The Curious Case of Risk Exposures in Diversified, Multi-Asset Class Portfolios – A Deep Dive

A Commonfund Whitepaper

commonfund

Table of Contents

Author

Commonfund
15 Old Danbury Road
Wilton, CT 06897
www.commonfund.org

About Commonfund

Commonfund was founded in 1971 as an independent nonprofit investment firm with a grant from the Ford Foundation. Commonfund today manages customized investment programs for endowments, foundations and pension funds. Among the pioneers in applying the endowment model of investing to institutional investors, Commonfund provides extensive investment flexibility using independent investment sub-advisors for discretionary outsourcing engagements, single strategies and multi-asset solutions. Investment programs incorporate active and passive strategies in equities and fixed income, hedge funds, commodities and private capital. All securities are distributed through Commonfund Securities, Inc., a member of FINRA. For additional information about Commonfund, please visit www.commonfund.org.

The Curious Case of Risk Exposures in Diversified, Multi-Asset Class Portfolios – A Deep Dive

Previous research at Commonfund has demonstrated that a traditional 70/30 stock/bond portfolio[1] has north of 99% of its risk allocated to equities[2]. Thus, portfolio risk in the traditional portfolio is not broadly diversified across equities and fixed income, but rather, highly concentrated in one exposure: equities. Does a more diversified, multi-asset class portfolio do a better job of balancing risk?

In this paper, we take a deeper look at portfolio risk exposures in diversified, multi-asset class portfolios, using the typical endowment portfolio as the paradigm. We begin with a standard decomposition of risk using asset class exposures and find that equities contribute only 70% of risk in the typical endowment portfolio, much less than in the traditional 70/30 portfolio. The magnitude of this victory for the typical endowment portfolio proves to be a little misleading, however, as our examination also reveals that individual asset class risk exposures are significantly correlated with one another.

Indeed, this commonality of risk across asset classes raises the question of whether the asset class lens provides the clearest assessment of risk. In order to address these shared sources of risk, we introduce the notion of factor exposures. Factor exposures are, quite simply, common risks (e.g., credit) which may be present across multiple asset classes. After providing an explanation of factors and factor exposures, we use a parsimonious factor model to demonstrate that the typical endowment portfolio allocates a bit less than 90% of its risk to equities.

Thus, the typical endowment portfolio does diversify risk better than the traditional 70/30 portfolio but not by as much as a simple asset class risk analysis would suggest. We conclude by outlining additional opportunities available to investors who would like to further diversify their portfolio risk.

The Diversified Multi-Asset Class Portfolio Study Design

Diversified, multi-asset class portfolios seek to incorporate a broader set of opportunities into the investment universe than traditional portfolios. These opportunities typically benefit from a global rather than a domestic purview and include real assets, hedge funds and private capital markets alongside traditional public equity and fixed income. While this diversification may, therefore, take many forms, the archetypal form for these portfolios is probably the endowment model. As such, for our representative diversified portfolio, we employ the 2014 NACUBO-Commonfund Study of Endowments portfolio (henceforth the NCSE portfolio).

The NCSE portfolio reflects the typical portfolio allocation extracted from a survey of 832 U.S. educational institutions overseeing $516 billion in assets, making it broadly representative of the endowment universe. At an aggregate asset class level, these institutions make dollar allocations of 51% to global equity, 13% to fixed income, 13% to real

1 70% S&P500, 30% Barclays US Aggregate
2 Dollar allocation ≠ risk allocation

assets and 23% to hedge funds. At a more disaggregated level, these investments involve public and private markets as well as active and passive management.[3]

As we do not observe monthly returns for the actual participants in the NACUBO-Commonfund Study of Endowments, we employ proxies for each of the strategies. For public markets, we rely on passive market exposures; for hedge funds and private capital, we rely on standard peer indexes. Active management in public markets may provide another route to diversification. Similarly, picking hedge fund and private equity managers that substantially deviate from the peer benchmark may also provide diversification. Neither of these opportunities is explored here.

With the data now described, we turn to the analytics.

