SECTORAL ASPECTS OF GLOBAL INFRASTRUCTURE INVESTMENT

A closer look at the MSCI Global Quarterly Infrastructure Asset Index

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June 2015

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EXECUTIVE SUMMARY

The MSCI Global Quarterly Infrastructure Asset Index is relatively new, with a time series beginning near the trough of the global recession of 2009. This period is so brief—it still covers less than a single business cycle—that it is difficult to make sweeping assessments of unlisted infrastructure's performance, let alone the performance of individual sectors. So in this paper, our aims are smaller. We attempt to describe and illustrate sector-specific nuances of interest to investors. At least three conclusions emerge in the paper.

First, there is a degree of sectoral variation within the index. Transport and power, the two dominant streams of activity in the index, have experienced both differential performance and differential volatility in the post-crisis recovery. The timing of each sector's cyclical recovery has also varied.

Second, we explore the reasons for differential performance in unlisted and listed infrastructure in the post-crisis recovery. In the real estate asset class, we know that historical listed indexes generally tend to have a higher risk/return profile than do unlisted indexes, but in its short history, the unlisted MSCI Global Quarterly Infrastructure Asset Index has tended to outperform the listed MSCI World Infrastructure Index. In this paper, we show that one of the factors contributing to this outperformance has been sector weighting. By matching the quarterly sector weights in the unlisted index to create a listed proxy, we see strong evidence that sectoral composition can explain performance patterns to some degree. Another possible contributor to differential performance may be valuation bias, but we conclude that it is too soon to measure this with the sophistication of transaction-linked indexes as used in unlisted real estate.

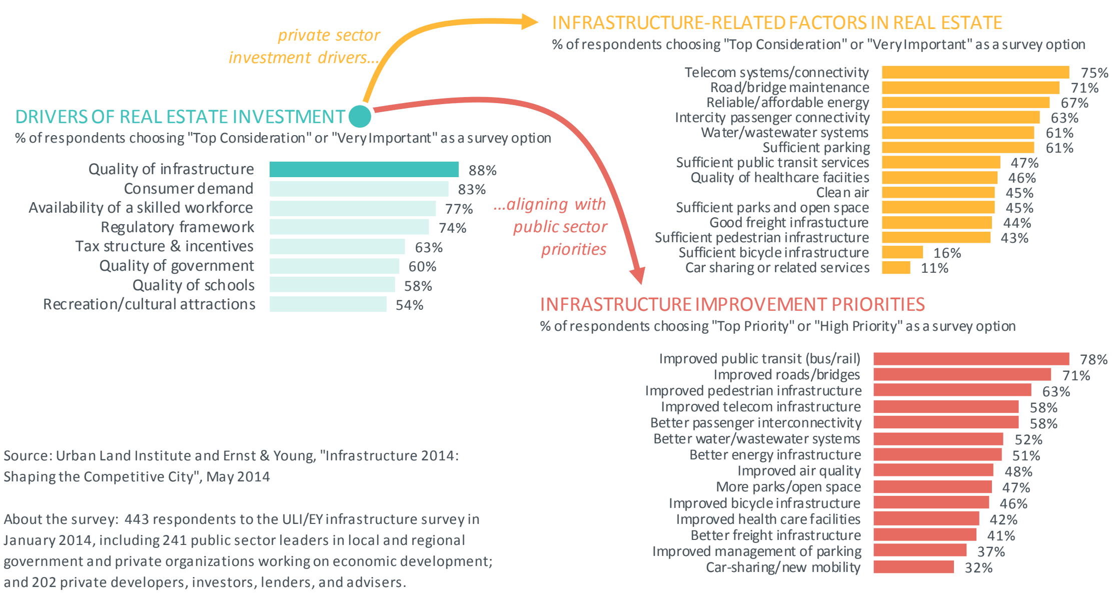
Finally, it is worth reiterating in this second MSCI report on unlisted infrastructure—as we did in the first report—that near-term disequilibrium of market fundamentals is having an impact on pricing, in part because allocations to infrastructure are rising faster than infrastructure product coming available to the market.

INTRODUCTION

From David Lean's cinematic classic *Bridge on the River Kwai* to the popular crime thriller *The Bridge* of modern Danish television. From *The Bridge of San Luis Rey*, Thornton Wilder's contemplation of human fate in the Andes to Katsushika Hokusai's timeless woodblock prints of iconic bridges in Edo period Japan. Bridges capture the imagination of artists as much as they do civil engineers. The value of bridges, like all infrastructure, is easy to grasp. Infrastructure is a real asset, a part of daily life that the general public understands. A retired teacher in Australia may take some comfort in knowing that her pension is invested in a Canadian power plant or a Dutch port, something that was there yesterday generating economic value and in all likelihood will still be there tomorrow doing the same.

