets within the equity index asset class. The deviation in these weights from a dollar weighted approach is highlighted in [Exhibit 6](#).

Since volatility is not constant but in fact is constantly fluctuating, it is important to systematically rebalance risk on a regular basis, i.e. evolving from static risk weights to dynamic risk weights. This is a relatively straightforward process that starts with managing volatility at the market level and then advances to balancing at the asset class level. The graph in [Exhibit 7](#) shows the 20-year performance

**Exhibit 5** Global stock indices long-term volatility, equal dollar weights, and equal static risk weights: 20 years ending June 2020

Market	20-Yr Vol	Equal Dollar Weight	Equal Static Risk Weight
S&P 500 (SPY)	19.71	1.00	1.23
Nasdaq (QQQ)	26.40	1.00	0.92
Russell 2000 (IWM)	24.14	1.00	1.00
MSCI UK (EWU)	23.52	1.00	1.03
MSCI Germany (EWG)	26.51	1.00	0.91
MSCI Japan (EWJ)	22.08	1.00	1.10
MSCI EAFE (EFA)	21.95	1.00	1.10
MSCI Emerging Markets (EEM)	29.21	1.00	0.83

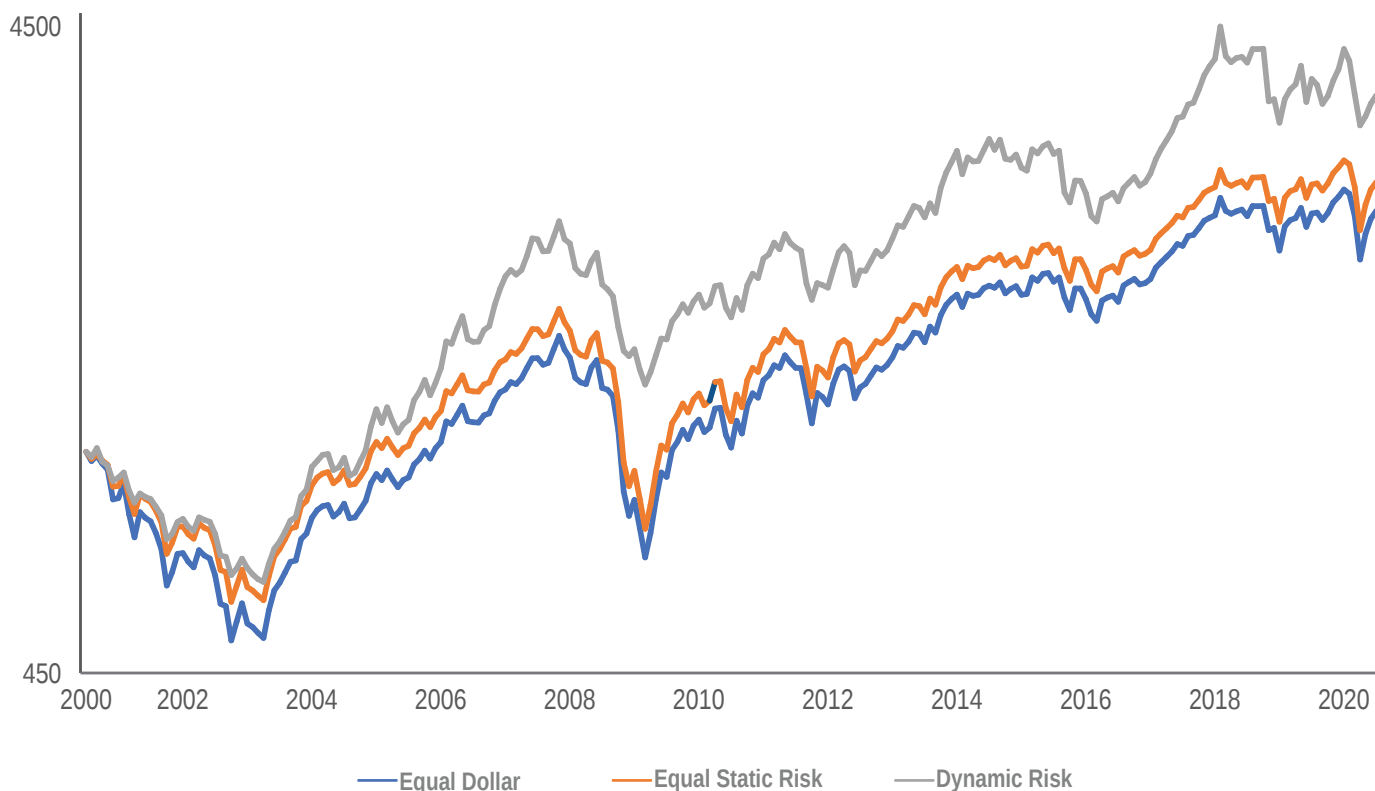
**Exhibit 6** Equal static risk weights versus equal dollar weights: 20 years ending June 2020



