

ALTERNATIVE STRATEGY ASSUMPTIONS

A stable to improving alpha outlook offsets the beta drag

Anthony Werley, *Chief Portfolio Strategist, Endowments and Foundations Group*

IN BRIEF

- We see an improving outlook for alternative strategies relative to public markets—largely due to industry and investment trends expected to favor alpha generation and help offset some of the drag from reduced public market expectations. Changes to our alternative return estimates vs. 2017 run from negative to positive, reflecting the unique fundamentals of each strategy type. As always, manager selection will be a critical determinant of investment success across all alternative strategy classes.
- **Private equity (PE):** Reduced public equity assumptions, historically high PE purchase price multiples and significant stores of dry powder lead to a somewhat more pronounced decline in return estimates for PE vs. other alternative strategy classes. A broader opportunity set may help enhance investors' returns.
- **Direct lending:** Projected returns are up slightly and imply yields meaningfully higher than comparable public market credits. Premiums can be expected to fall as this private market matures.
- **Hedge funds:** We mark up return estimates for most strategies, largely reflecting expectations of a transition from a macro-driven to a more fundamentally driven market environment, supportive of alpha generation.
- **Real estate:** Though return estimates are down slightly, the outlook for real estate remains a relative bright spot. Positive factors include disciplined supply, constrained leverage and the globalization of real estate investment flows. **REIT** returns are based primarily on regional core real asset return assumptions and incorporate leverage.
- **Infrastructure:** The return outlook for infrastructure equity is unchanged, given two opposing forces: a strong bid pushing up project pricing, and investors' expectations of higher illiquidity premiums. Infrastructure debt returns are also unchanged, as a lack of investor experience in these markets is expected to keep illiquidity premiums high.
- **Commodities:** Most current indicators (with the exception of those for the energy sector) continue to point to an upturn in the broad commodity cycle. Our return assumptions imply a 150 basis point (bps) real return over inflation, unchanged from last year. For gold, we anticipate a 25bps premium to commodities.

OVERVIEW

The improving return outlook for alternative strategies vs. public markets results from an upgrade in the investment environment for hedge funds, an incrementally expanded opportunity set in private equity and hedge funds, and investor discipline in core real estate, infrastructure and private debt. All three trends were previously identified in our 2017 alternatives outlook, but in our 2018 assumptions the trade-offs and benefits of private vs. public market execution options move a little closer to the conditions that prevailed prior to the current market cycle. As has been the case historically, the return dispersion among managers across the alternative investment spectrum remains wide; full compensation for the risks taken in alternative investing lies in execution above the average manager's performance.

Despite a markdown of public equity and credit expectations, alternative return expectations are generally flat to slightly down (except for direct lending and most hedge fund strategies, which are slightly up, and small and midsize private equity, which are down somewhat more significantly) relative to last year's assumptions (**Exhibit 1**). A clear exposure to non-U.S. markets—particularly Asia ex-Japan, where we have higher return expectations than for U.S. markets—benefits the private equity and hedge fund assumptions. Likewise, as a more fundamentally driven and less central bank/macro market-driven environment continues to evolve, we would expect hedge funds to be in a clearly better operating environment. Interestingly, while public market valuations and returns have been bid up over the past year, investors have asked for higher upfront compensation in the form of higher starting yields in core real estate, infrastructure equity and private debt.

The coast is still far from all-clear as asset size builds in private equity even as purchase price multiples reach or exceed previous peaks. Hedge funds face competition from smart beta and quantitative liquid market operators. U.S. real estate core supply is subdued but increasing, and the infrastructure regulatory outlook still has a bias toward modest allowed rates of return not attractive enough to induce new capital projects. All things considered, the risk-adjusted outlook for illiquid investing has improved on the margin, at least vs. public market options.

Alternative return assumptions are mostly flat to slightly down, but improved relative to public market returns

EXHIBIT 1: SELECTED ALTERNATIVE STRATEGIES—RETURN ASSUMPTIONS (%)

	2018	2017
PRIVATE EQUITY* (USD)	7.25	8.00
U.S. private equity - small cap	6.50	7.50
U.S. private equity - mid cap	6.75	7.75
U.S. private equity - large/mega cap	7.50	8.00
PRIVATE DEBT (USD)		
Direct lending	7.00	6.75
HEDGE FUNDS (USD)		
Equity long bias	4.75	4.50
Event-driven	4.75	4.75
Relative value	4.50	4.25
Macro	3.75	4.00
Diversified**	4.25	3.50
Conservative†	3.75	3.00
REAL ESTATE - DIRECT (UNLEVERED, LOCAL CURRENCY)		
U.S. core	5.25	5.50
U.S. value-added	6.50	7.00
European ex-UK prime	4.75	5.00
European ex-UK non-prime	6.50	7.00
UK core	4.75	5.25
Asia Pacific core	5.50	5.50
REITS (LEVERED, LOCAL CURRENCY)††		
U.S. REITs	6.25	
European REITs	7.00	
Asia Pacific REITs	7.00	
Global REITs	6.50	
GLOBAL INFRASTRUCTURE (USD)		
Equity - direct	6.25	6.25
Debt	4.25	4.25
COMMODITIES (USD)	3.75	3.75
Gold	4.00	4.00

Source: J.P. Morgan Asset Management; estimates as of September 30, 2017, and September 30, 2016.

* The private equity composite is AUM-weighted: 60% large cap and mega cap, 30% mid cap and 10% small cap. Capitalization size categories refer to the size of the asset pool, which has a direct correlation to the size of companies acquired, except in the case of mega cap.

** The diversified assumption now represents the projected return for multi-strategy hedge funds (vs. funds of funds, as in previous LTCMAs).

† "Conservative" represents the projected return for multi-strategy hedge funds that seek to achieve consistent returns and low overall portfolio volatility by primarily investing in lower volatility strategies such as equity market neutral and fixed income arbitrage.

†† 2018 assumptions for REITs are levered; in previous LTCMAs, these assumptions (not shown) were unlevered.

PRIVATE EQUITY

The principal driver of our private equity average return estimates—public equity return assumptions—has been reduced. This reduction, together with historically high PE purchase price multiples and a large store of assets to be invested, leads us to reduce our long-term PE return estimates (**Exhibit 2**). There are, however, some positive developments within the industry. Investment discipline has extended into new, higher growth and less efficient markets, and there is greater opportunity to invest in a more concentrated, less fee-burdened “co-invest” option.

Private equity can still offer the potential to earn a premium over public equity returns, but expectations of premia equivalent to those traditionally associated with private equity are unlikely to be met. As we have said in the past, fair compensation for private equity’s additional illiquidity, leverage and overall investment model risk accrues to those who can move up the internal rate of return (IRR) dispersion of PE funds through skillful due diligence and manager access; at the average manager level, expectations are for a very modest premium to public markets (**Exhibit 3**).

Private equity return estimates are down, given lower public equity assumptions and challenging PE industry conditions

EXHIBIT 2: PRIVATE EQUITY RETURN ASSUMPTIONS AND EQUITY BETA BUILDING BLOCKS

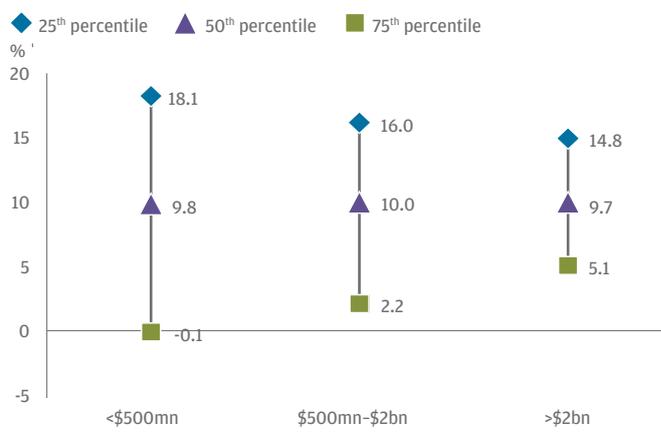
	Small PE (<\$500mn)	Mid PE (\$500mn-\$2bn)	Large/mega PE (>\$2bn)	Cap-weighted*
EQUITY BETAS				
Small cap	-0.19			
Mid cap	0.63	0.63	0.27	
Europe			0.21	
Asia ex-Japan			0.36	
Adjusted R ²	0.38	0.57	0.70	
INTERNAL RATE OF RETURN ASSUMPTIONS (USD, %)				
2018	6.50	6.75	7.50	7.25
2017	7.50	7.75	8.00	8.00

Source: J.P. Morgan Asset Management; regression data from June 30, 2006, to December 31, 2016; estimates as of September 30, 2016 and September 30, 2017.

