

July 2018

Infrastructure—No Longer a Niche Option

KEY ELEMENTS

- The landscape for infrastructure investments has developed significantly in the last 10 years. Institutional investors are increasing allocations, managers are creating more investment options, and benchmarks are being refined to better measure performance.
- Infrastructure assets benefit from inflationary environments as the value of the asset increases during these periods. Investors are attracted to infrastructure investments for their premise of stable, inflation-linked cash flows.
- Investors can add infrastructure to their portfolios in multiple ways: unlisted offerings (i.e., private market investments) with equity or debt strategies, or listed offerings (i.e., public markets).



“In recent years, the menu of options for infrastructure investment has expanded, and investors have a wider range of potential target returns for their infrastructure portfolio.”

Jan Mende

Callan's Real Assets Consulting group



Introduction

The infrastructure investment landscape has evolved significantly over the past decades. Globally, allocations to this asset class are increasing, and managers are introducing more investment vehicles and building track records. Further, benchmarks are being refined as investors develop their expectations for infrastructure and consider its performance over the past 10 years. Some investors remain on the sidelines, though, citing liquidity concerns, risk-return issues, and diversification questions.

In today's low-yield environment—with the prospect of rising interest rates—infrastructure can offer a number of benefits to institutional investors, including the opportunity for current yield (to offset the risks of capital market volatility). Investors are also attracted to infrastructure's potential for inflation-linked revenue increases and the protection associated with owning a tangible asset. Infrastructure encompasses a range of investment opportunities, structures, and styles that can be tailored to an investor's preference.

Before altering portfolio allocations or making a new infrastructure investment, a fiduciary should consider:

- Objectives for an infrastructure allocation—such as the relative importance of steady dividends, inflation protection, or long-term capital appreciation
- Preferred investment structures and the importance of liquidity
- Relevant benchmarks

This paper provides an overview of key sector concepts and terminology, discusses allocations and ways to access infrastructure investments, and provides a review of capital-raising and benchmarks. We focus on the unlisted market, although the paper will provide some context on the listed market, as well.

Key Concepts and Terminology

In general, infrastructure facilitates the movement of people, goods, and ideas, and it is essential for the economic productivity of a society. Infrastructure assets commonly have many of the following characteristics:

- Long and useful lives
- Monopoly market position or high barriers to entry
- Operation in a regulated environment or other resistance to economic cycles
- Stable cash flows, often linked to inflation
- Difficult to replicate due to high construction costs or scarcity of resources (i.e., land, equipment, or planning restrictions)

Infrastructure Sectors and Types of Assets

Infrastructure assets differ from real estate assets in that they are operating businesses which require a high level of expertise—to manage the actual physical asset as well as to work with regulators and their local communities—to be successful. Similar to real estate, though, investors are interested in the predictable stream of distributions from operations over a long horizon of asset ownership.

Typical infrastructure assets include:

- **Regulated utilities:** Electric; water
- **Transportation:** Airports; seaports; rail lines; toll roads and bridges
- **Energy:** Electricity generation, storage, and transmission; pipelines
- **Communications:** Radio and television broadcast towers; wireless communications facilities; fiber and satellite networks
- **Waste and water:** Waste companies and water systems
- **Social infrastructure:** Schools; health care facilities; courthouses; detention centers
- **Renewable energy:** Solar; hydro; wind; biomass; geothermal; tidal

Understanding Infrastructure Revenue Sources

Roads are generally perceived as an infrastructure asset, but it is important to understand the particular regulatory environment and revenue mechanism associated with any single road investment to assess the durability of its cash flows and level of income resilience. Some roads have income streams that are immune from economic cycles because their revenue is based on an agreement between a municipality and the road operator which stipulates only that the road must be maintained to a certain standard and available for use (known as **availability-based revenue**), and the operator's income is independent from the number of cars on the road.

Others are toll roads, in which the owner may collect revenue based on a contract, with another portion of revenue paid by cars traveling the road (i.e., **patronage revenue**), which can fluctuate with the economic cycle. Assets with patronage revenue can have a more variable income stream.

Types of Revenue

Investors typically cite the regular cash distributions from infrastructure assets as a key attraction, but cash flow profiles vary widely between individual assets, even within the same sector. Revenue risk is a significant consideration when evaluating the durability of any infrastructure asset cash flow. Below are the main categories of revenue. Note that a single asset can have more than one type of revenue.

Revenue Categories

Most Predictable

Least Predictable

| Availability | Regulated | Contracted | Patronage (Usage or GDP-linked) | Merchant |
|---|--|--|---|---|
| As long as the asset is maintained according to the contract, the operator's negotiated revenue is constant for the term of the contract. | Revenue is subject to government regulation regarding consumer pricing, economic returns earned by the investors, and quality of service provided. | Revenue is based on contracts with private-sector counterparties. The counterparty's credit risk is a key consideration. Contracts may include inflation-indexed rate increases. | Revenue models vary widely and are based on asset usage. Some assets have a significant portion of revenue from patronage fees while others have a small share. | Revenue depends on the current market prices of the natural resource input. |

Typical Assets

| | | | | |
|-----------------------|----------------------------|---|----------------|------------------|
| Social infrastructure | Energy and water utilities | Communications; energy generation and storage | Transportation | Power-generation |
|-----------------------|----------------------------|---|----------------|------------------|

Investment Stage

Infrastructure assets are typically categorized as either brownfield or greenfield. Brownfield refers to existing assets, while greenfield refers to the development or construction of new assets.