Infrastructure, like real estate, is a tangible income-producing alternative asset class, and the two share a certain link. A 2014 survey of government and real estate leaders by ULI and EY suggested that high-quality infrastructure is an important underlying driver of real estate investment decisions, edging ahead of other factors such as taxes, regulation, education, and skilled labor. (1) The ULI/EY survey also showed that the public sector's priorities for infrastructure improvement were converging with private investors' infrastructure-related preferences. Transport, energy, environmental quality, and communication emerged as general areas of overlapping priority. (1)

REAL ASSETS: THE LINK BETWEEN REAL ESTATE AND INFRASTRUCTURE



Source: Urban Land Institute and Ernst & Young, "Infrastructure 2014: Shaping the Competitive City", May 2014

About the survey: 443 respondents to the ULI/EY infrastructure survey in January 2014, including 241 public sector leaders in local and regional government and private organizations working on economic development; and 202 private developers, investors, lenders, and advisers.

The ULI/EY survey on global infrastructure priorities was timely. A few months later in 2014, MSCI introduced the Global Infrastructure Asset Index to measure the performance of infrastructure assets that are housed in unlisted vehicles. It was the first ever index of this type at the global level. [2] In this, our second report on unlisted global infrastructure investment, we take a closer look at the sectoral composition of this new index. Based on the funds participating in the index, we find a strong preference for two broad streams of infrastructure investments: transport and power. As we show in the report, the composition of the index is very much in line with anecdotal information available elsewhere in the industry about investment patterns. This report is largely descriptive, part of MSCI's ongoing effort to respond to growing interest in the new Global Infrastructure Asset Index by making its composition and performance more accessible to users.

INVESTMENT LANDSCAPE

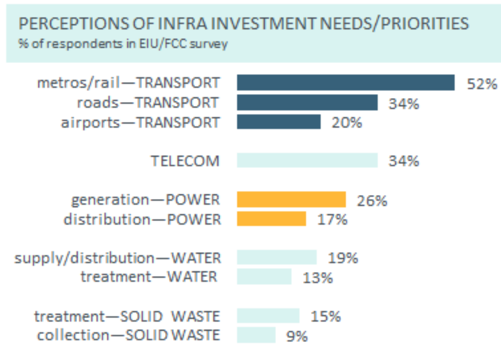
Are you happy with your own portfolio's performance? A recent Preqin survey found that 86% of institutional investors were satisfied with the performance of their infrastructure investments over the past 12 months. [3] This may come as little surprise since the infrastructure asset class aligns well with the long-term liabilities of institutional investors, and the revenue stream it generates is often inflation-protected. [4] [5] This view toward longer term objectives helps negate one of direct, unlisted infrastructure's biggest drawbacks as an investment—its illiquidity. More than two-thirds of investors with unlisted infrastructure holdings now report they are comfortable with a holding period of 10 years or more. [6]

As private sector interests in infrastructure rise, so too is the public sector's incentive to seek new sources of funding and participation, though the degree of public control ceded (and the vehicle to accomplish the divestment) can sometimes be subject to a long, spirited public process. [7] The scale needed for investment in infrastructure, particularly in certain transport initiatives, narrows the private sector playing field to larger players such as pension funds. [8]

Preqin recently reported that 40% of institutional investors with infrastructure holdings plan to commit more capital in the year ahead, while more than 60% plan to increase their long-term allocations. But intentions and actions are not the same thing. Fundraising in 2014 faced obstacles, namely due to current pricing. [3] When demand from investors exceeds the supply of investible infrastructure product, the 'weight of capital' can lead to near-term mismatches in pricing, an obstacle described in MSCI's previous report on infrastructure. [2]

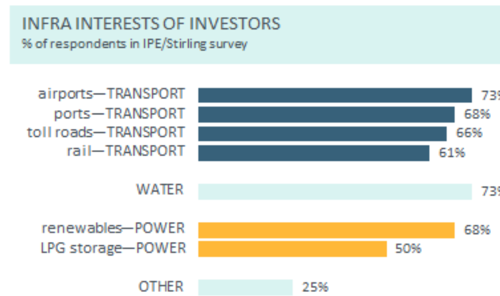
But near-term fundamentals of supply and demand aside, the long-term trajectory of the overall infrastructure market appears to be moving toward greater private participation in public infrastructure. Business executives and policymakers, when asked about infrastructure choices, consistently cite transport and power-related activities among their preferred sectors for private sector investment. (6) (7)

IDENTIFYING INFRASTRUCTURE SECTORS



Source: Economist Intelligence Unit (EIU) and Fomento de Construcciones y Contratas (FCC), "Urban Infrastructure Insights", 2015

About the survey: 409 global respondents, including 306 business executives and 103 policymakers, conducted in September and October of 2014.



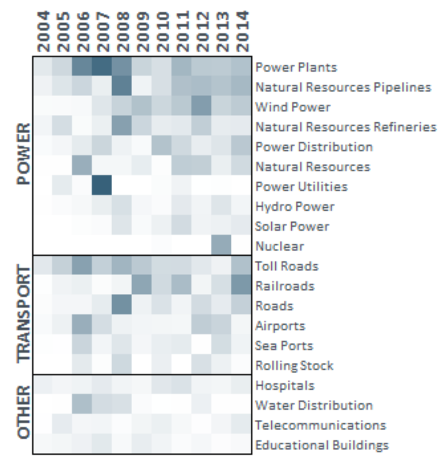
Source: Investment & Pensions Europe (IPE) and Stirling Capital Partners, "Institutional Infrastructure Survey", 2015

About the survey: 77 respondents (all institutional investors) in 26 countries.

