Exotic Beta: A Primer

By Joe DeLuca

Editor’s Note: This article is based on the working paper “Exotic Beta Revisited,” by Mark Carhart, Ul-Wing Cheah, Giorgio De Santis, Joe DeLuca, Bob Litterman, and Attilio Meucci. www.keposcapital.com.

Traditional portfolios are defined by their asset class allocations—60-percent equities/40-percent fixed income—but we propose a broader framework that includes many intuitive premia that are not correlated with the largest risk in many investors’ portfolios, i.e., equity. Unlike equity beta, these “exotic betas” have performed well historically over a panoply of market conditions, yet they are inexpensive relative to hedge funds and other active forms of management. They are also more straightforward, transparent, and tradable than many alternatives.

Exotic beta is not meant as a replacement for an exposure to equities but is rather a complement to other risk factors in a portfolio. Equity market exposure (beta) has provided a consistent and understandable source of return for decades. It may have disappointed over the past decade, particularly on a risk-adjusted basis, but it should be an important anchor of portfolio construction. For a variety of structural reasons, however, many investors expect the equity risk premium to be lower or more volatile in the future. Rationales for these reduced expectations include a high and increasing debt to gross domestic product (GDP) in the United States, destabilization of the European Union, and the disposal of assets by baby boomers. Bonds, the other cornerstone of asset allocation, do not look much better as interest rates hover at generational lows following a three-decade secular decline. Further exacerbating expectations in fixed income, President Barack Obama’s budget proposes taxes on municipal bond income.

Over the past 10 years, hedge funds have been characterized as a panacea for institutional investors’ worries. However, hedge funds are not an asset class, which foments trouble within an asset-class-based allocation framework. Some hedge funds exhibit a high beta to equities while some truly offer more “pure” alpha, but most are a mix of beta, alpha, and the very exotic betas described in this paper.

The Spectrum

Rather than attacking the strategic construction of a portfolio from an asset-class perspective, our approach focuses on the many sources of return generation. In this framework, all of these sources exist on a continuous spectrum between alpha and beta.

Exotic betas sometimes are (mis)classified as alpha due to their historic and expected excess return over and above the return that otherwise would be implied by their correlation to equities. Unlike alpha, however, exotic betas do not require the same level of skill or unique insight to source. Instead, they are compensation for accepting some recognizable longer-term risk. Under our criteria, exotic betas are transparent, intuitive, and tradable. Investors also may choose to hedge out equity beta so that exotic betas are uncorrelated with equities.

Other features distinguish exotic betas from alpha. These include time horizon, capacity, liquidity, and subjective judgment or intuition that justifies a pricing premium. The justification could be an actual or perceived risk of large loss or simply a behavioral preference. For these reasons, the evaluation criteria for managers of alternative risk premia should be different than those for active equity or pure alpha managers. Moreover, because exotic betas are well-known, intuitive, and more easily traded than true sources...
of alpha, they should cost less than a proprietary active hedge fund strategy.

**Exotic Betas**

We propose a list of nine tradable exotic betas for this discussion. Each risk premium lacks exposure to equities or is expressly hedged against global equities. This typically can be accomplished by simply shorting equity index futures in a specific ratio. Thus, the individual exotic betas, as well as the portfolio of exotic betas, are not expected to be correlated with global equity markets.

1. **Bond yields** — a GDP-weighted combination of global bonds
2. **Bond yields value** — long-short exposure to bond markets based on yields
3. **Catastrophe bonds** — weighted combination of bonds linked to catastrophic reinsurance risk
4. **Commodities** — commodity futures tilted towards high current yield commodities
5. **Credit** — equal-weight combination of the major credit sectors in developed markets
6. **Currency value** — long-short exposure to high interest rate and weak purchasing power parity currencies
7. **Equity value** — long-short exposure to countries based on fundamental value
8. **Real assets** — market-cap-weighted combination of real estate investment trust securities
9. **Volatility** — short equity index volatility generally (i.e., excluding expected stress periods)

There are, of course, other exotic betas. Convertible arbitrage or merger arbitrage spreads, for example, have been suggested in academic research. We have chosen nine here that meet our intuitive criteria while providing attractive characteristics such as excess return, diversification, and risk perspective.

These nine exotic betas are shown in figure 2. In an effort to make the premia comparable, we have standardized them to the same level of volatility, 10 percent.