* The private equity composite is AUM-weighted: 60% large cap and mega cap, 30% mid cap and 10% small cap. Capitalization size categories refer to the size of the asset pool, which has a direct correlation to the size of companies acquired, except in the case of mega cap.

Manager choice remains a key determinant of successful PE investing, particularly when investing in smaller funds

EXHIBIT 3: HISTORICAL PRIVATE EQUITY DISPERSION BY SIZE OF FUND,* IRR OF VINTAGE YEARS (2005-15) (%)



Source: Burgiss Private iQ, J.P. Morgan Asset Management; data as of December 2016. *Includes buyout and expansion capital funds.

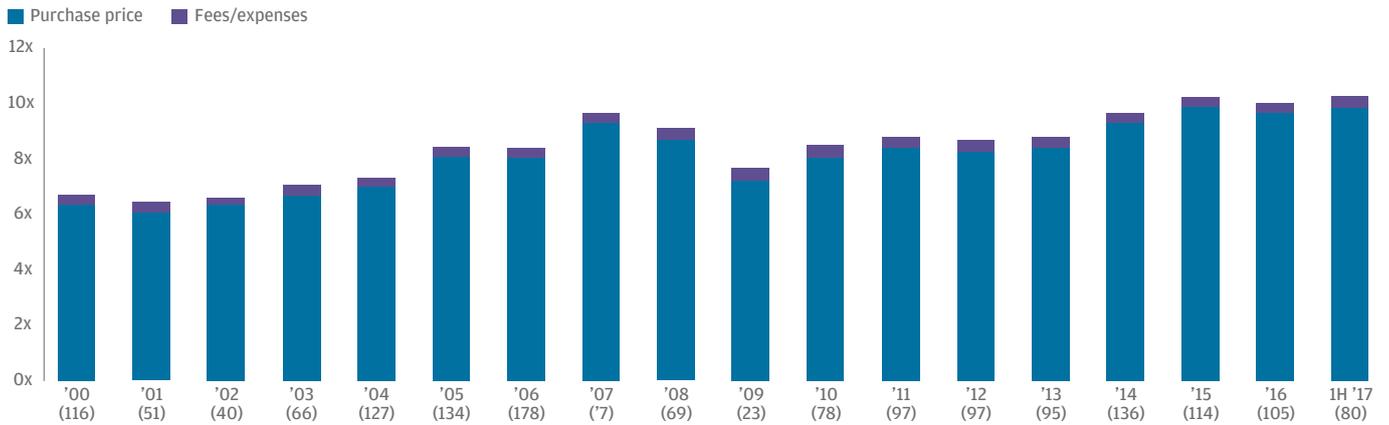
Current market conditions

Along many dimensions, the private equity strategy class currently resembles most of the capital markets: generous valuations, a large volume of assets to be invested and an extension along the risk curve in pursuit of potentially improved returns vs. the traditional portfolio profile. Valuations as measured by purchase price multiples have risen meaningfully since the bottom of the last market cycle and are now at or above the multiples paid at the prior cycle peak (**Exhibit 4**)—not just in the U.S. but generally across the developed markets. As one measure of risk-taking, however, the average debt multiples of issuers are still somewhat below those at the top of the last cycle (**Exhibit 5**).

Regardless of the industry environment, private equity is seen as an antidote to lower expected public equity returns and, as such, portfolio allocations to private equity have risen precipitously over the past few years. A strong distribution environment in recent years is also contributing to the capital available for investment. Fund sponsors have responded in kind by raising ever-larger funds (**Exhibit 6**). Anecdotally, the largest fund size so far this cycle has surpassed the peak fund size of 2007 by approximately 30%. Additional pressure on returns comes from the well-heeled competition of sovereign wealth funds and large pension plans looking to enhance returns by going direct and avoiding fund sponsor fees. Unlike other alternative strategies where historically higher returns have been challenged, there is no expectation of fee abatement within the illiquid equity space.

Purchase price multiples exceed those at the peak of the last cycle ...

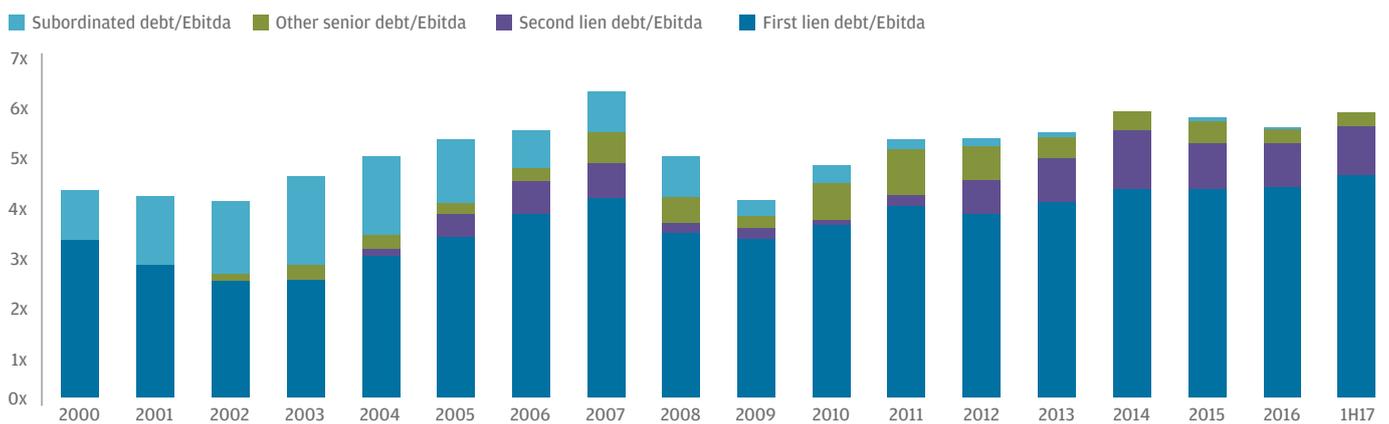
EXHIBIT 4: PRIVATE EQUITY PURCHASE PRICE MULTIPLES



Source: S&P Capital IQ, J.P. Morgan Asset Management; data as of June 30, 2017. Number of deals shown in parentheses.

... while debt multiples are still below the prior cycle's peak

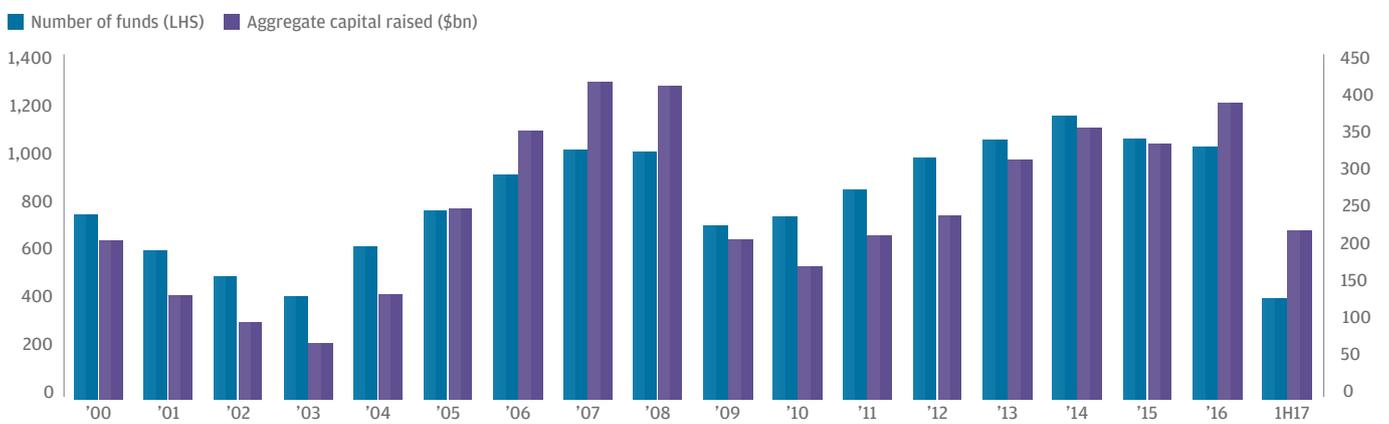
EXHIBIT 5: AVERAGE DEBT MULTIPLE OF ISSUERS (Ebitda > \$50M)



Source: S&P Capital IQ, J.P. Morgan Asset Management; data as of June 30, 2017.