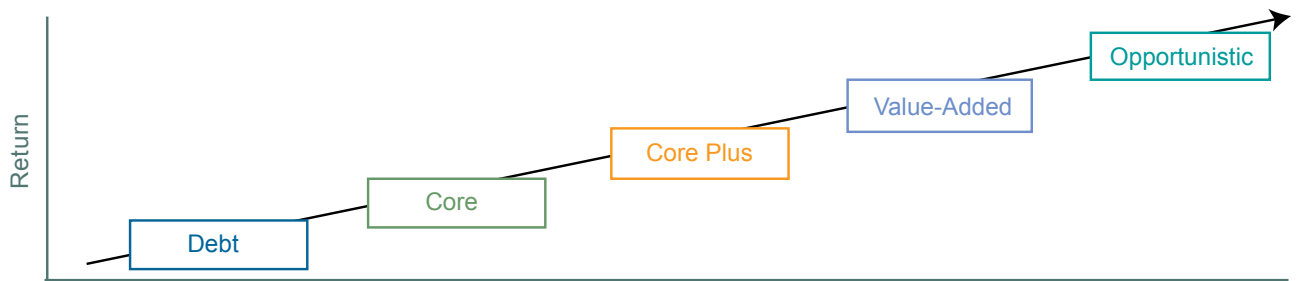
Greenfield investments are often divided into two categories:

- **Early-stage:** Assets for which policy and/or development plans are in the initial phase
- **Late-stage:** Assets where plans have been approved or construction is under way but the asset is not yet operational

Within brownfield assets, there are several different classifications (core, core plus, value-added), in part driven by cash-flow patterns. And infrastructure assets offer a range of risk/return options (**Exhibit 1**).

Exhibit 1

The Risk/Return Scale for Infrastructure Assets



| | Debt | Core | Core Plus | Value-Added | Opportunistic |
|------------------------|--|--|---|---|--|
| Net return estimate | Typical 3-5% over a fixed rate such as LIBOR | 5-7% | 8-10% | 10-12% | 13%+ |
| Asset | Asset-level loan Corporate-level debt | Stable asset | Existing asset | Enhancement of existing asset | Development of a new asset |
| Cash flow to investors | Interest payments | Regular distributions from operating cash flow | Semi-regular distributions from operating cash flow | Cash flow may be reinvested into the assets and not paid to investors until the enhancement is complete | No cash flow during the development of the asset, which may take 3-10 years depending on the type of asset and complexity to develop |
| Investment stage | Debt | Brownfield | Brownfield | Brownfield | Greenfield |

Source: Callan

Risk/Return Profiles

Infrastructure has several main risk/return profiles:

- **Debt:** Can be either project finance loans secured by the underlying asset, or debt at the corporate level serviced by the corporation's income. Generally there is a current-pay component, although debt structures vary widely. Can be arranged as senior or mezzanine loans, or convertible equity.
- **Core:** Typically an existing asset with a stable cash flow stream forecastable with a relatively low margin of error. The cash flow comes from a mix of monopolistic market conditions, transparent and consistent regulatory environments, long-term contracts with credible counterparties, mature demand profiles, low expected volatility, and prudent leverage strategies. Income is the primary source of return.

- **Core plus:** Very similar to core assets but with a higher level of revenue risk or required capital expenditure to justify a higher return. These assets may be less monopolistic or have less durable revenue. Returns are a mix of income and capital appreciation.
- **Value-added:** Often an expansion or upgrade of an existing asset with a cash-flow profile augmented by additional capital investment, akin to a “value-add” strategy in real estate. Returns are driven more by long-term growth in the value of the asset and less by current income generation, especially in the early years of investment.
- **Opportunistic:** Typically the development of a new asset without existing cashflow (similar to an opportunistic strategy in real estate). Investments in emerging markets often are categorized as opportunistic.

The U.S. and Infrastructure

Three key reasons for lower infrastructure allocations in the U.S. compared to other regions:

1. In the U.S., the municipal bond market provides attractive financing for many local infrastructure projects; European countries do not have the same options and have tended to use public-private partnerships to finance and deliver infrastructure assets.
2. The U.S. energy market was deregulated in the 1970s with the Public Utilities Regulatory Policy Act, which created a structure for independent power producers. This resulted in the growth of energy investment opportunities that have long been a part of U.S. investor portfolios, often as part of the private equity allocation.
3. The U.S. government spends relatively less on infrastructure than many other developed countries, so there are more investable projects in other countries than in the U.S.

Infrastructure Terminology

- **Public-Private Partnerships (PPP or P3):** Cooperative arrangements between two or more public and private sector entities, typically of a long-term nature, to deliver an infrastructure asset (often social and transportation). PPPs generally require significant up-front time commitments by both public and private participants to determine the scope and implementation. Due to the time commitment and uncertainty of winning the process, many private managers do not pursue these kinds of projects.
- **Private Finance Initiative (PFI):** a PPP program-equivalent developed by the governments of Australia and the United Kingdom, often to provide financing for social infrastructure; also used in other countries.

Infrastructure Allocations

Callan’s research indicates a minority of U.S. institutional investors (estimates range between 5% and 15%) have dedicated infrastructure allocations, typically of 2% or less. We expect that more institutions will look to add infrastructure assets, and that typical allocations could reach 5% within the next decade as investors seek the income and appreciation with which these assets are associated.

