Many investors are adding allocations to alternative investments to further diversify portfolios concentrated in stocks and bonds. Based on the distinct nature of their underlying asset economics, business-cycle sensitivities and unique drivers of risk and return, allocations to real assets—real estate, commodities, natural resources, infrastructure, timberland and farmland—have grown commensurately. However, while we see increasing numbers of investors allocating to listed real assets, many continue to overemphasize private real assets.

Our philosophy is that real assets are best approached with a focus on their fundamentals rather than on their varying ownership structures. As we explore in this paper, the various categories of real assets—whether public or private—exhibit many complementary investment characteristics. Investors aiming to improve overall portfolio efficiency, or risk-adjusted returns, should benefit from an allocation that is well-diversified across the real asset category and liquidity dimensions. As such, we argue for a balanced approach to real assets investing, recognizing that legitimate reasons to tilt one’s allocation in favor of listed versus private real assets may be driven by differences in investor objectives.
Executive Summary

This paper extends Cohen & Steers research on real assets, Exploring the Real Benefits of Real Assets, first published in the fall of 2013, which focused on four core listed real asset categories—real estate, commodities, natural resource equities and infrastructure. Our research examined the investment characteristics of these groups in the context of three common-sense criteria for constructing a real assets allocation: (i) the ability to provide meaningful diversification benefits to a portfolio concentrated in stocks and bonds; (ii) the potential to deliver attractive returns over a full market cycle; and (iii) the expectation of showing higher sensitivity than stocks and bonds to unexpected inflation. The core real asset categories—both individually and when combined together in a diversified portfolio—scored favorably on each of the above criteria.

A key premise of our more recent research is that these conclusions also hold true for private real assets, including real estate, timberland, farmland, natural resources and infrastructure. On the one hand, these results are naturally consistent with our understanding of real assets as best defined by their underlying economics and not by their varying ownership structures or the frequency of valuations. However, in light of a prevailing bias among investors to classify the private market categories as “more real” than listed real assets, we expect that our findings may surprise some readers.

While we believe that many investors have favored private real assets due to their demonstrated equity-like returns, combined with the apparent “free lunch” of relatively low measured volatilities and correlations, we side with academic researchers in our skepticism of these statistics. Measurement biases are a well-known problem with private market investments and, in our view, such distortions should never be seen as a legitimate source of diversification benefits. As it happens, the historical diversification benefits associated with listed real assets are themselves provocative enough that appealing to illusory efficiency gains is, in our view, unnecessary. In general, though, we support a balanced approach to listed and private real assets to maximize the efficiency of the overall real assets allocation.

At the same time, we acknowledge there are valid considerations that could tilt the investor’s preference toward listed or private investments. For example, private real estate can offer greater access to opportunistic, distressed properties at the right time of the cycle, and farmland is accessible almost exclusively through private markets. On the other hand, listed real assets offer similar investment characteristics as a complement to private investments, with the added benefits of liquidity, transparency and daily market pricing.
Introduction: The Lessons of Lincoln’s Riddle

The past decade has witnessed the emergence of an endless parade of new alternative investment vehicles, strategies and structures. While the objectives of (i) prudent diversification of risks and (ii) preservation of long-term return potential have not changed, confidence in a traditional portfolio of stocks and bonds to satisfy these objectives has waned.

This wave of innovation has also fostered misapprehension, particularly regarding the landscape of public and private real assets. These alternative investment categories are broad in scope but all have something in common: they are backed by tangible, hard assets. Therefore, the drivers of risk and return can be complementary to one another, as well as to a portfolio concentrated in stocks and bonds.

The good news is that the benefits of real assets are becoming better understood, particularly among institutions and consultants carving out a distinct real assets “bucket” as part of their long-term, strategic asset allocation policies. However, a recent Greenwich Associates survey on real assets investing pointed to a larger-than-expected gap between what the data reveals and the views of many institutions and consultants. As Exhibit 1 below indicates, when asked which investment categories they considered to be real assets, survey respondents were more likely to designate illiquid, private market categories as real assets compared with liquid, listed investments.

Investors tend to over-identify real assets with illiquid, private market categories.

Exhibit 1: Perceptions of Institutions on Which Categories are Real Assets

<table>
<thead>
<tr>
<th>Category</th>
<th>% of Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private Real Estate</td>
<td>94</td>
</tr>
<tr>
<td>Timberland</td>
<td>93</td>
</tr>
<tr>
<td>Farmland</td>
<td>90</td>
</tr>
<tr>
<td>Private Infrastructure</td>
<td>87</td>
</tr>
<tr>
<td>Commodities</td>
<td>65</td>
</tr>
<tr>
<td>Listed Infrastructure</td>
<td>65</td>
</tr>
<tr>
<td>Listed Real Estate</td>
<td>64</td>
</tr>
<tr>
<td>Natural Resource Equities</td>
<td>50</td>
</tr>
</tbody>
</table>


(1) Source: Greenwich Associates, October 2014.
Listed and private real assets are complementary, with listed providing the benefits of liquidity, an enhanced opportunity set and transparent market pricing.

Our research demonstrates that real assets are best defined through their underlying economics and not by their varying ownership structures. To us, the notion that real assets are somehow made “more real” by virtue of a private ownership structure calls to mind an age-old riddle, often attributed to Abraham Lincoln: How many legs does a dog have if you call the tail a leg? Answer: Four. Calling a tail a leg doesn’t make it a leg. In our view, we can no more alter the underlying economics of real asset investments by changing the ownership vehicle than we can alter the canine leg count by arbitrarily re-labeling appendages.

In the sections that follow, our goal is to help educate investors on several major misconceptions about real asset investing. We also offer our views on the role of real assets—both liquid and illiquid—as diversifiers in a broader investment portfolio, including an assessment of legitimate considerations that can tilt the investor preferences towards or away from private and listed real assets. In the final analysis, we find ample support for our views on the benefits of real assets investing—to echo Lincoln’s riddle, there are more than enough legs to stand on.

