The allure of the outlier: A framework for considering alternative investments

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- Alternative investments represent investments that are not public equity, public fixed income, or cash. This includes both additional asset classes (real estate and commodities) as well as private instruments (hedge funds, private equity, and private real assets).

- Private investments, a major focus of this paper, are not separate asset classes but a form of active management that have, on average, underperformed public markets.

- The use of private investments is made more complex by their reduced liquidity and transparency, the difficulty of effective attribution, investors' weaker legal standing, the wide dispersion of managers' returns, and higher fees.

- Careful evaluation of fund managers is thus crucial in the use of private investments. This has implications for portfolio construction and suggests that, when institutional investors consider using private investments, the traditional top-down asset-class approach is best replaced by a rigorous bottom-up manager-selection process.

Note: The authors thank Karin Peterson LaBarge, Ph.D., CFP®, for her contributions.

Notes on risk: All investing is subject to risk, including the possible loss of the money you invest. Bond funds are subject to interest rate risk, which is the chance that bond prices overall will decline because of rising interest rates, and credit risk, which is the chance that a bond issuer will fail to pay interest and principal in a timely manner or that negative perceptions of the issuer's ability to make such payments will cause the price of that bond to decline. In a diversified portfolio, gains from some investments may help offset losses from others. However, diversification does not ensure a profit or protect against a loss. Past performance is no guarantee of future results

Investments in stocks issued by non-U.S. companies are subject to risks that include country/regional risk, which is the chance that political upheaval, financial troubles, or natural disasters will adversely affect the value of securities issued by companies in foreign countries or regions; and currency risk, which is the chance that the value of a foreign investment, measured in U.S. dollars, will decrease because of unfavorable changes in currency exchange rates. Stocks of companies based in emerging markets are subject to national and regional political and economic risks and to the the risk of currency fluctuations. These risks are especially high in emerging markets.

Contents

This paper is intended to provide total-return-oriented institutional investors with a framework both for understanding what alternative investments are and for strategically considering how to use them in a portfolio.[1] Specifically, we first discuss how to categorize alternative investments. We then analyze how different types of these investments have performed. We conclude by outlining how to approach the portfolio construction process when contemplating the use of private alternative investments.

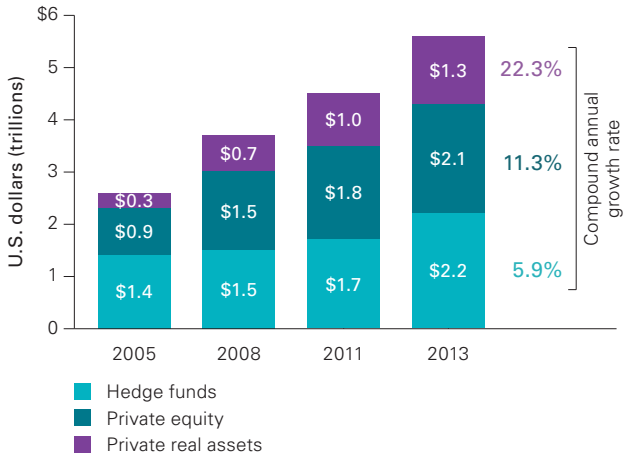
I. What are alternative investments?

Interest in alternatives

The beginning of the 21st century marked an inflection point in the way alternative investments were considered by many institutional investors. For the 20 years leading up to 2000, an indexed 60% U.S. stock/40% U.S. bond allocation returned a respectable 14.5% per year. Within a decade after the turn of the century, however, financial markets experienced two dramatic and lengthy bear markets (2000–2002 and 2007–2009). As a result, that same 60/40 portfolio allocation returned just 2.7% per year for the decade ended 2010.

These facts, coupled with the continued global low-yield environment, have led many investors to consider a broader range of portfolio solutions for the future. At the same time, the extraordinary investment results of widely recognized institutional endowments—such as those of Yale and Harvard universities in the United States—that have extensively used alternative investments encouraged a growing number of institutional investors to consider the potential portfolio benefits of these types of investments. **Figure 1** shows the resulting significant growth in alternative investment assets for the period 2005–2013.

Figure 1. Growth of key alternative investments has been strong: 2005–2013



Sources: Hedge-fund calculations—Based on data provided by BarclayHedge, Ltd. Private equity and private real assets calculations—Based on data provided by Preqin Ltd.

1 For U.S. institutional investors considering using alternative investments in a liability-driven investment strategy, see Bosse (2012).

Defining alternative investments

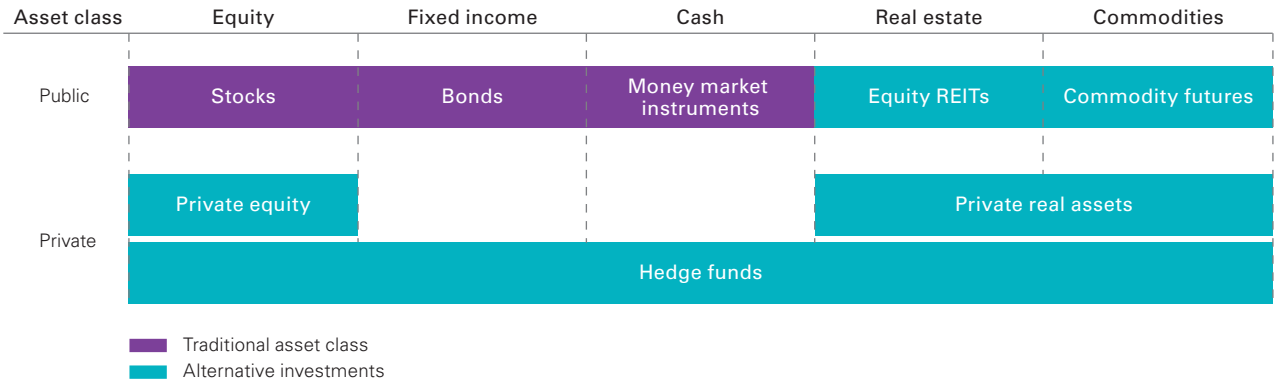
There is no universal industry definition of what constitutes an alternative investment. Generally, the term refers to securities or strategies that are not traditional investments—which inevitably leads to the question, "What is a traditional investment?" Many investors would agree that the term comprises at least three financial asset classes: public equity, public fixed income, and cash. Each of these asset classes trade in large, highly regulated public markets that provide investors with daily liquidity. Alternatives thus differ from traditional assets in one of two distinct ways: They are either a class of physical assets (i.e., real estate or commodities) or they are private investments (which purchase different forms of financial and/or physical assets).

As physical assets, real estate and commodities may require maintenance or storage to preserve their value. For this reason, physical—or real—assets, as they are also called, are more likely to be traded in several local markets, rather than in centralized exchanges, to account for their potentially different levels of investment quality and location. As we discuss later, it is difficult to obtain pure, broad-based investment exposure to physical assets, whereas public equity and fixed income can be effectively aggregated into market-capitalization-weighted indexes.

Private investments, the other type of alternative investment, comprise actively managed instruments that use the five major asset classes: equity, fixed income, cash, real estate, and commodities. Although some of these asset classes may be traditional and others alternative, all private investments are considered alternative investments.

Private investments fall into three major categories: hedge funds, private equity, and private real assets. (Note that each of these categories is discussed in more detail in Section II of this paper.) Private equity is an actively managed form of equity. Private real assets are most typically a form of real estate and/or commodities (e.g., direct purchase of office buildings, farmland, oil and gas reserves). Although hedge funds, for their part, are legal structures that can hold any variety of underlying investments, they typically use investments from one or more of the five major asset classes in pursuit of their strategy. As a result, private investments are not separate asset classes. **Figure 2** outlines the relationship between traditional asset classes, physical asset classes, and private investments.

Figure 2. Relationship of asset classes to alternative investments



Source: Vanguard.

Attributes complicating analysis of private alternatives

Private investments are a more complex form of active management. Indeed, there are six distinctive ways in which use of private investments in institutional investors' portfolios is *more complicated* than use of public investments: transparency, attribution, legal standing, liquidity, manager selection, and fees. We briefly summarize each of these challenges below:

- *Transparency.* Private investments typically lack clear transparency. Their limited disclosure requirements can make it difficult to know what investments their manager holds. Also, in cases where investors choose to use closed-end fund structures, the investors may be required to commit capital before any holdings are purchased by the manager.

- *Attribution.* Because of some managers' inconsistent data-collecting and reporting, as well as a tendency by some to change strategies over time, an accurate assessment of performance can be difficult. Specific challenges can include self-reporting of returns, backfilling of returns, survivorship, benchmarking, pricing, and time-period dependence (see **Appendix Figure A-1** for more details). In addition, rules on performance calculations and the valuing of holdings within private investments are not nearly as stringent as for public investments, complicating ongoing due diligence and leading to weakened confidence in reported results.[2]

- *Legal standing.* Partnership structures and overseas registrations can put investors in a weaker legal position. To the extent a partnership form of ownership is used to operate the private investment, the fund manager acts as the controlling general partner, whereas investors serve as limited partners. As their name suggests, limited partners have reduced legal rights and protections, which typically become most concerning when a difficult situation must be resolved through negotiation. The legal standing of investors can be further complicated if the investment vehicles are domiciled internationally, where laws and regulations may be different.[3] Also in some cases, the amount of legal documentation to review before investing is substantial and can be challenging to interpret.

- *Liquidity.* Private investments typically cannot be liquidated quickly. Private equity funds must be held to maturity, often ten years or more. Hedge funds are frequently structured with initial lockup periods, limited redemption opportunities, advance-notice deadlines, or gating provisions (see **Appendix Figure A-2** for more details). These structures can act to impede investors who have spending requirements or liability obligations or who regularly rebalance to maintain their target asset allocations. During times of crisis, liquidity can be further restricted, particularity given managers' degree of legal control, as just discussed.[4]

2 For instance, in late 2014, a report indicated that the U.S. Securities and Exchange Commission (SEC) was examining private equity firms' reporting of how they calculate average net returns for past funds (Source: Greg Roumeliotis, 2014, Exclusive: SEC probing private equity performance figures [Reuters article, October 29]; available at: http://www.reuters.com/article/2014/10/29/us-sec-privateequity-idUSKBN0II08K20141029).

3 For instance, foreign-domiciled (also referred to as "offshore") alternative investments are sometimes preferred by certain tax-exempt U.S. investors who may be subject to unrelated business taxable income (UBTI). This can happen if an investment vehicle is expected to generate income through debt financing (leverage)—examples include certain long/short hedge funds, leveraged buyouts, and opportunistic private real estate funds. If considering an offshore alternative investment, the investor must be comfortable with the laws and regulations in the jurisdiction where the fund is legally established.

