

# Asset Class Diversification: This Time Was Different

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## HighVista Strategies

HighVista Strategies was founded in 2004 by an experienced team with diverse backgrounds in endowment management, hedge fund and principal investing, wealth management and academia.

We focus singularly on achieving attractive risk-adjusted portfolio returns through investing across public and private markets. We utilize the time-tested principles of endowment investing and a forward-thinking application of risk management to manage globally diversified investment strategies and solutions tailored for our clients' varying needs. The priority placed on capital preservation and avoiding major drawdowns fosters the patient and rigorous pursuit of excess returns, and is itself a critical driver of long-term performance.

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## Executive Summary

The principle of diversification is foundational to prudent investing. Yet, as we demonstrate, in the period since the financial crisis, traditionally practiced diversification in institutional portfolios subtracted value relative to a simple 60/40 allocation to U.S. Equities and Treasuries. We show that this period represents a significant but important outlier when viewed in the broader historical context.

We attribute the underperformance of traditionally diversified portfolios to several sources of risk and return, among these chiefly the dramatically higher correlations among risky assets and the negative correlation between equities and bonds. Diversifying into asset classes such as foreign equities, real estate and commodities not only failed to reduce portfolio volatility—it significantly increased it while simultaneously detracting from return. This contrasts unfavorably with allocations to U.S. Treasuries, which both reduced portfolio risk and added significantly to portfolio return. We compare these results with the behavior of the broad asset classes over a longer history.

Our work suggests several implications for investors:

- Asset class risks and correlations are not static, and the best way to realize the proverbial “free lunch” of diversification varies from one environment to another. Investors should factor changing asset class volatilities and correlations into their investment policies and strategies, which also necessitates the use of a shorter time horizon for asset allocation.
- If the current environment persists—with the correlations among risky assets remaining high and their correlation with bonds continuing to be strongly negative—risky assets such as commodities and real estate will need to generate significantly higher than normal returns to justify an allocation within a portfolio, and bonds may play an important hedging role in portfolios even at zero or slightly negative expected real returns. To make sensible allocations to these asset classes investors must understand the current risk environment.
- The recent outperformance of the 60/40 portfolio is a significant outlier in the context of a longer history. To continue to outperform in the future will require that the correlation between stocks and bonds remain negative and/or continued strong performance from bonds—an outcome made far less likely starting from today's historically low yields.

# Asset Class Diversification: This Time Was Different

Diversification is in principle the great “free lunch” in the capital markets. By prudently diversifying, you achieve a higher Sharpe Ratio—more reward for the same risk, or less risk for the same reward.

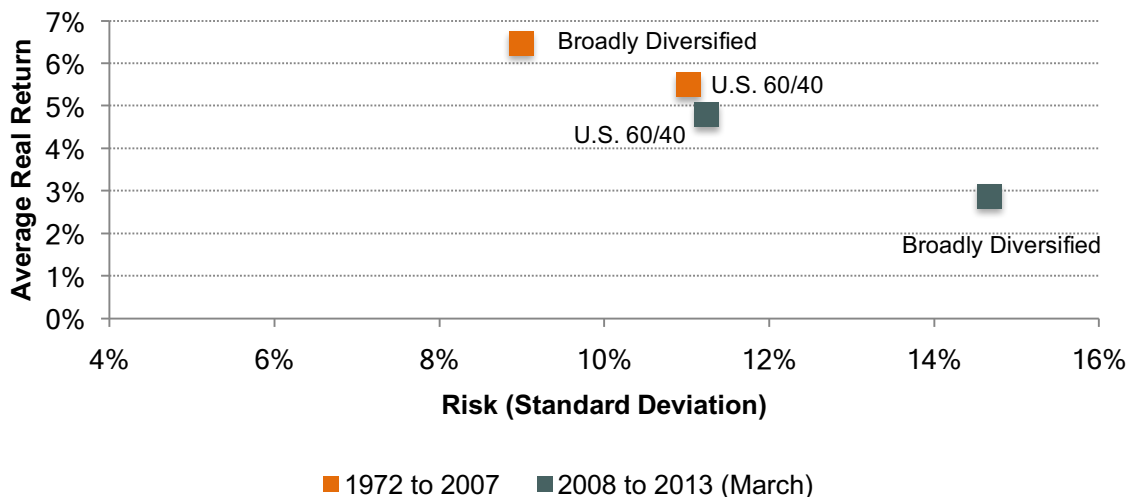
It’s an idea that is thousands of years old. Chinese merchants famously divided cargo among several vessels when travelling dangerous rivers to minimize the loss incurred by any single boat capsizing, and insurance businesses based on risk spreading date back at least to the 2nd millennium BC. Later, when data became available, the empirical evidence in favor of diversification was compelling.<sup>1</sup> In the last few decades, moreover, diversification has helped sophisticated investors such as the large university endowments to earn outsized returns from exposures to emerging markets, real assets, hedge funds, private equity and other less traditional asset classes.

