



February 2020

The Three Pillars of Better Strategic Portfolios

Roberto M. Croce, PhD | Managing Director, Senior Portfolio Manager

The Wilshire Risk Parity Index referenced throughout this piece was launched in June 2019 as a result of a collaboration between Wilshire Associates (Wilshire) and Mellon Investments Corporation (Mellon). Wilshire maintains all rights to the index presented in this document.

How confident are you that your portfolio can deliver an annualized return of 7-8% with adequate levels of liquidity? If not fully confident, we invite you to consider whether your portfolio is diversified across all possible dimensions. Most investors appreciate that combining risk assets with bonds can improve the risk-adjusted return of their portfolios. While this is a good first step, maximizing diversification requires applying the concept to the entire depth and breadth of a portfolio. With slower global economic momentum and uncertainty clouding most outlooks, we believe it is important for investors to consider the extent to which diversification is deployed in their portfolio.

In this paper we provide a common sense definition of diversification and apply it within and across asset classes, and across time. As we will show, each of the three dimensions of diversification is highly impactful. To the degree that investors are not pursuing all of three dimensions consistently in their asset allocation, there is substantial opportunity to improve the odds of generating meaningful return.

Investors almost invariably equate diversification with lower return. That is not what we are discussing here. Instead, we propose combining assets into a portfolio with maximum efficiency, and then using moderate leverage in an effort to convert the higher efficiency into higher return. More specifically, we propose a risk parity strategy that consistently targets balanced risk within and across asset classes, and across time. But the concepts can be applied more generally to understand whether any portfolio or rebalancing approach can be improved.

So what is diversification?

We think a common sense definition of diversification is the degree to which long-run portfolio outcomes are determined by a multitude of unrelated drivers. This paper explores three dimensions, or three pillars, that we think maximize an investor's probability of success in strategic asset allocation:

1. Diversification within asset classes
2. Diversification across asset classes
3. Diversification across time.

Diversification within asset classes means investing in asset-class-level portfolios that spread risk across countries and sectors as broadly as possible. As we will show, diversification within asset classes can rival the outcome of top-quartile tactical allocation, without taking the risk associated with betting on any single market.

Diversification across asset classes means allocating portfolio risk to asset classes that behave differently (i.e. primary asset classes). Compared against most traditional balanced portfolios (60/40 or otherwise), this means re-allocating significant risk—the bulk of it, in fact—from equities to asset classes like sovereign fixed income, credit spreads, and commodities. That is a radical shift, but we will show that it has the ability to improve the risk-adjusted return of the strategic mix of assets, even when some of the diversifying asset classes fail to perform on their own.

Diversification across time means targeting and actively managing the risk of a portfolio so that no subset of the investment horizon has a disproportionate impact on the long-run portfolio outcome. Think about what would happen to your current portfolio if stocks lost 40% of their value over the next six months. How much would that impact your terminal value five years out? If your portfolio looks like most, then the answer is “a lot.” It doesn't have to be that way. Active risk management trims position sizes as market risk rises, keeping the expected impact of a one-day move consistent through time and helping to mitigate the disproportionate impact volatile markets typically have on long-term investment outcomes. Time diversification can also help portfolios squeeze meaningful return from quiet markets, enhancing the number of unrelated drivers of long-run investment outcomes.

For the balance of this paper, we highlight the backtested performance of the Wilshire Risk Parity Index - 15% Target VolatilitySM (data backtested from 12/31/2004) in order to study the incremental impact of each type of diversification. The results show that all three dimensions of diversification add significant value in the context of strategic asset allocation.