Indeed, patterns of capital inflows to the infrastructure asset class over the past decade tend to bear out these choices of transport and power as the types of transactions most commonly represented among closed deals. In the period from 2004 through 2014, MSCI identified 20 subsectors of infrastructure investment in Preqin's database of completed deals that exceeded a cumulative value of USD 25 billion. Of these 20 subsectors, 10 could be loosely grouped in a broad category of upstream and downstream energy and power-related activities. Another six fell under the broad category of air and surface modes of transportation. The remaining four subsectors attracting significant capital inflows were spread across various other activities that were less interrelated. (9)

INTENSITY OF GLOBAL INFRASTRUCTURE DEAL ACTIVITY, 2004-2014

Based on infrastructure subsectors with cumulative deal volumes exceeding USD 25 billion*



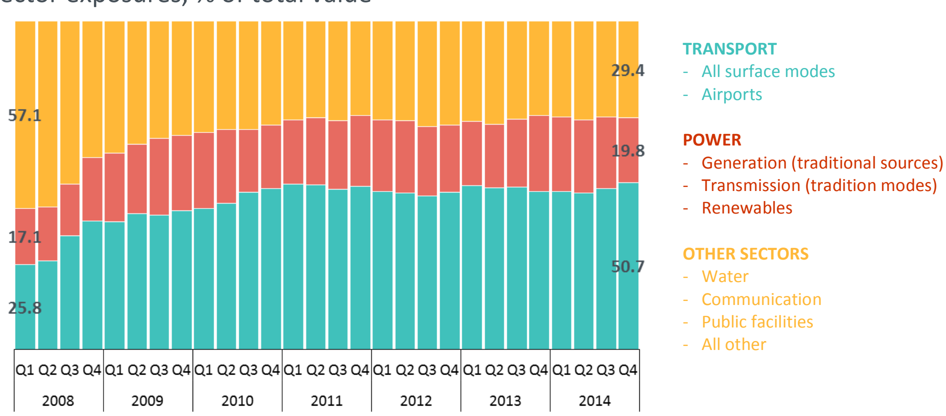
Source: Preqin

*Note: Preqin's infrastructure subsectors are loosely grouped for this analysis as power, transport, or other. Darker shading implies greater deal activity in a given year.

Preqin's accounting of infrastructure transactions by subsector corresponds roughly with the sectoral composition of the MSCI Global Infrastructure Asset Index. As of Q4 2014, the transport and power 'streams' accounted for more than two-thirds of the index's exposure. This translates to a rise from just over 40% of the total these two streams represented in Q1 2008. The shift in composition occurred largely in the 2008-2011 period during and immediately following the global financial crisis. During this period, exposure tilted strongly toward transport assets. Power-related assets also gained, though the increase in exposure was more modest. But it is also important to keep these patterns in perspective. While the trend in the global market parallels the change in sector weights, it is important to note that the index is consultative, and the variability of the sector weights over time may be due to sample bias rather than market changes.

MSCI GLOBAL QUARTERLY INFRASTRUCTURE ASSET INDEX

Sector exposures, % of total value



Source: MSCI Global Infrastructure Asset Index (UNLISTED INFRA)
Note: While the trend in the market parallels the change in sector weights, it is important to note that the index is consultative, and the variability of the sector weights over time may be due to sample bias rather than market changes.

AN EYE ON INFRASTRUCTURE SECTORS: DRIVERS & TRENDS TO WATCH

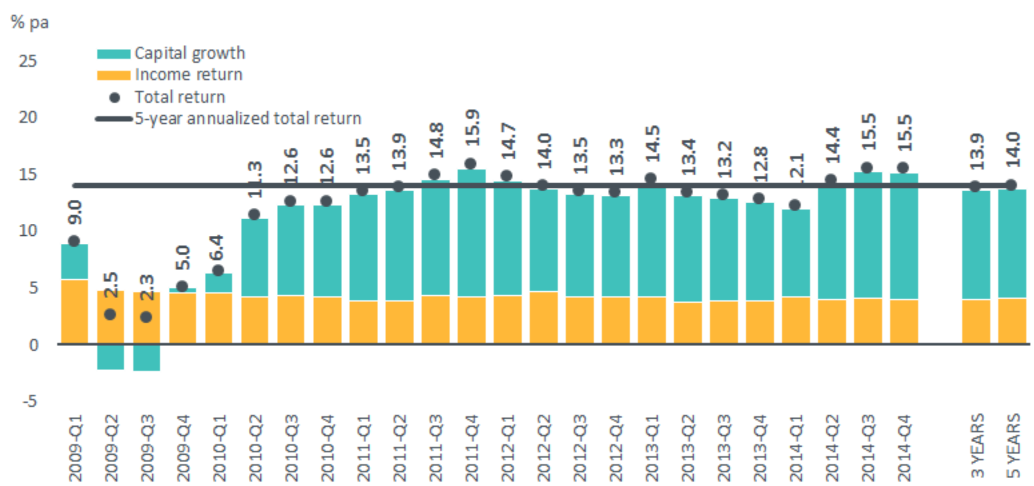
- **Growing focus on user charges**. In the wake of the global financial crisis, 'user fees' represented a revenue growth stream for US cities even as other public revenue streams were declining. [10]
- **Rising interest in transport**. Anecdotal and survey data indicate shifting investor preferences toward transport-related investments. [4] [6] An analysis of quarterly exposure data in MSCI's unlisted infrastructure index tends to confirm this pattern, as indicated within this report.
- **Evolving structure of power sector**. A relatively rapid shift to renewable power generation in some markets has led to technical complications in the grid as well as imbalances in market pricing. [11] [12] This has elevated sector-specific risks in some markets, especially Germany. But where risks and uncertainties lie, some investors also see opportunity. [13]
- **Renewables incentives in many markets**. The EU has set a 20% target for renewable generation by 2020. Various incentives are also in use in China, the US, and Australia. [5] [14] This has led to sharp increases in investment in renewable power generation, including solar installations in Asia and offshore wind in Europe. [13] [15]
- **Basel III's unintended impact on long-term project finance**. As banks shift their priorities to short-term liquidity, their willingness to engage in long-term project finance is expected to recede, thus raising financing costs. This has the potential to impact infrastructure projects, creating more demand for non-bank sources of financing. [16] This is paving the way for the creation and introduction of new financial instruments such as 'green bonds' for renewable power projects. [15] [17]