of three global stock index portfolios – the first portfolio is constructed using equal dollar allocations and is rebalanced monthly, the second uses equal static risk weights and is rebalanced monthly, and the third uses dynamic risk weights and is rebalanced opportunistically as volatility fluctuates. You will note that over this time period the dynamic risk weighted portfolio significantly outperformed the others.

## Managing, Balancing, and Targeting Risk

**Exhibit 7** Compounded return for a global stock index portfolio with equal dollar weights, equal static risk weights, and dynamic risk weights: 20 years ending June 2020



The table in [Exhibit 8](#) presents various statistics for the three portfolios. The outperformance is primarily due to two factors: (a) dynamic risk-balanced portfolios achieve better diversification than dollar-balanced or static-risk portfolios, and (b) the active management of risk tends to improve the risk-adjusted return and reduce the downside or drawdown risk (which we saw in the section on managing individual market risk.)

**Exhibit 8** Statistics for global stock index portfolio with equal dollar weights, equal static risk weights, and dynamic risk weights: 20 years ending June 2020

	Equal Dollar	Equal Risk	Dynamic Risk
Return (%)	4.39	4.93	6.56
Volatility (%)	17.31	16.49	17.31
Max Drawdown (%)	54.67	54.39	44.19
Ret/Vol	0.25	0.30	0.38
Ret/Max DD	0.08	0.09	0.15

### Balancing Portfolio Risk in a Multi-Asset Portfolio

Now that we are dynamically managing risk at the market and asset class levels, it is time to consider diversifying across asset classes. Similar to balancing risk within asset classes, this is a form of cross-sectional volatility management. The strategy known as “risk parity” makes excellent use of this particular approach. Risk parity portfolios generally include three or more asset classes (e.g., stocks, bonds, and commodities). Each asset class is allocated or budgeted the same amount of risk, which is then actively managed. Increases in the risk of an asset class result in reduced position sizes, while decreases in risk result in larger position sizes. Risk parity has generally outperformed traditional dollar-weight portfolios because of its superior risk-based diversification. Actively managing and balancing risk tends to improve risk-adjusted returns, reduce drawdowns, and control volatility.

Most conventional portfolios are dominated by equity

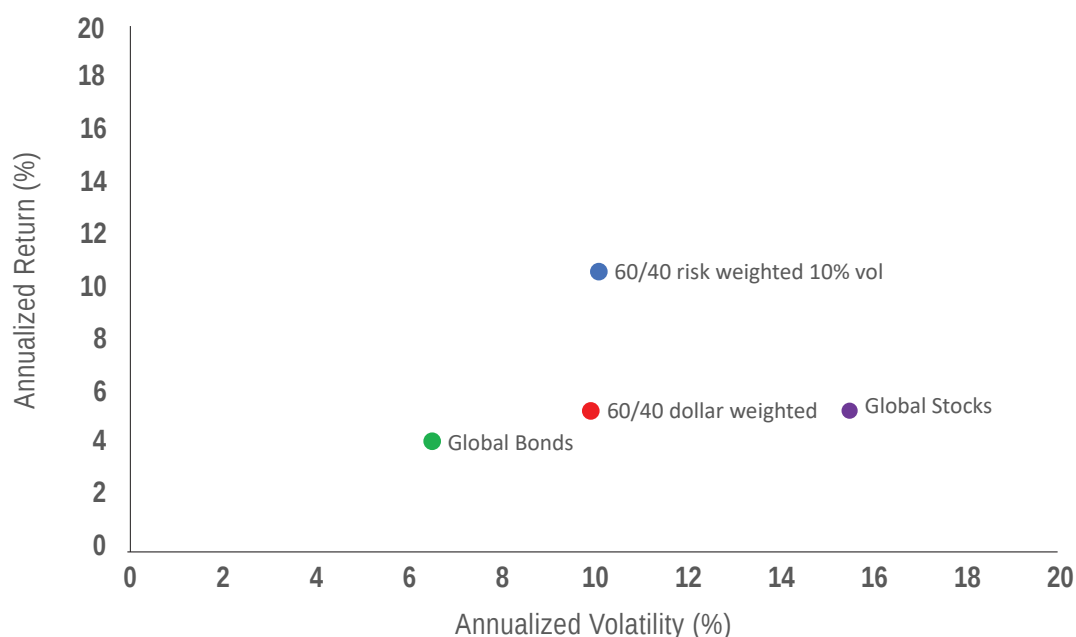
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risk. Even a 60/40 stock-to-bond portfolio has been shown to have as much as 90% of its risk concentrated in equities. Its performance, even with the 40% allocation to bonds, will tend to mirror the performance of equities. A 60/40 portfolio using the risk parity concept will be truly risk-diversified and much more likely to produce superior long-term results for the investor.