4 For example, during the global financial crisis of 2007–2009, it was difficult, if not impossible, to obtain liquidity from private equity funds (whose managers have full discretion as to the timing of any cash distribution), and numerous hedge funds and private real estate funds delayed processing of redemption requests by investors (Aiken, Clifford, and Ellis, 2013a; Ang and Bollen, 2010). For instance, more than 30% of hedge-fund managers restricted investor liquidity during this period (Aiken et al., 2013a).

- *Manager selection.* Investable, private-investment-based indexes do not exist, so manager selection is crucial. Furthermore, as discussed in more detail in Section II of this paper, dispersion of returns among managers is very wide, making results of the selection process the key driver of performance.[5]

- *Fees.* The all-in costs of private investments are typically high, often more than twice those of comparable public active funds.[6] Higher fees require greater manager skill because of the higher hurdle imposed for success. Further complicating the situation is the asymmetry of private investment performance fees in which private managers share fund gains with investors but are often not penalized when there are fund losses.[7]

A note on taxes

For some portfolios managed by institutional investors, the tax implications of alternative investments may serve as an additional complicating factor and cost. Given the multiplicity of tax rules country by country, we do not address this complex issue in this paper. Investors considering alternative investments should ensure that they understand both the tax impacts (if any) to their portfolios and the resources they would need to devote each year to determining and reporting them.

5 See **Appendix Figure A-3** for a sample of the factors involved in evaluating a hedge-fund manager.

6 At the end of 2013, the average actively managed public mutual fund expense ratio was 1.15% (based on data from Morningstar, Inc., as of December 31, 2013), and average Vanguard active mutual fund costs were 0.28%. These costs contrasted with an average hedge-fund management fee of 1.50% and an average performance fee (also known as carried interest) of 18% of profits above pre-specified return levels (according to Hedge Fund Research, as of December 31, 2013); as well as an average private equity fund management fee of 1.94% and an average performance fee of 20% (according to Robinson and Sensoy, 2013). It's important to note that these fees do not take into account the costs of conducting manager searches or of the ongoing oversight process.

7 This contrasts with traditional active mutual fund managers, who are required by the SEC to have a symmetrical performance fee structure if they charge a performance-based fee. As a result, these public equity and fixed income managers are rewarded for outperformance and are also penalized for underperformance. There is ongoing industry debate over whether the asymmetrical incentive structure creates an agency risk between the private investment manager and the end investor. For a more detailed discussion of the fees of private equity and hedge funds, respectively, see Shanahan, Marshall, and Shtekhman (2010) and Bhardwaj (2010a).

II. How have private alternative investments performed?

Hedge funds

Hedge funds are not a separate asset class; that is, they do not share unique structural characteristics (e.g., bonds represent a loan to a company or government agency, and equity represents ownership in a corporation). Instead, hedge funds are lightly regulated legal structures with more relaxed implementation guidelines (allowing their managers more flexibility) and can comprise any combination of underlying investment strategies or assets (e.g., stocks, bonds, commodities). In general, they are designed to deliver positive results independent of public equity and fixed income market returns. The broad nature of hedge funds and their limited governmental regulation have resulted in a proliferation (that is, thousands) of hedge funds with little consistency among and sometimes within subgroupings.[8] Indeed, the Lipper TASS (Trading Advisor Selection System) database alone represented more than 10,600 individual hedge funds as of December 31, 2014.

Returns

Level of returns. Hedge-fund returns have weakened over time and, on average, have underperformed the public markets. Earlier academic work on hedge funds (which have existed for several decades) began to be published in the late 1990s, when average hedge-fund assets under management were modest and the track record was short. Much of this research concluded that hedge funds benefited investors (e.g., Fung and Hsieh, 1997; Ackermann, McEnally, and Ravenscraft, 1999; Brown, Goetzmann, and Ibbotson, 1999; Bailey, Li, and Zhang, 2004; and Kosowski, Naik, and Teo, 2007).

Caution: Can public investment performance be accurately compared with private investment performance?

Measuring public and private investment results is not an apples-to-apples comparison, because of several data challenges including self-reporting, backfilling, and survivorship. In each instance, private data, although subject to some regulation, often lack the same level of precision and reporting standards that public investments are required by regulation to provide to investors (see Appendix Figure A-1 for a description of some of these issues). For the purposes of this paper's analysis, however, we have taken the private investment data at face value. This approach may overstate the historical returns and diversification benefits of private investments (see **Appendix Figure A-4** for a summary of recent studies that have tried to quantify one of the potential data biases).

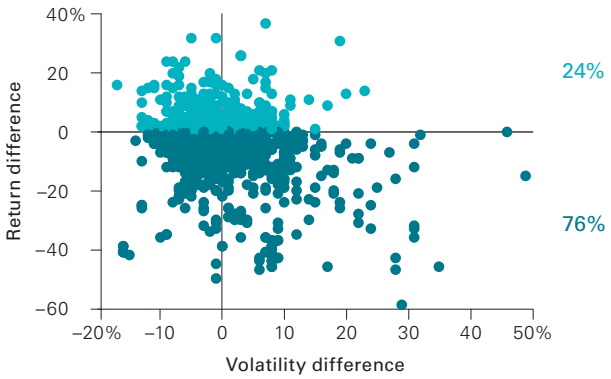
However, this work predated two important factors—the massive growth of the hedge-fund industry and the 2007–2009 global financial crisis. The size of the hedge-fund market increased more than tenfold between 1990 and 2013, from less than $200 billion in assets under management to more than $2 trillion. To the extent hedge funds attempt to add value by taking advantage of perceived market inefficiencies through skill-based strategies, one might expect the opportunity to achieve successful performance could be more challenging in the future, given the industry's substantial growth.

8 See **Appendix Figure A-5** for brief descriptions of the major hedge-fund categories.

The 2007–2009 global financial crisis saw dramatic reductions in both investment liquidity and global economic activity. Recent hedge-fund results accounting for both of these factors show that between January 1, 2000, and October 31, 2013 (even without correcting for backfill bias), the vast majority of funds-of-hedge funds—more than 75%—underperformed a traditional balanced 60% stock/40% bond portfolio benchmark (that is, a "traditional portfolio"), as illustrated in Figure 3.[9] Our analysis found that the probability of a fund-of-hedge funds beating a traditional portfolio was about the same as that of long-only, active public mutual funds—only one out of four such funds has outperformed (Philips et al., 2015).

Attribution of returns. One of the many challenges with hedge-fund evaluation is that of deconstructing how the funds' returns are truly generated. Weak data and lack of full transparency hamper efforts; however, one recent development may be improving results. Concurrent with the growth of the hedge-fund industry has been the advent of *factor investing*, which might aid in the analysis of hedge funds.[10] In particular, what was once often considered an "alpha" strategy (that is, attempting to generate return exceeding that of the benchmark on a risk-adjusted basis through pure skill in security selection and/or market timing) is increasingly being assessed as simply harvesting different return streams via investments in, for instance, value, small-cap, carry strategies, and merger arbitrage through replicable, rules-based techniques.[11]

Figure 3. Most funds-of-hedge funds have underperformed a traditional portfolio: January 1, 2000, through October 31, 2013



Notes: Performance period: January 1, 2000, through October 31, 2013. Fund-of-funds dataset retrieved from Lipper TASS database; total sample size, 2,248 funds. To be included in the sample, a hedge fund had to have at least 36 months of history. All funds-of-hedge funds were compared with a 60% stock/40% bond balanced portfolio during their existence. As plotted on the y-axis, return difference is arithmetic difference between the two geometric annual returns (fund-of-hedge funds minus 60/40 portfolio) and the same for volatility difference (fund-of-hedge funds' annual volatility minus 60/40 annual volatility). The 60%/40% balanced portfolio excludes cost. Equity component is proportioned 70% U.S. stocks and 30% international stocks, as follows: U.S. equity represented by Spliced Total Equity Market Index (Dow Jones U.S. Total Stock Market Index—formerly known as Dow Jones Wilshire 5000 Index—through April 22, 2005; MSCI US Broad Market Index through June 2, 2013; and CRSP US Total Market Index through October 31, 2013). International equity represented by Spliced Total International Equity Index (Total International Composite Index through August 31, 2006; MSCI EAFE and Emerging Markets Index through December 15, 2010; MSCI ACWI ex USA IMI Index through June 2, 2013; and FTSE Global All Cap ex US Index through October 31, 2013). Fixed income represented by Barclays U.S. Aggregate Bond Index.

Sources: Vanguard, based on data from Lipper TASS.

9 We chose funds-of-hedge funds, because these are professional managers who are paid to construct a high-quality collection of hedge funds for clients. This objective is similar to what numerous institutional investors would be attempting to do for their own portfolio. We also analyzed individual hedge funds over the same period using the same database and found that 56% outperformed a traditional portfolio. However, given that this percentage does not account for some of the data biases that affect hedge-fund performance evaluation (see Appendix Figure A-1 for examples), the true percentage is likely below 50%. Also, we acknowledge that it is more appropriate to measure individual hedge funds against different benchmarks, given the diversity of objectives, strategies, and risk exposures among funds. However, analyzing all of the various types against other benchmarks is beyond the scope of this paper. For more information on that topic, see Bhardwaj (2010a) and Philips (2006).

10 Some academics and practitioners refer to a portion of these factors using other terms such as: exotic beta, hedge-fund beta, and alternative risk premia. A detailed explanation of the difference is beyond the scope of this paper.

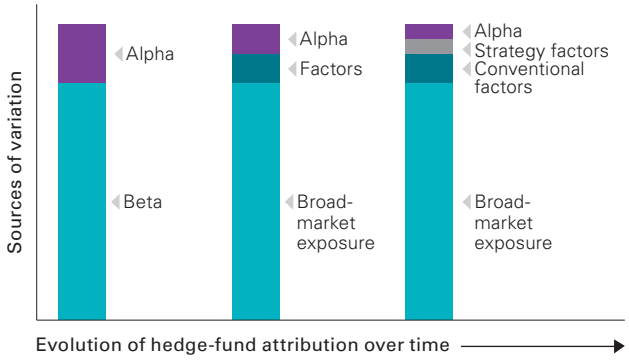
11 Value and small-cap factors are discussed in recent Vanguard research (Pappas and Dickson, 2015). Although carry strategies vary widely, a well-known one attempts to capture local interest rate differentials and expected currency movements across countries. Merger arbitrage is a strategy that seeks to profit from investing in equity securities of companies to capitalize on price discrepancies generated by mergers and acquisitions.