Dollar Allocation ≠ Risk Contribution

In this section, we conduct a traditional, asset class level risk decomposition for the NCSE portfolio. As our primary metric for risk allocation, we utilize contribution to risk. In a nutshell, the contribution to risk indicates how much risk, as measured by volatility, is attributable to each individual asset class. Analogously, the percentage contribution to risk equals the share of portfolio level volatility derived from each individual asset class. The sum of percentage contributions to risk across all asset classes must total 100%.

The contribution to risk may be calculated most simply by applying the x-sigma-rho framework coined by Jose Menchero and Ben Davis.[4] In this framework, the contribution to portfolio risk of each individual asset class equals the product of its dollar investment share (x), its volatility (sigma) and its correlation with the total portfolio (rho). Intuitively, a larger dollar investment share, higher volatility and higher correlation with the total portfolio all increase the contribution to risk of an individual asset class. To obtain the percentage contribution to risk for an asset class, we divide the contribution to risk of the asset class by the total portfolio risk.

Exhibit 1 depicts the return and risk statistics for the constituents of the NCSE portfolio alongside the correlations of each asset class with the NCSE portfolio. Equivalent statistics for the traditional 70/30 portfolio are also provided for reference.

A quick glance at the first and last rows reveals a startling inconsistency. The dollar allocation to asset classes dramatically misrepresents the risk allocation for the NCSE portfolio. Relatively similar dollar allocations to Fixed Income (13%) and Real Assets (13%) translate to considerably different risk contributions: less than 1% from fixed income and 18.3% from real assets.

The drivers of this mismatch are the asset classes' differences in volatility and in correlation with the total portfolio. Fixed income and hedge funds have low levels of volatility (3- 7%) compared to equities and real assets (16-18%). Purely from a volatility perspective, one dollar allocated to equity or real assets generates three times the risk (volatility) of one dollar allocated to fixed income or hedge funds. On its own this leads to lower contributions to risk from fixed income and hedge funds. In addition, fixed income has a low correlation with the total portfolio (less than 10%) when compared to equity, real assets and hedge funds (80%-100%). Purely from a correlation perspective, one dollar allocated to fixed income diversifies the portfolio much more than one dollar allocated to equity, real assets or hedge funds. This gap in correlation reinforces the smaller contribution to risk coming from fixed income.

From the lens of asset class exposures, the NCSE portfolio appears much better diversified than the traditional 70/30 portfolio. The traditional 70/30 portfolio has more than 99% of portfolio risk coming from equities while the NCSE portfolio has only 70% of portfolio risk coming from

3 The average NCSE portfolio allocations across all responding institutions are as follows: Equities 51% (15.7% US Large Cap, 1.3% US Small Cap, 12.2% Developed International, 6.8% Emerging markets, 11% Private Equity, 4% Venture Capital); Fixed Income 13% (6.7% Core Bonds, 2.3% Global Bonds, 4% short-term securities); Real Assets 13% (6% Private Real Estate, 6% Private Natural Resources, 1% Commodities); Hedge Funds 23% (12.6% Directional Hedge, 8.4% Relative Value, 2% Distressed Debt).

4 Jose Menchero, Ben Davis (2011). *Risk Contribution is Exposure Time Volatility Times Correlation: Decomposing Risk Using the* X-Sigma-Rho *Formula*. The Journal of Portfolio Management, Vol. 37, No.2: pp. 97-106

EXHIBIT 1: RETURN, RISK STATISTICS FOR COMPONENTS OF NCSE PORTFOLIO

Equities, Real Assets and Hedge Funds strongly correlated

	Equities	Fixed Income	Real Assets	Hedge Funds	NACUBO Portfolio	70/30
Allocation (to NACUBO Portfolio)	51.0%	13.0%	13.0%	23.0%		
Annualized return	6.2%	4.0%	12.5%	7.5%	7.3%	5.0%
Annualized volatility	16.2%	2.8%	17.8%	6.6%	11.7%	10.5%
Correlations						
Correlation with Equities	100%	5%	89%	85%	99%	95%
Correlation with Fixed Income	5%	100%	7%	2%	8%	6%
Correlation with Real Assets	89%	7%	100%	80%	93%	82%
Correlation with Hedge Funds	85%	2%	80%	100%	88%	75%
Correlation with NACUBO Portfolio	99%	8%	93%	88%	100%	93%
Correlation with 70/30	95%	6%	82%	75%	93%	100%
Risk Attribution						
Contribution to risk	8.2%	0.0%	2.2%	1.3%		
Percent contribution to risk	69.9%	0.3%	18.3%	11.5%		

