

Alternatives to normality

Some lessons from the credit crisis

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J.P.Morgan
Asset Management

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In this paper, we revisit the benefits of diversification to alternatives in light of the lessons of the current credit crisis. To do so, this paper focuses on three questions:

- 1** What difference does it make if we assume that the distribution of expected returns in each asset class is not normal, in that the risk of abnormally negative returns is greater than is the case in normal distributions?
- 2** Given the current market conditions, is now the right time to be considering an investment in alternatives?
- 3** What are the consequences for the liquidity of a portfolio that contains exposure to alternative assets?

Our overall conclusion is that alternatives can make a valuable contribution to the characteristics of a portfolio and that allocating part of a portfolio to alternatives improves the overall return per unit of risk taken.

1 Non normality of asset returns

As the stock market turbulence of the past two years has demonstrated, conventionally derived portfolios may carry a higher level of downside risk than many investors realise, or current portfolio modeling techniques can identify. There is therefore a need to modify risk management frameworks to better capture the long-term downside risk associated with market anomalies, which though rare, occur more frequently than is currently anticipated.

We have developed a model which accounts for three troublesome shortcomings of traditional portfolio modeling techniques:

- Serial correlation. Traditional models typically ignore the affect of past returns on present returns.
- Negative skewness. Traditional models underestimate the probability of extreme negative returns.
- Correlation breakdown. Correlations have proven to converge during periods of market stress, a characteristic not captured by traditional models.

At J.P. Morgan Asset Management, we are also moving away from relying on standard deviation as a measure of portfolio risk, because it treats desirable upside movements as if they were just as undesirable as downside movements. This is generally inconsistent with investor risk preferences. Further, standard deviation assumes symmetric distributions - which our empirical work contradicts. Because standard deviation defines risk as being only a one standard deviation event, it fails to capture the effect of 'fat' left tails (more akin to two or three standard deviation events) that should have an impact on optimal portfolio selection.

Instead, we use Conditional Value at Risk ("CVaR95"), defined as the average real portfolio loss (or gain) relative to the starting portfolio in the worst five percent of scenarios, based on 10,000 simulations. It is simply the average real loss (or gain) in the worst 500 (5% of 10,000) scenarios. CVaR95 overcomes many of the drawbacks of standard deviation as a risk measure. Primarily, as it only measures risk on the downside, it captures both the asymmetric risk preferences of investors (the fear of loss being disproportionately greater than any gain) and the incidence of 'fat' left tails induced by skewed return distributions. Further, given the widespread use by major institutional investors and regulators of its first cousin - Value at Risk - we judge it to be the most appropriate risk measure to incorporate it into our framework.

Our results indicate that despite holding a well diversified portfolio, there is scope for our hypothetical investor to improve portfolio efficiency. The following simulation exercise explores how changes to the asset allocation will impact its portfolio return when using CVaR95 as the risk measure.

Simulation study

In the table on page five, we show in column one the hypothetical core portfolio with £500mm invested in 5% cash, 35% bonds, and 60% equity (10% Global ex-UK equity and 50% UK equity). We also show various statistics for each portfolio such as the arithmetic and compound return, the CVaR95 as defined in the previous section, as well as the return per unit of CVaR95 which is simply the arithmetic return minus the risk free rate¹ divided by the CVaR95 (with CVaR95 expressed as a percentage of the £500mm starting portfolio value). The subsequent columns show the impact of transferring a portion of the equities allocation to alternatives. In each case, we compare the resulting portfolio characteristics with those of the core portfolio (i.e. column 1 vs. columns 2-6).

In column two, we show the impact of adding a 5% allocation to fund of hedge funds to the portfolio, with a corresponding reduction in UK equity. This increases the return per unit of CVaR95 from 3.3 to 7.7. Since CVaR95 measures the average loss for the total portfolio in the worst 5% of simulations, this result indicates that allocating to a fund of hedge funds reduces risk, as expected. It should however be noted that in modeling hedge funds, we considered a fund of hedge funds, which exhibits relatively low returns and correspondingly low levels of risk. Investing in directional hedge funds might offer the potential of much higher returns, but at a higher risk.