Pillar 1: Diversify Within Asset Classes

Pillar 1 explores our belief that exposure within asset classes should be diversified. As a simple illustration, we examine the challenge of building asset class portfolios in equities, commodities, and sovereign bonds. The table below shows the Sharpe ratio of the best and worst performing markets, as well as the breakpoints between each quartile in each asset class between January 2000 and May 2019. Trying to pick the best performing market would have been risky due to the difference in return between the best- and worst-performing markets in each asset class. For example, the worst performing equity market generated a Sharpe ratio of 0.10—investors in the EURO STOXX 50 earned 0.99% excess return over cash* for taking risk over this time period—while a position in the S&P 500 earned 3.65% excess return per year.* In commodities, allocators who chose the worst performing commodity, crude oil, would have lost 0.33% per annum* while investors in gold would have earned positive 4.64%.* Significant dispersion between the results of the various constituents in each asset class made tactical asset allocation risky. We think there is a better way.

Consider that the median annual Sharpe ratio across the developed market equity indices in the Wilshire Risk Parity Index is 0.21, as shown in the table below. The diversified portfolio, which is simply equal weighted markets in each asset class, significantly outperformed the median underlying market in all three asset classes. In fact, the Sharpe ratio is in excess of the top quartile breakpoint in equities and commodities, and better than every sovereign bond market. In other words, broad diversification within an asset class can be enough to position you in the top quartile in any of these asset classes without making any return forecasts or attempting to select markets. This is why the bar for tactical asset allocation is so high in our view—the diversified portfolio is the opportunity cost against which tactical asset allocation ought to be measured, and the diversified portfolio is quite good.

Diversified Portfolios Produced Better Sharpe Ratios than Most Underlying Markets

Percentiles	Equities	Commodities	Sovereign Bonds
Worst Performer	0.10	-0.03	0.50
Bottom Quartile	0.12	0.10	0.54
Median	0.21	0.30	0.63
Top Quartile	0.30	0.41	0.75
Best Performer	0.34	0.45	0.81
Diversified Portfolio	0.31	0.43	0.90

PAST PERFORMANCE IS NOT NECESSARILY INDICATIVE OF FUTURE RESULTS. Source: Wilshire and firm analysis, as of 5/31/19. Equities: S&P 500, FTSE 100, EURO STOXX 50, and Nikkei 225. Commodities: WTI Crude oil, soybeans, copper, and gold. Sovereign bonds (ten year maturity): US, UK, Eurozone, and Japan. *Broad-based securities indices are unmanaged and are not subject to fees and expenses typically associated with managed accounts or investment funds. Investors cannot invest directly in any index.

Pillar 2: Diversify Across Asset Classes

We believe diversifying across primary asset classes can add value over the long run by delivering exposure to diverse macro-fundamental drivers and mitigating the more dramatic boom-and-bust return profile associated with concentration in a single asset class. This is the core philosophy of risk parity: balance the risk deployed across asset classes rather than the capital allocated to them.

We consider how the backtested Wilshire Risk Parity Index performed in this context. The table below shows that a conventional 60/40 portfolio generated excess returns of 5.30%* at 8.29% annualized volatility, for a Sharpe ratio of 0.64. Compare a Static Risk Allocation (using average weights for the period 2005-2019) in the Wilshire Risk Parity Index (no rebalancing), which generates a much higher 8.44%* annual excess return at 13.60% volatility, for a Sharpe ratio of 0.62. The Wilshire Risk Parity Index manages to deliver a comparable Sharpe ratio to the 60/40 portfolio despite a sizable allocation to commodities, which is the worst performing asset class since 2005.

Backtested Risk Parity Outperforms 60/40 and Individual Asset Classes (January 2005 - May 2019)

	Wilshire Risk Parity Index Static Risk Allocation	60/40	S&P 500*	US 10-Year Futures	Bloomberg Commodity Index SM Total Return
Return	8.44%	5.30%	6.14%	3.21%	-4.24%
Volatility	13.60%	8.29%	14.23%	5.46%	16.40%
Sharpe Ratio	0.62	0.64	0.43	0.59	-0.26