Figure 4 illustrates the potential shift in attribution of hedge-fund returns. It's important to note that effectively capturing certain factor exposures can require leverage, derivatives, and/or short-selling, particularly if one is trying to generate return streams that are independent of traditional asset classes (such as stocks and bonds). One potential implication of this shift could be the ability of investors to obtain exposure to an increasing number of hedge fund strategies through less expensive and more public avenues (Asness, 2004; Hsieh, 2006; Jensen, Yechiely, and Rotenberg, 2006; Siegel, 2009; Ang, 2013a; Carhart et al., 2014; and Anson, 2015).

Although factor attribution and its implications have been gaining popularity, debate continues around the future magnitude of return and performance persistence of various investing factors (Jetley and Ji, 2010; Baker, Bradley, and Wurgler, 2011; Fama and French, 2012; and Asness, Moskowitz, and Pedersen, 2013). Others have suggested that it may be possible to replicate certain hedge fund performance using a combination of liquid, publicly traded investments (Hasanhodzic and Lo, 2007; Israel and Maloney, 2014). Also, some hedge funds have displayed a negative skew in their historical return patterns, meaning they have tended to have steeper losses than gains relative to their average outcome. This downside risk suggests that the volatility of these funds disproportionately penalizes investors during poor markets.[12] These potential asymmetrical return patterns reinforce the need to supplement traditional analytical techniques to measure return, risk, and attribution with other types of analysis.

Dispersion of manager returns. The dispersion of returns among private alternative investment managers has been extremely wide, making portfolio construction decisions challenging. The media commonly praises the extraordinary success of top-performing alternative funds, and some investors may interpret the large gains of individual managers as a signal of alternatives' overall value. Such an interpretation, however, is an over-simplification of the results. It's crucial not to confuse the cross-sectional dispersion of returns (the difference between the best- and worst-performing managers) with the probability of selecting a winning fund—there is no relationship between the two concepts. Greater dispersion among managers is simply a sign of the higher degree of active manager risk—and does not indicate that choosing better-performing managers will be an easier task. Rather, investors must be prepared for a wider array of possible results relative to the average peer (that is, higher implementation risk) and nothing more. In these circumstances, investors should look beyond the positive outlier results to assess the investment category at large.

Figure 4. Factors may help attribute hedge-fund returns



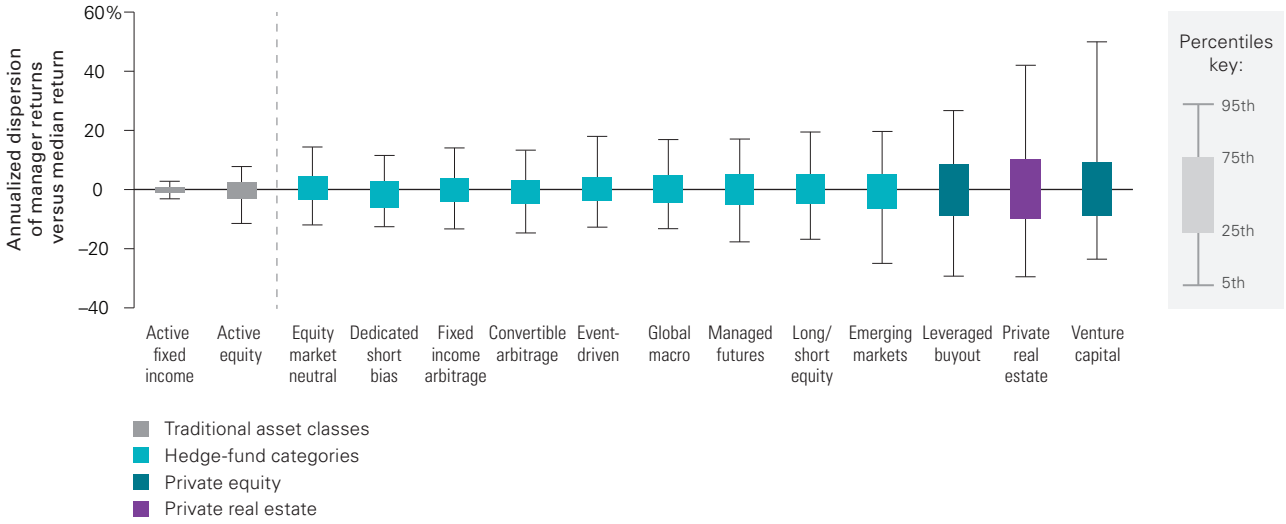
Notes: Results are hypothetical in nature and do not represent an actual hedge-fund investment. "Alpha" represents unique, skill-driven return streams resulting from selection and timing decisions. "Conventional factors" represent exposure to different return streams driven by the performance of subgroups of investments within asset classes (e.g., value, small-cap, credit). "Strategy factors" represent exposure to different return streams that result from the systematic, rules-based implementation of certain well-known strategies (e.g., merger arbitrage, carry trade). "Broad-market exposure" represents asset-class-level return streams (e.g., equity, fixed income). With reference to the terms *conventional factors* and *strategy factors*, see also footnotes 10 and 11, on page 9.

Source: Vanguard.

12 Hedge-fund volatility and risk are covered in detail in Philips (2006).

The ability to succeed using active managers within any category of investments depends on the skill of investors to not only select superior managers at a reasonable cost but to be willing and able to remain patient with those managers. To lend perspective to this concept, **Figure 5** illustrates the return-dispersion ranges for public fixed income, public equity funds, hedge funds, private real estate funds, and private equity funds. The figure shows that the range between the 25th and 75th percentiles of annualized active manager performance (the boxes in the figure) for active public fixed income and active public equity funds was 2% and 6% per year, respectively—noticeably narrower than those of the various hedge-fund categories, which ranged from 8% to 12% per year; private equity, which ranged from 17% to 18% per year; and private real estate, which was 20% per year. The wider the range, the more important manager selection becomes. In other words, all else equal, weak (or unlucky) active manager results in private investments can have a much more severe impact on portfolio-level performance. In summation, an investor in private alternative investments must be comfortable with a much wider range of possible outcomes, thus signifying the critical nature of manager selection, especially since an investable index proxy does not exist for private investment categories.

Figure 5. Manager dispersion with private alternative investments is significantly higher than with traditional asset classes

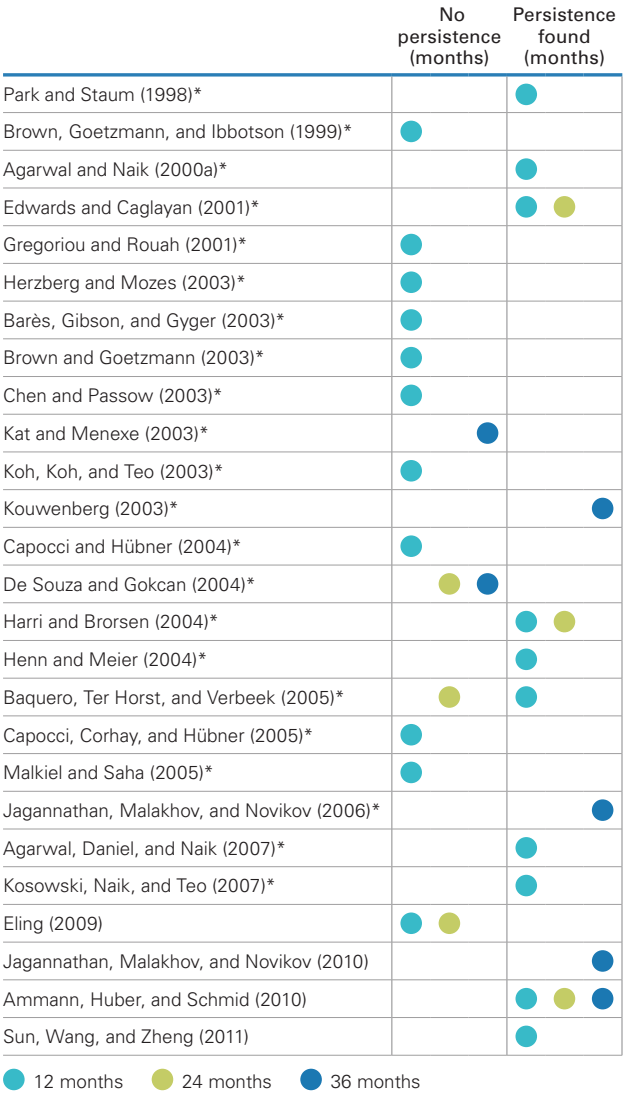


Notes: Public U.S. active fixed income and active equity distributions were based on data provided by Morningstar, Inc., for mutual funds domiciled in the United States from January 1, 1994, through July 31, 2014. Equity-market neutral, dedicated short bias, fixed income arbitrage, convertible arbitrage, event-driven, global macro, managed futures, long/short equity, and emerging markets' distributions were based on data provided by Lipper TASS, for hedge funds in existence from January 1, 1994, through July 31, 2014. All funds are U.S.-dollar-denominated, adjusting for survivorship bias in each category. Leveraged buyout, real estate, and venture capital distributions based on data provided by Preqin. Each distribution was based on an IRR (internal rate of return) calculation from a series of annual cash flows from each fund. For private equity funds that had not yet distributed 100% of the fund's capital back to the limited partners, IRR calculations were based on an ending NAV value. Each distribution has been adjusted so that the median resides at point zero, to isolate the dispersion.

Sources: Vanguard calculations, using data from Morningstar, Inc., Lipper TASS, and Preqin.

Persistence of manager returns. An investor may not worry about high active manager risk if he or she can find and access hedge-fund managers who regularly achieve strong results. However, the evidence for performance persistence among hedge funds is not clear. Despite extensive academic research on the topic, the collective results are inconclusive. See **Figure 6** for a list of results from 26 academic studies on the topic that have been conducted since 1998. Thirteen of the studies found no evidence of persistence, 12 studies found some persistence, and 1 study found persistence over a one-year time horizon but no persistence over a 2-year horizon. According to Eling (2009), the drivers of these varied results included differences in the performance-persistence calculation methodologies and databases used to conduct the analyses. Therefore, as our analysis confirms, it is difficult to confidently identify whether performance persistence exists among hedge funds overall; this concern is further confounded by the significant data challenges mentioned earlier in this paper.

Figure 6. Evidence of hedge-fund performance persistence is mixed



Notes: This chart represents results from 26 studies on hedge-fund persistence. Circles indicate time horizon over which persistence was or was not found. An asterisk (*) indicates study cited in Eling (2009); studies without asterisks are cited in References to this paper, beginning on page 23. We chose to focus on studies that analyzed hedge-fund persistence over at least a one-year horizon. As Eling (2009) noted and as described in the provisions in Appendix Figure A-2, it may not be possible to profit from persistence over a shorter time period.