Source: NACUBO, Commonfund
Statistics are based on observations from January 1999 to June 2015. Annualized returns reflect compounded (geometric) returns.
Past performance is not indicative of future results.
NACUBO portfolio: 51% Equities (15.7% US Large Cap, 1.3% US Small Cap, 12.2% Developed International, 6.8% Emerging, 11% Private Equity, 4% Venture Capital), 13% Fixed Income (6.7% Core Bonds, 2.3% Global Bonds, 4% Cash), 13% Real Assets (6% Opportunistic Real Estate, 6% Priv. Natural Resources, 1% Commodities), 23% Hedge Funds (12.6% Directional Hedge, 8.4% Relative Value, 2% Distressed Debt).
70/30 portfolio composition: 70% S&P 500, 30% Barclays US Aggregate

equities (as shown in Exhibit 1 above). However, we show below that this 70% contribution to risk from equities in the NCSE portfolio is a little misleading. Due to the high correlation among three of the constituent asset classes, the NCSE portfolio has equity "factor" risk well north of 70%.

A Factor Model

The relatively high correlation of equity, real assets and hedge funds to one another suggests the presence of one or more common underlying "factor" exposures. Identifying and quantifying these exposures leads to further insights into portfolio risk. Indeed, as we will show and as the reader has likely surmised, the primary common exposure is equity itself. But equity is not the only common exposure. There are other shared exposures.

Factors can be thought of as building blocks that help to explain the return and risk profile of a portfolio. Broadly speaking, there are four types of factor models. Market models employ asset class returns coming from investments like equity, credit, and government bonds. Macroeconomic models examine economic time series such as GDP growth and inflation. Fundamental models investigate cross-sectional asset characteristics such as price/book, market capitalization and yield. Finally, statistical models develop mathematical factors that maximize explanatory power but may not have immediate intuitive interpretation. Statistical models tend to be most helpful in identifying unforeseen exposures. These four types of models can be combined in various ways to meet an investor's specific needs.

For simplicity, we focus here on market models which are closest in spirit to the asset class framework familiar to most investors. The specific factor models were chosen to reflect the key drivers of risk for long term investors: equity, duration (interest rate), investment grade (IG) credit and commodities. This parsimonious set of four factors captures most of the market risk embedded in typical diversified

multi-asset class portfolios. Currency was evaluated as a factor but did not have statistical significance.[5]

Exhibit 2 illustrates annualized return and risk for these four factors based on monthly date for the 5, 10, and 15 year periods ending in June 2015. Factor returns are clearly sensitive to the time period examined even though each of the factors delivered positive returns over the full fifteen year period. Note that factor exposures need not be positively compensated even in expectation. Undiversifiable factor exposures such as equity and credit merit positive expected returns over long time periods. Diversifiable, or idiosyncratic, factor exposures need not have any expected compensation. Finally, risk-reducing factor exposures may even have negative expected compensation.

We represent factor risk by the annualized standard deviation. Over these three timeframes, each factor exhibits reasonably stable risk. On the other hand, risk varies significantly across factors. For instance, the 15 year volatility for credit was 2.3% while that for commodities was 23.3%. Thus, a one unit exposure to IG credit has ten times less risk than a one unit exposure to commodities. This is an important nuance as we will see later when we examine the NCSE portfolio using our factor model.