THESE RESULTS ARE BASED ON SIMULATED OR HYPOTHETICAL PERFORMANCE RESULTS THAT HAVE CERTAIN INHERENT LIMITATIONS. UNLIKE THE RESULTS SHOWN IN AN ACTUAL PERFORMANCE RECORD, THESE RESULTS DO NOT REPRESENT ACTUAL TRADING. ALSO, BECAUSE THE TRADES HAVE NOT ACTUALLY BEEN EXECUTED, THE RESULTS MAY HAVE UNDER- OR OVER-COMPENSATED FOR THE IMPACT, IF ANY, OF CERTAIN MARKET FACTORS, SUCH AS LACK OF LIQUIDITY. SIMULATED OR HYPOTHETICAL TRADING PROGRAMS IN GENERAL ARE ALSO SUBJECT TO THE FACT THAT THEY ARE DESIGNED WITH THE BENEFIT OF HINDSIGHT. NO REPRESENTATION IS BEING MADE THAT ANY ACCOUNT WILL OR IS LIKELY TO ACHIEVE PROFITS OR LOSSES SIMILAR TO THESE BEING SHOWN. Source: Wilshire and firm analysis. The 60/40 Portfolio is comprised of 60% S&P 500/40% Barclays US 10yr Note Futures Index. *Broad-based securities indices are unmanaged and are not subject to fees and expenses typically associated with managed accounts or investment funds. Investors can not invest directly in any index.

The very low average correlation of the primary asset classes drives the result. The similar Sharpe ratio comes in spite of the large risk allocation in commodities, an asset class that delivered negative returns over the time period. Diversification over the long run not only delivers a higher return and comparable Sharpe ratio relative to the 60/40 portfolio, it also beats concentrated exposure to bonds, the best-performing asset class. Even if a manager had the foresight to know that fixed income would produce the best Sharpe ratio and devoted 100% of the portfolio to 10-year Treasuries, they still underperformed the backtested Wilshire Risk Parity Index. Diversification was better than foresight and in our view will continue to be better than foresight, particularly if global economic momentum weakens. Unique macroeconomic sensitivities across and within asset classes, coupled with economic conditions that are difficult to forecast accurately, leads us to believe a portfolio balanced among economic environments will generate outperformance in the long run as concentrated exposures go in and out of favor.

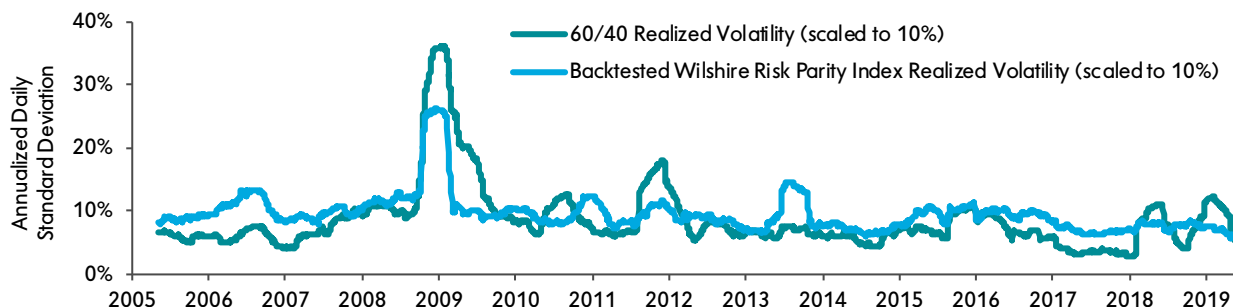
Pillar 3: Diversify Across Time

Pillar 3 explores our belief that proper diversification across time furthers our goal of ensuring performance is not excessively influenced by any one portfolio driver, where drivers can include not only asset classes and individual markets, but also periods of time. Sharp or prolonged equity declines can have enormous influence on the terminal value of traditional portfolios. The reason is that 60/40 portfolios, and really any static allocation, take more risk during periods of high market volatility than they do during periods of low market volatility. Even if returns were as likely to be good as bad when volatility rises, an investor should still reduce risk because higher volatility leads to increased uncertainty about the future.

Worse, returns tend to be poor during periods of high volatility, so traditional portfolios are disproportionately influenced by periods that tend to offer low returns. Conversely, periods of low volatility tend to offer much better risk-adjusted returns than average, meaning traditional investors' outcomes are under-influenced by the most favorable market environments. Managing to a constant volatility target attempts to correct the disproportionate impact of high volatility periods on a portfolio's long-run outcome.