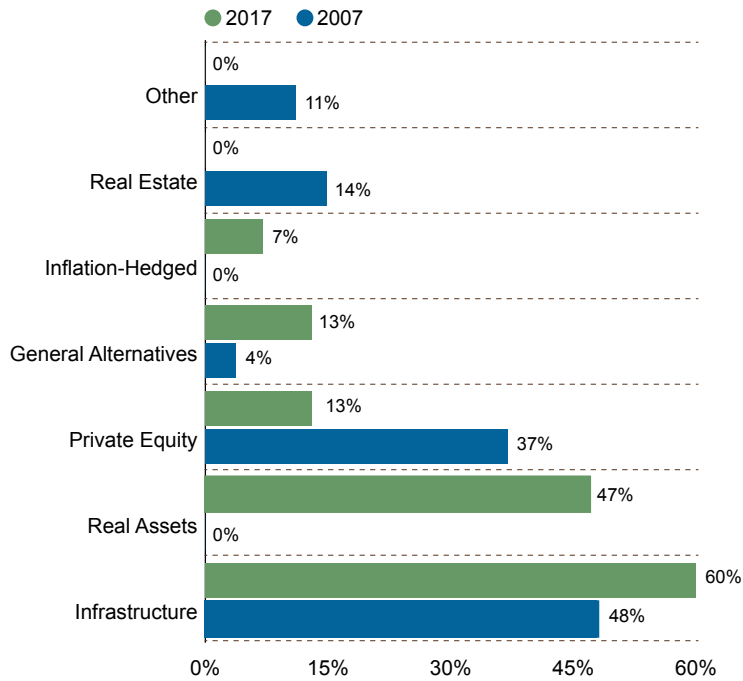
Outside the U.S., primarily in Europe, Australia, and Canada, institutional investors have more established and larger infrastructure investment programs with allocations ranging from 5% to 20%. A recent survey by a European organization found that nearly three-quarters of institutional investors had allocated to the asset class, and within that group 65% expected to increase it, 30% to keep it the same, and only 6% planned to cut their allocation.¹ Based on this and anecdotal data, non-U.S. investors have a longer history in the asset class, and it appears that performance has generally met expectations.

The role of infrastructure in portfolios has evolved. A decade ago, infrastructure was often considered part of the private equity allocation, since the two assets had similar return targets. Return targets were often in excess of 12% when the first private infrastructure funds were raised in the mid-2000s.

1. “Perception that infrastructure is expensive is fading, IPE survey suggests,” IPE.com, Oct. 25, 2017.

Now investors increasingly have separate infrastructure or real asset allocations (**Exhibit 2**); U.S. investors are more likely to hold infrastructure as part of the real asset allocation. Other investors place infrastructure in an “inflation-hedged” category. Unlisted infrastructure return targets can range from 6% to 12%, depending on the particular investor’s strategy. This creates further confusion for the asset class as some investors may see infrastructure as a bond-like substitute, while others view it as more similar to private equity in terms of the risk/return profile.

Exhibit 2
Where Experienced*
Investors Place
Infrastructure
Allocations



Source: Probitas Partners, Infrastructure Institutional Investor Trends Survey, 2007 and 2017

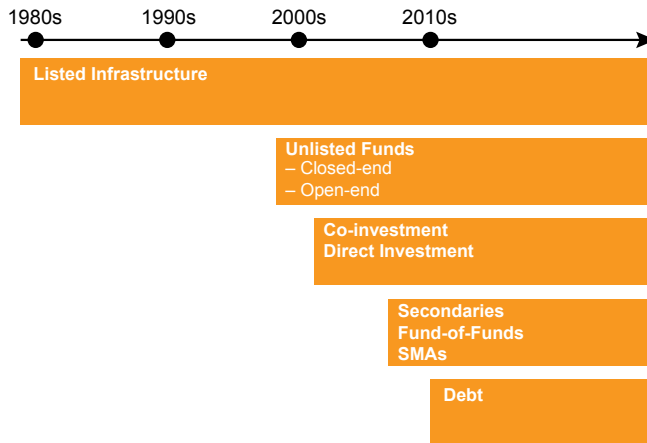
* Defined as those who have been active in the sector for five years or more

Accessing Infrastructure

Investors are able to add infrastructure to their portfolios in multiple ways. They can use unlisted offerings (i.e., private market investments) with equity or debt strategies. Or they can access it through listed offerings (i.e., public markets). Listed infrastructure can be held in an investor's public equity or occasionally real assets portfolio. Most investors use commingled products; separate accounts are less common due to the investment size of individual infrastructure assets and are more appropriate for very large investors.

Exhibit 3 illustrates the timeline of infrastructure product development.

Exhibit 3
Development of the Infrastructure Investment Market



Source: Callan

The table below compares unlisted and listed infrastructure investment approaches.

| | Unlisted (private markets) | Listed (public markets) |
|-------------------------------|---|---|
| Investments | Typically asset-level investments, some corporate-level investments possible | Publicly traded stocks of companies engaged in infrastructure-related activities |
| Return type | Income and/or appreciation depending on the particular strategy | Emphasis on appreciation |
| Portfolio construction | Portfolios consist of large assets; can take months to source and structure deals and multiple years to deploy capital | Portfolio can be constructed in relatively short time period via the public markets |
| Vehicles | Commingled products are used by most investors; some very large investors (e.g., sovereign wealth funds) can invest directly into single assets | Offered through commingled products or created for a single investor via separate account |
| Volatility | Appraisal-based valuations dampen volatility | Publicly traded securities are subject to equity volatility |
| Weakness | Diversification can be challenging due to large asset sizes | Shares volatility with equity markets |
| Liquidity | Low; limited secondary market | High; public markets provide liquidity |