Column three shows that if the 5% had been allocated to private equity rather than to a fund of hedge funds, the expected portfolio return would be higher than the starting core portfolio but with a lower return per unit of CVaR95. It should be noted, however, that private equity is an asset class which traditionally displays large performance differences between the top and bottom quartile manager. In this analysis, we rely on the long-term capital market assumptions, which assume the return of a median private equity manager and the volatility of the DJ US Microcap Total Stock Market Index ("microcap index"). If our hypothetical portfolio invested in a top quartile manager, we can expect returns to be 400-500bps higher.

¹ Risk free rate used is 4% as per the J.P.Morgan long-term capital market assumptions.

Initial value = £500 million	(1) Core portfolio	(2) 5% FoHfs	(3) 5% Private Equity	(4) 5% Real Estate	(5) 15% Alternatives	(6) 30% Alternatives
Total bonds	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%
Cash	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
UK Aggregate bonds	35.0%	35.0%	35.0%	35.0%	35.0%	35.0%
Total Equity	60.0%	55.0%	55.0%	55.0%	45.0%	30.0%
Global equity (ex UK)	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%
UK equity	50.0%	45.0%	45.0%	45.0%	35.0%	20.0%
Total Alternatives	0.0%	5.0%	5.0%	5.0%	15.0%	30.0%
Fund of Hedge Funds	0.0%	5.0%	0.0%	0.0%	5.0%	10.0%
Private Equity	0.0%	0.0%	5.0%	0.0%	5.0%	10.0%
Direct Real Estate	0.0%	0.0%	0.0%	5.0%	5.0%	10.0%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Expected arithmetic return	8.44%	8.33%	8.58%	8.37%	8.39%	8.34%
Expected compound return	8.11%	8.03%	8.24%	8.07%	8.12%	8.11%
Conditional Value at Risk 95 (allowing for non-normality)	£14	£6	£18	£4	£4	£2
Return per unit of CVaR95	3.3	7.7	2.5	12.0	11.6	22.3
Improvement relative to core portfolio		4.4	-0.8	8.7	8.3	19.0

Private equity volatility in reality should also be lower than a microcap index because of the appraisal methodology used to value private equity investments, in which the appraiser uses historical private equity transactions as a best estimate for the current investments. However, the recent implementation of FAS 157², which requires using fundamentals and market-based variables to value illiquid investments, may mitigate some of the volatility smoothing we have seen. Overall, however, investing in a top quartile manager and using a less volatile proxy than the microcap index to estimate private equity volatility should significantly increase the return per unit of CVaR95 of the portfolio.

Column four shows what might have happened if the 5% had been allocated to real estate rather than to a fund of hedge funds, or to private equity. Interestingly, in this case the return per unit of CVaR95 improves greatly, in fact, more than a portfolio with a 15% diversified allocation to group of alternatives (but less than a portfolio with a 30% diversified allocation to a group of alternatives). As in the case of private equity, we use market values rather than appraisal values. In addition, it should be noted that we did not take into account the fact that, as a leveraged investment, the overall risk of an investment in real estate comes from the risk of bond valuations as well as from the real estate valuation. We do not consider the risk in the bond valuation when modeling real estate.

Column five illustrates the impact of adding 5% to each of the three alternative asset classes. The impact on efficiency, relative to the core allocation, is clear: the return per unit of risk increases from 3.3 to 11.6. In column six, we add 10% to each of the three alternative asset classes. The improvement in the return per unit of risk increases along with the increased allocation to alternatives; 22.3 compares to 11.6 with less alternatives and 3.3 with no alternatives. However, we should not assume that returns per unit of CVaR95 improve in proportion with increased allocations to alternatives in all cases. In the limit, a portfolio of 100% alternatives might be very risky indeed.

In summary, including alternatives in the portfolio will increase the overall return per unit of CVaR95 in four out of the five scenarios illustrated above based on our model and long term capital market assumptions. In the case of column three which lowered the return per unit of CVaR95 when we included private equity, we should incorporate the economic realities of a private equity investment that performance differs significantly between managers and valuations are less volatile than our private equity proxy (microcap index). If viewed as a component of equities, private equity will also serve as a diversifier due to its lower correlations to public equities than the style and market cap funds are with each other within public equities. By taking these private equity characteristics into consideration, we expect that the inclusion of private equity will increase the portfolio's return per unit of CVaR95.

² The FAS 157 rule was announced in September 2006 by the Financial Accounting Standards Board (FASB), and seeks to have all portfolio investments reported at fair value on a consistent, transparent, and prudent basis. Fair value is defined as "the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date." This rule was effective for fiscal years beginning after November 2007.