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**FIGURE 2: CUMULATIVE EXCESS PERFORMANCE ON INDIVIDUAL EXOTIC BETAS**

![Graph showing cumulative excess performance on individual exotic betas.](image)

**TABLE 1: EXOTIC BETA PORTFOLIO (SIMULATED)**

<table>
<thead>
<tr>
<th>Quarter</th>
<th>Q1</th>
<th>Q2</th>
<th>Q3</th>
<th>Q4</th>
<th>FY</th>
<th>Annualized since inception</th>
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<tbody>
<tr>
<td>1990</td>
<td>3.3%</td>
<td>4.4%</td>
<td>8.5%</td>
<td>0.0%</td>
<td>16.9%</td>
<td>21.0%</td>
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<tr>
<td>1991</td>
<td>5.3%</td>
<td>0.8%</td>
<td>7.0%</td>
<td>3.6%</td>
<td>17.6%</td>
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</tr>
<tr>
<td>1992</td>
<td>2.8%</td>
<td>4.7%</td>
<td>7.3%</td>
<td>negate 1.2</td>
<td>14.1%</td>
<td></td>
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<tr>
<td>1993</td>
<td>9.6%</td>
<td>negate 1.5</td>
<td>4.7%</td>
<td>negate 0.1</td>
<td>12.9%</td>
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<td>negate 3.6</td>
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<tr>
<td>1995</td>
<td>negate 0.6</td>
<td>4.0%</td>
<td>4.8%</td>
<td>7.1%</td>
<td>16.1%</td>
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<tr>
<td>1996</td>
<td>8.7%</td>
<td>7.1%</td>
<td>10.4%</td>
<td>14.0%</td>
<td>46.4%</td>
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<tr>
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<td>negate 2.0</td>
<td>6.6%</td>
<td>negate 0.5</td>
<td>10.3%</td>
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<tr>
<td>1998</td>
<td>1.4%</td>
<td>negate 1.7</td>
<td>2.5%</td>
<td>negate 8.0</td>
<td>negate 6.0</td>
<td></td>
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<tr>
<td>1999</td>
<td>8.4%</td>
<td>7.5%</td>
<td>0.7%</td>
<td>negate 1.0</td>
<td>16.2%</td>
<td></td>
</tr>
<tr>
<td>2000</td>
<td>4.9%</td>
<td>6.9%</td>
<td>7.5%</td>
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<td>8.4%</td>
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<tr>
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<td>15.1%</td>
<td>9.4%</td>
<td>43.9%</td>
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<tr>
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<td>1.7%</td>
<td>13.4%</td>
<td>54.6%</td>
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<td>2004</td>
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<td>16.3%</td>
<td>4.9%</td>
<td>39.1%</td>
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<tr>
<td>2005</td>
<td>6.1%</td>
<td>10.3%</td>
<td>1.2%</td>
<td>4.8%</td>
<td>24.1%</td>
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<tr>
<td>2006</td>
<td>2.0%</td>
<td>0.4%</td>
<td>9.0%</td>
<td>9.1%</td>
<td>21.9%</td>
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<tr>
<td>2007</td>
<td>7.7%</td>
<td>1.5%</td>
<td>2.8%</td>
<td>4.8%</td>
<td>17.7%</td>
<td></td>
</tr>
<tr>
<td>2008</td>
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<td>9.8%</td>
<td>negate 3.9</td>
<td>5.2%</td>
<td>22.9%</td>
<td></td>
</tr>
<tr>
<td>2009</td>
<td>8.7%</td>
<td>3.5%</td>
<td>5.7%</td>
<td>0.6%</td>
<td>19.6%</td>
<td></td>
</tr>
<tr>
<td>2010</td>
<td>6.3%</td>
<td>10.1%</td>
<td>negate 2.7</td>
<td>3.2%</td>
<td>17.5%</td>
<td></td>
</tr>
<tr>
<td>2011</td>
<td>6.7%</td>
<td>7.3%</td>
<td>negate 7.4</td>
<td>3.6%</td>
<td>9.8%</td>
<td></td>
</tr>
<tr>
<td>Annualized since inception</td>
<td>21.0%</td>
<td></td>
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</tbody>
</table>
In table 1, we show the quarterly performance of a portfolio of exotic betas that targets 10-percent volatility overall (roughly the same volatility of a 60/40 stock/bond portfolio over the past 30 years). We would not necessarily expect performance to be this strong over the next 30 years, but the diversification benefit coupled with a positive risk-adjusted return suggests that it deserves a serious consideration for many equity-centric portfolios.