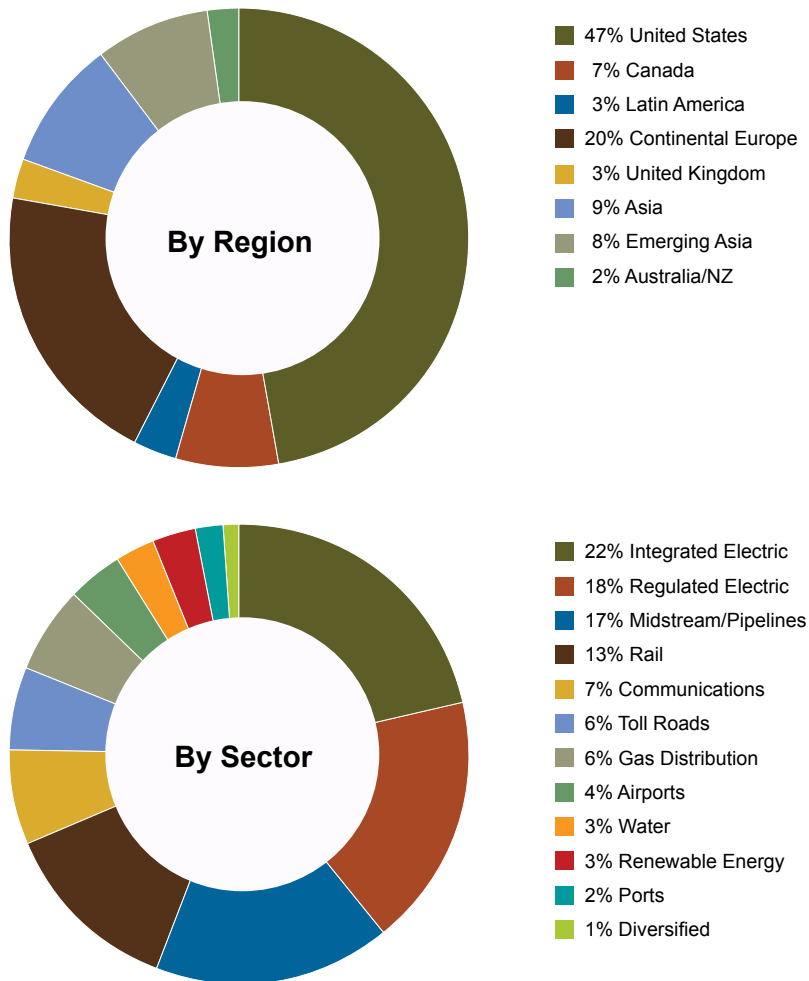
Source: Callan

Listed Infrastructure

Listed infrastructure as an investment option dates back to the 1980s. It offers the potential for immediate, global diversification across regions and infrastructure sub-sectors from operating assets, often with stable, regulated revenue streams. Listed infrastructure portfolios are comprised of publicly traded stocks from the energy, utilities, transportation, telecommunications, and, to a lesser extent, social infrastructure sectors. The distinction between listed and unlisted infrastructure is comparable to the difference between REITs and private real estate.

The listed infrastructure universe varies based on the methodology used for inclusion, but the key criteria typically requires listed companies to derive at least 65% of cash flow or revenues directly from infrastructure assets. The listed infrastructure universe is largely dominated by U.S. utilities and pipeline assets and is estimated at approximately \$3.6 trillion of value (**Exhibit 4**). There are 15-20 listed infrastructure strategies that represent approximately \$70 billion of invested capital. Fees typically range from 70-110 basis points on investor net asset values.

Exhibit 4
A Breakdown of
Listed Infrastructure's
\$3.6 Trillion Market
Capitalization

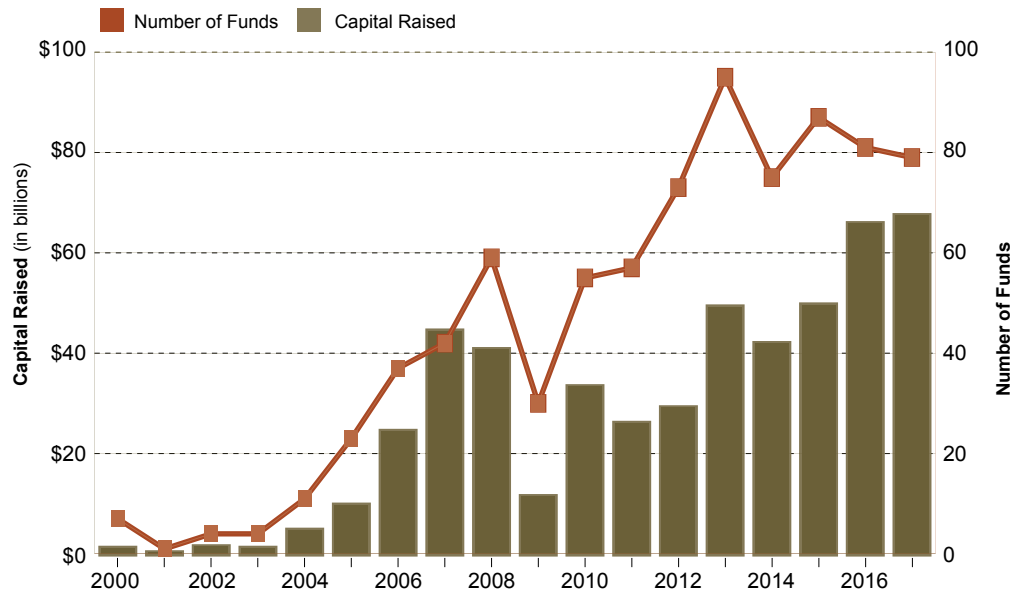


Sources: CBRE Clarion Securities and Bloomberg as of 03/31/2018. Percentages may not sum to 100% due to rounding.

Unlisted Infrastructure

Capital raised for unlisted infrastructure vehicles has grown from \$1.1 billion in 2004 to nearly \$68 billion in 2017 (Exhibit 5). In 2016 and 2017 over \$60 billion was raised each year, and it is unlikely that number will decline in 2018 as many investors are building out their infrastructure allocations and actively deploying capital into unlisted strategies.

Exhibit 5
Global Infrastructure
Fundraising



Sources: Callan research, Preqin

The majority of unlisted capital has been raised for closed-end equity strategies, although options for open-end strategies are increasing. Most fund managers are concentrated on the Organization for Economic Cooperation and Development (OECD) markets, typically Australia, Canada, Western Europe, and the United States. In recent years, the number of emerging market-focused offerings has increased, although most mainstream strategies continue to target OECD markets. Since 2009, there has been an increase in the number of debt-focused strategies as a result of the Global Financial Crisis and a reduction in the ability of banks to hold as much debt on their balance sheets. Callan featured a detailed look at infrastructure debt options in the [Summer/Fall 2017 Real Assets Reporter](#), “A New Development: The Rise of Infrastructure Debt as an Investment Opportunity.”

