Quant Corner: Adding Alternatives to a Traditional Portfolio

The answers to some difficult questions.

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Alternative investments have long been seen as the secret weapon of institutional investors, providing them with higher returns and protection in down markets. Today, innovations in the mutual fund marketplace have made many of these alternative strategies available to the average investor. But many questions remain. What are considered alternative investments? What is the benefit of adding these to a traditional portfolio? How much should be allocated to the different options?

What Are Alternatives?

At Ibbotson Associates, we define alternative investments as asset classes or investment strategies that are outside of traditional stock, bond, and cash categories and that generally display different performance characteristics than these traditional investment categories. It is the different performance characteristics, or low correlations, that make alternative investments a potentially beneficial addition to a traditional portfolio.

Our definition of alternative investments can be further broken down into two subcategories.

- Alternative Alpha—Investment strategies that have low correlations to traditional investments. Examples would include long short equity, merger arbitrage, and managed futures.
- Alternative Beta—Asset classes that have low correlations to traditional investment. These would include commodities, private equity, and Treasury Inflation-Protected Securities.

Overview of Alternative Investment Options

Long/Short Equity

This is a popular hedge fund strategy where the manager can take long positions in stocks that are viewed favorably and short positions in stocks that he believes will perform poorly. The amounts held in long and short positions can also vary based on overall market views. Several open-end mutual funds employ this strategy in a tamer format than what is seen in the hedge fund market.

Investment Vehicle Examples
Diamond Hill Long-Short **DIAMX**, Caldwell & Orkin Market Opportunity **COAGX**

Correlation to large U.S. stocks* **0.795**

*Correlations to large U.S. stocks were calculated using quarterly returns data since 1973 of the representative indexes in Table 1, and if necessary, backfilled returns based on factor regressions.

Market-Neutral

This strategy seeks to deliver consistent returns by being both long and short equity securities while maintaining a neutral or zero exposure to the equity market. A handful of open-end mutual funds are using this strategy today.

Investment Vehicle Examples
Highbridge Statistical Market Neutral **HSKAX**, JPMorgan Multi-Cap Market Neutral **OGNAX**

Correlation to large U.S. stocks **0.487**

Arbitrage

This strategy capitalizes on pricing discrepancies between securities. One common variation is merger arbitrage, where the security of the acquired company is bought and the security of the acquiring company is sold short with the goal of profiting from the pricing gap that exists before the merger is finalized. Open-end mutual funds are available in this category.

Investment Vehicle Examples
Merger Fund **MERFX**, Arbitrage Fund **ARBFX**

Correlation to large U.S. stocks **0.345**

Managed Futures

This strategy employs both long and short positions in the futures market with the hope of generating positive returns.

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Investment Vehicle Examples
Rydex/SGI Managed Futures Strategy **RYMTX**, ELEMENTS S&P CTI ETN **LSC**
Correlation to large U.S. stocks **–0.201**

Commodities
This asset class encompasses grains, metals, energy, and more. Many options now exist to gain exposure.

Investment Vehicle Examples
iPath DJ-UBS Commodity Index Total Return ETN **DJP**, Credit Suisse Commodity Return Strategy **CRSCX**
Correlation to large U.S. stocks **–0.142**

Infrastructure
Similar to using REITs, an investor can gain exposure to this asset class by investing in listed companies that engage in these businesses.

Investment Vehicle Examples
iShares S&P Global Infrastructure Index **IGF**, SPDR FTSE/Macquarie Global Infrastructure 100 **GII**
Correlation to large U.S. stocks **0.767**

Private Equity
Investing in companies that engage in venture capital activity is one way to gain exposure to this asset class. While not the same as direct participation, our analysis has determined that these companies are a beneficial addition to a portfolio.

Investment Vehicle Example
PowerShares Listed Private Equity **PSP**
Correlation to large U.S. stocks **0.630**

Frontier Markets
Frontier markets are less developed than emerging markets. This asset class is expected to provide correlation benefits.

Investment Vehicle Examples
PowerShares MENA Frontier Countries **PMNA**, Guggenheim Frontier Markets **FRN**
Correlation to large U.S. stocks **0.102**

Treasury Inflation-Protected Securities
TIPS provide a portfolio with excellent diversification benefits along with inflation protection.

Investment Vehicle Example
iShares Barclays TIPS Bond ETF **TIP**
Correlation to large U.S. stocks **0.318**

Emerging-Markets Debt
This asset class displays different performance characteristics than emerging-markets equity and provides good diversification benefits to a traditional portfolio.