Exhibit 3 displays the factor correlations. Credit and commodities have tended to perform well when equities performed well while duration has tended to perform poorly when equities performed well. This reflects the predominance of deflation risks over inflation risks over the last fifteen years as well as the severity of risk on/risk off moves. Thus, correlation can be regime specific. For instance, in periods when inflation risks are significant, commodities may be negatively correlated with equities.

With our factors selected, we can combine them into a multivariate regression model. The multivariate regression model enables us to estimate betas. As a reminder, betas measure the sensitivity of a portfolio to the corresponding factor [see Box: A Primer on Beta].

EXHIBIT 2: RETURN, RISK STATISTICS FOR CHOSEN FACTORS

Factor Returns are dynamic over time

Factor Exposure	5 Year		10 Year		15 Year	
	Return	Risk	Return	Risk	Return	Risk
Equities	11.9%	13.6%	6.4%	16.6%	3.6%	16.1%
Duration	4.2%	5.7%	5.2%	6.5%	6.1%	6.5%
Credit	1.0%	1.8%	0.5%	2.6%	0.6%	2.3%
Commodities	-2.3%	19.3%	1.5%	23.7%	4.3%	23.3%

Statistics are based on monthly observations for data through June 2015. Returns reflect compounded (geometric) returns. Equity risk is represented by MSCI ACWI equity total return index, duration risk by the Bank of America Merrill Lynch US 7-10 year Treasury note total return index, credit risk by the Barclays U.S. Aggregate Bond excluding U.S. Treasuries excess return index, and commodities risk by the S&P GSCI Spot Commodities index.

EXHIBIT 3: CORRELATIONS ACROSS CHOSEN FACTORS

Credit and Commodities are correlated to Equities

	Equities	Duration	Credit	Commodities
Equities	100%			
Duration	-27%	100%		
Credit	66%	-33%	100%	
Commodities	41%	-16%	34%	100%

Statistics are based on monthly observations for data through June 2015. Returns reflect compounded (geometric) returns. Equity risk is represented by MSCI ACWI equity total return index, duration risk by the Bank of America Merrill Lynch US 7-10 year Treasury note total return index, credit risk by the Barclays U.S. Aggregate Bond excluding U.S. Treasuries excess return index, and commodities risk by the S&P GSCI Spot Commodities index.

5 Equity risk is represented by the MSCI ACWI equity total return index net of 3 month U.S. Treasury bills, duration risk by the Bank of America Merrill Lynch US 7-10yr Treasury note total return index net of 3 month U.S. Treasury bills, IG credit risk by the Barclays U.S. Aggregate Bond excluding U.S. Treasuries excess return index, and commodity risk by the S&P GSCI Spot Commodities index. The IG credit risk factor is in excess returns rather than total returns in order to net out the return attributable to interest rate risk. It is constructed by computing the total return from each issue in the index and subtracting out the total return of an equivalent duration Treasury issue. This isolates the credit component of returns and provides diversified (not just corporate) investment grade credit risk. The commodity price index employs spot returns to focus on commodity price risk. Commodity total return indexes would include collateral returns.

A Primer on Beta

The beta of an asset class to a factor measures the sensitivity of the asset class's returns to movements in the factor. For instance, the beta of the NCSE portfolio to equity is 0.8. Thus, when equity has a 1% return, the NCSE portfolio can be expected to have a 0.8% return. On the other hand, the beta of the NCSE portfolio to duration is -0.4. Thus, when duration has a 1% return, the NCSE portfolio can be expected to have a -0.4% return. This should seem odd. Why would our NCSE portfolio have a negative return when duration has a positive return? We hold fixed income, which has duration, in the portfolio. Why don't we get a positive return from the fixed income?

The answer is that equity and duration are negatively correlated, with a correlation of -27%. The positive return to duration corresponds (on average) to a negative return to equity. Our portfolio then responds to both the direct return to duration and the correlation-implied return to equity. Since we have about twice the beta to equity (0.8) than we do to duration (-0.4), the equity effect dominates. How do we resolve this puzzle? We need to look at multivariate analysis. This means asking what happens to our portfolio if duration moves while equity does not move rather than asking what happens to our portfolio when duration moves without specifying what happens to equity.