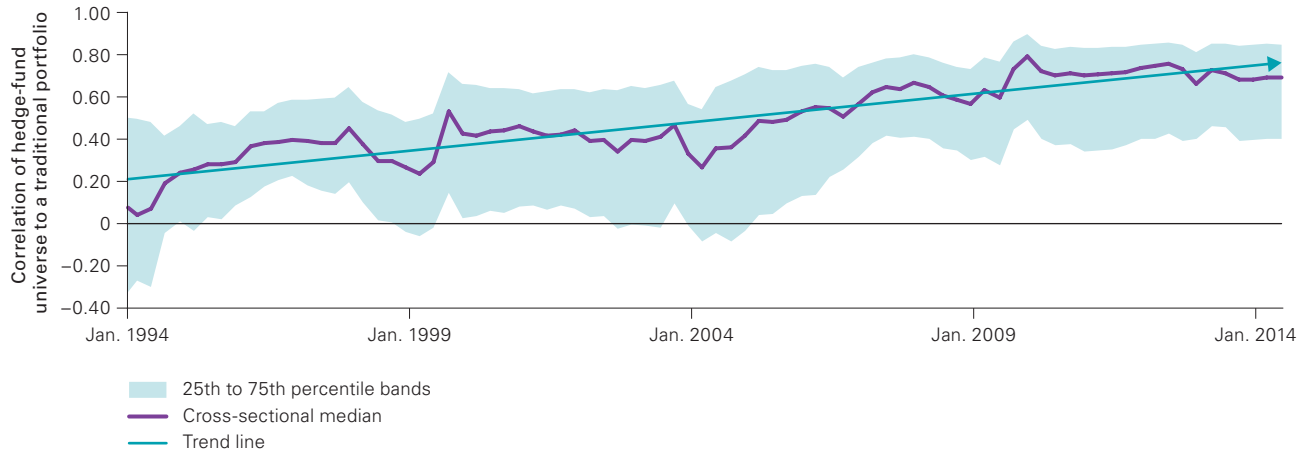
Sources: Chart adapted, by permission of John Wiley & Sons, Inc., publisher; from Martin Eling, 2009, Does Hedge Fund Performance Persist? Overview and New Empirical Evidence. *European Financial Management* 15(2): 362–401. Copyright © 2015 John Wiley & Sons, Inc. All rights reserved. This permission does not include the right to grant others permission to photocopy or otherwise reproduce this material, except for accessible sessions made by nonprofit organizations serving the blind, visually impaired, and other persons with print disabilities (VIPs).

Other data sources for chart are: Jagannathan et al. (2010), Ammann et al. (2010), and Sun et al. (2011).

Diversification

Hedge-fund correlation versus a traditional portfolio has increased significantly over the last two decades, as shown in **Figure 7**. The chart illustrates two important points. First, the diversification benefit of hedge funds versus a traditional portfolio has, on average, weakened significantly over time. Indeed, we found that in the three years from May 1, 2012, through June 30, 2014, the median hedge-fund correlation rose to 0.70. Second, there was a wide variation in correlations across the hedge-fund universe, given the variety of strategies that the funds use.

Figure 7. Diversification benefit of hedge funds has declined significantly over 20-plus years through June 30, 2014



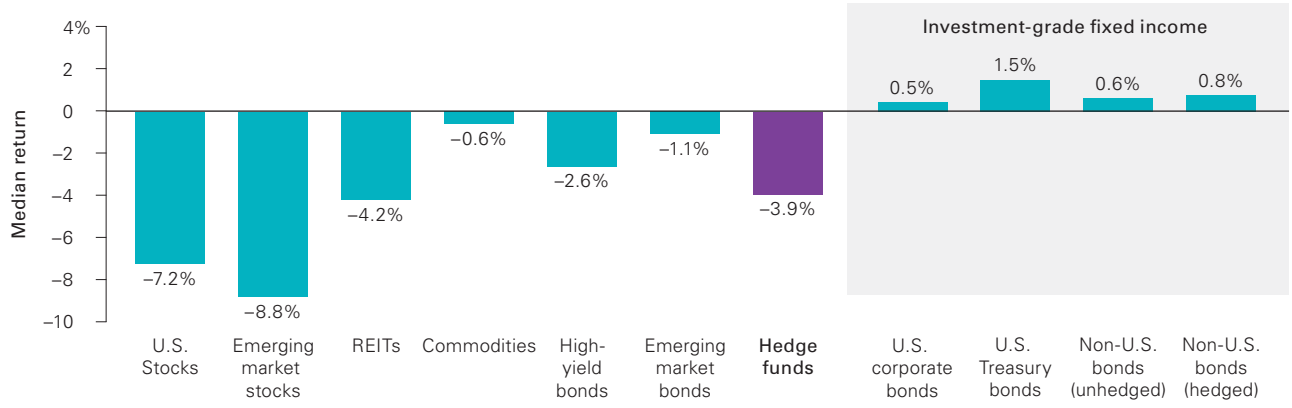
Notes: All hedge-fund categories in the Lipper TASS database were considered for this analysis. To be included in the sample of 5,460 hedge funds, each fund had to have at least 60 months (20 quarters) of continuous history. All funds were compared to a 60% stocks/40% bonds balanced portfolio. The 60%/40% balanced portfolio excludes cost. Stocks were apportioned 70% domestic stocks/30% international stocks, as follows: Domestic equity represented by Spliced Total Equity Market Index (Dow Jones U.S. Total Stock Market Index —formerly known as Dow Jones Wilshire 5000 Index—through April 22, 2005; MSCI US Broad Market Index through June 2, 2013; and CRSP US Total Market Index through June 30, 2014). International equity represented by Spliced Total International Equity Index (Total International Composite Index through August 31, 2006; MSCI EAFE and Emerging Markets Index through December 15, 2010; MSCI ACWI ex USA IMI Index through June 2, 2013; and FTSE Global All Cap ex US Index through June 30, 2014). Fixed income represented by Barclays U.S. Aggregate Bond Index. Purple line shows median rolling correlation against all funds that existed in each time period, and blue shading is the 25th to 75th interquartile range. Each cross-section represents a distribution of correlations across all funds in existence for that period. The analysis spans January 1, 1994, through June 30, 2014, using a rolling 12-quarter period for each fund. Trend line is based on ordinary least squares (OLS) regression of cross-sectional medians.

Sources: Vanguard calculations, using data from Lipper TASS.

These results were similar to those of a separate analysis of funds-of-hedge funds we conducted using data from January 1, 2000, through October 31, 2013.[13] That analysis found that more than 70% of funds-of-hedge funds had a positive correlation of 0.50 or higher, meaning that most such funds have moved in the same direction as a traditional portfolio for much of the time. In the same analysis, we also found that more funds-of-hedge funds had a positive correlation to the traditional portfolio than had a zero or negative correlation: 24% had a low, positive correlation (between zero and +0.50), while only 5% had a zero or negative correlation.[14] In general, funds-of-hedge funds cannot be counted on to provide the same level of portfolio protection as investment-grade fixed income funds during severe equity market downturns (as depicted in **Figure 8**). The figure shows how different investment categories performed during the most significant equity downturns for a recent 26-year period. This may have implications for investors considering replacing their investment-grade fixed income exposure with an allocation to hedge funds.

Figure 8. Hedge funds do not provide the same average protection as investment-grade fixed income when equities fall significantly

Median return of various asset categories during worst decile of monthly U.S. equity returns, 1988–2014



Notes: U.S. stocks represented by Dow Jones Wilshire 5000 Index from 1988 through April 22, 2005, and MSCI US Broad Market Index thereafter. U.S. corporate bonds represented by Barclays U.S. Corporate Investment Grade Bond Index. U.S. Treasury bonds represented by Barclays U.S. Treasury Bond Index. International bonds represented by Citigroup World Government Bond Ex-U.S. Index from 1988 through January 1989 and Barclays Global Aggregate ex-USD Bond Index thereafter. Emerging-market stocks represented by FTSE Emerging Index and emerging-market bonds by Barclays Emerging Markets Tradable USD Sovereign Bond Index. Equity REITs represented by FTSE NAREIT Equity REIT Index. Dividend stocks represented by Dow Jones U.S. Select Dividend Total Return Index. Commodities represented by S&P GSCI Commodity Index. High-yield bonds represented by Barclays U.S. Corporate High Yield Index. Hedge funds represented by median hedge fund-of-funds return as identified by Morningstar, Inc.

Source: Vanguard calculations.

13 The analysis covered the period January 1, 2000, through October 31, 2013. To be included in the sample, a fund-of-hedge funds had to have at least 36 months of history. All such funds were compared to a 60% stocks/40% bonds balanced portfolio. Stocks were apportioned 70% to domestic equity and 30% to international equity, as follows: Domestic equity represented by Spliced Total Equity Market Index (Dow Jones U.S. Total Stock Market Index—formerly known as Dow Jones Wilshire 5000 Index— through April 22, 2005; MSCI US Broad Market Index through June 2, 2013; and CRSP US Total Market Index through October 31, 2013). International equity represented by Spliced Total International Equity Index (Total International Composite Index through August 31, 2006; MSCI EAFE and Emerging Markets Index through December 15, 2010; MSCI ACWI ex USA IMI Index through June 2, 2013; and FTSE Global All Cap ex-US Index through October 31, 2013). Fixed income represented by Barclays U.S. Aggregate Bond Index.

14 Correlation is a critical metric that can provide useful information in the portfolio construction process. Nevertheless, it's important for investors to understand that correlation is a property of random variables, and so does not describe a fixed relationship between variables: Assets with low and unchanging correlation can and do move in the same direction from time to time. Correlation also does not capture the magnitude of returns in a certain direction; rather, it only assesses directionality. In addition, correlations between investments can and do change over time or in particular circumstances. Future correlations may differ from those in the past because of changing economic and market regimes. Investors should take these factors into consideration when using correlation as a key input for constructing investment portfolios, not relying solely on statistical measures, but mixing in common sense and qualitative judgment as well. For more information on this topic, see Philips, Walker, and Kinniry (2012).