Investment Vehicle Example
iShares JPMorgan USD Emerging Markets Bond **IEMB**
Correlation to large U.S. stocks **0.672**

Portfolio Construction—Adding Alternatives to a Traditional Portfolio

Step 1: Develop Capital Market Assumptions

One of the most challenging aspects of working with alternative investments is developing a set of capital market assumptions. Estimating expected return, standard deviation, and correlations is difficult due to a scarcity of historical data for many of these categories. One method that can be used to address this problem is to backfill data for benchmarks with a short history with the output (factors and weightings) from a regression of the actual data against a group of investment returns and factors. This will allow you to create a data set with a common time period. Alternatively, one could use historical expected returns, standard deviations, and correlations over the longest available time frame.

In Table 1, we selected benchmarks representing traditional investments and the alternative investments discussed above. We created a common time period for data analysis and generated the resulting historical statistics.

Step 2: Build the Asset Class Model

The most widely accepted approach or tool for creating an asset allocation is Harry Markowitz's mean-variance optimization framework. Over the past 50-plus years, this model has become the tool of choice for developing an asset allocation. Graph 1 (next page), generated from Morningstar® EnCorr®, shows the efficient frontier (combinations of securities or asset classes that maximize the return for each level of risk) resulting from the

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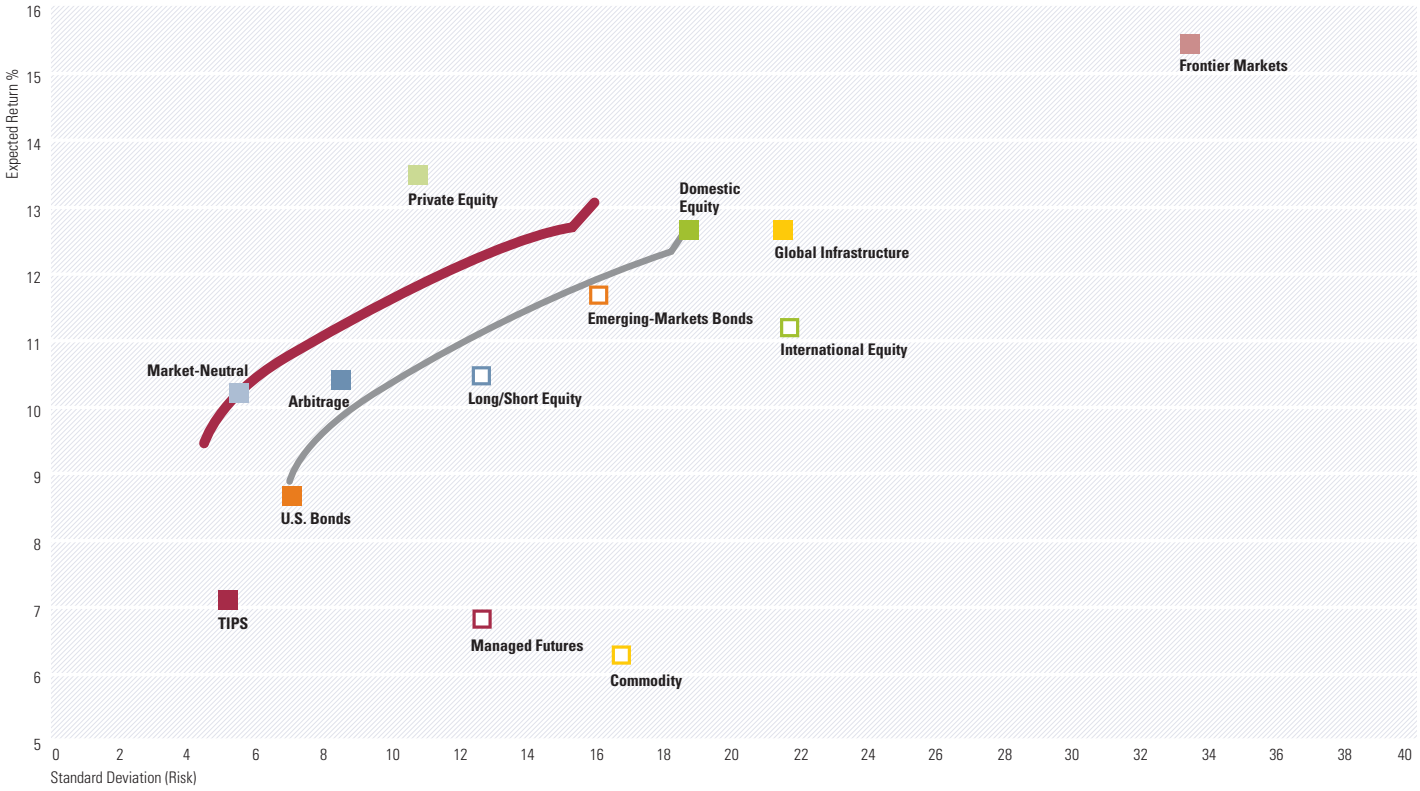
Table 1: Expected Returns and Standard Deviations