2 Revisiting allocating to alternatives and the challenges of rebalancing

Extreme market conditions in 2008/09 have resulted in allocations deviating significantly from strategic norms and being aggravated further by dramatically divergent performances. This has typically resulted in lower equity and higher fixed income exposure for core portfolios. Any wish to diversify is challenged by current market distortions (what do you rebalance from – equities or bonds?) whereas for larger schemes that already have alternatives, their exposure may have increased beyond the strategic allocation. Therefore the question is whether to rebalance out of illiquid assets or maintain a larger portfolio weighting.

Firstly, transaction costs associated with rebalancing are now greater than before. Also, rebalancing reduces the already stretched liquidity of investors' portfolios while volatility is at unprecedented highs. Rebalancing the alternatives portion of a portfolio towards equity only makes sense if the equity can make up for the costs of rebalancing and the loss of return on the divested portfolio. But beyond those short term considerations, investors should reconsider their long-term strategic allocations by protecting their schemes against downside risk. Alternatives are ideally placed to provide downside protection and appropriate risk adjusted returns to help pensions guard against major losses associated with adverse economic conditions.

Real estate considerations in the current environment

The current situation in real estate is quite challenging as investors face the issues of revaluation and lag between the economic cycle and real estate prices. A recent 40% decrease in UK real estate prices from their peak has highlighted the volatility in pricing to which investors could be exposed. The relationship between the economy and some real estate sectors (such as commercial real estate for example) could place the sector under further stress should the economy deteriorate further. Such a case would indeed put pressure on the rental cash flows and overall building occupancy. In previous crises, real estate has acted as a good hedge as it took some time for the appraisal values to reflect the dips in the economy. But in periods of rebound real estate has historically been a lower performing asset class as the economic conditions are finally factored into valuation models.

However, the situation in the current crisis is a bit different. The real estate downturn was in part a cause of the crisis. In addition, there has been a significant and quick adjustment of prices, which could suggest that the current crisis leaves less flexibility for further price revaluations. Also, the speed and scale of re-pricing, particularly for UK real estate, presents opportunities to buy good quality real estate at attractive initial yields, leading to good income returns and the prospect of medium-term capital growth, especially in an inflationary environment.

The traditional long-term benefits that real estate offers remain: an interesting combination of immediate income via cash flows and the potential for longer-term capital gains. It also protects the long-term capital value of investments as it has inflation hedging potential. Historically, there is a low correlation between real estate and fixed income and equities.

Infrastructure considerations in the current environment

The leverage used in infrastructure strategies has been a challenge for the overall infrastructure industry in 2008. While infrastructure cash flow requirements are long term in nature, financing has often been made on a five-year basis, sometimes less, with required refinancing in 2008 or 2009. When the leverage structures were too aggressive, relying on aggressive growth assumptions for infrastructure cash flows, an increase in interest rates has had a significant impact on the returns of portfolios. This has highlighted the need for careful selection of asset managers, especially when the investment in infrastructure was made originally to benefit from a stable stream of cash flows.

The long-term benefits of an investment in infrastructure include highly reliable cash flows through, for example, tolls on bridges and roads, and consistent revenues from regulated utilities. Investing in infrastructure offers pension funds a low volatility, consistent cash flow alternative, which delivers bond-like income to match their long-term liabilities. Our analysis demonstrates that the correlation coefficient between cash flows from US equities and US infrastructure between 1986 to 2006 was just -0.1. Sustained low correlations suggest that real assets can act as a powerful form of diversification within an equity-focused portfolio, helping to lower overall risk. Long-life stable assets with growing cash flows, such as real estate and infrastructure, have shown they can offer comparable returns to equities, and their stable cash flows suggest that they deliver these returns with significantly less volatility. In other words, real assets can provide a compelling combination of investment attributes: equity-like real growth combined with bond-like cash flow generation, plus the opportunity to reduce overall portfolio risk without any corresponding fall-off in investment returns. Infrastructure is not modeled in the above simulation due to a lack of long-term benchmark data, but we do consider it to be an integral part of an alternatives portfolio.