The annual and quarterly results in table 1 also appear quite attractive—in our estimation, perhaps too attractive. Note that in several quarters the exotic betas came under stress. For example, in the fourth quarter of 2008 even nonfinancial assets came under stress as investors sourced liquidity wherever possible. Looking beyond the data, we ask: Why do these premia exist in the first place?

**Perfectly Rational**

Rare is the investor who behaves perfectly rationally all the time, the way investors behave in the theoretical models imagined by economists. Anyone who has ever served on an investment committee knows that humans tend to focus on line items, i.e., the results of individual investment categories or individual managers. Investors often exhibit risk aversion that cannot be fully explained by the simple goal of maximizing the long-term appreciation of total wealth. Human behavior is among the most important justifications of why these premia exist.

Some exotic betas derive from the typical investor’s demand for liquidity. Certain assets, such as real estate investment trusts, appear to contain a premium that is at least partially justified given the low liquidity of the underlying property assets. Timber, farmland, and power plants exhibit such a premium as well.

Another form of risk aversion is investors’ understandable distaste for the fat tails on the downside exhibited in most markets. For example, even though most sophisticated investors recognize that traded volatility carries a premium not justified by the observed standard deviation of the underlying assets over time, they happily are willing to pay this insurance as opposed to accepting the risk of a market crash.

And perhaps the most well-known exotic beta is value. Investors have a demonstrated tendency to eschew assets that have decreased in value and favor those that have appreciated or are appreciating. Yet despite the nearly universal acceptance of value as a winning strategy throughout the history of organized markets, few investors have the fortitude to be true contrarians.

Understanding the source of the exotic beta has an additional benefit. It allows one to be more thoughtful in constructing a truly diversified portfolio. The assembled package of exotic betas should have some balance among the sources of the risk premia, including premia that are more like insurance against large but unlikely events, valuation dislocations, liquidity-driven discounts, and others, such as market segmentation.

**Timing**

It is worth noting that the attractive returns from each of the risk premia may not be permanent and may either temporarily or permanently decline over time. As investors become aware of an opportunity for return, they may eagerly chase it down and swamp it with new asset flows. There have been several constructive examples of this phenomenon in recent years; for example, institutional investors flocked to commodity indexes in the 1990s and subsequent returns due to backwardation in commodities’ appear to have dried up (at least for the time being).

Yet cycles in markets are a constant. Changes in risk preferences, shocks, and fiscal crises will create opportunities again. Regular monitoring and evaluation of these exotic betas are necessary to assess when the premia are relatively rich or conversely cheap from an historical perspective (consider equities in February 2009). One could think of this as value investing in exotic betas.

Furthermore, we have learned from previous crises that when changes in the markets are very swift or large, it may be helpful to vary one’s exposures. For example, while the volatility premium historically has been one of the highest-yielding and most-consistent exotic betas, it would have been reasonable to completely remove it from the portfolio during the period immediately surrounding the Lehman bankruptcy as the market disruption accelerated. Conversely, the value premia suddenly became so attractive that one might have chosen to overweight it in a portfolio.

In the first case, backwardation, we describe a slow-moving, secular decline in an exotic beta. In the second case, involving traded volatility, a tactical move is considered that may require a repositioning for as little as a few weeks. In the third case, that of the equity value premia, we recall a more intermediate opportunity that played out over several months.

This is not to suggest that it is easy to time exotic betas; in fact, our ongoing research suggests that it is quite difficult. Not all risk can be managed, yet it is quite important to supervise the portfolio carefully, paying close attention to the appropriate level of exposure to each risk premium over time. Many types of metrics can be used as measures of valuation for exotic betas. Some metrics, such as deviations from long-term trend returns, can be applied across many types of risk factors. Others, such as backwardation versus contango in commodities, or deviations from purchasing power parity in currencies, are specific to particular asset classes. In most cases, risk premia will have several metrics that can be used to measure whether the expected risk premium is more or less attractive than average.

**Where Does Exotic Beta Belong in a Portfolio?**

Rather than proposing a single solution to budgeting the appropriate exotic
beta allocation, we proffer two different approaches. The first is theoretically optimal, whereas the second is a more implementable partial measure. The optimal solution would be to rebudget one’s entire portfolio into its exposures to equity beta, exotic beta, and alpha. Given practical considerations, this is not a trivial exercise. Equity beta, exotic beta, and alpha are sourced across asset classes and individual manager products. For example, within a traditional corporate bond portfolio one might expect exposure to at least three risk premia: credit, bond yields, and equity. Each individual manager would be expected to have varied ratios of these exposures, and some might generate other exotic betas, e.g., volatility and purchasing power parity. A typical hedge fund portfolio carries with it a large exposure to equity as well as volatility and credit.