A Framework for Understanding Real Assets as an Asset Class

Our research on listed real assets focuses on the development of a framework to approach the space as a unique and coherent asset class.(1) In particular, we emphasize three key criteria for building a long-term, strategic real assets allocation:

1. **Diversification Potential**: The potential to outperform during periods of simultaneous stock and bond underperformance.

2. **Expected Return Potential**: The potential to provide attractive long-term expected returns across a full market or economic cycle.

3. **Inflation Sensitivity**: The potential to show higher sensitivity than stocks or bonds to unexpected inflation accelerations—surprise conditions that can be difficult for investors concentrated in stocks and bonds.

The two-part core message of our research has been that i) there is no single, silver-bullet asset category that excels across all of these investment dimensions, due to the inherent tradeoffs of the various real asset categories, and ii) building diversified portfolios of real assets allows investors to better navigate those

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tradeoffs. We have argued that treating real assets as a standalone asset class increases the likelihood of effectively managing some of the risks associated with traditional stock- and bond-centric portfolios.

Of course, any effort to incorporate private, illiquid real asset categories into our research framework opens up issues such as survivorship, selection and backfill biases. However, a more obvious difficulty lies in the limited performance history of private real asset indexes. Whereas our research into the four core listed categories stretches back to the early 1970s, reliable data across most private real asset categories generally extends back only to the early 1990s, a period notable for its absence of secular, 1970s-style inflation problems.

Critically, our conclusions about listed real assets hold up regardless of whether we begin the analysis in the 1970s or 1990s, thus giving us comfort that similar conclusions can be drawn for their private market counterparts. Moreover, while investors have often focused excessively on their inflation hedging potential, our research suggests that real assets offer a far richer array of benefits, regardless of the inflationary backdrop.

The following sections provide an overview of our research covering the risk and return profiles of various listed and private real asset categories over the period for which listed index data is broadly available, beginning in January 1992.

1. Diversification Potential

It is not uncommon for investors to assess diversification potential based on trailing correlation figures. However, our research maintains that, since correlation reflects an average relationship between asset returns over an arbitrary look-back horizon, the data provides little insight into the types of periods, or regimes, where asset classes experience above- or below-average performance.

We have argued that periods when stocks and bonds underperform their respective long-term averages at the same time pose perhaps the greatest risk that most investors face. Exhibit 2 on the next page illustrates this point by plotting the rolling 12-month real, or inflation-adjusted, returns of both stocks and bonds over the more than 40-year period from January 1973 through December 2013. The observations falling inside the box in the lower-left corner represent one-year periods in which stocks and bonds simultaneously delivered below-average inflation-adjusted returns. Notably, such regimes are relatively common in the historical record, occurring in 22% of all rolling one-year periods and resulting in average inflation-adjusted returns that were typically negative for both stocks and bonds.

(1) Survivorship bias occurs when a manager is excluded from a database because they are out of business or no longer reporting results. Selection bias occurs when index providers restrict which managers to include in their benchmarks or return series (e.g., minimum assets under management requirements). Backfill bias occurs when a fund or manager is added to an index and its historical returns are “backfilled” into the return data. Each of these biases may lead to overstated index returns and understated risk.
We believe that investors seeking diversification benefits should pursue investments with the potential to buoy core stock-bond exposures during periods of joint stock-bond underperformance. Our research into the deep history of listed real asset returns has demonstrated this potential, as the listed real asset categories have historically outperformed stocks and bonds during these episodes.

Exhibit 3 on the next page compares the performance of stocks, bonds and real assets—both listed and private—during periods when stocks and bonds simultaneously underperformed their long-term averages since 1992 (the inception of several broadly available private real assets indexes).

A few observations: first, since the early 1990s, both stocks and bonds have weathered joint underperformance periods relatively well; in fact, stocks have eeked out a small positive real return, on average. These results are in contrast to the negative real return characteristics of 1973–2013, shown in Exhibit 2. Second, consistent with our long-term research, each of the listed real asset categories delivered positive real returns during these periods, outperforming both stocks and bonds. Finally, the major categories of private real assets—private real estate, timberland and farmland—likewise exhibited strong performance under these conditions, showing an average 9.1% inflation-adjusted return, marginally better than the 7.9% real return of the listed real asset categories, combined in an equally weighted Diversified Real Assets Blend.\(^{(1)}\) Note that private infrastructure and private natural resources are not included in this exhibit due to the short history of available data.\(^{(2)}\)

Simultaneous stock-bond underperformance, a common occurrence historically, is one of the biggest challenges for investors.

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\(^{(1)}\) Performance data quoted represents past performance. Past performance is no guarantee of future results. See page 20 for index definitions and additional disclosures.

\(^{(2)}\) While most of our analyses in this paper include the returns to private natural resources and private infrastructure indexes, data for these categories becomes available only in 2006 and 2008, respectively. Since this time, there are virtually no observations of stocks and bonds underperforming their long-term averages in unison, thus we are not able to observe the historical behavior of these categories under such conditions.
Real asset categories—both listed and private—outperformed when stocks and bonds simultaneously underperformed their 40-year average returns.\(^1\)

We see far more similarities than differences in the potential for both listed and private real assets to diversify a portfolio of stocks and bonds.

It seems fair to conclude that there are more similarities than differences in the ability of listed and private real assets to diversify stocks and bonds under these circumstances. In other words, the various categories of listed and private real assets appear to be aligned in their ability to diversify against one of the highest-risk regimes impacting stock- and bond-centric portfolios.

2. Expected Return Potential

While both listed and private categories of real assets meet our initial diversification potential criterion, we would call into question the value of those benefits if the opportunity cost in terms of foregone return potential is too high. Moreover, we believe the full-cycle performance characteristics of real assets should allay the concerns of investors who deem them viable as investments only in periods of elevated inflation. In this sense, our 1992–2013 study period—an era characterized by the decided absence of inflation problems—provides an ideal environment to test this common concern.