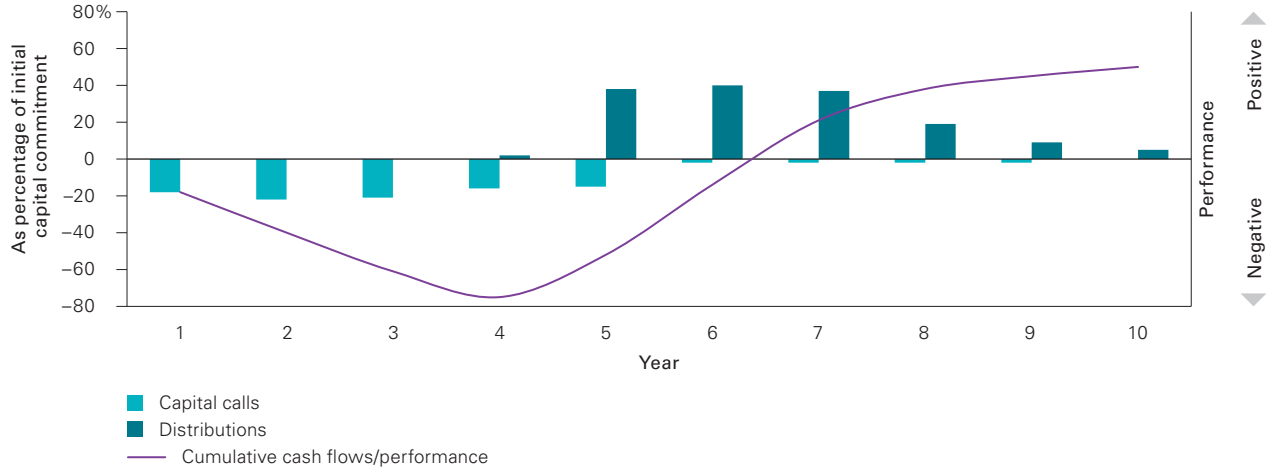
Private equity

Private equity, by definition, refers to equity that is sold in a privately negotiated transaction and is thus not traded on a public stock exchange. Private equity investors provide capital to companies when it is not possible or desirable to access the public markets or when there are opportunities to purchase public enterprises that are seen as undervalued or poorly managed. Private equity firms establish funds that raise money and deploy it on behalf of their investors in companies that they believe can achieve profitable growth and generate outsized returns. Limited partnerships are typically used to fund the four major categories of private equity: venture capital (VC) funds, leveraged buyout (LBO) funds, mezzanine funds, and distressed securities funds (each fund type is described in **Appendix Figure A-6**). Although VC often comes first to mind in terms of private equity, LBO investing actually represented the vast majority (65%) of private equity assets under management as of December 31, 2013; VC represented only 20% as of year-end 2013.[15]

Most private equity funds require investors to commit capital for a ten-year period or longer, with the timing and magnitude of contractually required cash contributions (referred to as "capital calls") and fund distributions unspecified in advance. The penalties for abandoning or refusing a capital call are severe, and can include forfeiting the entire equity interest in the fund (McKinsey Global Institute, 2009). The secondary market for private equity is extremely limited, often requiring the seller to accept a steep discount.[16]

Owing to the typically closed-end structure of private equity funds, their performance usually starts out negatively before (hopefully) turning positive. The shape of returns is thus referred to as a "J curve effect." **Figure 9** hypothetically depicts the cumulative effect of this pattern. Since the sale of holdings and cash distributions is skewed to the back-end of a fund's life, proper fund evaluation cannot occur until a sizable percentage of the limited partners' capital has been returned. Given this pattern of returns and frequent concentration of holdings, it often takes years for an investor to construct a diversified, high-quality private-equity fund lineup (typically called a "program") by type, manager, industry, and fund inception year ("vintage") (Siegel, 2008) and to smooth out this J curve effect.

Figure 9. Hypothetical life cycle of a private equity fund



Notes: Results are hypothetical and do not represent actual cash flows or returns. Actual timing and size of cash flows and returns vary greatly from fund to fund and can be influenced by the market environment that exists during the fund's tenure.

Source: Vanguard.

15 Sources: Vanguard calculations, using data from Preqin.

16 A high-profile example of this issue was illustrated in 2008 when Harvard University's endowment attempted to sell some of its $1.5 billion private equity program. Because of the lack of liquidity, the endowment instead chose to raise capital by issuing bonds (Ang, 2013b).

Assessing the impact of these nonlinear cash flows can be challenging. Some investors respond by building highly sophisticated cash-flow models that can stress-test liquidity in case of poor market environments and help in developing contingency plans for potentially adverse circumstances.[17] Given the uncertain cash-flow timing of private equity, some investors also use derivatives to conduct rebalancing or to help meet short-term liability requirements at the lowest reasonable cost, with the understanding that synthetic approaches to change private equity exposure are unlikely to match private equity fund performance precisely.

Returns

The average private equity fund has not outperformed the public markets. At the same time, however, the dispersion of returns among private equity managers has been enormous. Much of the academic literature on private equity has reported that it has underperformed the public equity market (e.g., Moskowitz and Vissing-Jorgensen, 2002; Kaplan and Schoar, 2005; Cochrane, 2005; Conroy and Harris, 2007; Phalippou and Gottschalg, 2009). Vanguard's analysis of private equity returns (Shanahan, Marshall, and Shtekhman, 2010) found that only 30% of the private equity managers in the study analysis outperformed the public markets.

Many believe that private equity funds should earn a return premium over public equity to compensate investors for liquidity risk (often referred to as the "liquidity risk premium") and in some cases operational or financial leverage risk inherent in the funds' structure (Franzoni, Nowak, and Phalippou, 2012). However, little empirical research has attempted to isolate and quantify these premia (Anson, 2010). The exact size of the liquidity risk premium remains a subject of debate, with recent studies placing the range between 2.0% and 3.0% per annum over public equity returns (Franzoni, Nowak, and Phalippou, 2012; Sorensen, Wang, and Yang, 2014).

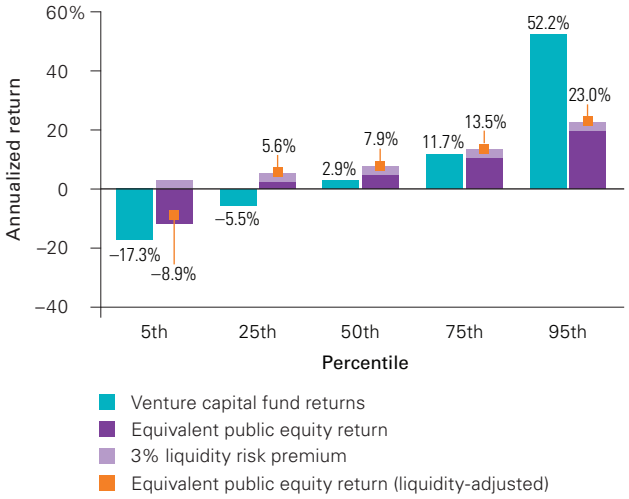
We also considered this issue and compared private equity results with public market returns for the period 1980–2012, using a 3.0% liquidity risk premium estimate. The results, in **Figure 10**, revealed two distinct findings. First, the median VC fund (shown in Figure 10a), adjusted for the liquidity risk premium, underperformed public equity by a substantial margin (2.9% versus 7.9% per year). The median LBO fund result (Figure 10b) was comparable to that of public equity (8.7% versus 8.6%).[18] What this comparison does not take into account is an adjustment for experienced volatility, which is difficult to measure, given quarter-to-quarter pricing challenges of private equity and the fact that investors have the option of holding public equity without taking on active manager risk. According to Driessen, Lin, and Phalippou (2012), the average market beta for a VC fund is 2.7 and for an LBO fund is 1.3. This implies that VC funds are about 2½ times more volatile (if marked to market) and that the LBO funds are about 30% more volatile than the broad public equity market. To the extent investors care about risk-adjusted results, private equity looks less attractive.

17 See Takahashi and Alexander (2002), Malherbe (2005), and Buchner, Kaserer, and Wagner (2010), for further discussion on the complex nature of managing private investment cash flows.

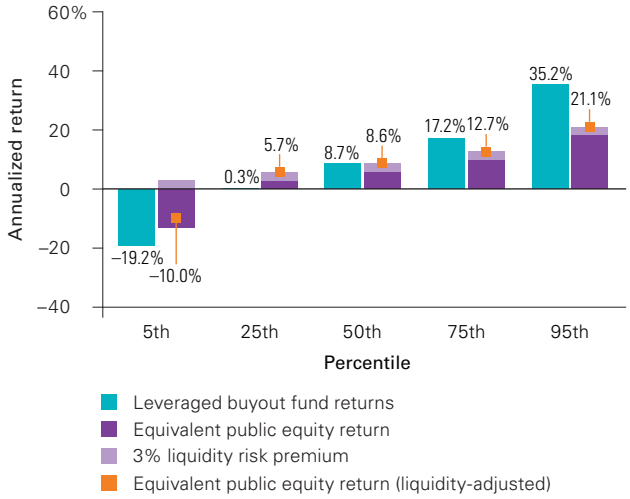
18 Some investors consider small-cap public equity a better benchmark for private equity than the broad public equity market (Ang, Ayala, and Goetzmann, 2013). When we compared the median annualized performance of VC funds and LBO fund's with the Russell 2000 Index, however, including the same 3.0% liquidity risk premium estimate, both fund types underperformed the Russell index by a sizable amount—2.9% versus 9.7%, and 8.7% versus 10.3%, respectively.

Figure 10. Private equity results are highly dependent on quality of manager-selection decisions: January 1, 1980, through December 31, 2012

a. Venture capital



b. Leveraged buyouts



Notes: Performance results are for January 1, 1980, through December 31, 2012. Total sample size excluding funds with only one cash flow observation was 2,177. Annualized total return from January 1, 1980, through December 31, 2012, as represented by Dow Jones U.S. Total Equity Market Index (formerly known as the Dow Jones Wilshire 5000 Index) through April 22, 2005; MSCI US Broad Market Index through December 31, 2012. Private equity returns are calculated using a standard IRR (internal rate of return), a dollar-weighted return approach based on aggregated annual cash flows for each private equity fund. The public-market-equivalent (PME+) figures are based on an approach that calculates the hypothetical dollar-weighted return that would have been achieved by investing in a public equity index when the private equity fund makes a capital call and selling a public equity index when capital is distributed back to the investor (Rouvinez, 2003; Ellis, Pattni, and Tailor, 2012).

Sources: Vanguard calculations, based on data from Preqin.

The second significant takeaway from Figure 10a and 10b is the wide dispersion of returns among private equity funds. Although the median results for both LBO and VC are not compelling, the most successful private equity fund manager's outlier results at the 95th percentile were outstanding. The significant return dispersion shown in the figure reinforces the need for effective manager selection to avoid harming the portfolio with private equity (this point was also illustrated in Figure 5).