The following table compares closed-end and open-end strategies.

| | Closed-End | Open-End |
|--------------------------------|--|--|
| Consistency of strategy | Manager typically states its strategic focus and associated targets once, at fund's inception | The manager of a perpetual structure may restate strategy and targets through the reissuance of updated private placement memoranda |
| Asset stage | Value-added Opportunistic | Core Core plus |
| Fees | Range from 125-175 bps on commitments during the investment period (typically three to five years), then on invested capital Incentive fees accrue with strong performance | Range from 75-175 bps, based on investor net asset value Performance hurdles and incentive fees may apply |
| Target returns | Typically 10%-12% net internal rate of return (IRR); higher for some strategies Income return more likely four or five years post-investment | Range from 6%-12% net per annum over the cycles, dependent on the strategy Income is a significant component of return from the start |
| Investment discipline | The fixed timeline focuses the manager on selecting assets it can improve over the stated investment period | The manager is never forced to sell assets that may be irreplaceable, but can elect to exit less attractive assets |
| Liquidity | Fund terms generally range from 10 to 12 years, with several additional years of extensions available to the manager A growing secondary market for closed-end funds can permit investors to exit the fund before the end of its term | Periodic (often quarterly) liquidity provides greater flexibility Fund liquidity is only as good as the liquidity of the underlying assets or ability of the manager to attract new commitments |

Closed-end funds generally focus on value-added or opportunistic strategies, targeting assets with a higher risk and return profile. Fundraising for this type of vehicle gained momentum around 2006, and since then over \$400 billion has been raised by more than 400 fund vehicles. These funds generally were structured with a 10- or 12-year life, with potential for extensions of another two or three years. As many of these funds are still in their initial 10-year lifespan, it is difficult to evaluate whether the fund achieved its objective. Given only a minority of investments have been realized, investors generally evaluate the performance of exited assets and the remaining portfolio. As these funds mature, some managers have reported a subset of fund investors asking to maintain ownership of a stable portfolio of cash-flowing assets, while other investors prefer to see a complete exit of the portfolio as per the original fund objectives.

As the asset class has matured, there has recently been an increase in the number of open-end vehicles to allow investors to hold infrastructure assets on a perpetual basis. Open-end funds generally focus on core and core plus assets, with stable dividend profiles. There are relatively few U.S. dollar-denominated open-end fund options, although we expect the number to increase as the market matures. As of 2018, these funds have raised in excess of \$30 billion in investor capital; that is likely to grow as investors increase infrastructure allocations and view these funds similarly to core, open-end real estate funds with bond-like income characteristics.

Benchmarks and Evaluating Infrastructure

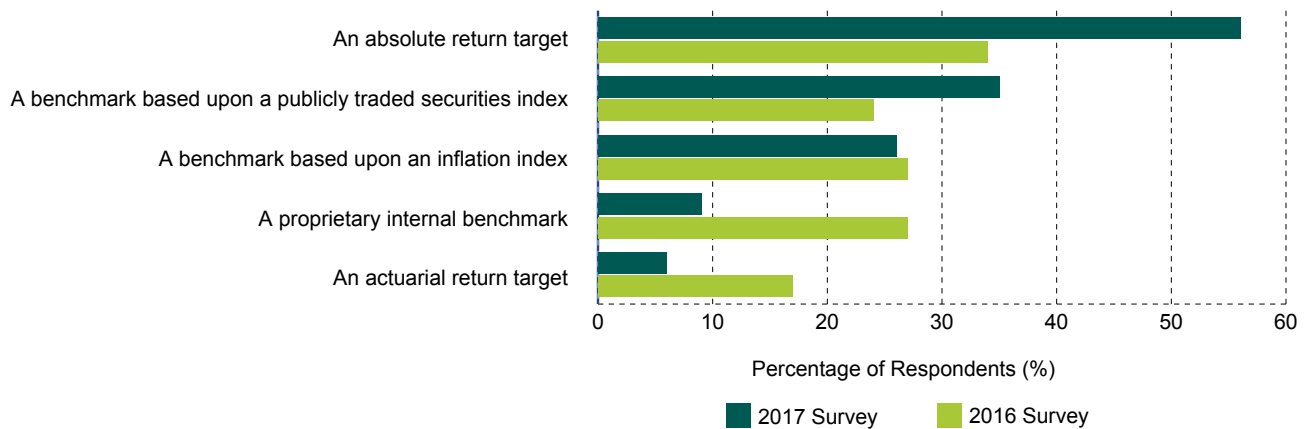
Investors use benchmarks in two ways: to evaluate the performance of their infrastructure allocation relative to its stated purpose (portfolio benchmarks) and to compare a manager's performance against other managers in the sector (performance benchmarks).

Portfolio Benchmarks

Determining the appropriate benchmark for an infrastructure allocation requires understanding the role of infrastructure in an investor's portfolio. Investors may have differing expectations for return, which can be expressed by their selection of investment options (i.e., closed-end or open-end). As infrastructure is a developing asset class and there are relatively few benchmarks, infrastructure investors have tended to use either a fixed rate of return (e.g., spread over CPI or LIBOR) or some combination of listed indices to create their own benchmark for investments in the sector, and use of benchmarks has been evolving (**Exhibit 6**).

Exhibit 6

Popular Infrastructure Benchmarks



Source: Probitas Partners, Infrastructure Institutional Investor Trends for 2017 Survey

Multiple responses allowed

Most infrastructure indices are comprised of public infrastructure securities (**Exhibit 7**). Among the more developed is the FTSE Global (and Developed) Core Infrastructure Indices, along with the related 50/50 indices that cap exposures in the two benchmarks. The caps are adjusted semi-annually based on the investable market capitalization.