The betas of the NCSE portfolio to equity and duration when run in isolation are 0.8 and -0.4. However, when examined jointly, the betas to equity and duration are 0.8 and 0.1. This is much more intuitive. When duration has a positive return, and equities have no return, the fixed income in our portfolio provides a positive return. Of course, we can ask what happens when both equities and duration have returns as well but only with multivariate analysis. Univariate analysis does not enable us to understand what happens when multiple factors move independently.

EXHIBIT 4: UNIVARIATE AND MULTIVARIATE BETAS FOR NCSE PORTFOLIO

Equity and Duration factors have a -27% correlation resulting in different betas for univariate, bivariate.

	Equity	Duration
Univariate beta to Equity	0.8	
Univariate beta to Duration		-0.4
Multivariate beta	0.8	0.1

Using the Factor Model: From Asset Classes to Factors

In this section, we deploy our multivariate factor model to examine the risk allocation of the NCSE portfolio through the lens of factor exposures rather than asset class exposures. While public market asset classes are straightforward to analyze, private markets and hedge funds require more sophisticated statistical tools [see Box: A primer on modeling alternative asset classes]. As before, we employ contribution to risk as our primary tool for understanding risk allocation. We begin, however, with beta because, conveniently, beta provides the x in the x-sigma-rho calculation of contribution to risk when using factor models.

Exhibit 5 illustrates the factor betas for the four asset classes, the NCSE portfolio and the 70/30 portfolio. Many of the results are straightforward but there are a few surprises here. The equity asset class is fully explained by equity with, get ready, a beta of 1.0. The fixed income asset class has nearly equal betas to duration and credit. This may be a little surprising. We think of core fixed income as moving more with duration (rates) than with credit. And, indeed, it still does. The reason is that the volatility of duration is nearly three times that of credit. Hence, while the response to an equal-sized move in duration and credit is the same, duration is bouncing around much more. It may help to think of duration and credit as two oscillating springs with duration loose and credit tight. Real assets have significant exposures to equities, credit and commodities. The credit exposure arises primarily from the Real Estate allocation. Real Estate has certain equity characteristics (capital gains) and certain fixed income characteristics (rents).

EXHIBIT 5: FACTOR EXPOSURES (BETA) ACROSS ASSET CLASSES, NCSE PORTFOLIO, 70/30 PORTFOLIOS

Real Assets and Hedge Funds have significant exposures to equities, credit factors

BETA		FACTORS			
		Equities	Duration	Credit	Commodities
ASSET CLASSES	Equities	1.0	0.0	0.0	0.0
	Fixed Income	0.0	0.4	0.4	0.0
	Real Assets	0.9	0.0	-0.2	0.3
	Hedge Funds	0.4	0.0	0.6	0.0
	NACUBO Portfolio	0.7	0.1	0.2	0.0
	70/30	0.7	0.1	-0.1	-0.1

Source: NACUBO, Commonfund. Statistics are based on observations from January 1999 to June 2015. Annualized returns reflect compounded (geometric) returns. NACUBO portfolio: 51% Equities (15.7% US Large Cap, 1.3% US Small Cap, 12.2% Developed International, 6.8% Emerging, 11% Private Equity, 4% Venture Capital), 13% Fixed Income (6.7% Core Bonds, 2.3% Global Bonds, 4% Cash), 13% Real Assets (6% Opportunistic Real Estate, 6% Priv. Natural Resources, 1% Commodities), 23% Hedge Funds (12.6% Directional Hedge, 8.4% Relative Value, 2% Distressed Debt). 70/30 portfolio : 70% S&P 500, 30% Barclays US Aggregate. Factors: Equities (MSCI ACWI), Duration (US 7-10 Treasury), Credit (Barclays US Aggregate ex Treasury) Commodities (GSCI Index)

Notes on Modeling Alternative Asset Classes

Many alternative asset classes, particularly those in private markets, hold illiquid securities whose valuations are determined by appraisals rather than market prices. As these illiquid securities are marked-to-market more slowly than more liquid securities, the asset classes in which they reside are also marked to market more slowly. The smoothing of returns due to slowly adjusting prices causes volatility to be underestimated. This excess smoothness, also known as the stale price problem, can be addressed through statistical techniques.