Fundraising, driven by increasing private equity allocations, has risen dramatically

EXHIBIT 6: HISTORICAL PRIVATE EQUITY FUNDRAISING BY YEAR



Source: Preqin, J.P. Morgan Asset Management; data as of June 30, 2017.

New opportunities and extensions along the risk curve

Several developments have the potential to enhance private equity returns, including an expansion of the PE opportunity set and new options for accessing PE investments.

Within large/mega and midsize funds, international market exposures, specifically in Europe, have appeared for a number of years. And, for the first time, our 2018 equity beta statistics record a measurable Asia ex-Japan exposure in large/mega funds (see Exhibit 2). Such exposures offer the base case of higher underlying public market returns vs. those of more U.S. domestically focused funds.

Within the growth equity subcomponent of private equity, the higher growth sectors of technology and life sciences offer opportunities for return above the outlook for general GDP-oriented investing. Specifically, cybersecurity, artificial intelligence, disruptive technology, industrial innovation and millennial-focused products and services portend better growth and potential return outlooks.¹

The most notable development within the past few years is the increasing role of co-investment opportunities—that is, single-company, often reduced-fee investment options—within a diversified private equity portfolio. Clearly, there is potential for higher overall portfolio returns when allocating to fewer, more select, higher conviction opportunities, coupled with a fee reduction. Yet our research indicates that, on average, actual results have not lived up to that premise. These concentrated bets have produced returns in line with, or slightly below, overall portfolio performance. Even so, co-invests have served to put some dry powder to work and have reduced the drag from fees at the margin. As fund sizes increase, however, co-investment opportunities are likely to become less available.

Co-investments serve, once again, to highlight the role that manager and investment selection, not allocation, play in generating excess returns as fund sponsors and investors go farther out on the risk curve through more concentrated portfolios.

The outlook for alpha

Full purchase price multiples, a sizable store of dry powder, increased competition and no discernible return advantage from co-invests, on average, argue for less of a premium above public markets across the fund capitalization spectrum. Our long-term return assumptions are marked down accordingly from last year's, given the lower underlying beta expectation and steady premium over public markets. A marginal exception is made in the large/mega capitalization fund segment to reflect the increased internationalization of portfolio holdings. This is in line with our expectation of higher underlying public market returns, especially in Asia, and the potential, at least, for improved alpha generation vs. the available alpha in U.S. markets.

Finally, it cannot be said too often: Our assumptions represent average manager returns. The true return-enhancing potential of private equity, as demonstrated by top quartile returns, is realized through careful due diligence and selection of top-performing managers.

¹ See "The impact of technology on long-term potential economic growth," J.P. Morgan Asset Management, 2018 Long-Term Capital Market Assumptions for more on this topic.

DIRECT LENDING

Our 2018 long-term return estimate for direct lending is 7.00%, up 25 basis points from last year's estimate (**Exhibit 7**). This increase is due largely to a broadening of the universe we model to incorporate somewhat higher quality borrowers, resulting in a smaller downward adjustment for expected credit losses.

Direct lending/private debt volumes continue to rise strongly, reflecting the benefits to borrowers of speed and certainty of execution, a single counterparty and the flexibility of debt structures that working with a customized provider affords. At the same time, regulatory constraints on bank lending are still in force for the traditional providers of credit to this middle market corporate segment. Current investors receive a significant illiquidity premium for taking on unrated, smaller size loans with a credit profile that is similar to leveraged loans but with a more cyclical bias. As assets and marginal operators are attracted to the space, we anticipate a degradation of both the illiquidity premium received by investors and the historically strong underwriting results experienced by the industry. As direct lending assets grow and become a more institutionalized portfolio allocation, the excess premium to publicly available credit should fall, consistent with the experience of other public-to-private management dynamics, such as private equity.

Composite characteristics

Direct lending characteristics are modeled primarily on the Cliffwater Direct Lending Index (CDLI), a composite of approximately \$90 billion of unrated floating rate loans. In developing our assumptions, we have modified the CDLI characteristics to include a slightly broader, higher quality universe, reflecting our assessment of future asset characteristics as this market matures. The assumed debt structure of the enterprise modeled is weighted approximately 65% to first lien and senior secured loans and 35% to second lien and junior securitized loans. For the majority of enterprises, Ebitda falls in the \$50 million to \$100 million range. Loans are generally a five-year maturity, though through prepayments and refinancing the effective loan life is three years.² The current starting terms for the CDLI composite are a 9.25% cash yield and 75bps of original issue discount (OID) and other concessions, with a 1% net credit loss. Our forward assumption suggests a meaningful, though smaller, premium to comparable public market credit options—one we view as more likely to prevail in an excess return, capital-attracting environment like that of the maturing direct lending market.

Direct lending is expected to offer yields meaningfully above comparable public market credits, even as this private market matures

EXHIBIT 7: DIRECT LENDING—RETURN ASSUMPTIONS AND BUILDING BLOCKS (USD, %)

BUILDING BLOCKS	2018	2017
Cash yield (interest income/coupon)	8.00	8.00
OID, prepayment fees, other concessions	0.50	0.50
Credit loss net	-1.50	-1.75
Total return	7.00	6.75

Source: J.P. Morgan Asset Management; estimates as of September 30, 2016 and September 30, 2017.

² Underlying the Cliffwater Direct Lending Index are unrated floating rate loans, selectively extended to middle market companies. The index is weighted approximately 50% to first lien and senior secured loans, 25% to second lien and junior secured loans and 25% to equity, mezzanine and other junior securities. Loans generally have a five-year maturity, reduced through prepayments and refinancing to an average loan life of three years.

HEDGE FUNDS

Our 2018 long-term return assumptions for hedge funds are marked higher vs. our 2017 assumptions for all strategies except event-driven (which is flat) and macro (which is down slightly), even as our beta assumptions across the capital markets are lowered (**Exhibit 8**). These marginally higher returns assume improvements in investment and industry conditions but are based primarily on the premise that the return-corrosive, central bank-driven, massive liquidity conditions of the past several years will give way to a fundamentally driven market environment—one more conducive to alpha generation.

Projecting multi-strategy vs. fund of funds returns

Our definition of diversified hedge funds has changed this year; return assumptions now represent multi-strategy funds vs. funds of funds. The increase in diversified hedge fund return estimates for 2018 vs. 2017 is due largely to the elimination of funds of funds’ additional fee level and the higher expected return potential of the more flexible multi-strategy fund structure.

Improving industry conditions

Many of the conditions that depressed hedge fund returns prior to the Great Recession era are still operative—in particular, too large an asset base chasing a diminished opportunity set and competition from non-traditional approaches such as smart beta and other quantitative strategies. On the positive side, changing fee structures and a winnowing-out of the bottom tier of managers owing to waning asset flows and a deterioration of the hedge fund business model should help increase returns.

A more fundamentally driven market is expected to boost returns for most hedge fund strategy types

EXHIBIT 8: HEDGE FUND RETURN ASSUMPTIONS (USD, %)

	2018	2017
Equity long bias	4.75	4.50
Event-driven	4.75	4.75
Relative value	4.50	4.25
Macro	3.75	4.00
Diversified*	4.25	3.50
Conservative**	3.75	3.00

Source: J.P. Morgan Asset Management; estimates as of September 30, 2016 and September 30, 2017.