Persistence of returns. A recent study by Harris et al. (2014) of more than 1,400 venture capital and leveraged buyout funds found that most private equity managers have not demonstrated positive persistence. The study, covering more than 25 years, found persistence in VC firms but little among LBO firms, particularly since 2000. Given that LBO funds constitute about two-thirds of the private equity market, most investors would not have experienced persistence in this alternative investment category.[19] These findings are illustrated in **Figure 11**. Within VC, fund managers with a previous fund in the top quartile landed their next fund in the top quartile about half the time and above the median about two-thirds of the time.[20] If results were purely random, then a top-quartile private equity manager from a prior fund would be expected to have equal odds of finishing in any quartile (100%/4 quartiles = 25% probability) with a successive fund.

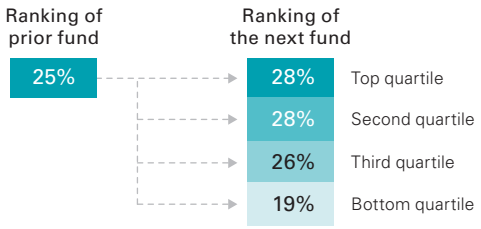
Diversification

Private equity is a different form of active equity investing and not a reliable way to diversify public equity holdings, which not only involve equity ownership of corporations but share many of the same systematic and economic risks. In addition, public equity market trends highly influence the valuations of firms that private equity funds both acquire and sell via private transaction or initial public offering (IPO) (Shanahan, Marshall, and Shtekhman, 2010).

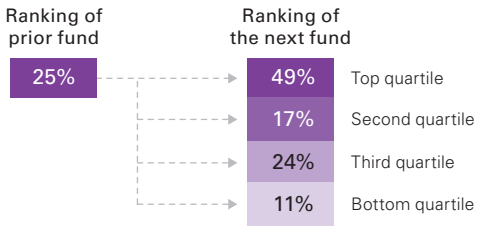
Given this relationship, it is perhaps not surprising that we found a high correlation between public and private equity (see the blue line in **Figure 12**). These results do not control for the use of appraisals (estimates of fair market value) by private equity funds. If we make an adjustment by lagging private equity returns by two quarters as a simplified approach to account for potentially stale appraisal prices, then the results are even more consistent (see the purple line in Figure 12).[21]

Figure 11. The conventional wisdom of strong private equity fund persistence is no longer the reality

a. Leveraged buyout funds



b. Venture capital funds



Notes: This figure shows the relationship between the performance (measured by the public market equivalent, or PME) of successive private equity funds, according to their performance quartile using data from Burgiss. The output is based on the analysis of private equity cash-flow data from 1984 through 2011, including funds with fund inception years through 2008. Numbers may not add to 100% due to rounding. Harris et al. (2014) indicated that these results were similar when using Preqin data as well.

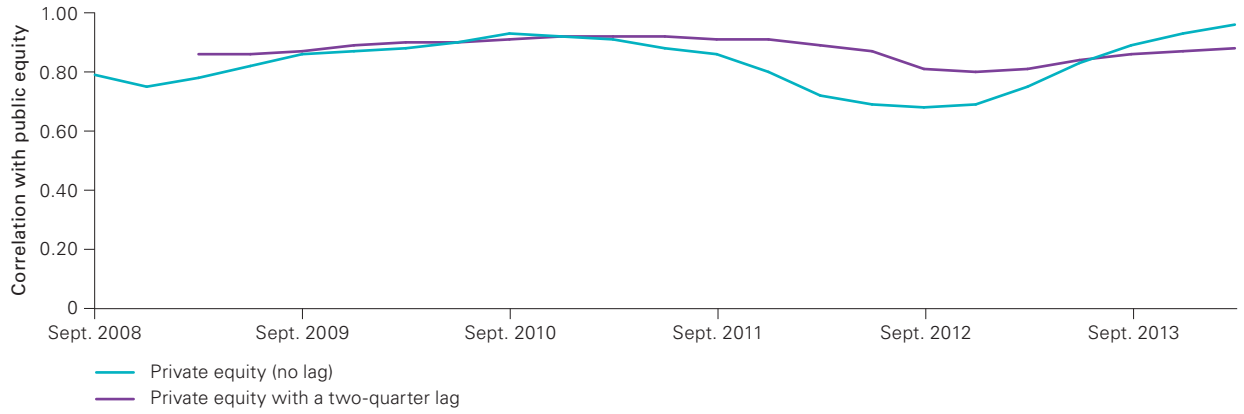
Source: Chart adapted, by permission, from Harris et al. (2014).

19 A study conducted by Korteweg and Sorensen (2014) concluded that "investors need a substantial amount of information that goes beyond just the performance of past funds."

20 However, as displayed in Figure 10, the performance of the median private equity fund has not been particularly attractive. The persistence found with VC funds is complicated by the challenge of having access, given that this category of private equity can handle only a limited amount of assets. According to Swensen (2009), "The highest quality, top-tier venture firms generally refuse to accept new investors and ration capacity even among existing providers of funds."

21 As Swensen (2009) pointed out, "the private company gains spurious diversifying characteristics based solely on lack of co-movement with the more frequently valued public company." For more details on the general private equity lag concept, see Anson (2007) or Woodward (2009). According to Welch (2014), "under the prior 'best practice' accounting for fund fair value, private equity firms reported typically at (or close to) cost unless there was a 'milestone event' (e.g., liquidity events, including new rounds of financing or an asset sale) with typically no write-down unless a bankruptcy or down round of equity financing occurred. Although this seems closer to historical cost accounting than to fair value accounting, the prior accounting best practice was reported as fair value to investors." This lagged effect may dissipate to some extent, given the passage of the Statement of Accounting Standards 157 (FAS 157), also known in the United States as ASC 820 in the updated Financial Accounting Standard Board's codification, and the passage of the International Accounting Standard 39 (IAS 39), both of which require private equity firms to value their assets at fair value every quarter. These rules may help explain why the blue and purple lines in Figure 12 crossed in 2013. According to Harris, Jenkinson, and Kaplan (2013), "this has likely had the effect of making estimated unrealized values closer to true market values than in the past, particularly for buyout funds."

Figure 12. Private equity has exhibited high correlation with public equity: September 30, 2000, through March 31, 2014



Notes: Correlations calculated using rolling five-year correlation based on three-year geometric returns, September 30, 2000, through March 31, 2014. Private equity represented by Preqin Quarterly Index; public equity represented by Standard & Poor's 500 Index.

Sources: Vanguard calculations, based on data from Preqin.

Private real assets

Real assets are investments that derive a significant proportion of their value from tangible, physical assets. This is in contrast to financial assets (e.g., equity, fixed income), whose value is primarily based on contractual claims of underlying assets. In most cases, real assets are some form of real estate and/or commodities (sometimes called "natural resources").[22] In their private investment forms, both real estate and commodity-related investments have challenges that are similar to those of other private investments (e.g., transparency, attribution, legal standing, liquidity, manager selection, and fees).

Real estate

The role of real estate in institutional portfolios is generally to diversify equity exposure (Philips, 2009) through the relatively steady income from contractual rents and the unique supply and demand dynamics of commercial real estate property. There are three major ways to assemble a diversified commercial real estate portfolio: direct ownership, private partnerships, and public real estate investment trusts (REITs).

Directly held commercial real estate requires a high initial capital outlay and significant ongoing commitment of time, expertise, and expense to handle the maintenance and upkeep of the property. As a result, many institutional investors look for other ways to gain real estate exposure.

Private partnerships can be structured as either closed pools (in which liquidity is restricted) or open pools (in which liquidity is available periodically). In either case, the pools are managed by a real estate specialist who typically focuses on a specific type of property (e.g., office, hotel, apartment, industrial, retail) and development stage (core, value-added, or opportunistic).

Equity REITs are typically publicly traded equity-funded organizations, enabling them to offer daily liquidity and significant transparency. REITs in the United States are most often vertically integrated real estate companies that also develop and manage the land, buildings, and, in some cases, the timber, on their balance sheets.[23] Given the liquid nature of these vehicles, it is easy for the investor to gain commercial real estate exposure that is diversified both by geography and by property type.

22 See the 2014 Greenwich Research survey of institutional investors for a full list of the most popular real assets. Overall, there has been little academic work on the performance of private timberland, farmland, and infrastructure, in part because these categories are highly fragmented, are quite small relative to other types of alternative investments, and do not frequently trade. As an example, since the 1990s, private infrastructure investing has gained momentum in several countries, including Australia, the United Kingdom, and Canada. Although the global infrastructure market is sizable (estimated at nearly $20 trillion), the private portion of this market has remained modest. Preqin (2012) estimated that the global assets managed by unlisted infrastructure fund managers was $174 billion as of June 2011. For more information on infrastructure investing, see Wallick and Cleborne (2009).

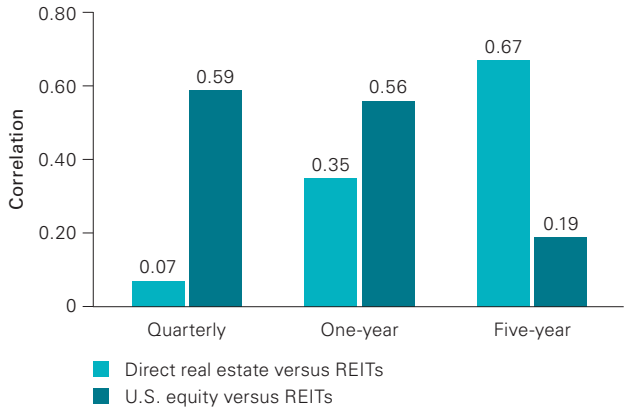
23 Outside the United States, the most prevalent structure for equitized real estate companies is a real estate operating company, or REOC. A REOC is similar to a REIT, except that it reinvests earnings in a business, while a REIT distributes earnings to the shareholders. In addition, REOCs may be able to invest in more types of instruments than can REITs. A detailed review of the differences between REOCs and REITs is beyond the scope of this paper. For more information, see Delcoure and Dickens (2004).

Both REITs and direct commercial real estate involve ownership of property. However, in the near term, REITs are highly influenced by their public equity nature and tend to react with the short-term movements of the stock market. Over longer time horizons, however, this difference dissipates and the two methods are highly similar. **Figure 13** illustrates this shift through a correlation analysis in which the relationship between REITs and direct real estate strengthens the longer the holding period, while the REITs to public equity relationship weakens (Ang, Nabar, and Wald, 2013; Pagliari, Scherer, and Monopoli, 2005).