\(^1\) This statement is supported by the data in Exhibit 3 above and related footnotes.
Exhibit 4 summarizes the realized inflation-adjusted returns of stocks, bonds and the real asset categories in our study. We also include the shorter return history of private natural resources and private infrastructure, beginning in 2006 and 2008, respectively, recognizing that they may not be entirely indicative of long-term return potential. Consistent with our longer-term research, the standalone real asset categories exhibited returns generally on par with those of broad-based equities.

The exception over this study period is commodities, whose significant underperformance in recent years represents an anomaly when compared to the other real asset categories; in fact, the recent stretch of subpar commodity returns negatively impacts the entire return series back to 1992. However, the full history of commodity returns going back to the early 1970s is far more constructive, indicating inflation-adjusted returns of around 4.5% and falling almost directly between long-run stock and bond real returns of 6.0% and 3.6%, respectively.\(^{(1)}\)

The 7.1% average inflation-adjusted return of the private real asset categories is strikingly similar to the 6.5% real return of the Diversified Real Assets Blend of listed categories, with both comparing favorably to the 6.6% real return of stocks since 1992. Again, we find no reason to conclude that illiquid real assets are somehow “more real” than their liquid counterparts. We also find little evidence to justify concerns about the long-term return potential of real assets in non-inflationary regimes—particularly when it comes to portfolios diversified across multiple real asset categories. These indications should dispel a common misconception about the asset class: that elevated inflation is necessary for real assets to perform. In fact, these returns were achieved amid average inflation of 2.5% since the early 1990s. More consistent with our findings is that real assets tend to experience above-average returns during periods when inflation surprises to the upside.

\(^{(1)}\) Performance data quoted represents past performance. Past performance is no guarantee of future results.
3. Inflation Sensitivity

It is clear from the historical data that neither listed nor private real assets are dependent on an adverse, 1970s-style inflation shock to generate attractive full-cycle returns. However, if there is a single factor that unites the various real asset categories together as an asset class, it is their inflation sensitivity. The focus of our inflation-related research is based on the sensitivity of asset returns to unexpected inflation changes—what we call inflation beta. In conducting our research, we examined the sensitivity of rolling 12-month inflation-adjusted asset returns to the difference between the current year-over-year realized inflation rate (actual inflation) and the prior year’s consensus inflation expectation. We define the gap between these two measures as unexpected inflation.(1) Exhibit 5 below summarizes the indicated inflation betas.

Notably, we find negative inflation betas for stocks and bonds and positive inflation betas for both listed and private real asset categories. For example, bonds indicate an inflation beta of -1.2, implying that, for a 1-percentage-point overshoot in realized inflation versus what the expectation was a year earlier, the inflation-adjusted returns tended to be about 1.2 percentage points below average. The same 1% gap between realized and expected inflation for commodities, with an inflation beta of 8.0, tended to result in real returns 8.0 percentage points above their study-period average. This large and reliable inflation beta of commodities is perhaps the group’s most significant diversification advantage.

Exhibit 5: Inflation Betas
1992–2013(a)

Performance data quoted represents past performance. Past performance is no guarantee of future results.

(a) Note that the inception date of returns for all categories is January 1992, with the exceptions of Private Natural Resources and Infrastructure, which begin on January 2006 and January 2008, respectively. See page 20 for asset class representations, index definitions and additional disclosure.

(1) Our measure of expected inflation reflects median inflation expectation from the University of Michigan Survey of 1-Year Ahead Inflation Expectations. Inflation beta was determined by calculating the linear regression beta of 1-year real returns to the difference between the year-over-year realized inflation rate and lagged 1-year ahead expected inflation, including the level of the lagged expected inflation rate. Linear regression is a statistical method that models the relationship between a dependent variable and one or more explanatory variables.
While such inflation betas represent statistical expectations rather than definitive point estimates, we attach importance to the positive inflation sensitivities of liquid and illiquid real asset categories—as well as the Diversified Real Assets Blend—as they indicate a tendency to deliver above-average returns precisely when inflation surprises are likely to weigh on stock and bond returns. We view this as confirmation of the potential for real assets to show higher sensitivity than stocks and bonds to unexpected inflation.

We have concluded, through this research, that listed real assets and private real assets share very similar economics based on the key investment dimensions of diversification potential, expected returns and inflation sensitivity. Ownership structure and liquidity profiles appear to have very little bearing on the fundamental sensitivities and characteristics of these assets. As such, we see no justification for the arbitrary dividing line between the liquid and illiquid real asset categories that appeared in the recent Greenwich Associates survey of institutional investors. We believe investors are best served by including both listed and private assets in a real asset allocation.

How Much and Why?
Optimizing Allocations to Real Assets

Just as investors looking to real assets have exhibited inconsistency in their views about the categories considered to be real assets, it also appears that investor perspectives also vary on the types of asset classes and strategies deemed to be alternatives. By some definitions, real assets clearly fit the bill—largely due to their expected returns, diversification potential and inflation sensitivity, as outlined in the prior section—while others reserve the alternatives label for strategies explicitly designed to deliver very low measured correlations with traditional stocks and bonds. Unfortunately, it appears that the basis of investor allocations to these non-directional, alpha-dependent alternatives is often not grounded in traditional diversification benefits per se. Rather, they are seeking the ever-elusive experience of bond-like risks with equity-like returns.

At the root of the problem is widespread confusion of volatility reduction—via an emphasis on “low beta” assets—with true diversification, which is properly understood as the inclusion of assets meant to improve overall portfolio efficiency, or risk-adjusted returns. Whether a given asset’s correlation is correctly judged to be high or low will ultimately depend on where that asset sits on the spectrum of expected risk and return. Higher-return assets—including directional, risk premium-generating alternatives like real assets—may carry a greater average level of exposure or correlation to broad market risks, yet they can still be meaningfully diversifying. However, non-directional strategies may warrant little place in investor portfolios, despite low realized correlations, if risks are not sufficiently minimized or if returns are not reasonably high.