But following the financial crisis in 2008, broadly diversified portfolios have generally not fared as well, and a plain vanilla portfolio of U.S. equities and bonds has been by far the better combination. The disparity is so strong that it is worth asking whether the recent period is an outlier, or whether something has fundamentally changed. We are firmly in the outlier camp, but the post-crisis period warrants examination.

## Diversification Before and After 2007

We begin by contrasting the performance of a simple 60/40 U.S. equities/bonds portfolio with that of a more diversified portfolio. For the purposes of our analysis we utilize a broadly diversified portfolio allocated across U.S. equities (20%), developed equities (20%), emerging equities (10%), U.S. REITs (10%), commodities (10%), and U.S. bonds (30%). **Figure 1** shows how these two portfolios performed over the period 1972 to 2007 compared with the period from 2008 through March 2013. Returns are after inflation as measured by the CPI, standard deviations are based on monthly data, and both portfolios are rebalanced monthly.

**Figure 1: Performance of Broadly Diversified vs. U.S. 60/40 Portfolios Before and After 12/31/07**

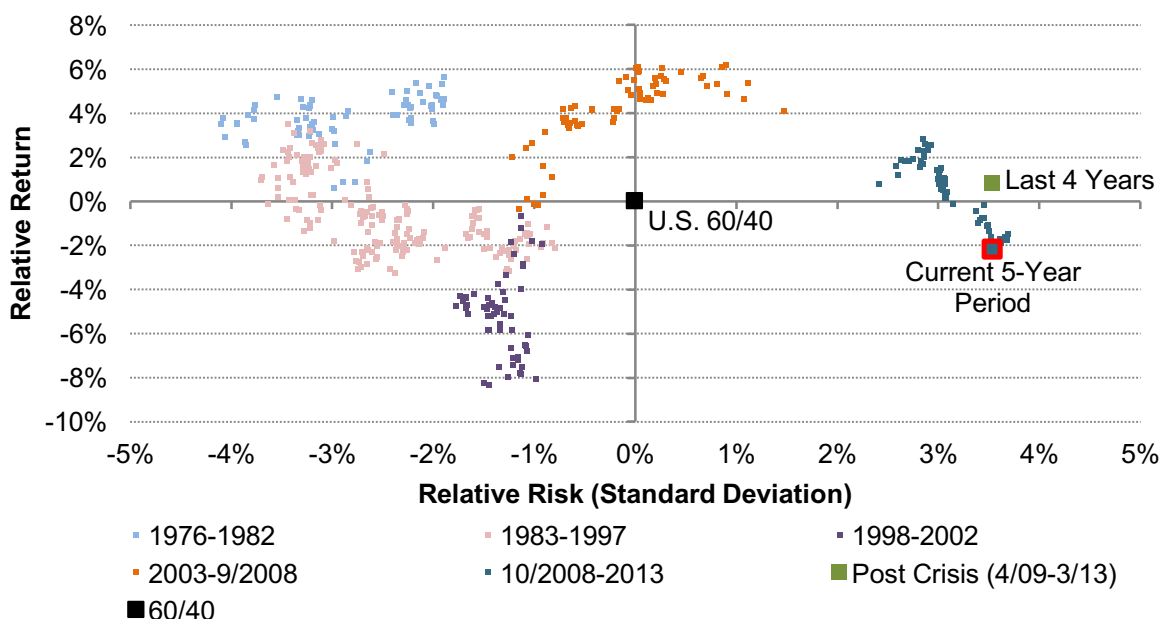


<sup>1</sup> For historical background, see Peter L. Bernstein, *Against the Gods: The Remarkable Story of Risk*, New York: John Wiley & Sons, Inc.