PERFORMANCE ANALYSIS

Two of the three best quarters of performance for the MSCI Global Infrastructure Asset Index occurred in the latter half of 2014. In the index's limited history, only Q4 2011 had a better total return (15.9%), and this occurred during the peak rebound from the global financial crisis. The index remained positive through the worst quarters of the downturn (Q2 and Q3 2009), with an income return that was able to offset modest declines in capital value. By Q2 2010 the index returned to double-digit total returns where it has held ever since with only moderate volatility. Annualized total returns over the five years ending in Q4 2014 were 14.0% with less than one-third of this performance (4.1%) generated from the income return.

MSCI GLOBAL QUARTERLY INFRASTRUCTURE ASSET INDEX

All property total return index including contributing components



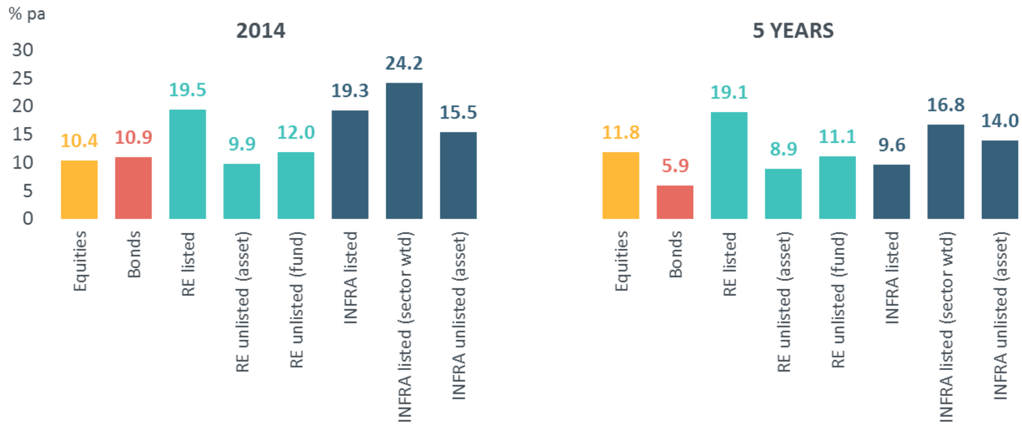
Source: MSCI Global Infrastructure Asset Index (UNLISTED INFRA)

In 2014 as well as over the past five years, total returns for unlisted infrastructure exceeded equities and bonds. During these one-year and five-year periods, listed real estate has been one of the few investment options that has had a better performance run.

Unlisted infrastructure (as represented by the MSCI Global Infrastructure Asset Index) also outperformed listed infrastructure (as represented by the MSCI World Infrastructure Index, Local) over the past five years (14.0% versus 9.6%). The question is why? During the same five-year period, listed real estate tended to outperform unlisted property. What might prevent infrastructure from following this same pattern over this longer time period?