In particular, the analyst can relate returns of an illiquid asset class to current and lagged returns of a related liquid asset class: while private real estate prices may adjust slowly, public real estate (REIT) prices respond quickly. Hence, adjustment in private real estate prices are related to what is going on currently in public real estate as well as what has happened in the past in public real estate markets but has not yet been passed through the appraisal process into private real estate markets.

In our work, this approach is used to estimate proxies for private markets including Private Equity, Venture Capital, Private Natural Resources, Private Real Estate as well as hedge fund strategies including Directional Hedge, Relative Value and Distressed Debt. We illustrate the methodology with Private Equity as an example. We obtain quarterly, time-weighted returns for a pool of about 1000 Private Equity funds from Burgiss[6]. These returns are regressed against current and lagged quarterly returns for MSCI ACWI. Statistically, six quarterly lags of MSCI ACWI explain about 80% of the variation of raw Private Equity returns. The sum of the current and lagged betas to MSCI ACWI, roughly 1.0, represents the systematic risk exposure of Private Equity to MSCI ACWI. The remaining 20% of variation that is not explained by MSCI ACWI represents idiosyncratic risk. The total volatility of Private Equity as an asset class is then given by combining the systematic risk applied contemporaneously with the idiosyncratic risk. Thus, we treat systematic risk in private markets as though it were realized up front rather than over time through the appraisal process.

The public market index along with the associated beta used to proxy the remaining illiquid asset classes are as follows: Venture Capital (1.20 to MSCI ACWI), Private Natural Resources (0.9 to S&P Global Natural Resources), Private Real Estate (1.0 to MSCI ACWI), Directional Hedge (0.57 to MSCI ACWI), Relative Value (0.45 to High Yield), and Distressed Debt (0.37 to High Yield and 0.27 to MSCI ACWI).

6 Burgiss is a commercial dataset provider for the private capital market

EXHIBIT 6: CONTRIBUTION TO RISK ACROSS ASSET CLASSES, NCSE PORTFOLIO

Real Assets and Hedge Funds have significant exposures to equities and idiosyncratic risk – the idiosyncratic components get diversified away at the portfolio level

CONTRIBUTION TO RISK		FACTORS				
		Equities	Duration	Credit	Commodities	Idiosyncratic
ASSET CLASSES	Equities	94.3%	0.0%	0.0%	0.1%	5.6%
	Fixed Income	0.9%	85.2%	2.3%	0.3%	11.4%
	Real Assets	44.9%	-0.2%	-0.9%	13.8%	42.3%
	Hedge Funds	66.6%	-0.9%	11.6%	-0.1%	22.9%
	NACUBO Portfolio	86.7%	-0.8%	1.9%	2.8%	9.3%
	70/30	98.7%	-1.0%	-1.6%	-3.3%	7.2%

Source: NACUBO, Commonfund. Statistics are based on observations from January 1999 to June 2015. Annualized returns reflect compounded (geometric) returns. Past performance is not indicative of future results. NACUBO portfolio: 51% Equities (15.7% US Large Cap, 1.3% US Small Cap, 12.2% Developed International, 6.8% Emerging, 11% Private Equity, 4% Venture Capital), 13% Fixed Income (6.7% Core Bonds, 2.3% Global Bonds, 4% Cash), 13% Real Assets (6% Opportunistic Real Estate, 6% Priv. Natural Resources, 1% Commodities), 23% Hedge Funds (12.6% Directional Hedge, 8.4% Relative Value, 2% Distressed Debt). 70/30 portfolio : 70% S&P 500, 30% Barclays US Aggregate. Factors: Equities (MSCI ACWI), Duration (US 7-10 Treasury), Credit (Barclays US Aggregate ex Treasury) Commodities (GSCI Index)

Exhibit 6 takes another look at factor exposures but from the perspective of contributions to risk. The contributions to risk in each row sum to 100%. This is as it should be: we are explaining all of the risk in each of the portfolios.