Private equity considerations in the current environment

The leverage issues that have been challenging for infrastructure (see above) were significant for the leverage buy-out segment of private equity as well. The economics of transactions that relied on low interest rate assumptions and high growth in returns were reversed in 2008 and 2009 as interest rates surged and growth stopped. The leverage issues and illiquidity in the credit markets, however, also created secondary market opportunities for many buyers, as distressed sellers were willing to sell their high quality private equity investments at significant discounts. In early 2009, the J.P. Morgan Asset Management private equity team saw discounts in excess of 50% of the net asset value (“NAV”) for funded partnership investments and discounts up to 100% of the NAV for unfunded partnerships. However, discounts to NAV is not always the case in secondary markets because valuations can fluctuate widely across periods and portfolios, and we have seen secondary transactions trading at a premium to NAV in the past. Nonetheless, if implemented properly, a buyer with sufficient liquidity should reap significant benefits in the secondary market.

Valuation issues should also be considered before making a private equity investment. Private equity mandates are valued using market values only when the investments are sold, but appraisal value in which an appraiser gives a best valuation estimate by adjusting the historical value for cash contributions or distributions is the more common valuation approach. As a result of the smoothing mechanism built into private equity valuations, it is possible that private equity prices will decrease less than public equity markets during periods of market downturn, and may also be less likely to surge during a market rebound. However, FAS 157 should reduce the smoothing impact on valuations going forward, as previously discussed.

Another key consideration for investing in private equity is the much higher return potential than investing in public equity, because private equity returns are largely manager-driven, while public equity returns are largely beta or market driven. In fact, a top quartile manager can generate alpha of 400-500bps above public equity markets in normal market conditions. The return potential can be even higher during periods of financial crises, such as in 2001 and 2002 when private equity benefited from low equity valuations. For example, the Cambridge Associates U.S. Private Equity benchmark³, saw net median returns to limited partners in 2001 and 2002 at +22% (vs. FTSE 100 return of -14%) and +21% (vs. FTSE 100 return of -22%), respectively. Therefore, investors with sufficient liquidity to invest in private equity funds during periods of financial crisis should gain significant benefits over time when low valuations return to more normal levels. Private equity should also help diversify an investor’s equity portfolio, complementing large-, mid- and small-cap international and emerging market stocks.

Hedge fund considerations in the current environment

The current credit crisis has created an environment where financing for hedge funds is limited, due to both general reluctance and an increased concentration of providers, which has in turn led to a decreased ability for hedge funds to negotiate terms and an increased cost associated with borrowing. Large hedge funds will be less impacted as they will have relatively better negotiating power compared to smaller funds. Because of these issues, there is an expectation that the hedge fund market will have fewer new entrants and continue to experience attrition among current fund managers.

In previous crises, hedge funds managed to offer a premium compared to a balanced equity/fixed income portfolio. For example, during the 2001-2002 financial crisis, our hypothetical core portfolio from the above simulation study generated a return of -8.3%⁴ vs. HFRI Fund of Funds Composite return of +1.0%. In 2008, hedge fund losses were on average less than those of public equity markets (-12.6% for HFRI Fund of Funds Composite vs -28.3% for FTSE 100⁵). However, when compared to a balanced portfolio such as the core portfolio in the above simulation, losses were similar (on average -14.7%). In 2009 thus far, we have seen positive returns from hedge funds relative to global equities (+3.3% for HFRI Fund of Funds Composite vs -7.3% for MSCI World ex-UK as at 30th June 2009).

An increasing number of hedge fund investors are in need of immediate liquidity. As a result, they are willing to sell their hedge funds at a discount, which creates attractive opportunities for investors who want to invest in hedge funds. The credit dislocation is advantageous for managers with the right skill set as certain credit opportunities not easily accessed through traditional long-only strategies are available.

³ Cambridge Associates LLC U.S. Private Equity Index® And Selected Benchmark Statistics, March 31, 2009.

⁴ 2001-2002 financial crisis defined as September 2001 - December 2002 using historical benchmark returns only (no alpha assumptions).

⁵ All benchmark returns are unhedged in £.

3 Liquidity concerns

Across the alternatives considered in this paper (real estate, infrastructure, private equity, hedge funds), investors will have difficulties immediately selling their investments to gain liquidity. An asset allocation optimiser might suggest a significant allocation to alternatives but it is important to consider the consequences for liquidity that a high allocation to alternatives may present. In the last quarter of 2008, for example, investors bewildered by the magnitude of losses in their equity portfolio and the lack of liquidity provided by their fixed income portfolio turned to their alternative assets for liquidity. However, this is not the role that alternative assets should have in a portfolio. Below, we explore a few liquidity characteristics to bear in mind when looking at alternatives.