As a result, REITs can be a valuable investment vehicle for investors interested in a strategic position in real estate. Relative to direct holdings, REITs can provide investors with a highly liquid, less concentrated, lower-cost form of commercial real estate exposure (Philips, Walker, and Zilbering, 2011; Hoesli and Oikarinen, 2012). This allows investors the option of buying a passive proxy if they wish to avoid active manager risk (as demonstrated earlier in Figure 5). In addition, according to a recent academic study covering 1982–2011 (Fisher and Hartzell, 2013), private real estate funds, on average, underperformed a public equity REIT index. Also, the evidence for positive persistence among private real estate managers is conflicting; Aarts and Baum (2013) claimed no persistence, whereas Tomperi (2010) claimed persistence.

Unlike traditional investments, no practical method of commercial real estate ownership offers pure systematic exposure to the entire asset class. As a result, an investor has to be content knowing that any selected option will only cover a subset of the overall commercial real estate market.[24] For investors who desire exposure to commercial real estate and are comfortable with its potential short-term equity-like volatility, a broad, public equity REIT index can serve as an effective long-term proxy.[25] Consequently, most investors need not incur the illiquidity, high costs, and manager risk of a relatively concentrated privately managed portfolio of commercial properties.

Figure 13. REITs act more like private real estate over longer time horizons



Notes: Performance results are from January 1, 1994, through September 30, 2013. Direct real estate represented by National Council of Real Estate Investment Fiduciaries (NCREIF) Transaction Based Index (NTBI). Equity REITs represented by FTSE NAREIT All Equity Index.

Sources: Vanguard calculations, based on data from NCREIF and FTSE.

Physical commodities

A broad portfolio of commodities can play a diversification role for investors who are willing to accept the distinctive attributes of the asset class (Bhardwaj, 2010b). Historically, the correlation between commodities and equity returns has been lower than other widely used diversifiers such as international equity. Although commodities may help reduce portfolio-level volatility in certain market environments, investors must also be patient, since the stand-alone volatility of the asset class can be greater than that of the equity market.

There are two primary ways that investors can gain exposure to commodities such as oil, wheat, or silver. One way is to buy the physical commodity directly and hold it. This approach requires being able to store and protect the physical—and potentially perishable—asset. Holding physical assets entails costs not included in holding financial assets, such as costs of storage, insurance, and transportation. Collectively, these expenses are known as the cost of carry. Since commodities do not generate income, the net return is then the difference in price between the time of purchase and the time of sale, adjusted for the cost of carry.

24 For example, according to Wilshire (2012), equity REITs comprised approximately 10% of U.S. institutional-grade commercial real estate assets.

25 When deciding whether to include exposure to commercial real estate and in what amount, investors should also account for any real estate exposure that may already be embedded in other parts of their portfolio.

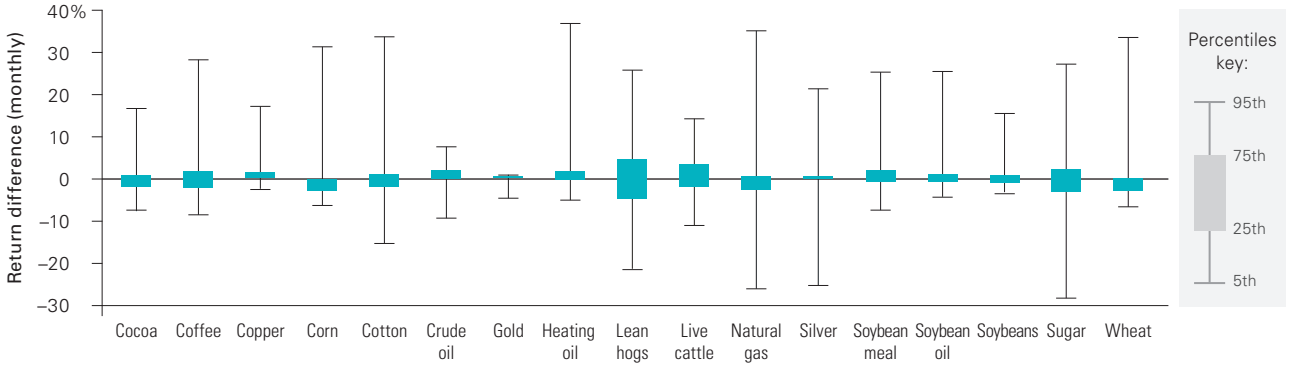
The other main way to gain commodities exposure is to take a long position in a commodity futures contract: a liquid, exchange-traded, standardized agreement to buy a specified quantity of a commodity at some later future date.[26] At any point in time, a futures price reflects the commodity's expected spot price at the futures contract maturity date as well as the carrying costs of the physical commodity. See Bhardwaj (2010b) and Till (2006) for more details on this concept.

The price difference between spot (current) prices and futures prices can be significant. This difference is known as the "basis." The basis for each commodity can be volatile and either positive or negative. **Figure 14** shows the basis range for a large basket of commodities over the nearly 55 years through 2013.

Futures prices are affected by several factors, including the current and expected supply and demand for the underlying commodity, as well as the time to maturity of the futures contract. At nearly all points in time, spot and futures prices will and should be different.[27] As a result, investors considering commodity futures as a proxy investment must be prepared for a return experience that may be materially different from that of holding a position in physical commodities directly.[28]

Figure 14. Commodities' spot and futures prices can be quite different: July 1, 1959–December 31, 2013

Monthly return differences in spot and futures prices



Notes: Spot price is assumed to be the end-of-day price of the nearest futures contract available for each commodity. Futures price is assumed to be the end-of-day price of the second-nearest futures contract available for each commodity. Monthly percentage differences between spot and futures prices are normalized to 0%. Blue region represents the distribution's 25th to 75th percentiles. Monthly individual futures contract end-of-day prices start in July 1959.

Sources: Vanguard calculations, using data from Commodity Research Bureau.

26 Funds and exchange-traded products that purchase equity of companies in the commodities business are also available to investors. However, researchers have found that "commodity company equity behave more like other equity than their counterparts in the commodity futures market" (Gorton and Rouwenhorst, 2006). The value of the equity-based investments also fluctuates when decisions are made by company management, which could potentially include hedging the company's commodity exposure for justifiable business reasons (Greer, 2007). Another reason the performance of companies in the commodities industry may differ from that of physical commodities could result from regulatory changes. As a purely hypothetical example, if, to limit carbon dioxide emissions, government legislation were passed restricting the amount of oil that could be sold by energy companies, this could have negative implications for oil companies (because of reduced expected sales) and positive implications for oil prices (because of reduced expected availability of supply for sale).

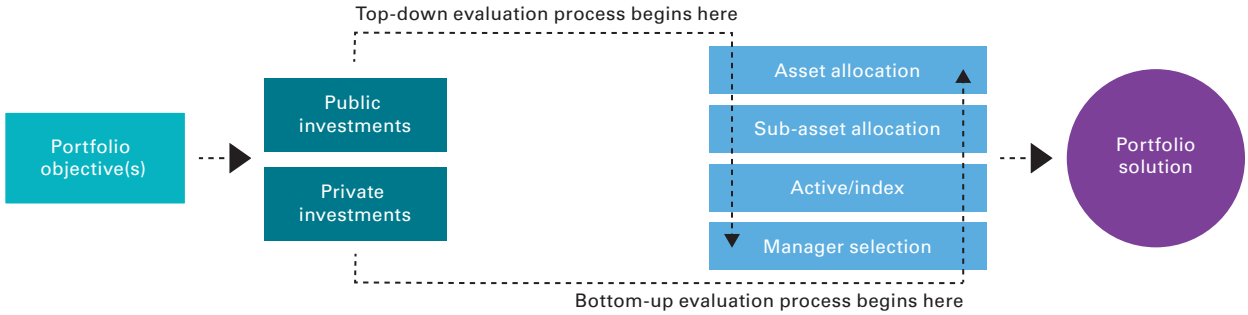
27 More recently, and often with a focus on the energy futures markets, some researchers and government regulators have put forward the idea that higher cash flows into long positions in commodity index products push futures prices higher (Chilton, 2011; Singleton, 2011). Others have argued that these index cash flows have no causal relationship to the spot-futures price relationship and that market fundamentals, not speculation, drive changes in spot and futures prices (Black, 2009; Stoll and Whaley, 2010). Hamilton and Wu (2013) found some support for Singleton's findings during the global financial crisis, but not for the post-2009 period.

28 Commodities futures can be used to construct a broadly diversified index or as an active trading strategy. Unlike stocks and bonds, there is no broadly accepted neutral index weighting methodology for a broadly diversified mix of commodity futures. As a result, returns across the various commodity futures indexes can vary widely. Active trading strategies are typically managed by a commodity trading advisor (CTA). The CTA may take only long positions or may choose to use both long and short positions. Therefore, depending upon the manager(s) chosen, the exposure to commodities may not be long-only. The investor would have to decide what type of exposure to commodities is most appropriate for the portfolio. Also, in a study conducted by Bhardwaj, Gorton, and Rouwenhorst (2014), from 1994 through 2012, CTAs, on average, did not generate excess returns net of fees.

III. Implications

Portfolio construction using public forms of asset classes is traditionally implemented through a top-down process based on the premise that the choice of broad asset classes drives most of the variation in portfolio returns (and not sub-asset allocation decisions, tactical asset allocation tilts, or manager selection) (Wallick et al., 2012). As a result, many investors have become conditioned to viewing proper portfolio construction as only involving a top-down process. Given that private investments are all actively managed; that the risk exposures can dynamically change based on the specific underlying managers; that fees are high; that transparency and liquidity are limited; and that active manager dispersion in these categories is significant, it is prudent for investors to consider hedge funds, private equity, and private real assets in a bottom-up manager-selection fashion when determining whether to invest and in what size (see **Figure 15**). This approach suggests that such investors should designate a percentage allocation to private alternative investments only in relationship to their specific circumstances, resources, risk tolerance, and confidence in accessible private alternative investments (see **Appendix Figure A-7** for a partial list of factors to consider during this process). Indeed, asset allocation modeling should not be the sole driver of the decision to include private investments in a portfolio; rather, it should be considered as one component in a broader evaluation toolkit. See Kinniry and Philips (2012) for more details on these modeling challenges.

Figure 15. Private alternative investments require a thorough, bottom-up approach



Source: Vanguard.

Conclusion

Our examination of alternative investments draws three major conclusions.

- Private alternative investments are a form of active management, not separate asset classes.
- The average private investment has underperformed the public markets.
- The decision to include private investments is complex and should be evaluated using a thorough bottom-up approach.