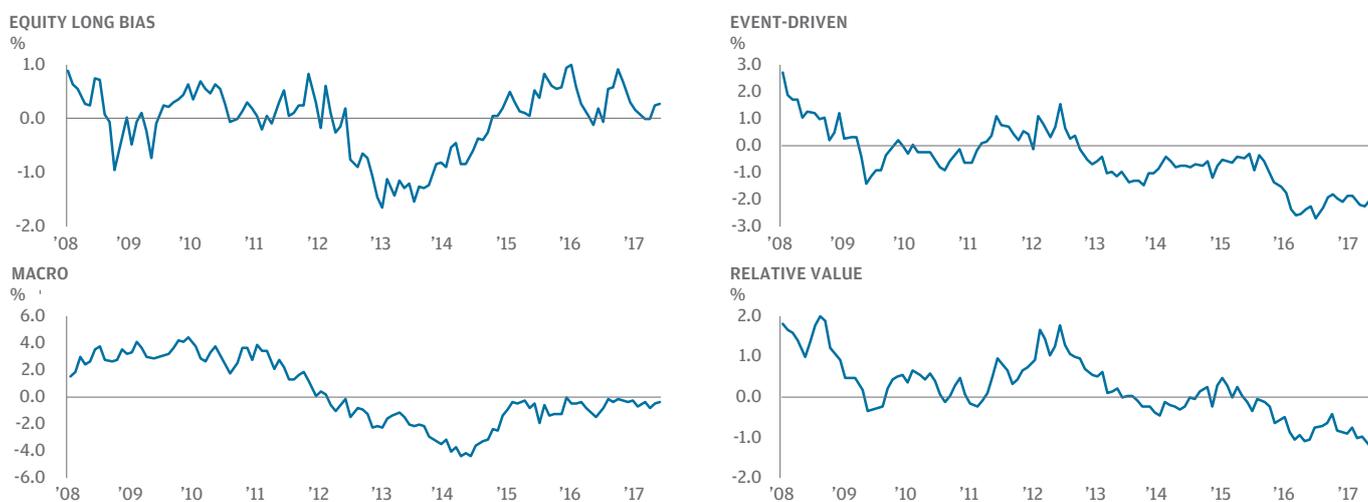
* The diversified assumption now represents the projected return for multi-strategy hedge funds (vs. funds of funds as in previous LTCMAS). ** “Conservative” represents the projected return for multi-strategy hedge funds that seek to achieve consistent returns and low overall portfolio volatility by primarily investing in lower volatility strategies such as equity market neutral and fixed income arbitrage.

Potential for an alpha upturn

Since the Great Recession, the trend for alpha (residual return not described by beta) has been clearly negative, with the exception of equity long bias strategies (**Exhibit 9**). These trends have been consistent with the macro-driven market conditions of the period, characterized by declining interest rates (and an accompanying decline in hedge fund net interest income), rising return correlations, low market volatility and massive liquidity throughout the financial system (which, among other effects, has enabled the survivorship of otherwise less viable entities, hurting the performance of the short book in more fundamentally oriented strategies). Macro—specifically, systematic macro strategies—face a more problematic outlook because the powerful bull market in fixed income has been a key generator of historical macro returns.

We see a bottoming and gradual upturn of negative alpha trends as the industry and market environment improve

EXHIBIT 9: TREND LINES FOR 36-MONTH ROLLING ALPHAS* BY MAJOR HEDGE FUND STRATEGY CLASS



Source: Hedge Fund Research, Bloomberg, J.P. Morgan Asset Management for estimates; data as of May 31, 2017. *Alpha is defined here as the difference between actual composite returns and estimated core beta returns for a given hedge fund strategy. Core beta returns are estimated using J.P. Morgan Asset Management proprietary regression models and actual historical values for the traditional asset class/market drivers of return.

With interest rates at an inflection point, this powerful source of return is, at a minimum, diminished going forward.

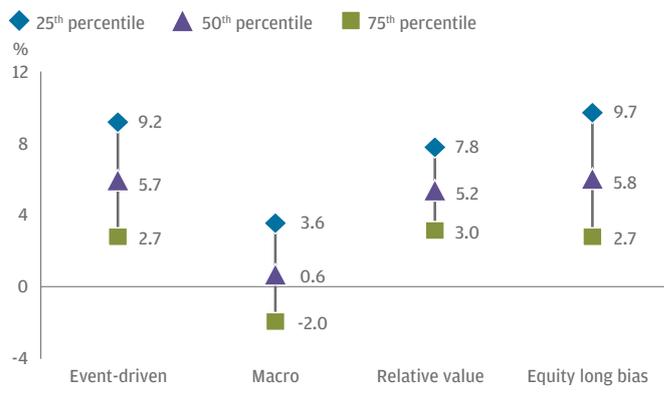
Manager selection matters

As explained in “**Building blocks of hedge fund return estimation (average industry conditions)**,” our approach to projecting average hedge fund industry returns incorporates three basic components—core beta returns, alpha trends and alpha potential—but these are *average* return assumptions.

While beta continues to be the overwhelming driver of returns at the average manager level, hedge funds exhibit a high alpha-to-beta ratio vs. traditional asset managers as you move upward through the peer group performance ranking. Likewise, the wide differential in results between top vs. bottom performers is a key risk of the strategy class. Manager selection remains a critical determinant of the extent to which investors realize the potential of hedge funds to generate returns equivalent to a stock-bond combination and to diversify and risk-adjust multi-asset class portfolio performance (**Exhibit 10**).

Manager selection is critical in realizing the investment potential of hedge funds

EXHIBIT 10: DISPERSION OF MANAGER RETURNS (%), JULY 2012-JUNE 2017



Source: Hedge Fund Research, J.P. Morgan Asset Management; data as of June 30, 2017.

BUILDING BLOCKS OF HEDGE FUND RETURN ESTIMATION (AVERAGE INDUSTRY CONDITIONS)

CORE BETA RETURNS: the primary component of our projected hedge fund returns—estimated as the product of beta exposures (from our proprietary regression models; see chart below) and our long-term return assumptions for traditional asset classes

- Our analysis finds beta exposures increasingly rotating toward higher return non-U.S. markets.

ALPHA TRENDS: based on historical alpha trends, adjusted for forward-looking expectations (Exhibit 9)

- We expect the long-running negative alpha trend to moderate as fundamentals increasingly drive performance.

ALPHA POTENTIAL: further adjustments, based on our interpretation of the impact of industry conditions on the forward-looking alpha potential of each strategy class

- We anticipate a fee reduction of at least 25bps at the average manager level, industry-wide.

DERIVED EQUITY BETA EXPOSURES (COEFFICIENTS) AND GOODNESS OF FIT (R²) STATISTICS

	Long bias	Event-driven	Relative value	Macro	Diversified*	Conservative**
Large cap	-0.18					
Mid cap	0.30	0.13				
Small cap			-0.03	-0.02		
EAFE	0.15		0.10	0.07	0.19	0.12
Japan		0.05				
Asia ex-Japan	0.13	0.05		0.06		
Commodities	0.05	0.06	0.06	0.08	0.07	0.07
U.S. aggregate	-0.40	-0.37		0.18		
U.S. high yield	0.00	0.17	0.23	-0.20	0.03	0.04
World gov. ex-U.S.			-0.16	0.02	-0.20	-0.19
EM corporate			0.11			0.05
Adj. R ²	0.93	0.83	0.84	0.23	0.68	0.67

Source: Bloomberg, J.P. Morgan Asset Management. The time frame for regression analysis is December 31, 2004, through May 31, 2017. *The diversified assumption now represents the projected return for multi-strategy hedge funds (vs. funds of funds as in previous LTCMAs). **The conservative assumption represents the projected return for multi-strategy hedge funds that seek to achieve consistent returns and low overall portfolio volatility by primarily investing in lower volatility strategies such as equity market neutral and fixed income arbitrage. For further details on our methodology, please see J.P. Morgan Asset Management, *2017 Long-Term Capital Market Assumptions*, pp. 65-66.