To illustrate how much of an impact this has on risk parity portfolios, we plot the realized rolling one-year volatility for a 60/40 portfolio relative to the Wilshire Risk Parity Index. As the chart below displays, the Index's realized risk is in the vicinity of the target level very consistently, meaning that its terminal value is similarly influenced by all of the rolling one-year periods since 2005. The ability to navigate varying economic environments over an approximate 15-year period and achieve consistent realized risk is evidence of the benefits of diversification across time.

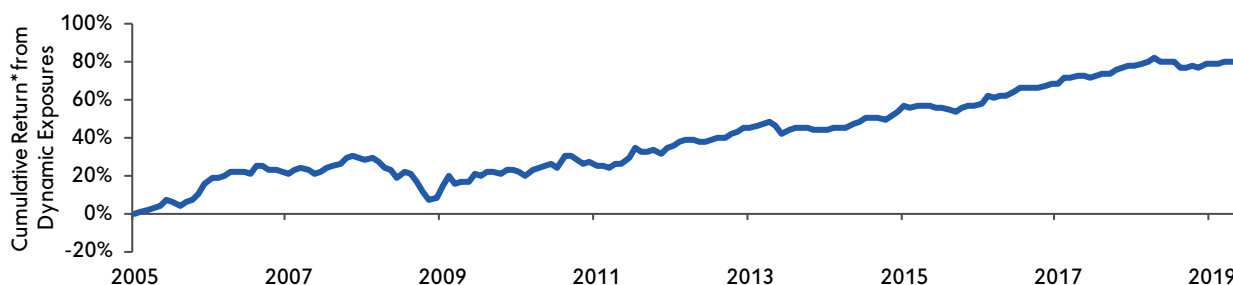
Risk Parity Increases the Consistency of Risk Delivery in Backtest (January 2005 - May 2019)



THESE RESULTS ARE BASED ON SIMULATED OR HYPOTHETICAL PERFORMANCE RESULTS THAT HAVE CERTAIN INHERENT LIMITATIONS. UNLIKE THE RESULTS SHOWN IN AN ACTUAL PERFORMANCE RECORD, THESE RESULTS DO NOT REPRESENT ACTUAL TRADING. ALSO, BECAUSE THE TRADES HAVE NOT ACTUALLY BEEN EXECUTED, THE RESULTS MAY HAVE UNDER- OR OVER-COMPENSATED FOR THE IMPACT, IF ANY, OF CERTAIN MARKET FACTORS, SUCH AS LACK OF LIQUIDITY. SIMULATED OR HYPOTHETICAL TRADING PROGRAMS IN GENERAL ARE ALSO SUBJECT TO THE FACT THAT THEY ARE DESIGNED WITH THE BENEFIT OF HINDSIGHT. NO REPRESENTATION IS BEING MADE THAT ANY ACCOUNT WILL OR IS LIKELY TO ACHIEVE PROFITS OR LOSSES SIMILAR TO THESE BEING SHOWN. Source: Wilshire and firm analysis. The 60/40 Portfolio is comprised of 60% S&P 500/40% Barclays US 10yr Note Futures Index. Daily returns of the 60/40 and Wilshire Risk Parity Index returns are scaled so that the full sample volatility, for each return series, is exactly 10%. We then calculate the rolling volatilities using a 90-day trailing window. Investors can not invest directly in any index.

In our discussion of Pillar 2, we showed that diversifying across asset classes has the ability to deliver better risk-adjusted return than any of the individual underlying assets based on a regression that explained less than 100% of the risk. The portion of the Wilshire Risk Parity Index returns that was not successfully explained by the static allocations in Pillar 2 reflect dynamic exposures—the constant rebalancing of positions in order to keep the blue line (above) as close to the target level as possible. This dynamic rebalancing is Pillar 3, and is the third dimension of diversification. Below we plot the cumulative backtested return of the Wilshire Risk Parity Index above and beyond what is explained by the static risk allocation in Pillar 2.

