



Investing in Infrastructure

Edward Szado, PhD, CFA
University of Massachusetts, Amherst

Inderst, Georg,

“Infrastructure as an Asset Class,”

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Inderst (2010) provides a comprehensive review of the major issues surrounding infrastructure investment. In particular, central to the paper is the question of whether infrastructure is a distinct asset class. Inderst discusses the evolution of infrastructure investment, the economic and financial characteristics, the investment vehicles and benchmarks, performance and risk, and the role of infrastructure in asset allocation.

While investors have held infrastructure equities and bonds (e.g., utilities sector equities and municipal bonds) as part of their traditional sector allocations for many years, the treatment of infrastructure as a distinct asset class is more recent. Dedicated infrastructure funds were first developed by Australian investment banks in the mid-1990s and they began to expand significantly in the 2000s in the U.S., as well as Europe and Asia. The expansion was largely driven by a search for diversification into new alternative asset classes in the years following the dot-com crisis.

Infrastructure can be divided into two types: economic infrastructure (e.g., transport, utilities, communication, and renewable energy) and social infrastructure (e.g., schools, healthcare, prisons, and stadiums). The economic characteristics that make infrastructure a unique investment include: high barriers to entry, economies of scale, inelastic demand, high operating margins, and long lives. The resulting financial characteristics include: high returns, low correlations with other asset classes and economic conditions, steady cash flows, inflation hedging ability, low default rates and a good match for long-term pension liabilities.

Inderst identifies a variety of infrastructure vehicles, including: private equity-type investments (mostly closed-end funds), listed infrastructure funds (closed-end or open-end, including ETFs), and direct unlisted investment. A recurring theme throughout the paper is the degree of heterogeneity within these vehicles, largely due to variations in geography, industry sector, and stage of development.

More than one-third of the global investment in infrastructure funds is attributed to pension funds. Most investors classify unlisted infrastructure investments as a stand-alone investment category, while just over one-quarter include them in the private equity category and just over 15% classify infrastructure investments in the real asset category. In contrast, Inderst argues that most listed infrastructure investments are likely categorized within the traditional stock and bond classifications. While three-quarters of investors have target allocations to unlisted infrastructure funds of 1% to 10%, the actual allocations tend to be much less (less than 1%, globally). Allocations to listed infrastructure (dominated by utilities) tend to be much higher. While the global financial crisis has tempered the growth of infrastructure investment, in 2010 Prequin indicated that almost half of investors planned new investments in infrastructure funds.

Infrastructure investments contain a myriad of risks, which may not be captured in typical ex-post statistical

measures. For infrastructure projects, the risks include: construction risk, operational risk, business risk, interest rate risk, refinancing risk, legal risk, regulatory risk, environmental risk, political and taxation risk, and social risks. At the fund level, the risks include: concentration risk, illiquidity risk, valuation risk, and governance risk.

While target returns have dropped since the financial crisis, Preqin reports that three-quarters of funds report IRR targets of 10.1% to 20%. Along with a drop in target returns, there has been a drop in leverage, now generally in the 60% to 80% range.

While absolute return benchmarking is the predominant approach, Inderst lists a variety of approaches to benchmarking infrastructure funds, including absolute return, inflation plus margin, bond yield or GDP plus margin, inflation-linked bond plus margin, equity, real estate plus private equity, listed-infrastructure indices, peer groups, and unlisted-infrastructure indices.

Listed infrastructure indices are essentially equity market sector indices. In historical studies, they generally show superior performance over equity markets prior to the financial crisis, while the performance wanes in later years. Generally, they display high correlation with equity indices, with negatively skewed and fat tail returns. However, their applicability to unlisted infrastructure investment is limited. Historically, performance analysis of unlisted funds has generally been limited to Australian funds. These analyses find high risk-adjusted returns and diversification benefits in weak market environments.

Inderst analyzes a more diverse set of global unlisted infrastructure funds from the Preqin database and compares them to a larger set of private equity funds for the period of 1993 to 2009. Since fund vintage has a significant impact on performance characteristics, and the majority of funds were introduced in the three years from 2006 to 2008, Inderst divides the period into three sub-periods: 1993-1999, 2000-2004 and 2005-2008. The average IRR over the full period is 6.3%, with a standard deviation of 15.4%. More than one-quarter of the funds exhibited negative IRRs. Newer funds experienced significantly lower IRRs, in keeping with the J-curve effect observed for private equity funds. Over the full period, infrastructure funds performed slightly better than private equity funds overall, but worse than buyout and mezzanine funds. Infrastructure and mezzanine fund returns tended to be more consistent over vintage years than other private equity funds and infrastructure returns tend to have less variance cross sectionally than most private equity categories. However, Inderst cautions that the results should be considered in light of the data limitations (a small sample, concentrated in later vintages).