REAL ESTATE

We see a neutral to positive outlook for real estate relative to most other asset classes, varying by real estate sector. We expect current supply discipline to support returns above levels typical of this later stage in the real estate cycle, contributing to this relative performance over the long term. Our 2018 Long-Term Capital Market Assumptions (LTCMAs) for real estate are, however, revised slightly downward from last year’s projections, save for Asia Pacific core (**Exhibit 11**).

Real estate return expectations are reduced, but still strong relative to most asset classes

EXHIBIT 11: REAL ESTATE RETURN ASSUMPTIONS DIRECT (UNLEVERED, LOCAL CURRENCY, %)

	2018	2017
U.S. core	5.25	5.50
U.S. value-added	6.50	7.00
Europe ex-UK prime	4.75	5.00
Europe ex-UK non-prime	6.50	7.00
UK core	4.75	5.25
Asia Pacific core	5.50	5.50

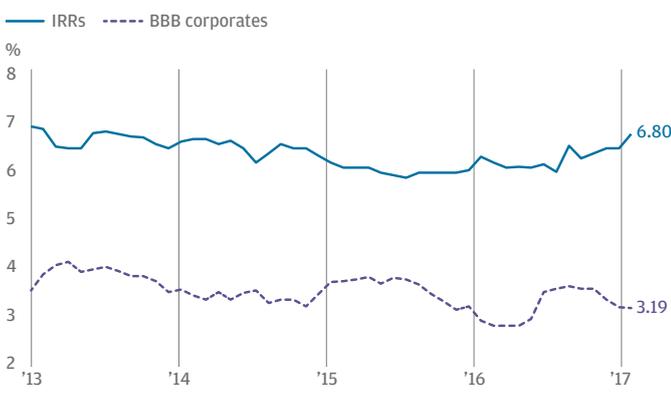
Source: J.P. Morgan Asset Management; estimates as of September 30, 2016 and September 30, 2017.

Global real estate market trends

A number of common themes—the globalization of real estate investment flows, more modest loan to value vs. past cycles and historically attractive spreads vs. public market credit—are recurring globally across real estate markets. While the implications of these trends for returns may differ from region

U.S. core real estate is increasingly attractive vs. comparable public credit

EXHIBIT 12: U.S. CORE REAL ESTATE IRRs VS. BBB CORPORATE BOND YIELD TO MATURITY (%)



Source: J.P. Morgan Asset Management; data as of June 30, 2017. *IRRs refer to forward-looking underwriting internal rates of return.

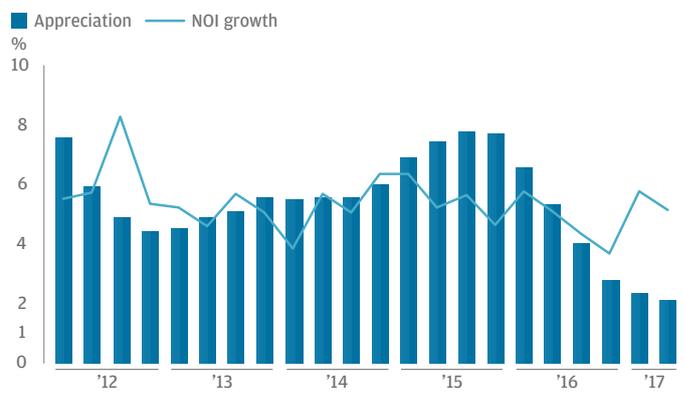
to region and city to city, in general, variations are likely to be muted. Over our investment horizon, changing demographics and online vs. in-store purchasing will likely be global phenomena impacting traditional patterns of asset utilization. The supply discipline of the current U.S. and European cycles and greater anticipated constraint in developed Asia Pacific economies dominate the long-term outlook for real estate returns compared with most other investment options, despite the relatively low current absolute cap rates in many parts of the industry. Leverage is generally constrained even as net operating incomes (NOIs) remain healthy for this stage of the cycle. The increased globalization of real estate flows may exert a modest measure of return harmonization across regions, somewhat akin to the dynamics of the global fixed income markets. Within the industry, generally, there exists a wide dispersion of sectoral return outlooks, bounded on the upside by the relatively controlled development pace and low leverage of core office markets and on the downside by the disruption in the brick and mortar retail segment.

U.S. markets

A general tone of caution and regulation in core real estate development and lending this cycle continues to define the attractive relative return expectation in the space vs. most other asset class return assumptions. Investors’ shift away from core to value-added has softened pricing and raised core cap rates and forward-looking underwriting internal rates of return by about 60bps to 75bps over the past two years (**Exhibit 12**). Leverage for core assets has remained inexpensive as rates and spreads have stayed relatively low even as the aversion to leverage remains high. Notably for this late stage in the cycle, NOI growth has outpaced asset appreciation (**Exhibit 13**).

NOI growth is outpacing appreciation for core U.S. real estate

EXHIBIT 13: FOUR-QUARTER NCREIF ODCE* UNLEVERED PROPERTY APPRECIATION VS. NOI GROWTH



Source: National Council of Real Estate Investment Fiduciaries (NCREIF); data as of June 30, 2017. *ODCE is an abbreviation for open end diversified core equity.

Over the past six months, a step-up in development activity has slightly reduced this cycle's supply discipline, but at the same time, an upturn in corporate earnings and improved business outlook may provide further absorption power, as business expectations drive office leasing more than immediate space needs would indicate. However, the recent uptick in IRRs and overall tone of the cycle have moderated downside expectations for the end of this cycle, producing a better compounding effect over the term of the projection despite marginally lower current cap rates vs. long-term equilibrium.

Our basic model for projecting U.S. core returns begins with current starting yields, adds estimated growth in yields over the term and deducts standard industry fees. A final calculation—the exit yield adjustment—is made to reflect the impact of a rising or falling yield environment on asset valuation (**Exhibit 14**).

Attractive relative return expectations characterize U.S. core real estate

EXHIBIT 14: U.S. UNLEVERED CORE REAL ESTATE ASSUMPTIONS AND BUILDING BLOCKS (USD, %)

BUILDING BLOCKS	
Starting yield	5.00
Net cash flow growth	2.50
Exit yield adjustment	-1.55
Standard industry fees	-0.70
IRR assumption	5.25

Source: J.P. Morgan Asset Management; estimates as of September 30, 2017.

Sectoral considerations

OFFICE: Supply discipline, modest levels of leverage, lower financing rates and extended debt maturities characterize this segment, setting up less onerous expectations in the downside of the cycle. Absorption rates have been slower than expected but are likely to improve along with business confidence.

INDUSTRIAL: The torrid pace of gains, primarily driven by fulfillment centers, should moderate, but unmet demand for logistics facilities remains robust. We expect the impact of direct-to-consumer distribution to moderate in the next few years, as the entire logistics chain is now focused on reducing inventory overhang.

RETAIL: Rumors of the demise of brick and mortar retailers may be exaggerated. Macroeconomic data supports further rationalization of existing facilities rather than more extreme outcomes. Material risk exists within the mall space from

approximately 500 weaker malls that may not be able to navigate the move from “goods distribution” to “placemaking and services delivery.”³

MULTI-FAMILY: Rents are still at a constructive 3% trend line growth despite significant new development. Value resides in suburban markets even as urban luxury apartment rent growth has recently turned negative.

VALUE-ADDED: Flows to value-added strategies are strong at this stage of the cycle. As this dry powder gets invested, expect a compression in returns and convergence between core and value-added returns.

Europe ex-UK

European ex-UK real estate trends are generally in line with the global themes of supply constraint, flow of funds impacting local prices, meaningfully lower leverage vs. the past cycle and an overall positive tone for the duration of the current cycle. Likewise, European cap rates are by historical standards expensive, but spreads to interest rates are historically wide and the global yield quest may yet keep returns from reverting to long-term equilibriums.