As **Figure 1** illustrates, in the 1972 to 2007 period the diversified portfolio had significantly lower volatility than U.S. 60/40, while achieving a higher return—a result consistent with the theory of diversification. Since 2007, however, the diversified portfolio has delivered less than half of its prior return with 60% greater volatility. The U.S. 60/40 portfolio by contrast had similar volatility and real return in both periods. The question is, what is responsible for the disparity in relative performance between the two portfolios across periods?

To gain context, we examine the relative performance of the diversified portfolio versus U.S. 60/40 over rolling 5-year periods. This is shown in **Figure 2**, where each point on the chart represents the performance differential versus U.S. 60/40 over a given 5-year interval (risk differential as well as return differential). Thus points above the horizontal line at 0% represent 5-year periods where the diversified portfolio had higher returns than 60/40, while points to the left of the vertical line at 0% represent periods where the diversified portfolio had lower risk than U.S. 60/40. The most recent 5-year period is highlighted on the far right of the chart.

**Figure 2: Relative Performance of Broadly Diversified Portfolio vs. U.S. 60/40 (Rolling 5-Year Periods)**



As is evident in the figure, and as one would expect, broad asset class diversification has paid off statistically. The diversified portfolio over 5-year periods had a lower after-the-fact volatility than U.S. 60/40 about 80% of the time; it had a higher real return more than 50% of the time, and its average real return exceeded that of U.S. 60/40 over the full period by 0.6% per annum.

There is an interesting pattern of clustering over time in which relative return and volatility mirror the economic environment of the period. Specifically:

- The 5-year periods ending between 1976 and 1982 (light blue dots) were characterized by shocks to inflation and interest rates—a very unfavorable environment for real returns on U.S. equities and bonds. Diversification paid off handsomely from a return as well as a risk perspective.
- The 5-year periods ending between 1983 and 1997 (pink dots) spanned a variety of macroeconomic environments—including a sustained period of falling interest rates, the 1980s junk-bond financed LBO boom, the stock market crash of 1987, the Japan real estate bubble and its collapse, the first Gulf War, the credit crisis of 1992, the Tequila crisis of 1994, and the Asian

financial crisis of 1997. In all of these 5-year periods, diversification resulted in lower volatility, sometimes significantly so.

- The 5-year periods ending in 1998 to 2002 (purple dots) were characterized primarily by the tech bubble (although other events such as 9/11 and the credit crisis of 2002 were hardly insignificant). It was a period in which large cap U.S. equities dominated from a return perspective. The diversified portfolio did not lose money; it just underperformed U.S. 60/40—at times by a significant margin although with lower volatility.
- The 5-year periods ending between 2003 and September 2008 (pre the Lehman bankruptcy; orange dots) were defined mostly by the “Goldilocks” period in the world economy including booming world trade (especially between China and America) and the development of the U.S. housing bubble. These were periods in which the diversified portfolio generally benefited return-wise from strong performance in real estate, commodities and emerging equities. However, the correlations between equities, real estate and commodities were considerably higher than normal, and diversification became less effective in dampening volatility.
- Finally and most important for this discussion are the 5-year periods ending between October 2008 and March 2013 (dark blue dots). These periods include the worst months of the global financial crisis as well as the unprecedented government intervention and strong market recovery over the last four years. They are the biggest outliers from a relative risk perspective. Equities, real estate and commodities remained extremely highly correlated with one another, but also very negatively correlated with bonds. The negative stock-bond correlation benefited the U.S. 60/40 portfolio the most, and there was minimal benefit from risk spreading across the other asset classes.