In terms real estate and infrastructure, the investment vehicle used is key to determining their liquidity characteristics. If the investment is made via a closed-ended fund, investors cannot sell their real estate portfolio; they will need to wait until the manager distributes the money back to investors. This is typically done over the course of five-to-ten years, at the full discretion of the portfolio manager. In 2008, as real estate markets struggled, little distribution was made. Open-ended funds, on the other hand, offer some liquidity to investors. However, this is often subject to the constraints of the funds, which in periods of stress can give rise to long queues to get your money (two years or more) or create large discounts compared to the book value of their investments (70% discounts have been discussed in some instances this year). These parameters limit the exit strategy of real estate investors. In addition, investors might not have funded their entire investment at the outset and will have to face capital calls when portfolio managers find opportunities to deploy capital. The strain this may put on institutional investors should be considered when developing a strategic asset allocation.

Private equity investors will have similar liquidity issues as real estate investors in closed-ended funds. Investments in private equity funds are typically long-term, buy-and-hold investments without a listed public market. Liquidity is unavailable for investors until capital distributions are made, which can typically begin in the third or fourth year after the initial investment, depending on the fund's underlying assets and the market environment. However, investors looking for immediate liquidity may sell their private equity investment into a secondary market via an over-the-counter negotiated transaction. Potential buyers in the secondary market can generally purchase private equity interests at discounts in excess of 50% up to 100% of NAV, although it is possible to purchase at a premium to NAV as well. The investor's commitment to a private equity fund is drawn overtime, and investors are obligated to make cash contributions when the portfolio manager makes a capital call. There are a variety of investment options available, but an ideal private equity investment should be in a well-diversified portfolio with exposure to a wide range of "vintage years," which is the first year of capital drawdown. This type of portfolio should allow institutional investors to use the cash flows distributed by old investments for future capitals calls or new investments.

Hedge funds are traditionally illiquid for a lockup period between 12-24 months, with a potential exit in the second year after a penalty fee. Quarterly liquidity is generally available after the lockup period, to the extent that gates are not implemented by the hedge fund manager. Gates are withdrawal restrictions that are implemented when a large number of redemption requests are made at the same time, to ensure that not all of the assets are liquidated at once. While some hedge funds are more liquid than others (for example, statistical arbitrage strategies where a high number of positions are made and closed everyday can lend themselves to daily liquidity), the majority of hedge fund strategies cannot structurally provide short-term liquidity as positions are not meant to be unwound in the short term or follow the timing of the client. In addition, some strategies have built in leverage, which may imply significant liquidity constraints with regards to collateral or margin call requirements. 2008 was a difficult year for hedge funds as an unprecedented proportion of investors withdrew their assets for liquidity purposes. Gates and lock ups are currently being revised, with some structural amendments on gates for example, where priority gates are being avoided. Even though the liquidity of hedge funds is not high, it is the most liquid of alternative investments.

Given the high asset manager risk that investors take when investing in alternatives, the lack of transparency that alternatives offer compared to equities or fixed income, and that managers are investing in highly specialised areas, it is extremely important for the end investor to diversify their alternative investments and spread them over a number of years. This has repercussions on liquidity analysis, and investors should consider the possible consequences of capital calls, distributions, and spreading vintage years investments.

Investors should consider that if no investment is made in 2009 due to liquidity constraints, whether their allocation to alternatives will not reduce significantly in 2010-2011 as:

- distributions (which have slowed down significantly in 2008-9) begin again;
- a rebound in other asset classes reduces the investment loss experienced recently; and
- the lag in valuation of alternatives is reduced and the loss of 2008 is fully realised in alternatives' valuations.

Summary

While the anomalous events of 2008 are rare, we find that many investors are not prepared for these periods of non-normality. As many investors have an asymmetric view of risk (ie they are focused on losing less versus gaining more), it is important to consider the ways in which this priority can be incorporated into the strategic asset allocation of a portfolio. As many investors have experienced through recent economic events, a conventionally derived portfolio may have more downside risk than one which has been allocated through employing the concept of CVaR as a risk measure. By constructing a portfolio with the aid of CVaR, we can see that diversifying into alternatives still offers many benefits, even in difficult times, though there are important issues to be considered, namely surrounding liquidity of the portfolio.

This analysis has been adapted from “Non-normality of Market Returns: A New Framework for Asset Allocation Decision Making”, originally written and published in the US market. To access the original report, please download a copy from the following web address:

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