COMPARATIVE GLOBAL PERFORMANCE ACROSS ASSET CLASSES

Annualized results at 1 & 5 years for the period ending 31 December 2014



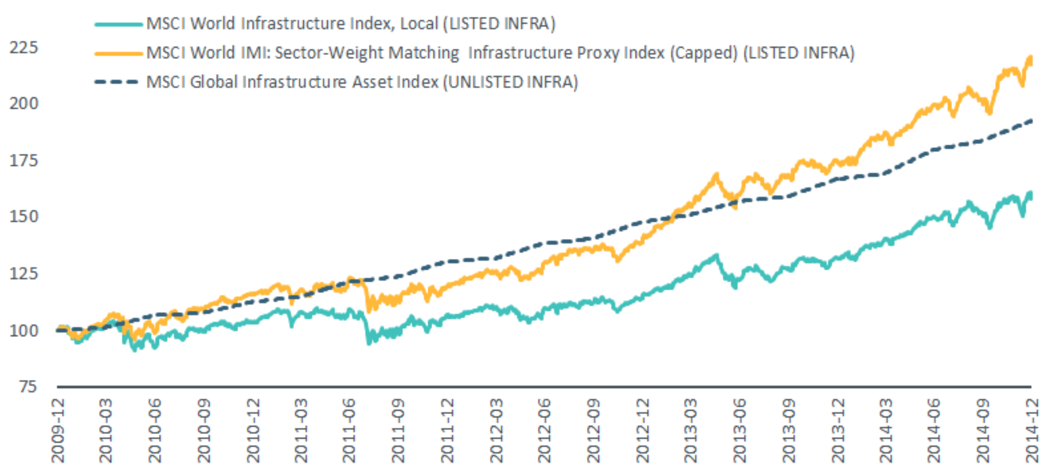
Sources: MSCI World Equities Index, Local (EQUITIES); J.P. Morgan, GBI Global, Local (BONDS); MSCI World Real Estate index, Local (LISTED PROPERTY); IPD Global Property Index (UNLISTED PROPERTY - ASSET LEVEL); IPD Global Property Fund Index (UNLISTED PROPERTY - FUND LEVEL); MSCI World Infrastructure Index , Local (LISTED INFRA); MSCI World IMI Infrastructure Index - Sector-Weight Matching Infrastructure Proxy Index Capped, Local (LISTED INFRA); MSCI Global Infrastructure Asset Index (UNLISTED INFRA).

A possible contributing factor could be the valuation of unlisted infrastructure. Indexes of unlisted real estate are based on quarterly appraisals, but in those markets where transaction-weighted indexes are also available, the performance between the two indexes can sometimes vary. If the same is true for infrastructure, it is too soon to tell. The indexing of unlisted infrastructure is in its infancy, and greater sophistication will come in time, as it has with real estate.

But could there be other reasons, other significant contributing factors to help explain the performance in listed and unlisted infrastructure over this five-year time period? Perhaps. As we show throughout this paper, the sectoral composition of infrastructure is varied, with certain sectors attracting more investment than others. Each sector carries its own regulatory, market, and technological risks and rewards which can thus impact the composite of infrastructure performance in different ways. What if that explained some of the variation in listed and unlisted performance? To explore this option, we created a sector-weighted listed proxy (see sidebar) to match the weights in the unlisted index. The comparative results appear in the preceding exhibit of asset class performance. Over the five-year time period, the unlisted and sector-weighted listed indexes are toggled. The sector-weighted listed index outperformed the unlisted index over the five-year period (16.8% versus 14.0%).

The exhibit below traces the indexes over the five-year period from December 2009 through December 2014. To be clear, the unlisted index is an unsmoothed quarterly series, so the implied lack of volatility may be a bit misleading. This does not, however, distract from our findings, which relate to performance, not volatility. During the five years of global economic recovery, the sector-weighted proxy significantly outperformed the MSCI World Infrastructure Index, Local, within the confines of the listed space. As we showed earlier in the paper, the composition of the unlisted index (and thus the listed proxy) is heavily tilted toward activities related to transport and power. In the next section of the paper, we take a closer look at how the two unlisted 'streams' of transport and power activity have performed.

5-YEAR COMPARATIVE PERFORMANCE INDEX FROM DECEMBER 2009



Source: MSCI

HOW WE BUILT THE BRIDGE: CONSTRUCTING A LISTED MSCI PROXY FOR THE UNLISTED MSCI INDEX

MSCI first launched a listed infrastructure index in 2008. The MSCI Infrastructure Index is a pure cap-weighted index which includes all stocks from a broad range of GICS®sub-industries associated with infrastructure. More recently, in January 2015, MSCI launched the MSCI Core Infrastructure Index family which focuses on a more tightly defined set of infrastructure-related subindustries along with industry and stock-level capping to ensure a more diversified exposure to the individual infrastructure segments. This new index methodology has a market cap coverage of the parent index typically half that of the original listed index approach which illustrates its greater focus.

Even after this refinement, the geographic and, to a lesser extent, the industry mix of established unlisted assets is rather different from that available via publicly listed companies. To bridge this gap, we have built a listed proxy of the unlisted MSCI Global Infrastructure Asset Index. This allows us to assess the feasibility of a "Liquid Infrastructure" listed index as well as providing a higher frequency index with which asset class correlations can be studied.

We used the MSCI Core Infrastructure Index methodology to select the 225 eligible stocks from the MSCI World IMI parent index. We then mapped the stocks' GICS subindustry membership to the most relevant unlisted infrastructure segment as shown in the table below.