Dynamic Rebalancing Adds Value in Backtest (January 2005 - May 2019)



THESE RESULTS ARE BASED ON SIMULATED OR HYPOTHETICAL PERFORMANCE RESULTS THAT HAVE CERTAIN INHERENT LIMITATIONS. UNLIKE THE RESULTS SHOWN IN AN ACTUAL PERFORMANCE RECORD, THESE RESULTS DO NOT REPRESENT ACTUAL TRADING. ALSO, BECAUSE THE TRADES HAVE NOT ACTUALLY BEEN EXECUTED, THE RESULTS MAY HAVE UNDER- OR OVER-COMPENSATED FOR THE IMPACT, IF ANY, OF CERTAIN MARKET FACTORS, SUCH AS LACK OF LIQUIDITY. SIMULATED OR HYPOTHETICAL TRADING PROGRAMS IN GENERAL ARE ALSO SUBJECT TO THE FACT THAT THEY ARE DESIGNED WITH THE BENEFIT OF HINDSIGHT. NO REPRESENTATION IS BEING MADE THAT ANY ACCOUNT WILL OR IS LIKELY TO ACHIEVE PROFITS OR LOSSES SIMILAR TO THESE BEING SHOWN. Source: Wilshire and firm analysis. *Broad-based securities indices are unmanaged and are not subject to fees and expenses typically associated with managed accounts or investment funds. Investors can not invest directly in any index.

The table below demonstrates the value of combining the diversified static portfolio with the dynamic exposure overlay; dynamic positioning improves the risk-adjusted return, increasing the Sharpe ratio from 0.62 to 0.94.

Dynamic Rebalancing Improves Sharpe Ratio in Backtest (January 2005 - May 2019)

	60/40	Wilshire Risk Parity Index Static Risk Allocation	Wilshire Risk Parity Index Dynamic Rebalancing	Wilshire Risk Parity Index
Return*	5.30%	8.44%	5.66%	14.51%
Volatility	8.29%	13.60%	6.86%	15.51%
Sharpe Ratio	0.64	0.62	0.83	0.94

THESE RESULTS ARE BASED ON SIMULATED OR HYPOTHETICAL PERFORMANCE RESULTS THAT HAVE CERTAIN INHERENT LIMITATIONS. UNLIKE THE RESULTS SHOWN IN AN ACTUAL PERFORMANCE RECORD, THESE RESULTS DO NOT REPRESENT ACTUAL TRADING. ALSO, BECAUSE THE TRADES HAVE NOT ACTUALLY BEEN EXECUTED, THE RESULTS MAY HAVE UNDER- OR OVER-COMPENSATED FOR THE IMPACT, IF ANY, OF CERTAIN MARKET FACTORS, SUCH AS LACK OF LIQUIDITY. SIMULATED OR HYPOTHETICAL TRADING PROGRAMS IN GENERAL ARE ALSO SUBJECT TO THE FACT THAT THEY ARE DESIGNED WITH THE BENEFIT OF HINDSIGHT. NO REPRESENTATION IS BEING MADE THAT ANY ACCOUNT WILL OR IS LIKELY TO ACHIEVE PROFITS OR LOSSES SIMILAR TO THESE BEING SHOWN. Source: Wilshire and firm analysis. The 60/40 Portfolio is comprised of 60% S&P 500/40% Barclays US 10yr Note Futures Index. *Broad-based securities indices are unmanaged and are not subject to fees and expenses typically associated with managed accounts or investment funds. Investors can not invest directly in any index.

Delivering True Diversification

Most investors have taken to heart that holding a combination of risk assets and bonds can improve the Sharpe ratio of their portfolios. However, most investors never fully consider diversification as a way to potentially improve the odds of achieving high target portfolio returns because, in most investors' minds, diversification leads to lower return. Risk parity breaks the link between diversification and lower return by using moderate leverage to convert a more efficient portfolio into one that is designed to generate high return at an acceptable level of risk.