The bifurcation of markets into prime and non-prime continues, with the core/primary cities experiencing better demand and more aggressive pricing than non-prime/tier two cities. As risk appetites increase and the European economy continues its expansion, we would expect a catch-up in pricing for the non-prime sector of the market and a compression in the spread between the two tiers.

UK

Longer-term projections for pan-European real estate trends should include a Brexit dynamic that creates a modest return differential between the fortunes of Continental assets and those in the UK. While UK transaction volumes are down precipitously since the June 2016 Brexit referendum, returns have been buffered by the arrival of global investors, particularly from China. London cap rates have risen modestly over the past year, while Continental cap rates are down. The pace and outlook for rent growth have slowed more markedly vs. Continental assets. However, with healthy fundamentals (including low vacancy levels and a somewhat constrained supply in the pipeline), the UK real estate market remains resilient, though a “wait and see” attitude prevails as the Brexit process unfolds.

³ “Placemaking” is a multi-faceted approach to the planning, design and management of public spaces, capitalizing on a local community's assets, inspiration and potential to create public spaces that promote health, happiness and well-being.

Asia Pacific

The 10- to 15-year outlook for APAC real estate has a slightly healthier tone than that for real estate in the U.S. or European developed markets. This outlook reflects an APAC economic growth rate that, while structurally slowing, is still anticipated to exceed the rate of growth for these developed markets. Slower but still increasing urbanization, changing demographics and a rising middle income population are expected to drive this APAC growth advantage. A stronger web of intra-APAC economic linkages, especially with China, and fewer linkages with a slower-growing, developed U.S. economy should help sustain growth.

Consistent with Asian growth cyclically reaccelerating later than U.S. economic growth, APAC markets, while quite diversified, are likely still in the mid-cycle stage. Commercial real estate supply is decelerating from the stepped-up pace of the last three years even as demand is expected to remain firm going forward. Capital inflows should continue, reflecting healthy fundamentals and the underexposure of U.S. and EMEA institutional investors to the region.

The developing services sector is expected to grow faster than overall GDP, particularly in the China and India markets. Together with increasing urbanization, this should continue to drive commercial real estate growth. The changing complexion of the demographics in the region, both from a growing number of millennials and an aging population, should increasingly impact traditional real estate utilization assumptions. Diminished overcapacity, primarily in China, is expected to drive more efficient use of both office and logistic assets.

Real estate investment trusts (REITs)

Publicly traded real estate prices ultimately converge to the underlying value of the real assets in the REIT index. Our methodology for determining a regional REIT return assumption starts with that region's core real asset return assumption. The regional core assumption is then adjusted for three factors, measured at the regional level, specifically impacting REIT returns:

- net REIT leverage
- discount or premium to NAV amortized to its historical average
- sectoral differences in the composition of the regional REIT index vs. the core real estate composite

Given that our methodology uses regional core real estate assumptions as a starting point, our REIT and core estimates reflect the same regional real estate fundamentals. The adjustments fine-tune these estimates. For example, 20% of underlying assets in regional REIT indices vary from the assets in that region's core real estate composite; the slightly higher growth potential for this 20% adds an incremental return to our REIT assumptions. Our 2018 methodology differs from previous years primarily by the inclusion of average industry leverage, which can also add to REIT returns and have a differential impact across regions. (Exhibit 15).

REIT return estimates assume convergence to the value of the underlying real assets and incorporate leverage

EXHIBIT 15: REIT RETURN ASSUMPTIONS AND BUILDING BLOCKS (LEVERED, LOCAL CURRENCY, %)

REITS	U.S.	Europe*	Asia Pacific	Global
Core real asset assumption	5.25	5.50	5.50	5.33
Net leverage benefit	0.40	1.25	1.10	0.66
NAV amortization	0.35	0.25	0.40	0.35
REIT vs. real asset composite difference	0.25	0.00	0.00	0.17
Total return	6.25	7.00	7.00	6.50

Source: J.P. Morgan Asset Management; estimates as of September 30, 2017.

* Includes European core prime and non-prime asset assumptions.

INFRASTRUCTURE EQUITY

Our long-term outlook is for infrastructure equity returns of 6.25%. While unchanged from 2017, our 2018 assumption reflects a slight but offsetting shift in the building blocks of return: We anticipate a decline in valuation impact as strong demand bids up project pricing, and expect an equivalent increase in average yield from investors requiring a higher illiquidity premium for these long-term investments (Exhibit 16).

No change in infrastructure equity returns, but a shift in components

EXHIBIT 16: OECD INFRASTRUCTURE EQUITY—RETURN ASSUMPTIONS AND BUILDING BLOCKS (USD, %)

	2018	2017
Valuation impact	1.00	1.25
Average yield	3.50	3.25
OECD/developed inflation	1.75	1.75
Total return	6.25	6.25

Source: J.P. Morgan Asset Management; estimates as of September 30, 2016 and September 30, 2017.

Core outlook

The attractiveness of infrastructure as an investment lies in its potential to provide stable and relatively high core returns augmented by the inflation pass-through accorded selected sectors. The overall economic growth and inflation outlook—modest and steady—should continue to be the primary determinant of core infrastructure returns and their stability over much of our forecast period.

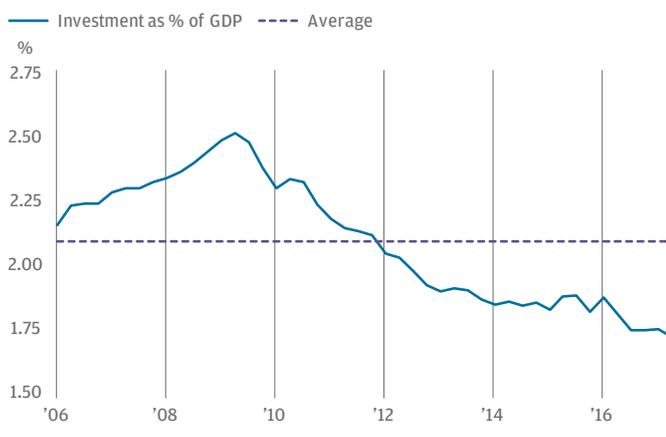
The asset class outlook reflects the same underlying intermediate themes as our 2017 Long-Term Capital Market Assumptions—an expectation that regulators will become less reluctant to authorize capital expenditures at higher rates of return as the necessity of a replacement cycle, particularly in the U.S., becomes more acute. An accumulating capital spending deficit is hard to deny, though its expected size depends on the source of the estimate (Exhibits 17A and 17B). At the same time, the ongoing surge in demand continues for stable high cash flow assets attractive to multiple investor types—from sovereign wealth funds to pensions and sophisticated individual investors. Nevertheless, higher returns are likely to be required to galvanize funding for this plethora of infrastructure projects as they come on line. There are, however, challenges to catalyzing momentum in the short term, as well as elements of uncertainty in the longer term.

In the short term, the outlook for regulatory cycle improvement and a meaningful acceleration of infrastructure spending appears to be on hold. Consistent with the breakout of populist politics, the tone of the regulatory environment has gotten tougher on the margin and allowed returns on equity (ROEs) have been stable to down, though still consistent with a lower weighted average cost of capital.

At the far end of our 10- to 15-year LTCMA time frame, the view is clouded by the difficulty of anticipating the various ways in which technological innovation, populist sentiment and the inclusion of public-private partnerships (PPPs) may impact infrastructure economics.

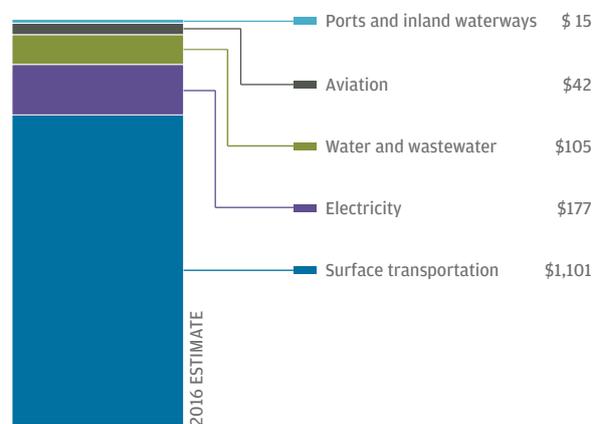
Delayed investment in aging infrastructure portends a very significant capital spending gap

EXHIBIT 17A: U.S. STATE AND LOCAL INVESTMENT IN CAPITAL PROJECTS AS A PERCENTAGE OF GDP (%)



Source: U.S. Bureau of Economic Analysis; data as of June 30, 2017.