Still, most investors with even moderate long-term return targets will find that their allocation of risk is most heavily weighted to equity beta. One could optimize one’s desired exposure to all risk premia using a framework that assesses long-term return potential by the risk premia from equity beta, exotic beta, and alpha. One easily could incorporate assumptions about the near-term valuation of the exotic betas, aversion to extreme scenarios, leverage, or common-sense constraints (i.e., balancing the sources of exotic betas).

The partial-measure approach would be to simply carve an allocation from an existing asset class; equities would be most logical because the exotic beta portfolio is designed to have zero correlation with equities. Figure 3 shows a typical portfolio that is 60-percent equities/30-percent bonds/10-percent hedge funds moving along the optimal frontier with 5-percent, 10-percent, and 25-percent allocation to exotic beta (the highest information-ratio combination based on our assumptions includes a 43-percent allocation to exotic beta, which we recognize is untenable for most investors).

We support strategic benchmarks, but many of the exotic betas we propose here do get richer or cheaper over shorter cycles than could be deemed strategic. For example, declining rates have been a terrific source of return over much of the past three decades, yet it would be impractical to lean heavily on bonds at this moment. Many argue that backwardation in commodities has generated most of the historical return in commodity futures-based indexes. However, as real money investors have taken notice and moved portions of their strategic allocations into such indexes, backwardation on average has faded.
Another way to think about assembling an exotic beta portfolio would be from a sensitivity perspective. Unlike equity beta, a portfolio of exotic betas, at least historically, has been relatively insensitive to the macroeconomic environment. For example, our nine exotic betas have exhibited robustness in low growth or inflationary settings, as shown in figure 4. The quadrants represent strong vs. weak growth environments and high or low inflation environments (relative to history). The performance of the exotic betas is relatively insensitive to the type of environment. In other words, the exotic beta strategy had a strong absolute performance even in the worst environment for the strategy—high inflation and strong GDP growth. The difference between the average risk-adjusted performance of the strategy (information ratio or IR) and the IR in a given environment is shown in parentheses. For example, the simulated IR for the exotic beta strategy in a weak GDP growth, high inflation environment is 2.11, which is 0.09 higher than average for the entire period.

Exotic Beta vs. Risk Parity

Given the evolution of risk parity as an investment category, it is worth taking a brief moment to compare and contrast the exotic beta approach with risk parity.

Typically “risk parity” means weighting the contribution to risk from various asset classes equally, often through the use of leverage. This reduces the dependence upon equity risk, typically the dominant risk in a portfolio. It is also agnostic as to relative weightings, i.e., there is no view as to which asset class will outperform going forward.

The exotic beta proposal, however, focuses not on asset classes but rather on the sources of return—the risk premia themselves. It expressly hedges away equity risk, whereas risk parity still has equity risk in the underlying asset classes (i.e., credit assets typically exhibit equity exposure and rate sensitivity along with the credit premium). Finally, while an agnostic or equal weighting is a nice place to start, we think we have much more information about the intermediate-term return prospects of the various exotic betas. We previously had noted that while bond yields have delivered a terrific mean return over the past 30 years, yields probably will not drop below zero. We would prefer not to have an equal weight to bond premia and to volatility premia right now.

Conclusion

Many risk factors—which we call exotic beta—are neither equity exposure nor pure alpha. It is more important today than it has been in recent history for investors to consider including exotic beta in their portfolios, particularly given reduced expectations around stocks and bonds. We continue to recommend that investors develop a framework for understanding, appropriately sizing, and managing the multiple risk factors that generate return in their portfolios and that exotic betas become a more important element within that calculus.

In light of the most-recent financial crisis we are even more convinced that exposures to exotic betas are attractive in a portfolio context and also provide a critical tool to reduce an investor’s reliance on equity risk. Importantly, we do not believe it is optimal to have an equal allocation to these risk premia at all times. They must be carefully monitored, as is the case with any investment. Finally, the benefits of exotic beta can be compelling from a return and portfolio construction perspective. The concept is beginning to catch on, and it can be implemented in a low-cost, transparent, and customized fashion.

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Endnotes
1 Backwardation refers to a downward-sloping futures price curve.
2 Contango refers to an upward-sloping futures price curve.

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