CONCORDANCE OF SECTORAL CLASSIFICATIONS

INDUSTRY "STREAM"	UNLISTED INDEX CLASSIFICATIONS	GICS® SUB-INDUSTRIES
POWER	Power - Generation *(excluding renewable energy)*	Electric Utilities, Gas Utilities, Multi-Utilities
	Power - Transmission *(excluding renewable energy)*	Oil & Gas Storage and Transportation
	Renewable Energy	(Renewable Electricity)
TRANSPORT	Transport *(excluding Airports)*	Railroads; Highways & Railtracks; Marine Ports and Services
	Airports	Airports
OTHER SECTORS	Water	Water Utilities
	Communication	Specialized REITs (Wireless telecoms only)
	Public Facilities	N/A
	Other	None

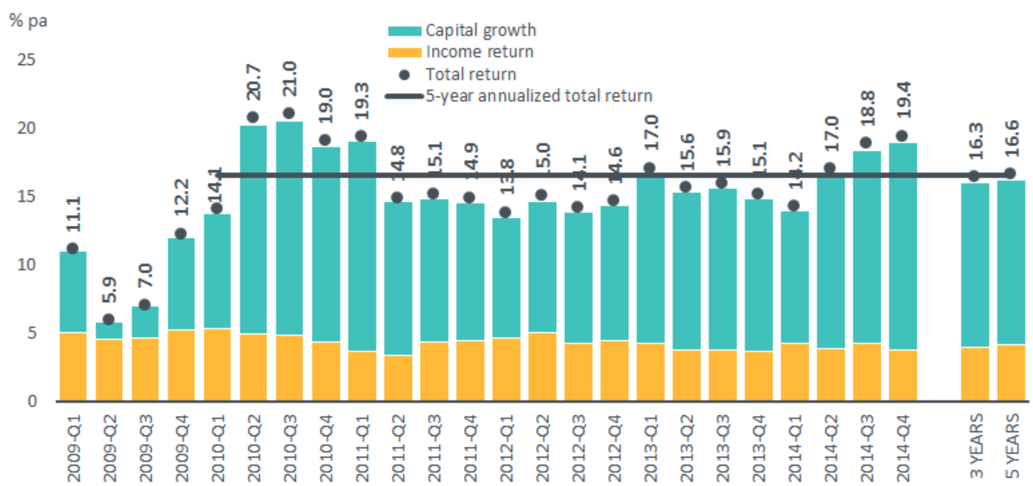
The quarterly relative weights of the relevant unlisted segments can be used in an index simulation from June 2008 as industry weight caps during the quarterly rebalances. We also constructed a version of the proxy index with a 5% issuer weight limit to provide improved diversification and better align the index profile with an invested portfolio. The performance of both indexes was very similar and while the exposure of the listed indexes to daily pricing sees a drawdown during the start of the global financial crisis, the return to both the unlisted and listed indexes since September 2009 has been broadly in line.

TRANSPORT

The discrepancies are subtle, but unlisted transport experienced a somewhat different cycle than unlisted infrastructure overall. For starters, there were no capital value losses during the darkest quarters of 2009. And the post-crisis rebound was also much faster. Annual total returns for global transport peaked high and early, hitting 21.0% in Q3 2010. The overall index for unlisted infrastructure peaked five quarters later at 15.9% in Q4 2011. While annual total returns for unlisted transport have not dipped below double-digit levels since Q3 2009, performance has been moderately more volatile than unlisted infrastructure overall. Still, this additional volatility has produced returns for transport in the past five years that are more than 200 basis points above the unlisted infrastructure average.

UNLISTED GLOBAL TRANSPORT SECTOR PERFORMANCE

MSCI Global Quarterly Infrastructure Asset index, transport sector total return and components



Source: MSCI Global Infrastructure Asset Index (UNLISTED INFRA)

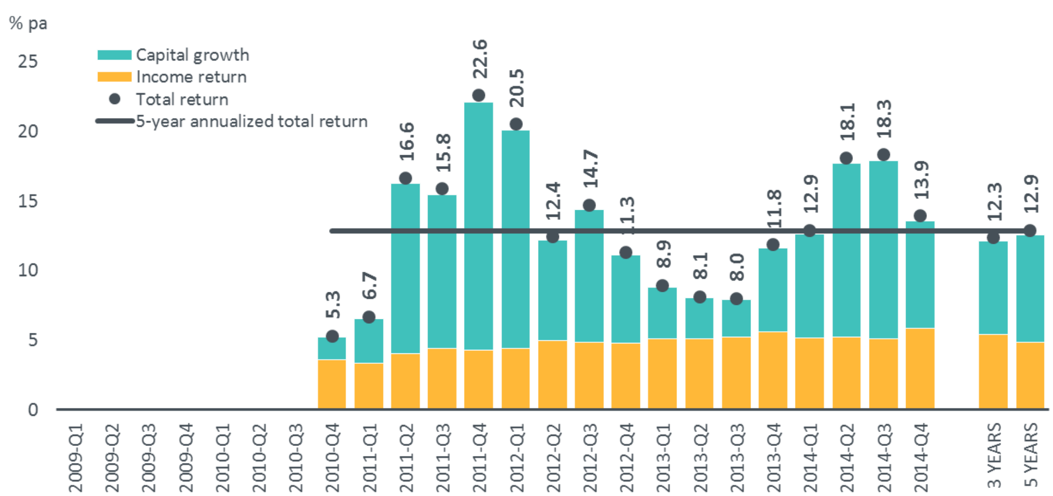
POWER

As a component of the consultative index for unlisted infrastructure, the time series for the power stream is shorter, so it is not possible to assess the full performance of the sector from the trough of the global recession. We do know that the power stream's performance in Q4 2010 and Q1 2011 had not yet risen above double-digits as it had at this point for the transport sector and the broader index, so this at least implies that the performance downturn for the power stream was likely more prolonged. There is not yet enough information in the consultative index to speculate about the depth of the downturn for this sector. The peak of the rebound (Q4 2011) did fall very much in line with the broader unlisted index. The power stream's peak total return of 22.6% in that quarter was much higher than the peak 15.9% return of the broader index, suggesting that power's outperformance played an important role in influencing peak of the overall index, even though the power stream represented only about one-fifth of the weighting.