(2) See our additional work on this topic: Liquid Real Assets: The “Alternative” Liquid Alt, at cohenandsteers.com.
Undoubtedly, many investors considering a real assets allocation have studied data such as those depicted in Exhibit 6 below, and have envisioned an alternative pathway to the holy grail of equity-like returns with bond-like risks through investments in the illiquid, private real asset categories. Notably, most of these types of investments are clustered on the upper left-hand side of the display and are marked with arrows pointing right, reflecting our view that the true measures of risk are higher. Indeed, we suspect that many investors have favored private over listed real assets with the belief that illiquid categories are superior alternatives due to their historically high returns, relatively tame volatilities and very low correlations to the broad equity market. Based on these numbers, however, we don’t need to conduct a formal optimization exercise to see that the results will lead directly to the following question: why would anyone want to hold anything other than a portfolio of private real assets? In our view, the fact that few if any investors actually pursue this course of action itself speaks volumes.

Exhibit 6: Private Real Assets: Downplaying the Risks
Listed and Private Risk and Return, 1992–2013

<table>
<thead>
<tr>
<th>Traditional</th>
<th>Listed</th>
<th>Private</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bonds</td>
<td>Stocks</td>
<td>Real Estate Securities</td>
</tr>
<tr>
<td>6.5%</td>
<td>9.2%</td>
<td>10.6%</td>
</tr>
<tr>
<td>Volatility (Standard Deviation)</td>
<td>7.1%</td>
<td>16.1%</td>
</tr>
</tbody>
</table>

* Based on appraisals, which leads to understated volatility.
Ultimately, the problem lies not with the long-term return realizations associated with private real assets; these are, in our judgment, reasonably reliable. At issue are the unusually low measured volatilities and correlations, which seem to indicate a kind of “free lunch” for the illiquid categories. This is a widely recognized problem with almost all private investments. The academic and practitioner literature is replete with methodologies developed to adjust available asset return series for illiquid investments—including those for many private real asset categories—which tend to exhibit artificial smoothing due to infrequent or actuarial, rather than real-time, market-based valuations. We illustrate these effects with an example of an artificially smoothed series in the sidebar on page 14.

Smoothing bias ultimately works to drive down both correlation and volatility statistics for private investments to understated levels.

While it’s not uncommon for various unsmoothing techniques to suggest that volatility estimates for illiquid investments should be adjusted upwards by as much as 2–3x versus their measured results, such adjustments can be difficult for many investors to implement effectively.\(^{(1)}\) As a general rule, researchers often recommend instead relying on publicly traded proxies to overcome reporting biases and thus better estimate prospective diversification benefits. The goal in this case is to recognize that, considering the difficulty in developing perfect volatility and correlation estimates from unreliable private market data, it is preferable, as the saying goes, to be roughly right rather than precisely wrong. We believe this approach dovetails nicely with our view that there is no reason why investors should receive extra credit for not marking their positions to market. As we stressed earlier, risk should be understood as a function of underlying asset economics and not ownership structure or the vagaries of private-market valuation assumptions.

If we rely on data from publicly traded real assets as a proxy for the broader asset class, what does real assets allocation data suggest? The table in Exhibit 7 on the following page details the historical returns, volatilities and correlations of stocks, bonds and the Diversified Real Assets Blend—an equally weighted portfolio, rebalanced monthly, of the four core listed real assets. The visual in the display plots two historical efficient frontiers, one representing only combinations of stocks and bonds (colored in orange) and the other including our listed real assets proxy (in blue).\(^{(2)}\) The exhibit shows that the inclusion of real assets would have historically improved the efficient frontier spanning stocks and bonds, thus improving returns at every level of realized risk. The historical data also suggests very substantial re-allocations away from both stocks and bonds in favor of real assets as part of improving the portfolio risk-return tradeoff. In fact, the optimal allocation to real assets in this historical exercise ranges from over 30% of the portfolio, at the lower

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\(^{(2)}\) The efficient frontier is a concept in modern portfolio theory. A combination of assets, i.e., a portfolio, is referred to as “efficient” if it has the best possible return for its level of volatility.
end of the risk spectrum, to more than 50% of the portfolio near the upper end of the risk spectrum. These are, to say the least, very provocative results.

Furthermore, when we use global rather than U.S. stock and bond proxies in our analyses (not shown), we find evidence that is even more supportive of real asset allocations and, correspondingly, desirable shifts in the historical frontier. Notably, these large model-based allocations to diversified real assets are consistent with a positive equity correlation of approximately 0.7 as shown in the table in Exhibit 7. These findings reaffirm our earlier caution about not confusing raw correlation statistics with true diversification benefits, which additionally depend on risk and expected-return estimates. Moreover, these benefits are again defined as improving overall risk-adjusted returns rather than blindly reducing volatility.

We recognize that few investors are likely to allocate as much as 30–50% of their portfolios to diversified real assets based on such historical analyses alone. Realized history reflects, after all, only one of many possible outcomes. On a forward-looking basis, investors should test the impact of varying assumptions about risks, returns and correlations on optimal allocations. Additionally, investors should consider that our focus on the listed real assets data is, again, intended to be a conservative first step in thinking about the diversification benefits of the asset class as a whole, inclusive of the various private real asset categories. While their measured volatilities and correlations do not reflect their true economic characteristics, we have little doubt that further diversification into timberland, farmland and other private real assets can make the asset class as a whole more diversifying, even if the benefits are difficult to measure with precision.