Risk parity goes well beyond conventional diversification by maximizing diversification within asset classes, across asset classes and across time. Only then is a portfolio fully diversified. As we have shown here, diversifying within asset classes can provide much more efficient asset class exposure without the risk associated with forecasting or market timing. Diversifying across asset classes may deliver better returns than even the best underlying asset class, even when some of the asset classes are significant drags on performance. Stacking a time series overlay to diversify across time adds a third dimension to the return stream, driving another 5.66%* return over and above a static diversified portfolio.

Diversifying across all three dimensions is conceptually straightforward, but delivering it requires experience. Mellon's 30+ years of macro and multi-asset research experience, global multi-asset trading team, industry-leading investment platform, and independent risk management function have the scale and expertise to potentially deliver the full benefit of true diversification in practice.

**Roberto M. Croce, PhD**

Managing Director, Senior Portfolio Manager

Rob is the senior portfolio manager for the Risk Parity and Managed Futures strategies at the firm. He is responsible for managing our suite of liquid alternative strategies and the development and maintenance of the underlying quantitative models. Prior to joining the firm in 2018, Rob was a managing director of quantitative strategies at Salient Partners. He was the lead portfolio manager on Salient's risk parity and managed futures strategies and co-portfolio manager on several other funds. In addition, Rob and his team built Salient's quantitative software and hardware platform from the ground up and continue researching potential strategy improvements and new products. Prior to joining Salient in 2011, Rob taught macroeconomics and finance at Ohio State University, published academic research and served as a research assistant. In 2010, Rob interned in the Strategic Research group at the Teacher Retirement System of Texas.

Rob earned both a master's and doctoral degrees in economics from Ohio State University and a Bachelor of Science in economics from Penn State University.

Disclosure

Mellon Investments Corporation ("Mellon") is a registered investment advisor and subsidiary of The Bank of New York Mellon Corporation ("BNY Mellon"). Any statements of opinion constitute only current opinions of Mellon, which are subject to change and which Mellon does not undertake to update. This publication or any portion thereof may not be copied or distributed without prior written approval from the firm. Statements are correct as of the date of the material only. This document may not be used for the purpose of an offer or solicitation in any jurisdiction or in any circumstances in which such offer or solicitation is unlawful or not authorized. The information in this publication is for general information only and is not intended to provide specific investment advice or recommendations for any purchase or sale of any specific security. Some information contained herein has been obtained from third party sources that are believed to be reliable, but the information has not been independently verified by Mellon. Mellon makes no representations as to the accuracy or the completeness of such information. No investment strategy or risk management technique can guarantee returns or eliminate risk in any market environment and past performance is no indication of future performance. The indices referred to herein are used for comparative and informational purposes only and have been selected because they are generally considered to be representative of certain markets. Comparisons to indices as benchmarks have limitations because indices have volatility and other material characteristics that may differ from the portfolio, investment or hedge to which they are compared. Wilshire®, the Wilshire IndexesSM and the Wilshire Risk Parity Index – 15% Target VolatilitySM are service marks of Wilshire Associates Incorporated ("Wilshire") and have been licensed for use by The Bank of New York Mellon Corporation. All content of the Wilshire IndexesSM and the Wilshire Risk Parity Index – 15% Target VolatilitySM is ©2019 Wilshire Associates Incorporated, all rights reserved. Product(s) are not sponsored, endorsed, sold or promoted by Wilshire, and Wilshire makes no representations or warranties with respect to the Product(s). Please see mellon.com for important index licensing information. This material is solely for informational and educational purposes only, and shall not constitute an offer to sell or a solicitation to buy any securities or strategy. This material is directed exclusively at investment professionals.

The back-tested results assumes the reinvestment of all income and earnings. All rebalancing activity was assumed to have occurred using daily close pricing. For use with institutions only, not for use with retail investors. An overview of the methodology of the index is available upon request.

Information about the Wilshire Risk Parity Index - 15% Target VolatilitySM can be found at wilshire.com.