Exhibit 7

Popular Listed Infrastructure Indices and Their Components

| | Dow Jones Brookfield Infrastructure | FTSE Developed Core Infra 50/50 | FTSE Global Core Infra 50/50 | MSCI ACWI Core Infrastructure | MSCI World Core Infrastructure | S&P Global Infrastructure |
|-------------------------------|-------------------------------------|---------------------------------|------------------------------|-------------------------------|--------------------------------|---------------------------|
| Holdings | 102 | 149 | 226 | 253 | 149 | 73 |
| Individual Holding Cap | None | 5% | 5% | None | None | 5% |
| Regional Breakdown | | | | | | |
| North America | 61% | 62% | 59% | 48% | 56% | 46% |
| Europe | 27% | 21% | 16% | 25% | 29% | 34% |
| Japan | 1% | 5% | 5% | 7% | 9% | 0% |
| Pacific Rim | 7% | 12% | 9% | 6% | 6% | 12% |
| Emerging Markets | 5% | 1% | 12% | 15% | 0% | 8% |
| Sector Breakdown | | | | | | |
| Utilities | 37% | 47% | 47% | 40% | 43% | 39% |
| Industrials | 20% | 32% | 32% | 5% | 4% | 41% |
| Energy | 28% | 13% | 13% | 9% | 10% | 19% |
| Real Estate | 13% | 7% | 7% | 0% | 0% | 0% |
| Telecommunications | 1% | 1% | 1% | 43% | 41% | 0% |
| Health Care | 0% | 0% | 0% | 2% | 2% | 0% |
| Consumer Discretionary | 1% | 1% | 1% | 1% | 0% | 0% |

Sources: Callan, Dow Jones Brookfield, FTSE Russell, MSCI, Standard & Poor's

As of Dec. 31, 2017

There are very few options for unlisted infrastructure indices because infrastructure is a relatively new asset class; the earliest closed-end funds date from 2006. Furthermore, since infrastructure funds are so varied in their geographic focus and targeted returns, it has been difficult to assemble a critical mass of funds to develop a viable benchmark based on unlisted performance. MSCI just launched the MSCI Global Quarterly Infrastructure Asset Index with data from a significant number of private infrastructure owners; assets tracked in this Index represent core and core plus strategies. But it has a large weighting to Australia; with additional participation from other owners, it has the potential to develop into a robust benchmark.

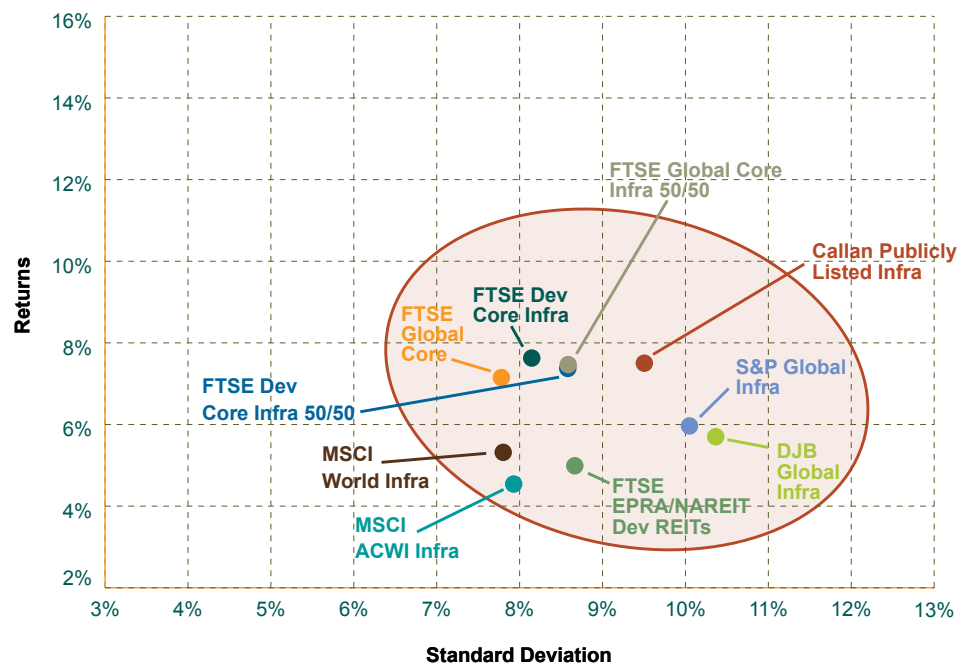
Performance Benchmarks

Investors also use benchmarks to evaluate the relative performance of managers and their strategies against their peers. Listed infrastructure managers can benchmark their performance against a particular index, while others are benchmark-agnostic. Unlisted infrastructure manager benchmarking is difficult due to the lack of very robust indices.

Evaluating Infrastructure Performance

Exhibit 8 shows the diversity of returns across a handful of the more popular listed infrastructure benchmarks and Callan's style group of approximately 60 active global infrastructure managers (primarily focused on equities), as well as a REIT index as a point of comparison. The reason for the relatively wide diversity is the components of each index. Investors should compare their targeted and/or existing portfolio with the investments captured by the benchmark to assess if the benchmark is appropriate.

Exhibit 8
Returns vs. Volatility



Sources: Callan, Dow Jones Brookfield, FTSE Russell, MSCI, Standard & Poor's, Bloomberg Barclays, NCREIF

For 5 years ended 3/31/18; ellipsis represents data points for 80% of the members of the Callan Publicly Listed Infrastructure Style Group

Although the unlisted infrastructure market has grown significantly in the past 10 years, the sample size of closed-end funds that have completed their life cycle is small, and there are relatively few open-end infrastructure funds with a track record greater than five years that are appropriate for U.S.-based investors. As a result, evaluating the performance of the asset class is not straightforward. Callan maintains a dialogue with a range of managers in both the closed-end and open-end sectors to evaluate relative and absolute performance; managers generally agree that infrastructure returns are coming down from earlier levels due to the amount of capital being invested into the asset class, similar to other asset classes.