The evidence of diversification benefits of infrastructure is mixed, largely due to data limitations. Much of the research is based on readily available listed infrastructure indices, which tend to be highly correlated with equity indices (0.50 to 0.80). Unlisted infrastructure funds exhibit much lower correlations with equities (0.05 to 0.27) and bonds (-0.10 to 0.17), based on Australian data. This suggests unlisted funds have diversification potential for traditional portfolios, although data limitations mitigate the significance of the results and make optimal allocation determinations challenging. Furthermore, infrastructure may provide a degree of inflation protection and stable cash flows that are uncorrelated with equity markets; however, it is not yet clear whether these benefits pass directly to investors in infrastructure funds or which type of infrastructure vehicles best provide these benefits to investors. While research tends to focus on equity-based infrastructure, infrastructure bonds and syndicated loans have garnered a great deal of interest in the years following the onset of the financial crisis.

Inderst identifies a number of new developments in infrastructure investment. In response to agency concerns and high fees related to private equity structures, there is a trend toward alternative means of accessing infrastructure returns, including direct investment in infrastructure, co-investment, club investment, listed infrastructure funds,

and infrastructure bonds. There is also a trend towards longer lived funds to better match fund live times to asset lives. Investors are also seeking greater transparency and more rigorous corporate-governance.

Finally, there remains a great deal of controversy around the labeling of infrastructure as a distinct asset class. From the author's perspective, the extant evidence and financial theory suggests that infrastructure is simply a sector within other standard asset classes such as equity, bonds and private equity.

Hammami, Mona, Jean-Francois Ruhashyankiko, and Etienne B. Yehoue,
"Determinants of Public-Private Partnerships in Infrastructure,"

IMF Working Paper WP/06/99, April 2006.

Available at: <http://www.imf.org/external/pubs/ft/wp/2006/wp0699.pdf>

Hammami, et al. (2006), focus on the factors that led (and continue to lead) to an increased private investment in public infrastructure. Since the 1970s, developing countries have faced an increasing divergence in the supply and demand for infrastructure. Since infrastructure is fundamental to economic growth, and fiscal constraints have limited the ability of the public sector to provide infrastructure development and maintenance, governments have turned to the private sector as an alternative means of financing and providing infrastructure. Since the late 1990s there has been significant growth globally in the delivery of public goods by private firms, including, designing, maintaining, managing, owning, or financing a wide array of infrastructure products, such as schools, hospitals, and roads. World Bank estimates suggest that about 20% of infrastructure in developing countries in the 1990s were financed by the private sector.

The authors empirically address a number of questions regarding public-private partnerships (PPPs): the sources of their growth, the factors that drive a countries ability to attract PPP investments, the factors that result in concentration of PPP investments in certain industries, and the factors that drive private sector interest in participation with the public sector.

The authors focus on seven channels that determine the level of PPPs based on constraints and incentives in the public and private sectors, government constraints, political environment, market conditions, macroeconomic stability, institutional quality, the legal system, and past experience with PPPs.

The authors find that the most important channel affecting the formation of PPPs is the market conditions channel. In particular, market size and customer purchasing power are important variables in PPP development, as they help curtail demand risk.

The authors find that stable prices and exchange rates are important components of the macroeconomic stability channel. In fact, many governments have had to guarantee prices or revenues to attract sufficient PPP partners.

Previous PPP experience is also a significant determining factor for the development of future PPPs. Similarly, assistance from global and local development agencies with the established skills to aid PPP development can further foster PPP growth.

The political environment channel can reduce the formation of PPPs if significant political risk exists in the form of ethnic tensions, political biases, and the lack of political oversight. In particular, PPP development can be fostered by eliminating corruption and ensuring effective rule of law.

At the industry level, PPP development is driven by the marketability of the goods and services, the capital and technology requirements, and “impurity” of the goods and services (a mix of public and private, rather than purely public or private). The authors find greater PPP development for impure and technologically intensive goods and services, consistent with high PPP development in telecommunications, and few PPPs in water infrastructure, with energy and transportation sectors in between.

Finally, the authors find a concentration of PPPs in Latin America, the Caribbean, Europe, and Central Asia. While this paper does not address the viability or appropriateness of infrastructure as an investment from a portfolio management perspective, it does make great strides toward understanding the basis of past and future development of infrastructure-based investment vehicles.

Clark, Gordon L., Ashby H. B. Monk, Ryan Orr, and William Scott,
“The New Era of Infrastructure Investing,”

Working Paper, May 2011.

Available at: <http://ssrn.com/abstract=1837813>

The authors argue that long-horizon investors such as insurance companies, pensions, endowments, and sovereign wealth funds are in a unique position to take advantage of asset classes such as infrastructure since the time horizons for most infrastructure investments significantly exceed the time horizon of the typical investor. Furthermore, the large scale of most infrastructure investments creates a barrier to entry to the typical investor. Ultimately, institutional investors have been attracted to infrastructure investments because of their competitive advantage and the investments' stable cash flows, diversification potential and ability to provide a hedge against inflation. While institutional investors initially accessed infrastructure investments through intermediaries, the authors focus on the growing interest that institutional investors have in accessing infrastructure investments directly to minimize agency problems.