EXHIBIT 17B: ESTIMATED U.S. INFRASTRUCTURE INVESTMENT GAP FOR 2016-25 PERIOD (CUMULATIVE GAPS, BILLIONS OF CONSTANT 2015 DOLLARS)



Source: American Society of Civil Engineers, 2016 Failure to Act analysis.

A surge in activity based on the injection of private capital into the infrastructure demand/supply mix appears unlikely for the time being, at least in the U.S. The sale of, and contractual agreements related to, taxpayer assets are not always well received by the stakeholders, such as affected employees, labor unions and the public utilizing the asset, and fair sharing of the risks and rewards is often seen through a political lens. In short, while the potential for infrastructure asset growth is significant, it is difficult to insert private equity ownership and terms into the existing structure of regulation even before the emotional obstacles of populism and partisan politics come into play.

Regulated power

The most stable part of the infrastructure complex—electric distribution—is undergoing a longer-term adjustment as the industry begins to feel the impact of technological and societal change. Consider the small yet growing impact of local sources of alternative power generation feeding into utilities' power grids. Utilities are under pressure to make regulator-approved capital improvements and expenditures in order to bring supply from distributed generation and renewables, especially solar, onto the grid. Yet their ability to recoup these investments—through, for example, “smart metering”—may be necessary to allow the industry to transition from the current system. On the positive side, renewable energy is projected to expand its role as a leading source for electricity generation (**Exhibit 18**). Upgrade of the distribution grid is necessary longer term to accommodate the new sources of power, general obsolescence and growth. This should result in an uptick in regulator-allowed returns on those new assets.

Transportation

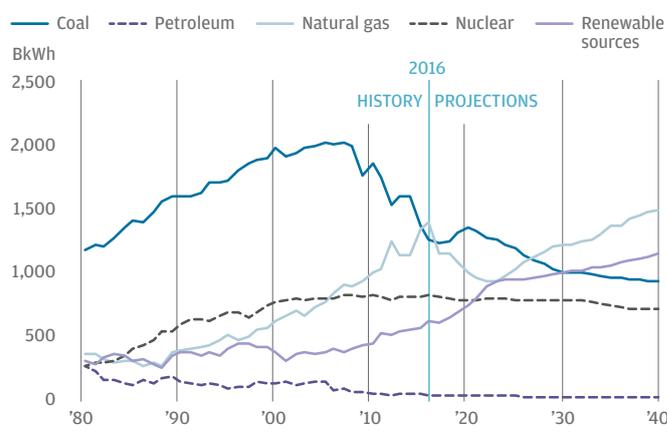
This sector is directly impacted by the consumer outlook, as the improved cyclical economic conditions and lower oil prices are passing through to a better pace of demand for toll roads and consumer-related transport generally. Seaports are experiencing a slower demand outlook as China's growth trajectory slows and global trade has decelerated.

Contracted power

In an industry where the term of contracts is a key value indicator, the recent lengthening of contract terms is a distinct positive, as the percentage of the time an asset is owned outside of the contract term exposes the operator to price risk. The renewables boom, however, is lowering the average cost of power generation and consequently driving down revenue growth.

Renewable energy is expanding its role as a major source for electricity generation

EXHIBIT 18: U.S. NET ELECTRICITY GENERATION BY FUEL (BILLION KILOWATT HOURS)



Source: U.S. Energy Information Administration Annual Energy Outlook 2017, J.P. Morgan Asset Management.

INFRASTRUCTURE DEBT

Our long-term return assumption for infrastructure debt is unchanged from last year's projection.

We view infrastructure debt as essentially an A credit (based on long-term credit loss statistics from rating agency data) with a BBB yield. The spread above the extrapolated credit rating represents a premium demanded by investors for the relative illiquidity of infrastructure debt with more than seven years to maturity. The illiquidity spread emanates from the original sourcing of debt as project finance loans underwritten by banks and generally kept on their books. The increasing secondary market liquidity and secondary market issuance of these loans may eventually reduce the required illiquidity premium, but until there is broader investment experience with these strategies, the required illiquidity premium should remain somewhat elevated at approximately 100bps (**Exhibit 19**).

Infrastructure debt—an A credit with a BBB yield

EXHIBIT 19: GLOBAL INFRASTRUCTURE DEBT—RETURN ASSUMPTIONS AND BUILDING BLOCKS (USD, %)

	2018	2017
A rated credit total return assumption	3.25	3.25
Required illiquidity premium	1.00	1.00
Total return	4.25	4.25

Source: J.P. Morgan Asset Management; estimates as of September 30, 2016 and September 30, 2017.

COMMODITIES

Our 2018 long-term compound annual commodity return assumption of 3.75% implies a positive real return of 150 basis points over our U.S inflation outlook (2.25%). Projected returns (real and nominal) are unchanged from last year’s assumptions. In fact, all of the building blocks we use in constructing our commodity assumptions, starting with the U.S. inflation outlook, are unchanged from 2017 (see “Building blocks of commodity returns”).

Current state of the commodity cycle

Most current indicators continue to point to an upturn in the broad commodity cycle following its turnaround from the bottoming of the commodity supercycle over a year ago. However, the energy sector, accounting for roughly 30% of the Bloomberg Commodity Total Return Index, presents an exception. While an uptick in global economic activity has stabilized energy demand and the OPEC production agreement of November 2016 is helping to constrain supply, the innovative and low cost U.S. fracking industry has seen these developments as an invitation to loosen production discipline. As a consequence, the energy segment has now taken on late-cycle characteristics in terms of supply outpacing demand, falling prices, easy access to expansion capital and energy operators’ seeming expectation of permanent demand absorption.

We see the fracking industry’s response as delaying and muting the energy sector’s cyclical upturn, but only in the initial years of our forecast period. Arguably, fracking price curves (Exhibits 20A and 20B) enable the industry to produce

BUILDING BLOCKS OF COMMODITY RETURNS*

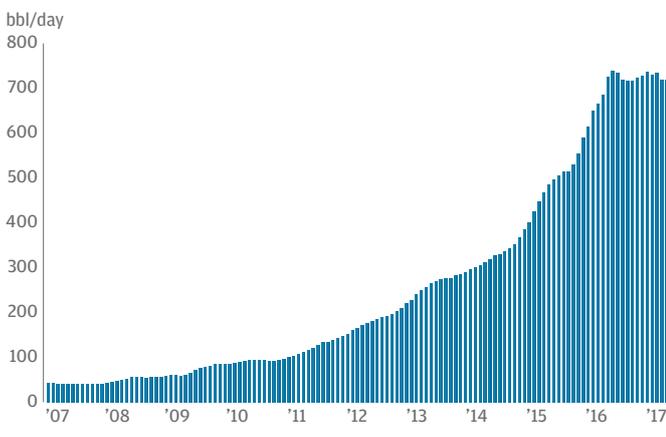
We build our assumptions for commodity returns on the long-term record of the Bloomberg Commodity Total Return Index (a collateralized, investible index). We start with our LTCMA for U.S. inflation and adjust for:

- (1) the differential between the 25-year collateralized commodity index return and **inflation** in the U.S. (which we estimate netted to 0.00 for the 1991-2015 period, despite interim differentials)
- (2) where we are in the current **commodity cycle** (pricing theories based on the economics of non-renewable resources in finite supply are not embedded in our estimates)
- (3) a **scaling effect** to account for the absolute increment in commodity usage of key marginal consumers (namely, emerging Asian and frontier economies)
- (4) the inverse relationship between commodity returns and the **U.S. trade-weighted dollar**
- (5) the potential contribution from **roll yields** (which we found for the 1994-2015 period to be inconsistent and statistically negligible; we expect a zero contribution from this source during the 10- to 15-year time frame of our assumptions.)