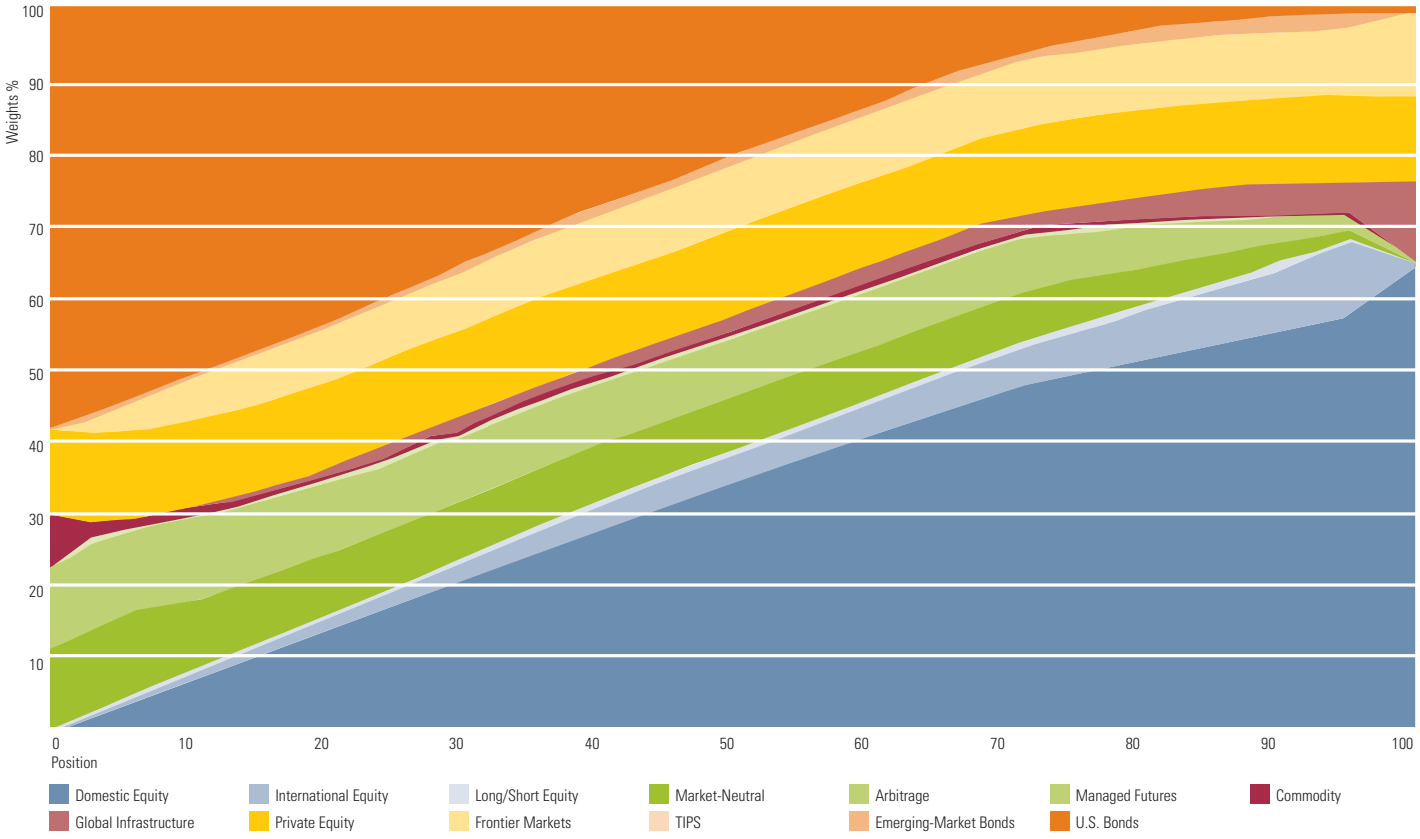
Alternative Asset Class (representative index)	Expected Return*	Standard Deviation*
Domestic Equity (Russell 3000 TR USD)	12.63	18.80
International Equity (MSCI EAFE GR USD)	11.17	21.70
Long/Short Equity (Credit Suisse Tremont Long Shrt Eqty USD)	10.45	12.66
Market-Neutral (Greenwich Global HF Eqty Market Neutral)	10.22	5.58
Arbitrage (CASAM CISDM Merger Arbitrage USD)	10.38	8.57
Managed Futures (Credit Suisse Tremont Managed Futures USD)	6.84	12.69
Commodities (DJ UBS Commodity TR USD)	6.27	16.79
Global Infrastructure (S&P Global Infrastructure TR USD)	12.65	21.47
Private Equity (Cambridge Associates US Private Equity)	13.47	10.77
Frontier Markets (MSCI Frontier Markets GR USD)	15.41	33.46
Treasury Inflation-Protected Securities (BarCap Gbl Infl Linked US TIPS TR USD)	7.08	5.22
Emerging-Markets Debt (JPM EMBI Plus TR USD)	11.67	16.09
Aggregate Bonds (BarCap US Agg Bond TR USD)	8.64	7.13