Unlike the transport stream, power has been inconsistent in double-digit performance across the recovery quarters. Moreover, despite its short time series, power has exhibited much more performance volatility than transport and has produced a return of 300-400 basis points below transport on annualized basis over the past three to five years. And to put this in context, it is also worth noting that the power stream includes both regulated and unregulated assets that have very different return profiles and levels of leverage.

UNLISTED GLOBAL POWER SECTOR PERFORMANCE

MSCI Global Quarterly Infrastructure Asset Index, power sector total return and components



Source: MSCI Global Infrastructure Asset Index (UNLISTED INFRA)
Note: The power stream is indexed to Dec-2009 = 100, thus the first annualized return is in Dec-2010, and the 5-year annualized represents the period from Dec-2009 forward.

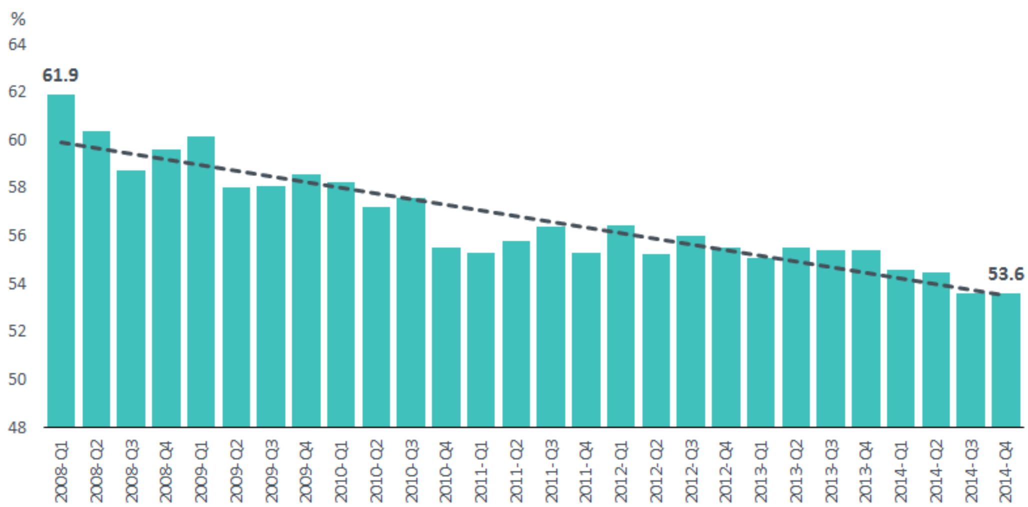
RISK LANDSCAPE

USE OF LEVERAGE

A key feature of the unlisted MSCI Global Infrastructure Asset Index is that it includes information about the use of leverage. Gearing levels for infrastructure assets edged downward during the global recovery from more than 60% in early 2008 to less than 55% as of the end of 2014. The decline in leverage occurred at the same time that performance was generally rising. The downward trend in leverage coincides with a general deleveraging of investment markets that followed the global financial crisis. Leverage levels also reflect capital expenditure trends as well as the strength and stability of an asset's cash flows.

TREND IN LEVERAGE FOR UNLISTED GLOBAL INFRASTRUCTURE

Annual values on quarterly periods to Q4 2014

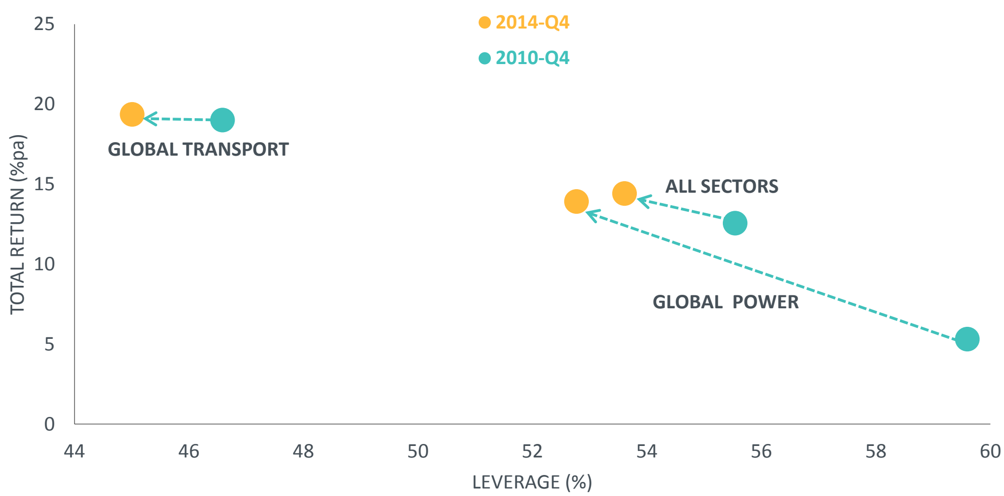


Source: MSCI Global Infrastructure Asset Index (UNLISTED INFRA).