<table>
<thead>
<tr>
<th>Return</th>
<th>Volatility</th>
<th>Correlation to Stocks</th>
<th>Correlation to Bonds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diversified Real Assets Blend</td>
<td>9.0%</td>
<td>14.3%</td>
<td>0.67</td>
</tr>
<tr>
<td>Stocks</td>
<td>9.2%</td>
<td>16.1%</td>
<td>1.00</td>
</tr>
<tr>
<td>Bonds</td>
<td>6.5%</td>
<td>7.1%</td>
<td>-0.44</td>
</tr>
</tbody>
</table>

Performance data quoted represents past performance. Past performance is no guarantee of future results.

(a) The efficient frontier represents the portfolio mix that offers the greatest expected return for a given level of risk, using historical data from 1992-2013. See page 20 for asset class representations, index definitions and additional disclosure.

Allocating to real assets can provide unique diversification potential and better risk-adjusted returns.
Seen in this light, the fact that many institutions and their consultants recommend overall allocations to real assets of at least 10% of the portfolio, and often as much as 20%, strikes us as reasonable. Finally, in consideration of the split between listed and private across the entire real assets allocation, we believe a balanced 50/50 split between listed and private real assets is a reasonable starting point for many allocation exercises. It must be remembered, though, that opting for an allocation to illiquid investments, including private real assets, necessitates taking on some level of liquidity risk for which there should be some associated expected return premiums and allocation adjustments.

Case Study: The Low Volatility Myth of Private Markets

Exhibit A shows a time series of quarterly returns for both the S&P 500 Energy Sector Total Return Index and the total return for the Preqin Energy-Focused Funds Index, a series of illiquid private energy investments. Visually, it seems clear that these two series are economically related, as expected considering that both series represent allocations to energy-related equity investments. However, the accompanying statistics table indicates that, while the full-period total returns are very similar, the same cannot be said of measured volatility.

Not surprisingly, the returns of the private series exhibit about half as much volatility as the marked-to-market S&P Energy series—and the tell-tale signs of artificial smoothing in the illiquid index are apparent in the 0.5 serial correlation of the quarterly returns, as opposed to the near-zero serial correlation of the listed market index.\(^1\) Additionally, we can see an apparent lead-lag relationship between the listed and private returns, also indicative of a smoothed return series. Again, we find little merit in claims that such methodological valuation biases are a legitimate source of diversification benefits.

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\(^1\) Serial correlation (also called autocorrelation) is a statistical variable capturing the cross-correlation of a variable with itself. In a time series it reflects the similarity of observations as a function of the time lag between them.
Beyond Optimization: 
Listed and Private Structural Characteristics

Some investors have favored a core-satellite approach to real assets, employing listed real assets to build a highly diversified, global core exposure to the asset class while relying on private real assets to make more opportunistic investments. Indeed, many of the themes favoring listed real assets revolve around notions of breadth and liquidity in these markets, while themes associated with private markets tend to emphasize the value of control, vintage selection and access to more concentrated or opportunistic investments. Additionally, many investors have indicated a desire to pursue perceived illiquidity premiums believed to be embedded in the valuations of private investments, although we bring into question whether this premium is actually earned consistently, based on historical returns in commercial real estate and infrastructure.\(^{1}\)

Overall, we find the universe of real asset-based investments to be a highly segmented opportunity set presenting large efficiency gains from diversifying across listed and private markets. Nevertheless, we recognize that there are a number of investor-specific needs and preferences that can legitimately justify a tilt towards or away from listed or private investments. As such, we can understand a defined benefit (DB) plan allocating heavily toward private real assets—for example, 2/3 private, 1/3 listed real assets. Such investors may have very long investment time frames and thus limited liquidity needs, thereby allowing them to accept multiyear capital lock-ups. However, it is our view that in certain, restricted cases investors should pursue only listed real assets—defined contribution (DC) plans that have strict liquidity requirements are, of course, an example. Whenever possible, though, we believe that investors should embrace the improved efficiency that comes from marrying listed and private real assets together as a unified asset class.

The breadth and liquidity of listed markets support a core allocation to listed investments, while higher-asset-class-specific risks can be pursued opportunistically through private markets.

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\(^{1}\) See our prior work on this topic: *Revisiting the Truth About Real Estate Allocations and Global Infrastructure: The Listed Alternative*, at cohenandsteers.com. Cohen & Steers’ Truth Series assesses the performance of public and private real estate markets. We conclude that there is little evidence that expected liquidity premiums have been earned in the real estate markets historically.
While there is no one-size-fits-all prescription for how investors should allocate across listed and private real assets, the summary table below highlights some of the typical advantages and limitations of allocating to real assets through listed securities and private investments that we believe should inform investors’ decision-making. Furthermore, the appendix on page 18 outlines additional considerations specific to the four core real asset categories discussed earlier in this paper.