The easiest way to implement a risk parity approach is with the use of futures contracts, which act as a proxy for the underlying instruments they represent. Futures contracts facilitate adjusting position size based on changes in volatility because they require only a deposit, not full cash funding. The use of futures contracts allows the investment manager to target a specific level of volatility for the portfolio without adjusting the relative mix of portfolio assets. For example, consider a traditional dollar weighted portfolio consisting of 60% stocks and 40% bonds, a common portfolio mix. Another approach would be to allocate risk instead of capital – that is, 60% of the expected volatility of the portfolio will be allocated to stocks and 40% to bonds. In addition to maintaining this balance of risk, we will also target a specific level of volatility for the entire portfolio of say 10%.

The graph in [Exhibit 9](#) shows what a risk-balanced portfolio would have looked like over the past 20 years making

**Exhibit 9 Return and Volatility for a risk-weighted portfolio compared to that of global stocks, global bonds, and a 60/40 dollar weighted mix of stocks & bonds: 20 years ending June 2020**



certain assumptions (see list of assumptions that follows). The vertical axis shows average annual return and the horizontal axis shows volatility. Also shown on the chart are proxies for global stocks, global bonds, and a traditional dollar weighted 60/40 global stock/bond portfolio over the same time period.

Note that global bonds exhibited the least volatility and the lowest return. Global stocks generated a slighter higher return but at the cost of significantly higher volatility. The 60/40 dollar-weighted portfolio ended up somewhat in the middle, while the 60/40 dynamic risk-weighted portfolio with a 10% volatility target achieved a significantly higher rate of return with roughly the same volatility as the dollar weighted version. These statistics are seen in the table in [Exhibit 10](#), including the risk-adjusted return, defined as return/volatility.

# Managing, Balancing, and Targeting Risk

**Exhibit 10 Return, Volatility, and Return/Volatility for Global Bonds, Global Stocks, a 60/40 dollar weighted portfolio, and a 60/40 risk weighted portfolio: 20 years ending June 2020**

	Return (%)	Volatility (%)	Return/Volatility
Global Bonds	4.21	6.49	0.65
Global Stocks	5.26	15.37	0.34
60/40 Dollar Weighted	5.14	9.90	0.52
60/40 Risk Weighted (10% target)	10.66	10.00	1.07