Demand for good infrastructure assets has been strong in major markets such as Europe and North America.

Open-end Funds

- Open-end funds typically target an annual return ranging from 6%-12% net, depending on the strategy, with 50% or more of the return coming from distributable cash flow. This is similar to returns targeted by open-end real estate funds.
- Open-end infrastructure managers often cite inflation protection as a key benefit to their strategies as asset-level cash flows may be inflation-linked. Even though there has been relatively little inflation during the past few years, infrastructure investments have generally met performance expectations and benefited from the low interest rate environment.
- Most open-end infrastructure funds have made investments outside the United States, and as a result, currency movements can impact investor returns. Considering the geographic focus, currency, and hedging policies for each fund manager is important for evaluating performance.

Closed-end Funds

- Closed-end funds have generally targeted an internal rate of return (IRR) in excess of 12% net to the investor, with a majority of the return coming from capital appreciation over the investment lifecycle, rather than current yield from operations. This return target is similar to value-added real estate funds.
- Investors can assess the performance of closed-end managers that have not completed a full fund investment program by evaluating whether individual asset sales have met the manager's targets, and if there are any troubled assets that are underperforming stated targets.

Brownfield Asset Performance

Not every infrastructure investment has been successful. Assets have suffered from operational failures, refinancing difficulty, declining demand, or unforeseen competition. Because of the risks related to ownership and management of infrastructure assets, it is important to select a manager with an experienced team to underwrite those risks, avoid riskier investments, and operate often complex assets, among other considerations.

In terms of asset sales, unlisted managers have been able to exit assets at or better than their projected returns. Demand for good infrastructure assets has been strong in major markets such as Europe and North America, where a large number of managers have successfully exited investments in the transport, communication, water, and energy sectors, often selling to their co-investors, strategic buyers, or other funds. In a few notable cases, managers have been able to sell an entire fund to an outside investor and achieve complete liquidity for the initial fund investors.

Relative Performance of Infrastructure Indices

Most of the indices in **Exhibit 9** are based on listed infrastructure. Listed infrastructure consists of operational businesses that are most similar in profile to open-end infrastructure investments, although valuations are subject to public markets volatility, which can impact performance. The majority of listed infrastructure indices generally outperformed the FTSE EPRA/NAREIT Developed REITs Index, but underperformed the S&P 500, during the past 10 years.

Exhibit 9

Infrastructure Index Performance Compared

| | Last Quarter | Last Year | Last 3 Years | Last 5 Years | Last 10 Years |
|--|--------------|-----------|--------------|--------------|---------------|
| Dow Jones Brookfield Global Infrastructure | -5.26 | 2.03 | 2.22 | 5.70 | 7.07 |
| FTSE Developed Core Infrastructure | -3.91 | 4.85 | 5.08 | 7.63 | 7.36 |
| FTSE Developed Core Infrastructure 50/50 | -4.64 | 4.61 | 5.50 | 7.37 | 6.61 |
| FTSE Global Core Infrastructure | -3.79 | 5.18 | 5.32 | 7.38 | 7.23 |
| FTSE Global Core Infrastructure 50/50 | -4.34 | 5.45 | 6.12 | 7.47 | -- |
| MSCI ACWI Infrastructure | -4.15 | 1.82 | 2.18 | 4.54 | 2.41 |
| MSCI World Infrastructure | -4.49 | 0.79 | 2.52 | 5.32 | 2.86 |
| S&P Global Infrastructure | -5.51 | 5.15 | 4.44 | 6.88 | 3.74 |
| Callan Publicly Listed Infrastructure | -4.80 | 4.66 | 4.50 | 7.50 | 6.43 |
| S&P 500 | -0.76 | 13.99 | 10.78 | 13.31 | 9.50 |
| Bloomberg Barclays Aggregate | -1.46 | 1.20 | 1.20 | 1.82 | 3.63 |
| NCREIF Property | 1.70 | 7.12 | 8.72 | 10.00 | 6.09 |
| FTSE EPRA/NAREIT Dev REITs | -4.30 | 4.23 | 2.45 | 4.99 | 4.24 |

Sources: Callan, Dow Jones Brookfield, FTSE Russell, MSCI, Standard & Poor's, Bloomberg Barclays, NCREIF

Time periods ending 3/31/18

Unlisted infrastructure performance data is limited; however, **Exhibit 10** shows the performance of closed-end infrastructure funds based on internal rates of return (IRR), focused on value-added or opportunistic strategies, across all geographies, dating back to 2007. It is important to note the number of funds raised in each vintage year is relatively small compared to the number of private equity and real estate strategies raised during the same vintage years, due to the developing nature of the infrastructure asset class. In addition, the strategies were diverse, so this performance data must be viewed critically, if used for benchmarking. Furthermore, it is typical that funds with good performance report their data to providers such as Preqin while funds that have underperformed do not report their data; therefore, it is likely these numbers reflect a survivorship bias and reported performance may be higher than the actual performance for all funds of that vintage year.