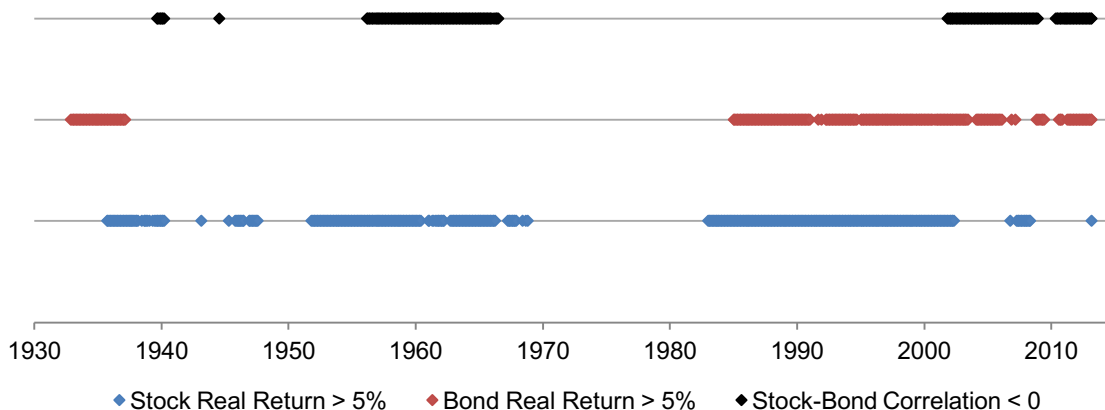
Note also the inclusion in **Figure 2** of the 4-year period starting April 2009—a period designed to exclude the losses from the financial crisis. This period saw significant gains in risky assets across the world, yet in relative risk-adjusted performance is only marginally better than the last 5-year period in our sample. The disparate recent performance illustrated by **Figure 2** is not simply the result of the inclusion of data from the financial crisis itself.

## Stocks and Bonds in the Long Run

The recent period is certainly an outlier when viewed against the longer history in **Figure 2**. The higher risk of the diversified portfolio relative to 60/40 is attributable primarily to the risk of the former being elevated (**Figure 1**), though the remarkable performance of 60/40 over this period should not go without comment. As noted, the correlation between stocks and bonds has recently been strongly negative, which has kept the risk of 60/40 low even during the very turbulent last 5 years. There have been other periods of negative stock-bond correlation, but the strongly positive performance of both U.S. stocks and bonds while also exhibiting negative correlation is nearly without historical precedent. Like two ships consistently on opposite tack but both pushed forward by the same prevailing wind, stocks and bonds appreciated even while moving against one another month-to-month.

**Figure 3** below puts this performance in the context of a longer history beginning in 1932. Each month for which a 5-year history is available for both stocks and bonds is plotted. Any month in which the trailing five-year real return of stocks is greater than 5% p.a. is given a blue dot. Similarly, any month in which the trailing five-year real return of bonds is greater than 5% p.a. is given a red dot. Finally, any month in which the trailing five-year correlation between stocks and bonds is negative is given a black dot.

**Figure 3: U.S. Stock and Bond Performance since 1932 (5-year periods)**



As **Figure 3** illustrates, the recent negative correlation of stocks and bonds has persisted for roughly a decade, but followed a positive correlation that held for the nearly four decades that preceded it. Against the longer history this negative correlation is clearly more the exception than the rule. The recent performance of bonds is similarly unique, with nearly all 5-year periods of greater-than-5% real returns occurring from 1985 to the present. Stock returns have been more consistent, but certainly not reliably greater than 5% over time.

The most recent month in the data set, March 2013, is in rare company as one of the only months in the sample where all three conditions are true: over the last 5 years both stocks and bonds have returned greater than 5% p.a. real while the correlation between them has been negative over that same five-year period. While this particular fact is obviously somewhat sensitive to the parameters selected, the conclusion of **Figure 3** is not—recent years have been a uniquely great time to own both stocks and bonds. Placed in this historical context, the remarkable recent performance of 60/40 seems more likely an outlier than a forecast of future performance.

As 60/40 enjoyed a period of great success, the diversified portfolio endured both lower returns and much greater volatility. To better understand the sources and attribution of this relatively poor performance we turn to a method that can be applied across asset classes to evaluate their contributions to a diversified portfolio.