### Key Advantages and Limitations of Listed and Private Real Assets

<table>
<thead>
<tr>
<th></th>
<th>Listed Real Assets</th>
<th>Private Real Assets</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Diversification</strong></td>
<td>Broad portfolio diversification can improve risk-adjusted returns</td>
<td>Concentrated investments may be tailored to specific investor needs</td>
</tr>
<tr>
<td><strong>Liquidity</strong></td>
<td>Investments can be bought and sold at any time</td>
<td>Holding periods generally last from 6–10 years</td>
</tr>
<tr>
<td><strong>Risk</strong></td>
<td>Volatility fully reflected in market-based valuations</td>
<td>Infrequent pricing can understate true risk of underlying investments</td>
</tr>
<tr>
<td><strong>Financing</strong></td>
<td>Easy access to equity and debt capital markets as well as low cost funding sources</td>
<td>Greater use of leverage can enhance total return potential but also increases downside risk</td>
</tr>
<tr>
<td><strong>Pricing</strong></td>
<td>Benefit from transparent real-time pricing which can drive the perception of greater volatility</td>
<td>Infrequent asset pricing artificially smooths performance over time</td>
</tr>
<tr>
<td><strong>Opportunity Set</strong></td>
<td>Complete access to global equity and futures exchanges but may not have access to niche or highly targeted investments</td>
<td>Ability to invest in some assets unavailable in public markets</td>
</tr>
<tr>
<td><strong>Control</strong></td>
<td>Real asset exposure without owning or managing the underlying assets</td>
<td>Increased control over assets can drive excess investment returns</td>
</tr>
<tr>
<td><strong>Governance</strong></td>
<td>Board of directors and governance aligns shareholder and management interests</td>
<td>Less regulatory oversight can reduce overall transparency and alignment of interests</td>
</tr>
<tr>
<td><strong>Minimums</strong></td>
<td>Low investment minimums</td>
<td>Significant capital requirements</td>
</tr>
<tr>
<td><strong>Costs</strong></td>
<td>Lower management fees and no ongoing operating costs</td>
<td>Higher management fees and ongoing costs of maintaining investment</td>
</tr>
<tr>
<td><strong>Unique Considerations</strong></td>
<td>Unrivaled global franchises and value-added management</td>
<td>Vintage year may have a major impact on long-term performance</td>
</tr>
</tbody>
</table>
Our Closing Perspective

Our research-based framework emphasizes three key criteria that should be met in building a long-term, strategic allocation to real assets:

1. **Diversification Potential**: The potential to outperform during periods of simultaneous stock and bond underperformance.
2. **Expected Return Potential**: The potential to provide attractive long-term expected returns across a full market or economic cycle.
3. **Inflation Sensitivity**: The potential to show higher sensitivity than stocks or bonds to unexpected inflation accelerations—surprise conditions that can be difficult for investors concentrated in stocks and bonds.

Contrary to popular perception, when we examine the characteristics of both listed and private real assets across these dimensions, we cannot conclude that private investments are somehow “more real” than their listed market counterparts. Our research suggests that both listed and private investments are excellent complements across all real asset categories. This fits with our economic intuition that real assets are best defined by their fundamental investment characteristics and sensitivities rather than by their ownership structures. In our judgment, investors are greatest served by integrating both listed and private investments as part of their overall real assets allocations.

While we suspect that many investors have traditionally favored private over listed real assets based on their equity-like returns and lower measured volatilities and correlations, we believe that significant measurement biases are endemic in the private markets. As such, we do not believe in this apparent “free lunch.” A conservative first step in judging the diversification benefits of real assets is to evaluate the impact of a diversified allocation to listed, liquid real assets on the broader portfolio. Such analyses have suggested substantial allocations to real assets in an effort to improve risk-adjusted returns. While history reflects, of course, only one of many possible outcomes, we believe adding private real assets should be further diversifying.

We believe in a balanced allocation to both listed and private real assets. We recognize, however, that investors differ in terms of their risk-return objectives, liquidity needs and investment horizons. These differences further impact the particular qualitative considerations that may justify a tilt towards or away from listed or private investments, including ease of investment, geographic and sector diversification and the value of control.

Finally, in further considering the investor survey that initiated this paper, we think it’s important to point out some of the areas where we believe our survey respondents are “getting it right.” Awareness and use of real assets is on the rise and many investors are carving out distinct real asset allocations as part of their policy portfolios. While investors understand that sensitivity to inflation may be the single factor that best ties together the various real asset categories as an asset class, they also recognize that broader diversification benefits and the potential for growth or capital appreciation is at least as, and in some cases more, important. And considering the complexity associated with real assets investing, we believe the fact that 90% of survey respondents rated manager expertise as either “important” or “very important” is reflective of an advancing understanding that real assets, properly managed, can enhance the broader portfolio.
Appendix: The Complementary Characteristics of Listed and Private Real Assets

**Commercial Real Estate**

The underlying assets of both listed and private real estate investments are composed of land and buildings that have intrinsic value based on their location, quality and leases. Commercial real estate has performed well across various stages of the economic, inflation and interest-rate cycles as some sectors are more economically sensitive than others, based on their lease structures and cyclicality of their underlying tenancy.

<table>
<thead>
<tr>
<th>Listed Real Estate</th>
<th>Private Real Estate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Globally diversified portfolios can be quickly and easily constructed using relatively little capital</td>
<td>Investments are focused on a targeted portfolio of properties</td>
</tr>
<tr>
<td>Excellent global franchises, competitive market positions, advantages of scale and highly skilled management teams can add value</td>
<td>Wide range of opportunities, from core property types to distressed properties that may be significantly undervalued</td>
</tr>
<tr>
<td>Performance is grounded in the true transaction-based prices of listed securities markets</td>
<td>Returns derived from appraisal-based equilibrium prices, which may reduce perceived volatility</td>
</tr>
<tr>
<td>A greater number of sectors are available through the listed market</td>
<td>Investors are generally subject to long lock-up periods and limited secondary markets</td>
</tr>
</tbody>
</table>

**Commodities**

There are two types of participants in the overall commodities market: owners of physical commodities and owners of commodities futures. Many investors who take physical delivery seek to stabilize their cost and reduce the volatility of raw materials they buy and sell. Futures market investors aim to profit from price movement of the commodity. Investors have often turned to commodities for the potential to hedge against unexpected spikes in inflation.