As a result of these findings, Vanguard continues to believe that public, market-cap-weighted index investment vehicles for traditional asset classes are a valuable starting point for all investors. Such vehicles provide broadly diversified, highly transparent, low-cost, and extremely competitive performance over time. Private alternatives are actively managed investments with limited transparency and regulation, lower liquidity, and higher active manager risk and fees. As a result, use of private alternatives requires a thorough bottom-up manager-selection-driven process, as opposed to the traditional top-down asset-allocation-driven process.

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IV. Appendix

Figure A-1. Performance evaluation challenges with private alternative investments

One of the challenges in assessing private investments is the lack of clear performance data. Examples of potential data biases include:

Self-reporting: Private investment performance is voluntarily reported to data providers, making the collective results of any peer benchmark selective, not universal (Agarwal, Fos, and Jiang, 2013). Indeed, a recent study found that 50% of the hedge funds analyzed did not report results to any of the private investment data providers (Aiken, Clifford, and Ellis, 2013b). Therefore, it is difficult to discern whether any database of private investments is truly representative of the universe.

Backfill (instant history): This occurs when private investment funds are permitted to submit historical performance when they first report to a database.

Survivorship: Funds that drop out of the database no longer count toward historical results.[29]

Benchmarking: Unlike most benchmarks, many private investments can use leverage (borrowed funds). Also, some funds may be employing a strategy that does not perfectly fit them into a peer category.

Pricing: Valuation of holdings is often appraisal-based, as opposed to marked-to-market on a daily basis, which can effectively lead to a lag or smoothing effect in reported returns and volatility.

Time period: Given that the performance history for many private alternative investments is fairly short,[30] it is difficult to determine whether the results are time-period specific (particularly if the returns do not cover at least a full market cycle).

Source: Vanguard.

Figure A-2. Common liquidity provisions in open-end private investment limited partnership structures

Provision	Description
Advance notice requirement	The minimum period of time that must be provided to a manager to notify him or her of your intent to withdraw assets at the next possible redemption date.
Gating option	Funds may temporarily limit the amount that can be withdrawn on a specific redemption date (at the fund and/or investor level). Gating is typically imposed to slow redemption outflows in times of severe market stress.
Holdback clause	In the case of a full redemption request, a manager may pay out 90%–95% of the proceeds and retain the investor's remaining balance until the fund's NAV is determined after the fiscal year-end audit is conducted. How that remaining balance is invested during the review period depends on the specific language in the partnership agreement.
In-kind distributions	Depending on the partnership arrangement, some managers may have the discretion to satisfy redemption requests by distributing securities from their fund, rather than liquidating securities and wiring cash to investors.
Lockup period	Period of time after initial investment when the investor is not permitted to withdraw any assets (typically three months to three years). There are hard and soft lockups: In a soft lockup, the investor can redeem during this period but may have to pay a penalty fee. During a hard lockup, the investor does not have access to his or her capital.
Redemption frequency	After the initial lockup period ends, investors can redeem assets only at certain times throughout the year (ranging from daily to annually).
"Side-pocket" arrangements	A separate account that is used to separate illiquid assets from more liquid investments. When redeeming from the fund, the investor's portion of assets in the side pocket remains there until such time as the manager is able to liquidate the account.

Note: These provisions vary greatly from fund to fund, and in certain cases, the specific terms can be negotiated by the investor.

Sources: Chart adapted, by permission, from Sameer Jain, 2013, Investment Considerations in Illiquid Assets. *Alternative Investment Analyst Review (AIAR)*; available at https://caia.org/sites/default/files/AIAR-2013-Vol-2-Issue-2-Investment.pdf). Copyright © 2013, CAIA® Association.

29 See Appendix Figure A-4, for quantitative estimates of survivorship bias based on various academic studies.

30 Only 53% of hedge funds reporting to the Lipper TASS database (as of June 30, 2014) had a performance history of at least five years.

Figure A-3. The challenging nature of hedge-fund due diligence

Some factors to consider

Performance

- Reputational consequences among stakeholders if results turn out to be poor.
- Attribution (given dynamic factor exposures in many cases).
- Understandable explanation of results.
- Can we articulate the strategy to stakeholders?
- Third-party valuation policies.
- Persistence.
- Objective benchmarks.
- Market-environment dependence.
- Is alpha really hidden beta or luck?
- Data biases.

Firm

- Depth of team.
- Experience.
- Incentive structure.
- Succession/contingency plan.
- Key talent retention strategy.
- Ethics.
- Investment philosophy.
- Repeatable, understandable process.

Legal

- Regulatory oversight and changes.
- "Key person" clause.
- Conflict of interest policies.
- Voting rules.
- Governance rights.

Transparency

- Derivatives usage and breadth.
- Leverage allowance and oversight.
- Position-level analytics.
- Frequency of and lag in reporting.

Counterparty exposure

- Direct and indirect.
- Monitoring policy, restrictions, and constraints.

Program design

- Bottom-up exercise.
- Dynamic correlations and minimum funding requirements hamper ability to build a diversified multi-manager mix:
  - — Heterogeneous nature of hedge fund universe.
  - — Significant manager dispersion.

Liquidity

- Gating provisions.
- Lockup period.
- Frequency of "exit windows."
- Advance-notice requirements.
- Rebalancing flexibility.
- "Crowded trades."
- Redemption queues.
- "Side-pocket" options.

Supervisory

- Board of director independence.
- Separation of duties of key professionals.

Fees

- Management fee.
- Asymmetric incentive fee.
- Entry fee.
- Exit fee
- Hurdle rate.
- High-water mark.

Ownership structure/breadth

- Public/private.
- Co-investment as percentage of general partners' wealth.
- Equity distribution across investment professionals.

Limited partner (LP) awareness

- Who are the other LPs?
- How many are there?
- What is their level of patience when short-term underperformance inevitably occurs through time?

Operational

- Risk management resources, systems, and reporting.
- Compliance culture.
- Does dedicated risk management team truly have the power to overrule portfolio decisions?
- Is risk management team compensation linked to performance?
- Is risk management team pay high enough to ensure continuity over time?
- Trader-level constraints ("rogue trader" protection).
- Limits/thresholds on concentration.

Source: Vanguard.

Figure A-4. Hedge-fund survivorship bias has been material

Authors	Time period	Database	Survivorship bias
Xu, Liu, and Loviscek (2011)	1994–2009	CISDM	3.12%
Ibbotson, Chen, and Zhu (2011)	1995–2009	Lipper TASS	5.21%
Kaiser and Haberfelner (2011)	2002–2010	Lipper TASS	2.75%
Joenväärä, Kosowski, and Tolonen (2014)	1994–2012	Lipper TASS, Hedge Fund Research, BarclayHedge	2.40%

Notes: Table provides an overview of recent academic studies on survivorship bias in hedge funds. All survivorship bias figures are annualized and represent an upward bias (an overestimation of historical hedge-fund returns since all results are positive). CISDM = Center for International Securities and Derivatives Markets database.

Sources: Vanguard calculations, using data from CISDM, Lipper TASS, and BarclayHedge.

Figure A-5. Major categories of hedge funds

Fund type	Definition
Convertible arbitrage	Funds that purchase convertible securities (mostly bonds) and sell short the corresponding stock with the aim of profiting from any pricing error embedded in the conversion factor.
Dedicated short bias	Funds that take short positions, mostly in equities, focusing on companies with weak cash flow. Funds borrow the stock from a counterparty and sell it in the market with the aim of later repurchasing it at a lower price.
Emerging markets	Funds that invest in emerging and developing countries that are expected to grow at an accelerated rate. The fund manager can invest in a variety of instruments, including currencies, debt instruments, and equities.
Equity market neutral	Funds that aim to minimize the systematic risk of the market by taking both long and short positions in stocks. Stock selection can be either quantitative or fundamental.
Event driven	Funds that focus on potential mispricings related to specific corporate or market events, such as mergers, bankruptcies, asset sales, spin-offs, lawsuits, and regulatory and legislative changes.
Fixed income arbitrage	Funds that aim to exploit inefficient pricing between related fixed income securities. One way to do this is to take long and short positions in the securities.
Fund-of-funds	Funds that invest in a portfolio of hedge funds to provide broad exposure to the hedge fund industry while providing diversification across manager styles.
Global macro	Funds that trade on anticipated price movements in equity, currency, interest rate, and commodity markets that are expected to occur as a result of political and macroeconomic trends.
Long/short equity	Funds that take both long and short positions in equity markets. Stocks are ranked and chosen through the use of quantitative models.
Managed futures	Funds (whose managers are often registered as commodity trading advisors, or CTAs) that rely on technical trend-following techniques to take long and short positions in currency, commodity, equity, and fixed income futures markets.
Multi-strategy	Funds that allocate capital among several strategies to diversify the risks associated with a particular approach.

Source: Lipper TASS.

Figure A-6. Major categories of private equity

Fund type	Definition
Venture capital funds	Funds that provide equity capital to privately owned businesses in early stages of development. A typical portfolio company has limited or no access to public finance or bank loans.
Leveraged buyout funds	Funds that invest in more-established portfolio companies with positive cash flows for purposes of acquisition (using a significant amount of debt).
Mezzanine funds	Funds that provide venture financing to portfolio companies shortly before a public offering.
Distressed securities funds	Funds that invest in securities, principally debt instruments, of financially troubled corporations.

Source: Thomson Venture Economics/National Venture Capital Association.

Figure A-7. Key factors that drive the bottom-up decision

Conviction	Fit	Costs
1. Does the investment staff have the requisite expertise and time necessary to identify and access high-quality managers?	1. What would be the role of each of the private investments?	1. What are the direct costs (e.g., management fees, performance fees, exit fees, consultant fees)?
2. What are the governance and implementation capabilities (insourced and outsourced)?	2. What would be prudent to liquidate in order to fund the purchases?	2. What are the indirect costs (e.g., reporting, custody, internal oversight, audit, manager search, transition management)?
3. Are there private investments accessible now with an attractive and sustainable value proposition?	3. Will the weights be significant enough to make a difference but not too large to significantly harm the portfolio if results do not turn out as expected?	3. If it is determined that the portfolio allocation to private alternatives will be small, is it truly worth the extra cost, given the added work and potential risks?
4. What is the level of stakeholder comfort (e.g., committee, board, donors, key shareholders)?	4. Will the resulting portfolio align with the parameters defined in the Investment Policy Statement (e.g., liquidity, leverage, transparency, partnerships, short positions, derivatives)? If not, what flexibility exists to make revisions to it?	

Source: Vanguard.

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