## Diversification Alpha

The best gauge of whether there is a benefit or hindrance from diversifying into a given asset class is its alpha—the return of the asset class after accounting for its correlation and relative volatility with respect to one’s current portfolio. A positive alpha means there is at least some improvement to be gained in reward versus risk by allocating to that asset class; a zero or negative alpha means that allocating to that asset class at best won’t detract from performance, but is most likely to be deleterious.

The value of diversification is based on the principle that because assets are not all perfectly correlated, combining them into a portfolio will add more to return than to risk as some of the risk in any single asset class (the non-correlated part) is diversified away. Thus we should expect each asset class to have positive “diversification alpha” over the long run. In what follows, we present the correlations, relative volatilities, and alpha statistics of the asset classes in relation to investing in U.S. equities over the period from 1972 to 2007 and from 2008 through March 2013. These are shown in **Table 1**.

**Table 1: Asset Class Alpha vs. U.S. Equities**

			EAFE	Emerging Equities	Commodities	Equity REITs	U.S. Treasurys
a.	Correlation with U.S. Equities	1972 to 2007	0.57	0.45	(0.03)	0.53	0.25
		2008 to 3/2013	0.92	0.85	0.62	0.82	(0.24)
b.	Relative Volatility vs. U.S. Equities	1972 to 2007	1.09	1.20	1.25	0.93	0.69
		2008 to 3/2013	1.24	1.52	1.41	1.70	0.79
c.	Beta vs. U.S. Equities	1972 to 2007	0.63	0.54	(0.04)	0.49	0.18
		2008 to 3/2013	1.14	1.29	0.88	1.39	(0.19)
d.	Diversification Alpha	1972 to 2007	2.9%	3.3%	7.1%	4.9%	2.1%
		2008 to 3/2013	-5.9%	-3.8%	-8.9%	4.9%	9.7%

As illustrated in row d, in the 1972 to 2007 period the asset classes all had attractive “diversification alphas”—meaning that they each improved the portfolio risk/reward beyond investing only in U.S. equities. By contrast, in the period since 2008, developed non-US equities, emerging equities, and commodities had large negative alphas—indicating that it was better after-the-fact in this period to own only U.S. equities than to include any of these in the portfolio. Treasury bonds (and REITs) on the other hand had a significantly positive alpha in the recent period and accordingly greatly improved the risk-reward tradeoff when held along with U.S. equities.

The cause of the disparate diversification alphas across asset classes can be identified in the preceding rows of **Table 1**. The first row (row a) illustrates the significant increase in correlations with U.S. equities in the period since 2008 for all asset classes except bonds. For example, the U.S. equities-commodities correlation increased from -0.03 to 0.62, while the U.S. equities-bonds correlation decreased from 0.25 to -0.24. At the same time, all asset classes became considerably more volatile relative to U.S. equities in the latter period (row b). Together, the changes in correlation and relative volatility meant that the asset class betas with respect to U.S. equities increased significantly with the exception of bonds (row c). (Beta is the product of correlation and relative volatility.) Since a higher beta means a lower alpha (all else equal), the change in betas from the earlier to the latter period significantly raised the bar to benefit from diversification into foreign equities and commodities, and significantly lowered the bar to benefit from diversification into Treasury bonds.

In any particular period it is hardly surprising that some asset classes might not achieve positive diversification alphas. The analysis in **Table 1** is nevertheless instructive for several reasons. First, although simple relative performance is easy to measure, the more complete picture of volatility, correlation, and alpha provides valuable intuition for the causes of underperformance. Second, the analysis provides necessary context for evaluating the performance of any diversified portfolio during this latter period. Any evaluation of performance should always be framed in the proper context of a longer historical record, just as any investment decision should make use of all available information. In particular, to abandon broad diversification in favor of 60/40 based on recent outperformance is to ignore the weight of the longer history and commonsense intuition. Finally, as we next address, the framework presented in the table provides intuition for allocation decisions going forward.

## Forward Looking Returns

The exercise in **Table 1** can be useful in considering the role these asset classes should play in a portfolio going forward. Specifically we might ask: if asset class betas continue at their current high levels (and a negative beta for bonds), what is the minimum return required for each asset class to achieve positive diversification alpha? What is the minimum return if asset class betas return to “normal”? The analysis in **Table 2**, a continuation from **Table 1**, presents an answer to these questions, where for simplicity in comparing across asset classes we have assumed U.S. equities will return 5% p.a. real and that interest rates and inflation are roughly equal.