* For further details on our methodology, please see J.P. Morgan Asset Management, 2017 Long-Term Capital Market Assumptions, pp. 71-73.

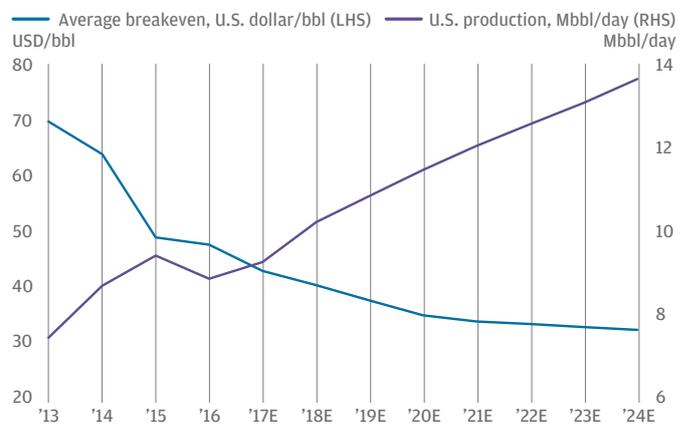
Shale drilling innovation enables more oil production per rig at a decreasing cost per barrel

EXHIBIT 20A: U.S. NEW-WELL OIL PRODUCTION PER RIG



Source: U.S. Energy Information Administration; data as of June 2017.

EXHIBIT 20B: OIL PRODUCTION—KEY U.S. SHALE PRODUCERS VS. AVERAGE SHALE WTI BREAKEVENS



Source: Company reports, U.S. Department of Energy, U.S. Energy Information Administration, J.P. Morgan Asset Management; data as of July 2017.

more oil and gas at a declining cost per barrel, but the incentive to add to current excess supply assumes sufficient demand to absorb these increases at an attractive price. Current demand/supply conditions seem inconsistent with higher oil prices on a cyclical basis unless the economic cycle grows past the excesses of current supply. In our view, that growth will materialize, absorbing current excess supply and allowing the energy cycle to resume its upturn.

On balance, considering Chinese basic metals capacity shutdowns, OPEC supply constraint and U.S. fracking, among other factors, the outlook for the broad commodities market continues to be one of modest supply rationalization. The supply rationalization process, as indicated by our Commodity Event Index (see “**The Commodity Event Index—Capturing producers’ supply constraint sentiment**”), while not quite as robust as it appeared last year, is still essentially operative relative to the demand outlook. As such, we make the same incremental adjustment (+.25bps) as we did last year to our commodity return assumption for where we are in the current commodity cycle (**Exhibit 21**).

Refining the estimation process

The Bloomberg Commodity Total Return Index is basically unchanged from its level at the time of last year’s LTCMA publication—masking widely divergent sectoral returns. In examining the component pieces of the index over the past year, we find both rapidly changing cyclical and long-term drivers behind the pattern of recent returns. Analyzing the reasons behind short-term cyclical volatility presents additional insight into the estimation methodology and points to potential refinements to the estimation procedure.

For example, we have made slight adjustments to our Commodity Event Index, which seeks to capture the underlying drivers of supply rationalization as a key element in projecting long-term cycle dynamics. Since the technological innovation within the U.S. shale industry is having a heightened impact on global oil production and the overall commodity change cycle, a reweighting of the component pieces of the index, including an increase in the weighting of the explicit energy rig count factor, is warranted. In effect, with the reweighting of the index, the new commodity cycle appears slightly less robust in turning the corner on past excesses.

Our commodity return assumption is 1.50% in excess of U.S. inflation

EXHIBIT 21: COMMODITIES—RETURN ASSUMPTIONS AND BUILDING BLOCKS (USD, %)

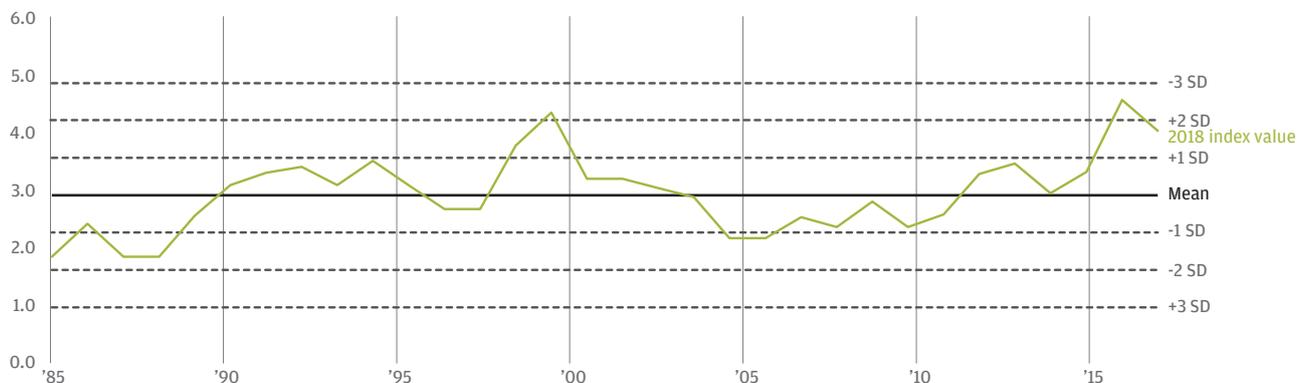
	2018	2017
U.S. inflation assumption	2.25	2.25
Adjustment for historical 25-year investible index return above inflation	0.00	0.00
Position in current cycle (premium/discount)	0.25	0.25
Scaling function adjustment for emerging and developing Asian economies	0.25	0.25
USD decline impact (projected incremental annual decline vs. historical base period)	1.00*	1.00
Impact of roll yield	0.00	0.00
Total return	3.75	3.75

Source: J.P. Morgan Asset Management; estimates as of September 30, 2016 and September 30, 2017.

* Rounded up from 0.90.

THE COMMODITY EVENT INDEX—CAPTURING PRODUCERS’ SUPPLY CONSTRAINT SENTIMENT

THE COMMODITY EVENT INDEX



COMMODITY EVENT INDEX COMPONENTS

The Commodity Event Index is designed to capture producer sentiment around the loosening/tightening of production constraints within commodity markets. Higher index values indicate a more constrained environment, supportive of increasing commodity prices.

The event index utilizes a component weight scheme in which four components have 11.1% weightings, while three components that we deem more important receive an 18.5% weighting, as indicated below. Components were added as available (inclusion date in parentheses) for our universe of energy and materials companies, including:

Index component	Component weight %	Observed change to index component	Impact on index value
Credit rating (1985)	11.1	lower	higher
Age of capital stock (1985)	11.1	older	higher
Financial leverage (1985)	11.1	higher	higher
Volume of bankruptcies, takeovers, debt-for-equity swaps (2004)	11.1	higher	higher
Capital expenditure to sales (1985)	18.5	higher	higher
Oil rig count (1991)	18.5	higher	lower
CEO turnover (2007)	18.5	higher	higher

Source: Baker Hughes, Bloomberg, U.S. Bureau of Economic Analysis, J.P. Morgan Asset Management; Commodity Event Index estimation as of May 31, 2017.

Gold

The return for gold is driven by many of the same factors as general commodity returns but primarily by U.S. inflation, the direction of the trade-weighted U.S. dollar and a scaling factor that reflects the increasingly important developing economy impact on gold consumption. Consumption per capita can be expected to fall in China and India. However, since the two highest per capita gold consumers (with roughly twice the per capita consumption of developed economies) are also the two fastest-growing economies, we expect the net effect to be an increase in the absolute demand for gold. Another small increment to demand is assumed from an erratic but still long-term accumulation of gold for investment purposes.

Within the last few years, central banks have ceased liquidating their gold reserves and have started accumulating once again. We project a 25bps gold return premium to broad commodities (equivalent to last year’s), implying a 4.00% return for gold.

PORTFOLIO INSIGHTS



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