<table>
<thead>
<tr>
<th>Exchange-Traded Commodity Futures</th>
<th>Physical Ownership and Private Investment in Commodities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Owning futures does not require technical expertise in managing the operations of extraction</td>
<td>Physical ownership requires a network of commercial consumers and producers to buy and sell the commodity</td>
</tr>
<tr>
<td>Investors pay the initial margin, a form of collateral against a commodity futures that must be available to trade futures contracts</td>
<td>Storage and transportation is costly and requires deep expertise as some commodities have a shelf life and are highly perishable</td>
</tr>
<tr>
<td>Spread trades, which involve the purchase of one future against the sale of another, take advantage of pricing inefficiencies along the futures curve</td>
<td>Private investments can be tied to time-sensitive opportunities or to a specific commodity not available in the futures market</td>
</tr>
<tr>
<td>Futures exchanges are fully liquid and allow investors to maintain commodity exposure without having to take physical delivery</td>
<td>Generally requires large amounts of capital and a full capital outlay</td>
</tr>
</tbody>
</table>
Natural Resource Equities
These securities represent ownership interests in companies involved in the production of tangible assets facing intense capital requirements and barriers to supply that are often linked to depleting commodity-related resources. Listed timber is one such example, characterized by the ownership and management of forest lands and wood-based products. Natural resource equities are subject to shifting supply and demand of the underlying natural resources, which can play a large role in determining which stocks perform better or worse at any time.

<table>
<thead>
<tr>
<th>Natural Resource Equities</th>
<th>Private Investments in Natural Resource Equities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural resource equities can provide natural resource exposure without the need for extraction or operational experience</td>
<td>Owners of private natural resource producers can have greater influence and control in driving producer or strategy success</td>
</tr>
<tr>
<td>The scope of public markets can enhance diversification, helping to prevent over-concentration in a single project or resource</td>
<td>Private investments can provide access to some sectors not readily available in public markets</td>
</tr>
<tr>
<td>Access to global agribusiness, a sector with growing importance that includes agriculture and industries such as fertilizers &amp; agricultural chemicals and packaged foods &amp; meats</td>
<td>Direct investments can provide targeted investment solutions, though it is somewhat limited across the broader natural resources spectrum and tends to be energy centric</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Listed Timber REITs</th>
<th>Private Timber Investments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provide investors access to United States timberland diversified by geography and managed by professionals</td>
<td>Private timber investments generally require significant amounts of capital and are often made through a timber investment management organization that actively manages the timberland for the investor</td>
</tr>
</tbody>
</table>

Global Infrastructure
Both listed and private investments focus on long-lived infrastructure assets that provide essential services in utilities, transportation and communications. Often, these businesses have significant barriers to entry, with regulated and monopolistic structures. Infrastructure assets tend to be relatively resistant to economic downturns, but they have also shown the potential to perform when the economy is expanding, given business models that are, in some cases, correlated with local economic conditions.

<table>
<thead>
<tr>
<th>Listed Infrastructure</th>
<th>Private Infrastructure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Established franchises of many listed companies and experienced management teams add value</td>
<td>As private demand has grown, constraints have risen through financing complexities, lengthy privatization processes and regulatory approvals</td>
</tr>
<tr>
<td>Access to assets not available in private markets, such as Chinese toll roads or Brazilian water utilities</td>
<td>Ability to invest in social infrastructure and public/private partnerships that may not be available in public markets</td>
</tr>
<tr>
<td>Listed infrastructure companies tend to hold a greater number of assets in more diversified portfolios by geography and subsector</td>
<td>Private infrastructure investments can offer investors greater control over the assets, depending on the ownership structure</td>
</tr>
<tr>
<td>Public infrastructure tends to be conservatively leveraged relative to direct infrastructure investing</td>
<td>Recent popularity has led to a backlog of capital and heightened competition for assets</td>
</tr>
</tbody>
</table>
Asset Class Representations

Bonds are represented by the BoA Merrill Lynch U.S. 7-10 Year Treasury Index.
Commodities are represented by the S&P GSCI commodity index through July 1998 and the Bloomberg Commodity Index thereafter.
The Diversified Real Assets Blend is represented by an equally weighted blend of Listed Real Estate, Commodities, Natural Resource Equities and Listed Infrastructure.
Farmland is represented by the NCREIF Farmland Index.
Listed Infrastructure is represented by a 50/50 Blend of the Datastream World Pipelines Index and Datastream World Gas, Water & Multi-Utilities Index through July 2008 and the Dow Jones Brookfield Global Infrastructure Index thereafter.
Listed Real Estate is represented by the FTSE NAREIT Equity REIT Index through February 2005 and the FTSE EPRA/NAREIT Developed Real Estate Index thereafter.
Natural Resource Equities are represented by a 50/50 Blend of the Datastream World Oil & Gas Index and Datastream World Basic Materials Index through May 2008 and the S&P Global Natural Resources Index thereafter.
Private Infrastructure is represented by the Preqin Infrastructure Index.
Private Natural Resources is represented by the Preqin Natural Resources Index.
Private Real Estate is represented by the NCREIF Property Index.
Stocks are represented by the S&P 500 Index.
Timberland is represented by the NCREIF Timberland Index.