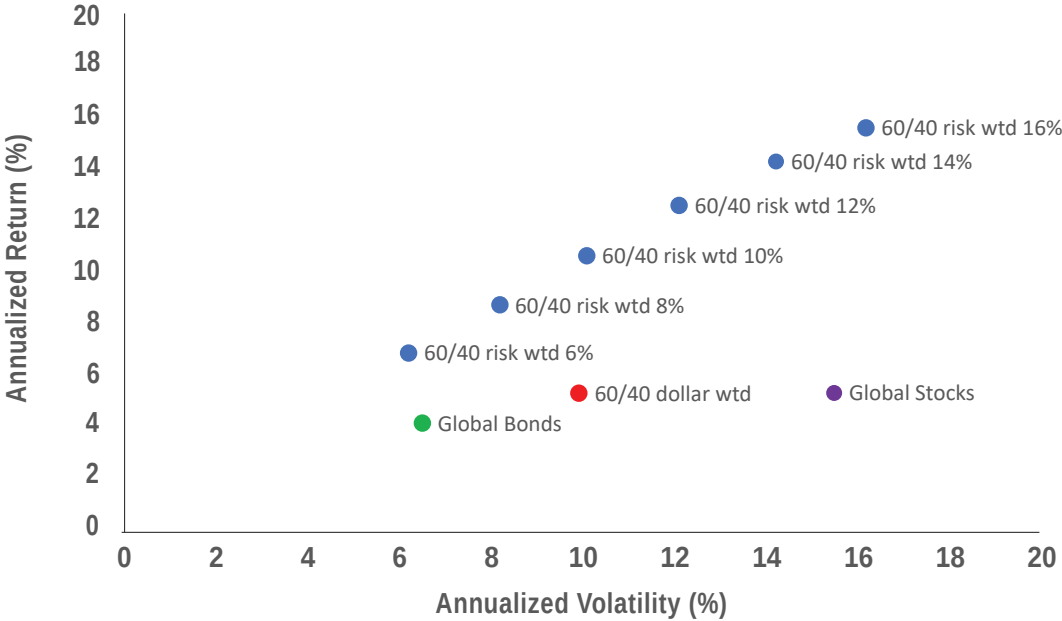
## Targeting Portfolio Risk in a Multi-Asset Portfolio to Achieve Customized Investor Outcomes

The graph in [Exhibit 11](#) builds on that of [Exhibit 9](#) by including additional 60/40 risk-weighted portfolios with a range of different volatility targets, from 6% to 16%. This flexibility is made possible by futures contracts which allow for various degrees of leverage at the market and portfolio levels. Futures contracts allow the manager to not only balance risk across the portfolio, but also to

target different levels of risk without changing the relative mix of the portfolio. This is a powerful tool for managing portfolios. For instance, a 6% risk weighted 60/40 portfolio over this time period would have had roughly the same level of risk as global bonds, but with an annual excess return of 2.70%. A similar situation occurs with global stocks. A 60/40 risk weighted portfolio targeting 14% (slightly less than the realized volatility of global stocks) would have generated an annual excess return of 9.07% over the global stock portfolio.

By using futures to target various levels of volatility or risk, we are always dynamically targeting the optimal risk-balanced mix, whether the goal is to realize 6% portfolio-level volatility or 16%. With traditional dollar weighting using actual stocks and bonds, a 6% volatility portfolio would need to be almost exclusively bonds and a 16% volatility portfolio would need to be almost exclusively stocks. This is a sub-optimal outcome, since we know that neither all stocks nor all bonds is optimal across sufficiently long time horizons.

**Exhibit 11 Return & volatility for risk weighted portfolios with various volatility targets vs. global stocks, global bonds, and a 60/40 dollar weighted mix of stocks & bonds: 20 years ending June 2020**



### **Dynamic Risk Management – A Superior Method of Portfolio Construction**

The concepts involved in dynamic risk management – active management, risk balancing, and targeting risk levels, can be using in almost any investment strategy. They can be particularly effective in strategies that make regular use of futures contracts, like risk parity, tactical asset allocation, and trend following. Although not common in the traditional investment world, these concepts have been used successfully for many years by alternative investment practitioners. Embracing a dynamic risk-based approach can help improve investor outcomes by keeping them aligned with the tried and true axiom that “the essence of portfolio management is the management of risks, not the management of returns.”

### **Significant Simulation Assumptions for Exhibits 9-11**

- Evaluation period: 2000-2020
- Global Stocks are represented by the MSCI World total return index USD
- Global Bonds are represented by the FTSE World Government Bond Index USD
- The 60/40 dollar weighted portfolio is a combination of the global stocks and bonds described above, rebalanced monthly, and is created for illustration purposes only. It does not include transaction costs, fees, expenses, or taxes
- Risk balanced portfolios utilize the following exchange-cleared stock index futures: S&P 500, Nasdaq, German DAX, U.K. FTSE, French CAC, Hong Kong Hang Seng, and Japanese Nikkei; and the following government bond futures: U.S. 10-years, U.S. 5-years, Euro bund, Euro bobl, U.K. gilt, and Australian 10-years
- The risk balanced portfolios include transaction costs and interest income on cash balances in excess of exchange margin requirements, but do not include fees, expenses, or taxes