Exhibit 10
How Unlisted Infrastructure Funds Performed

| | Top Quartile Net IRR Boundary | Median Net IRR | Bottom Quartile Net IRR Boundary |
|------|-------------------------------|----------------|----------------------------------|
| 2007 | 17% | 9% | 1% |
| 2008 | 14% | 7% | 0% |
| 2009 | 14% | 11% | 8% |
| 2010 | 19% | 12% | 8% |
| 2011 | 13% | 10% | 4% |
| 2012 | 12% | 7% | 5% |
| 2013 | 15% | 10% | 5% |
| 2014 | 22% | 9% | 6% |
| 2015 | 20% | 10% | 4% |

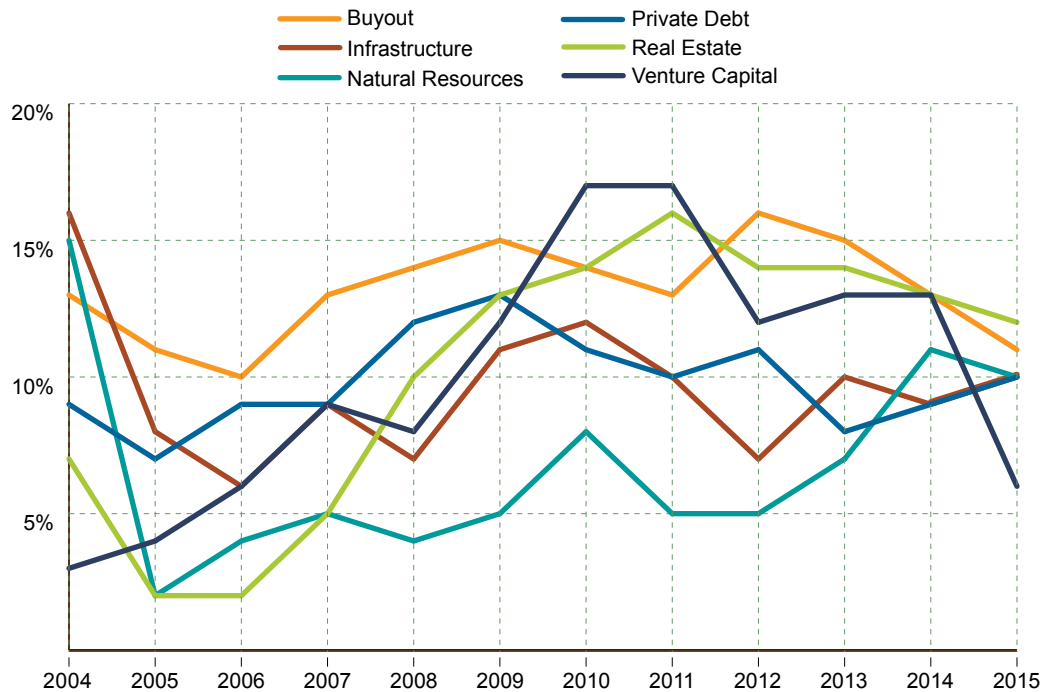
Source: Preqin

Comparing Infrastructure

Unlisted Infrastructure returns to-date have tended to be more consistent, with fewer peaks and valleys, compared to other private capital strategies such as venture capital, and somewhat similar to private debt in terms of performance (**Exhibit 11**).

Exhibit 11

Unlisted Infrastructure Returns vs. Other Private Capital Strategies



Source: Preqin

Data represent median net IRRs by vintage year

ESG

In Europe, which has a longer history of investing in infrastructure, many investors also have environmental, social, and governance (ESG) goals for their portfolio. These investors view infrastructure as one way to add investments with high ESG impact. One way to assess a manager's commitment to ESG is to determine whether it is a signatory to the Principles for Responsible Investment (PRI), or whether it has issued a statement with its view on ESG and how the manager plans to implement that view via investments.

To date, the collection of ESG data across the industry has not been standardized; instead it is dependent on individual managers. Renewable managers have been most likely to disclose the positive ESG impact of their clean energy portfolios by citing the reduction of carbon emissions from their sources of energy compared to traditional energy sources. Other infrastructure managers cite an increased focus on health and safety across assets in their portfolios by implementing policies and procedures that reduce the risk of on-the-job injuries and track the number of days without safety incidents. This lack of data may be changing, however, with greater adoption of standards from industry groups such as the Global Real Estate Sustainability Benchmark (GRESB), an investor-driven organization committed to assessing the ESG performance of real assets. As of 2018, 64 funds and 160 assets completed the GRESB Infrastructure Investment Assessment.

Conclusion

Listed and open-end infrastructure products in particular are of interest for investors with smaller portfolios and allocations.

Up to now, the majority of infrastructure capital was invested in unlisted, closed-end equity strategies, reflecting investors' initial decision to consider infrastructure as part of their private equity allocation. As the first generation of closed-end, sector-diversified infrastructure funds that launched around 2006 reaches maturity, investors are faced with the prospect of redeploying that capital. Current and potential infrastructure investors have more experience with the asset class and are revisiting their implementation strategies.

In recent years, the menu of options for infrastructure investment has expanded, and investors have a wider range of potential target returns for their infrastructure portfolios. Listed and open-end infrastructure products in particular are of interest for investors with smaller portfolios and allocations. By investing in these options, they can gain and maintain more flexible exposure to the sector without having to manage the reinvestment risk associated with the more typical closed-end fund offerings that have comprised most of the market since the mid-2000s. Key developments for investors looking to make infrastructure investments include:

- An increasing number of closed-end strategies that look to invest beyond the staple major markets favored by the initial generation of infrastructure managers as well as more sector-specific strategies to complement existing portfolios
- A larger number of open-end vehicles, similar to core open-end real estate vehicles, which allow investors to perpetually hold infrastructure assets for the income, appreciation, and inflation-protection potential associated with irreplaceable long-lived assets
- Debt-focused vehicles with lower return targets than the original equity-focused strategies; sector research based on prior infrastructure lending performance indicates infrastructure cash flows are relatively durable compared to typical corporate debt

With the maturation of the sector in terms of performance, an increase in the number of managers launching strategies, and the development of new products, institutional investors have the opportunity to review their organization's allocation and objectives for infrastructure, as well as the available implementation methods, and consider any adjustments to their program.

About the Author



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