Index Definitions

An investor cannot invest directly in an index, and index performance does not reflect the deduction of any fees, expenses or taxes.
The Bloomberg Commodity Index, formerly known as the Dow Jones-UBS Commodity Index, is a broadly diversified index composed of commodities traded on U.S. exchanges, with the exception of aluminum, nickel and zinc, which trade on the London Metals Exchange.
The BoA Merrill Lynch U.S. 7-10 Year Treasury Index is composed of U.S. Treasury Notes with a 7-10 year maturity.
The Datastream World Gas, Water & Multi-Utilities Index is a global index of companies in these sectors compiled by Thomson Reuters Datastream.
The Datastream World Pipelines Index is a global index of energy pipeline companies compiled by Thomson Reuters Datastream.
The Dow Jones Brookfield Global Infrastructure Index measures the stock performance of publicly listed infrastructure companies. The index intends to measure all sectors of the infrastructure market.
The FTSE EPRA/NAREIT Developed Real Estate Index (net) is an unmanaged market-weighted total return index which consists of many companies from developed markets who derive more than half of their revenue from property-related activities.
The FTSE NAREIT Equity REIT Index is an unmanaged, market-capitalization-weighted index of all publicly traded U.S. REITs that invest predominantly in the equity ownership of real estate, not including timber or infrastructure.
The NCREIF Farmland Index is a quarterly time series composite return measure of investment performance of a large pool of individual agricultural properties acquired in the private market for investment purposes only.
The NCREIF Property Index is a quarterly time series composite total rate of return measure of investment performance of a very large pool of individual commercial real estate properties acquired in the private market for investment purposes only.
The NCREIF Timberland Index is a quarterly time series composite return measure of investment performance of a large pool of individual timber properties acquired in the private market for investment purposes only.
The Preqin Energy-Focused Index is a custom index calculated on a quarterly basis using quarterly cash flow transactions and NAVs from more than 500 unlisted energy-focused partnerships, net of fees.
The Preqin Infrastructure Index is calculated on a quarterly basis using data from Preqin Infrastructure Online. Index performance captures quarterly cash flow transactions and NAVs reported for more than 140 individual unlisted infrastructure partnerships, net of fees.
The Preqin Natural Resources Index is calculated on a quarterly basis using data from Preqin Performance Analyst. Index performance captures quarterly cash flow transactions and NAVs reported for more than 170 individual unlisted natural resource partnerships, net of fees.
The S&P 500 Index is an unmanaged index of 500 large-capitalization, publicly traded stocks representing a variety of industries.
The S&P Global Agribusiness Index includes 24 of the largest publicly traded agribusiness companies from around the world. The index is comprised of a diversified mix of producers, distributors & processors and equipment & materials suppliers companies.
The S&P Global Agriculture Index is a subsector of the S&P Global Natural Resources Index that measures the investment performance of companies engaged in agriculture.
The S&P Global Natural Resources Index includes 90 of the largest publicly traded companies in natural resources and commodities businesses that meet specific investability requirements, offering investors diversified, liquid and investable equity exposure across three primary commodity-related sectors: Agribusiness, Energy and Metals & Mining.
The S&P GSCI commodity index is a composite index of commodity sector returns representing an unleveraged, long-only investment in commodity futures that is broadly diversified across the spectrum of commodities.
The S&P North American Natural Resources Index provides investors with a benchmark that represents U.S. traded securities that are classified under the GICS® energy and materials sector excluding the chemicals industry; and steel sub-industry.
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**Understanding the Risks of Investing.** A real assets strategy is subject to the risk that its asset allocations may not achieve the desired risk-return characteristic, underperform other similar investment strategies or cause an investor to lose money. The risks of investing in REITs are similar to those associated with private investments in real estate securities. Property values may fall due to increasing vacancies, declining rents resulting from economic, legal, tax, political or technological developments, lack of liquidity, limited diversification and sensitivity to certain economic factors such as interest rate changes and market recessions. An investment in commodity-linked derivative instruments may be subject to greater volatility than investments in traditional securities, particularly if the instruments involve leverage. The value of commodity-linked derivative instruments may be affected by changes in overall market movements, commodity index volatility, changes in interest rates, or factors affecting a particular industry or commodity, such as drought, floods, weather, livestock disease, embargoes, tariffs and international economic, political and regulatory developments. The use of derivatives presents risks different from, and possibly greater than, the risks associated with investing directly in traditional securities. Among the risks presented are market risk, credit risk, counterparty risk, leverage risk and liquidity risk. The use of derivatives can lead to losses because of adverse movements in the price or value of the underlying asset, index or rate, which may be magnified by certain features of the derivatives. Infrastructure issuers may be subject to adverse economic occurrences, government regulation, operational or other mishaps, tariffs and changes in tax laws and accounting standards. Foreign securities involve special risks, including currency fluctuation and lower liquidity. The market value of securities of natural resource companies may be affected by numerous factors, including events occurring in nature, inflationary pressures and international politics. Because the strategy invests significantly in natural resource companies, there is the risk that the strategy will perform poorly during a downturn in the natural resource sector. The risks of investing in the global timber industry include the potential impact of numerous factors, including events occurring in nature and international politics. Global timber is highly competitive globally, continues to suffer from excess capacity and is subject to many federal, state and local environmental, health and safety laws and regulations. The risks of investing in farmland include those associated with making investments in companies engaged in the agriculture business such as economic forces, energy and financial markets, government policies and regulations, and environmental laws and regulations.

**Futures Trading Is Volatile, Highly Leveraged and May Be Illiquid.** Investments in commodity futures contracts and options on commodity futures contracts have a high degree of price variability and are subject to rapid and substantial price changes. Such investments could incur significant losses. There can be no assurance that the options strategy will be successful. The use of options on commodity futures contracts is to enhance risk-adjusted total returns. The use of options, however, may not provide any, or only partial, protection for market declines. The return performance of the commodity futures contracts may not parallel the performance of the commodities or indexes that serve as the basis for the options it buys or sells; this basis risk may reduce overall returns.

*This commentary must be accompanied by the most recent Cohen & Steers Real Assets Fund fact sheet if used in connection with the sale of mutual fund shares.*
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**Americas**

**NEW YORK**

Corporate Headquarters  
280 Park Avenue, 10th Floor  
New York, New York 10017  
Phone  212 832 3232  
Fax  212 832 3622

**SEATTLE**

Cohen & Steers Capital Management, Inc.  
1201 Third Avenue, Suite 3810  
Seattle, Washington 98101  
Phone  206 788 4240

**Europe**

**LONDON**

Cohen & Steers UK Limited  
21 Sackville Street, 4th Floor  
London W1S 3DN  
United Kingdom  
Phone  +44 0 20 7460 6350

**Asia Pacific**

**HONG KONG**

Cohen & Steers Asia Limited  
Suites 1201-02, Citibank Tower  
Citibank Plaza, 3 Garden Road  
Central, Hong Kong  
Phone  +852 3667 0080

**TOKYO**

Cohen & Steers Japan, LLC  
Pacific Century Place, 8F  
1-11-1 Marunouchi Chiyoda-ku  
Tokyo 100-6208 Japan  
Phone  +81 3 6860 9398

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