**Table 2: Required Real Return Given That U.S. Equities Deliver 5% p.a.**

			EAFE	Emerging Equities	Commodities	Equity REITs	U.S. Treasurys
c.	Beta vs. U.S. Equities	1972 to 2007	0.63	0.54	(0.04)	0.49	0.18
		2008 to 3/2013	1.14	1.29	0.88	1.39	(0.19)
e.	Required Real Return for Zero Alpha	1972 to 2007	3.1%	2.7%	-0.2%	2.5%	0.9%
		2008 to 3/2013	5.7%	6.4%	4.4%	6.9%	-1.0%
f.	Difference in Required Return		<b>2.6%</b>	<b>3.7%</b>	<b>4.6%</b>	<b>4.4%</b>	<b>-1.9%</b>

Using longer-term betas (1972 to 2007), the required returns for each asset class are fairly modest (row e). For foreign equities and Equity REITs the required return is considerably lower than our assumed U.S. Equity return of 5%, while for commodities it is closer to 0%. Bonds also have a fairly low but positive hurdle at just 0.9%. For an investor with a longer time horizon or who believes the longer term betas are likely to prevail there is considerable value in diversifying into these asset classes.

Using betas from the recent period (2008 to 3/2013), the required return is significantly higher for all asset classes with the exception of bonds, where it is much lower (rows e and f). The math is straightforward—the required return for these asset classes to be additive has to be higher, in proportion to the beta differential, by 2.6% to 4.6% per year. For an investor with a shorter time horizon or with the view that these elevated betas are likely to persist this presents a high bar for diversifying out of U.S. Equities and into these asset classes.

In contrast, the bar for owning bonds in the current environment is actually negative. The insurance value of bonds makes them a complement to equities rather than a substitute—owning bonds allows one to own *more* equities. As noted in the table, an investor is better off allocating to Treasurys as long as they manage to lose less than 1.0% per year.

The required return analysis also speaks to the important question of whether the bond market today is aptly characterized as a “bubble.” Bond prices may not be precariously high if the environment of a negative bond beta is likely to persist. Conversely, if the beta of bonds to equities were to revert to its longer-term positive average, holders of bonds should then require nearly 2% additional return per year (**Table 2**) to continue to want to hold bonds. Prices would have to decline significantly to convince investors that the *prospective* return of bonds is 2% per year higher.



## Summary and Conclusions

The period from the financial crisis of 2008-2009 to the present has posed many unique challenges for investors. As we have demonstrated, one of the most vexing of these is the dramatic underperformance of traditionally diversified portfolios relative to a simple 60/40 portfolio. To understand this underperformance requires a consideration of both risk and return, as both are significant contributors. Viewed in the context of a longer history this period is a significant outlier in many respects, perhaps none more striking than the elevated correlations among risky assets and the very negative correlation of stocks and bonds.

Our work suggests several implications for investors:

1. *Risk characteristics of asset classes can change over time.* Volatilities and correlations are not constant and change with the economic and investment environment. Investors should frequently evaluate and revise views of the risk profile of asset classes and portfolios to understand the risks of their portfolios and the diversification benefit of each asset class in them. This necessitates use of a shorter time horizon for asset allocation.
2. *Investors should evaluate asset classes through the lens of required returns.* Forecasting expected returns of asset classes is notoriously difficult, but the idea of required returns presents an intuitive and straightforward starting point. Required returns can be derived using both current and longer-term risk statistics according to one's particular timeline and views. Today's risk environment requires relatively high expected returns for risky assets such as commodities and real estate to play a significant role in portfolios, whereas bonds may play an important hedging role in portfolios even at zero or slightly negative expected real returns. This type of analysis cannot be performed without cognizance of the dynamic risk characteristics of these asset classes.
3. *Investors should measure performance in the larger historical context, including recognition that interest rates have been in secular decline for more than 30 years.* For the 60/40 portfolio to continue to perform as strongly as it has requires an environment in which bonds continue to add significant diversification alpha—an outcome far less likely starting from today's historically low yields.

### Legal Disclosures:

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