*These annualized statistics are calculated using quarterly data over the longest available time frame for each representative index.

Graph 1: Efficient Frontier with Alternative Asset Classes



Graph 2: Frontier Area Graph



above capital market assumptions. The thin gray line represents the efficient frontier that results from optimizing only the traditional asset classes: domestic equity, international equity, and U.S. bonds. By adding alternative asset classes to the opportunity set, the efficient frontier improves (moves northwest), as can be seen by the red line in the graph.

Unfortunately, efficient frontier graphs hide the underlying asset allocations. The efficient frontier graph is the type of output most people are accustomed to seeing, but it is often more informative to look at it in conjunction with what is called an asset-allocation area graph. An asset-allocation area graph (see Graph 2) shows the evolution of the efficient asset allocation across the risk spectrum of the efficient frontier.

Recognizing that the asset-allocation area graphs are somewhat difficult to analyze, we identified three efficient frontier asset-allocation mixes with standard deviation levels of 5%, 9%, and 13%, respectively. For these three risk levels, which we loosely refer to as conservative, moderate, and aggressive, we identify the asset-allocation mix in Table 2.

In contrast, a traditional portfolio (of U.S. and international equity and bonds) at the same standard deviation levels produced lower returns (of 8.84%, 10.08%, and 11.50%, respectively, for the conservative, moderate, and aggressive portfolios) and, consequently, lower risk-adjusted returns, or Sharpe ratios.

As always, careful interpretations and inferences from this optimization need to be made. First, traditional mean-variance optimization treats the capital market assumptions as if they were known with certainty. We attempt to address this shortcoming by running a resampled optimization. Conceptually, resampled optimization is a combination between an optimizer and a Monte Carlo simulation. Resampling averages the results of a large number of mean-variance optimizations, all of which are based on different sets of plausible capital market assumptions.

Second, using historical inputs may result in highly concentrated asset allocations, which may have been optimal over a certain period in history. For example, the optimizer favors private equity, one of the best-performing asset classes over this particular time period (June 30, 1986, to June 30, 2010). However, in a forward-looking context, such extreme allocations should be avoided, especially given the new market conditions of lower liquidity, restricted credit, and ongoing deleveraging. When creating a long-term strategic portfolio, it is better to use forward-looking estimates that take into account more-realistic economic conditions. In addition, investors do not usually pick a portfolio on the efficient frontier, as they may choose to diversify beyond what the optimizer suggests or they may consider income, wealth protection, or downside-risk parameters. In practice, constraints are added to the optimizer to create a well-diversified portfolio.

Table 2: Asset-Allocation Mixes

Alternative Asset Class (representative index)	Conservative	Moderate	Aggressive
Domestic Equity	2.71	27.31	49.17
International Equity	0.87	3.37	6.00
Long/Short Equity	0.72	0.60	0.89
Market-Neutral	11.07	7.59	6.17
Arbitrage	11.75	8.79	6.90
Managed Futures	0.25	0.27	0.32
Commodity	1.99	0.91	0.60
Global Infrastructure	0.06	1.64	2.66
Private Equity	12.00	12.00	11.98
Frontier Markets	3.34	8.70	9.65
Treasury Inflation-Protected Securities	0.05	0.00	0.00
Emerging-Markets Debt	0.57	1.20	1.84
Aggregate Bonds	54.62	27.63	3.82
Expected Return	**9.94**	**11.34**	**12.36**
Standard Deviation	**5.05**	**9.00**	**13.07**
Sharpe Ratio	**1.97**	**1.26**	**0.95**

Conclusion

In the previous discussion, we presented a starting framework for including alternative asset classes into a portfolio. When deciding what the appropriate allocation to each asset class should be, the results of the optimizer should be considered in conjunction with the investor's risk tolerance and the suitability of each asset class to the overall portfolio. In the end, when used correctly, adding alternative investments to a traditional portfolio can improve the risk-adjusted return of a portfolio at any level of risk and may provide relatively superior downside protection risk due to low correlations between alternative asset classes and traditional asset classes.