Or are we? The last column in Exhibit 5 presents the idiosyncratic contribution to risk - the component of risk that is not explained by the four factors we evaluated. A closer look at the idiosyncratic components for the four asset classes reveals very low correlations with one other. In addition, idiosyncratic risks at the total NCSE portfolio level are small. Thus, it seems unlikely that significant systematic risks have been missed by our choice of risk factors.

On the other hand, real assets and hedge funds do have substantial contributions from idiosyncratic risk. For real assets, this is predominantly because our four factors are not picking up the industry-specific risks associated with real estate and natural resources as well as some of the peculiarities of individual commodities within the index. In the case of hedge funds, high idiosyncratic risk is as expected. The hedge fund indices are a source of active risk in the NCSE portfolio along with private capital (private equity, venture capital, private real estate and private natural resources). Since we have assumed passive exposures to the public markets (equities, fixed income and commodities), we do not have active risks from these components of the NCSE portfolio.

How do we resolve the puzzle that real assets and hedge funds have large contributions from idiosyncratic risk but the NCSE portfolio has only a smaller contribution? Where did the idiosyncratic risk at the asset class level go? The answer is that the idiosyncratic risks at the asset class level diversified one another away while the systematic risks added to one another.[7] This is a tough lesson for investors. We think of security selection (idiosyncratic) risks as driving true investment alpha. Yet it is very difficult to preserve security selection alpha at a total portfolio level. As the old adage goes, if you hold enough active managers, you hold the index.

Returning to the systematic factor exposures, there are a few additional key observations worth making. First, equity is evidently a broadly shared risk across asset classes. Equities, real assets and hedge funds all exhibit non-negligible contributions from equity risk. Second, real assets and hedge funds have the best diversified risk of the four asset classes with more than 10% contributions from two different factors.

7 Ultimately, the biggest idiosyncratic risk contribution at the total portfolio level comes from real assets. The idiosyncratic risk contribution in the real asset bucket is 42.3%, the volatility of real asset bucket is about 22.9% and the allocation of real assets in the NCSE portfolio is 13%, resulting in a risk of 42.3% * 22.9% * 13% =1.2%. This results in approximately 10% contribution to the total portfolio risk of about 12.6%

Finally, the NCSE portfolio exhibits better risk balance than the traditional 70/30 portfolio. The addition of hedge funds and real assets to the traditional 70/30 portfolio does improve diversification and reduce risk concentration but not by as much as we might have hoped. This is largely due to the substantial equity factor risk embedded in real assets and hedge funds. Thus, although the NCSE portfolio is much better diversified than the 70/30 portfolio from a dollar allocation perspective, it is only slightly better diversified when seen through the factor lens. Equities still account for more than 85% of portfolio risk.

What is an Institutional Investor to do?

Our analysis demonstrates that diversified multi-asset class portfolios, as represented by the NCSE portfolio, diversify risk better than traditional portfolios. Adding real assets and hedge funds to a traditional 70/30 portfolio reduces equity's contribution to risk by about 12%. This can be a valuable step in the right direction. Unfortunately, diversified multi-asset class portfolios still have about 87% of their risk exposure in equities.

Yet hope for further diversification remains because investors have more levers to pull. They can achieve greater strategic diversification by increasing the role of active management, adding additional asset classes, directly sourcing factor exposures like carry or low volatility and by judiciously employing risk parity-style strategies. [8]

There is also an opportunity for investors to diversify through dynamic asset allocation. This could include dynamic rebalancing, managed volatility strategies and implementation of tactical views.

8 Risk parity involves the application of leverage to increase the contribution from factor exposures like duration and credit that exhibit attractive diversification properties but currently provide low contributions to risk in typical multi-asset class portfolios.

Published December 2015

15 Old Danbury Road
Wilton, CT 06897

Tel 888-TCF-Main
Tel 203-563-5000
www.commonfund.org

commonfund