Direct investment in infrastructure involves its own set of considerations. The authors address a number of these considerations and provide some direction for investors interested in developing a direct infrastructure investment program. In order to assess whether the investor should pursue direct investment, the authors recommend beginning with an assessment of the aim of the infrastructure investment as set out by the board, including risk and return goals, diversification/hedging goals (e.g., inflation protection), cash flows and allocation to the asset class, the investment strategy including geographical or sector focus and degree of activism, and the resources required to implement the direct investment program.

Once the investor decides to pursue direct investment in infrastructure, they should focus on the people, process and politics required for successful implementation. The people must possess skills that differ in fundamental ways from the typical institutional investor skill set. Since individual infrastructure investments tend to be very large, long term, and illiquid, transaction level considerations may outweigh market level considerations. Executing the right deal efficiently is critical when the costs of exit are as high as they are in direct infrastructure investment. Similarly, the processes utilized by institutional investors may need to adapt for infrastructure investment. Decisions are costly to reverse, often need to be made quickly, and must consider a broad range of risks that may or may not be present in more typical investment alternatives. Furthermore, long-term investment horizons require a refocusing of goals from their typical short-term focus. The long-term investment horizon of direct infrastructure investment also involves internal and external politics. Externally, the investments may result in an increased public visibility. Internally, an appropriate political environment and structure is required to allow the long-term

focus that is inherent in direct infrastructure investment.

Ultimately, the authors provide some brief guidelines for what does and does not work in direct infrastructure investing, once the funds have overcome the challenges outlined above. The authors suggest that the following approaches work well:

What works:

- A focus on core operating assets and quality management.
- Designing a deal which is well aligned with long-term goals and efficiently uses capital.
- The “buy a fox to catch a rabbit” strategy in which the investor buys a firm that already possesses the required operational expertise and then acquires similar companies.
- In order to fill out their expertise and access larger investments, investors may work together in clubs.

What doesn't work:

- Some strategies that may work for indirect investment do not seem to work well for direct investment. One example is greenfield PPPs.
- Another difficult direct investment is the privatization of previously public assets.
- The inherent conflicts of interest involved in partnerships with industrials, contractors or operators on newly created assets make these strategies difficult to implement.

Rödel, Maximilian and Christoph Rothballe,

“Infrastructure as Hedge against Inflation—Fact or Fantasy?”

The Journal of Alternative Investments, Summer 2012, Vol. 15, No. 1, pp. 110-123.

Available at: <http://www.ijournals.com/doi/pdfplus/10.3905/jai.2012.15.1.110>

Rödel and Rothballe (2012) describe their paper as “the first to analyze the inflation hedging of infrastructure in a comprehensive and methodologically robust study.” While there is a general belief in the investment community that infrastructure is an effective inflation hedge, Rödel and Rothballe's analysis suggests this may not be the case. The authors argue that the extant literature provides four main sources for infrastructure's inflation hedging ability: (1) infrastructure's replacement cost rises with inflation, (2) the quasi-monopolistic position of many infrastructure firms allow them to pass on cost increases to consumers, (3) regulation allows inflation-linked revenues (e.g., inflation-linked rent agreements), and (4) infrastructure firms tend to have low operating costs after the initial high capital investment.

The authors use a diverse dataset of 824 infrastructure firms across 46 countries. The dataset covers all sectors of economic infrastructure (e.g., transport, utilities, and telecommunication) and excludes social infrastructure (e.g., schools and hospitals). While it does contain some PPPs, it is predominantly made up of fully privatized assets. While the data covers the period from 1973 to 2009, most of the analysis is based on the period from 1990 to 2009. Thus, the analysis focuses on moderate inflation environments, possibly biasing the results towards finding less hedging abilities for both equities and infrastructure.

The primary analysis uses a regression model based on 1- and 5-year investment horizons in which real returns are regressed on inflation, changes in inflation, and real GDP growth. In addition, dummy variables are introduced to allow the comparison of the hedging abilities of infrastructure and equities.

Their results suggest that, in general, infrastructure investments provide no additional inflation hedging ability when compared to traditional equity investments. The one exception appears to be high pricing power infrastructure at the 5-year time horizon. More specifically, their findings are as follows:

- At a 1-year time horizon, infrastructure is slightly more effective at hedging inflation than equities are, but the difference is not statistically significant. The same, but weaker, pattern holds for the 5-year horizon.
- At the 5-year horizon, infrastructure is worse than equities for hedging unexpected inflation.
- At the sector level, both telecommunication and utilities infrastructure provide similar inflation hedging to equities.
- The authors find that infrastructure with high pricing power provides more effective inflation hedging than infrastructure with low pricing power or equities. This pattern is particularly evident at the 5-year time horizon. In fact, the authors find that high pricing power infrastructure is almost a perfect hedge for inflation at the 5-year horizon.

Author Bio



Edward Szado, PhD, CFA, is a Visiting Assistant Professor at the University of Massachusetts Amherst, the Director of Research of the Institute for Global Asset and Risk Management (INGARM), an Editor of the Alternative Investment Analyst Review (AIAR) and Assistant Editor of the Journal of Alternative Investments (JAI). He earned a B.Comm. at McMaster University in Canada and an M.B.A. in finance at Tulane University and a PhD in Finance at the University of Massachusetts Amherst.