What else could be contributing to this pattern of declining leverage? Part of the answer may be due to sectoral composition of the index. As shown earlier in this paper, exposure to the transport sector increased during this period, and transport tends to be leveraged less than infrastructure overall. The leverage trends for the transport sector have shifted only marginally over the past few years, but the use of leverage in the power sector shifted more, falling more than 600 basis points between Q4 2010 and Q4 2014.

SELECTED UNLISTED GLOBAL INFRASTRUCTURE INVESTMENTS

Leverage vs annual total return, Q4 2010 and Q4 2014



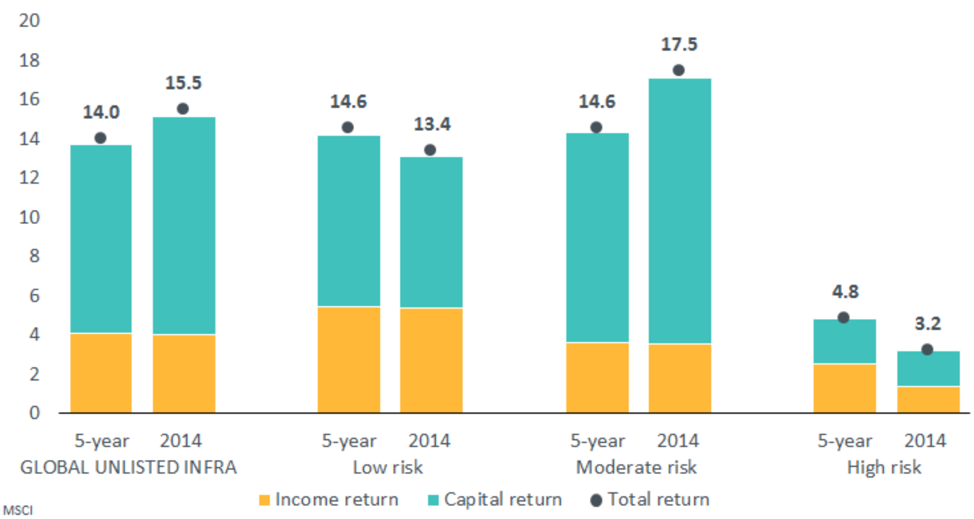
Source: MSCI Global Infrastructure Asset Index (UNLISTED INFRA).

RISK/RETURN

The MSCI Global Infrastructure Asset Index is segmented by risk categories. These include low, medium and high risk. This segmentation is designed to characterize investments in the risk-reward space. In the five-year period from December 2008 through 2014, the low and moderate risk segments outperformed the overall index and significantly outperformed the high risk segment.

RETURNS ACROSS SELECTED INVESTMENT STYLES

Average nominal returns to Dec 2014



Source: MSCI

While infrastructure may carry the *image* of being a low risk investment, it does in fact harbor substantial downside risks. For example, with unlisted real assets—this includes property as well as infrastructure—the relationship between risk and return is affected by the smoothing effect of appraisal valuations which occur with relative infrequency compared to public markets. Without desmoothing, risk-adjusted returns can be inadvertently overstated.

There are more general risks as well. Infrastructure policies are inevitably shaped by governments rather than free markets. [16] Politics can influence development-phase projects as well as regulatory regimes for existing infrastructure. [4] [5] [11] [16] [19] There are also hidden risks associated with maintentance. Public sector infrastructure operators have often neglected or underfunded maintenance with serious long-term consequences, and these burdens of long-term upkeep are just as real for private owners. [7] Another emerging risk specific to unlisted investors is the increasing concentration of capital in relatively few infrastructure funds. [3]

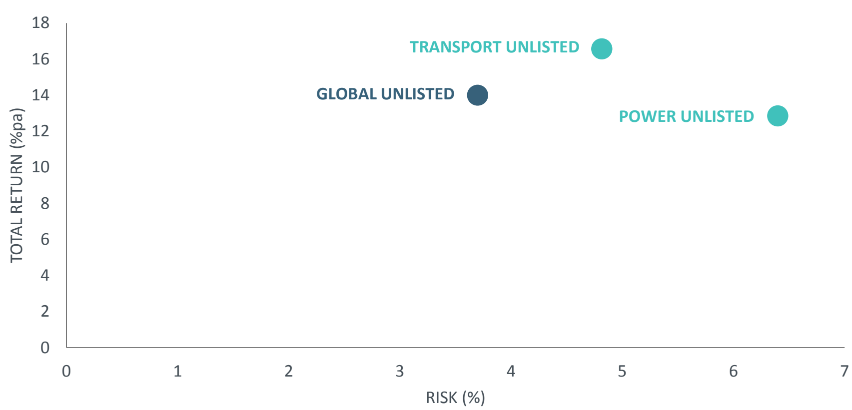
At a cursory level, however, many of these risks may be hidden. Return/risk assessments for the years following the global financial crisis certainly seem to belie the possibility of a rocky ride. Over the past five years, return/risk for the unlisted MSCI Global Infrastructure Asset Index was impressive, with a 14.0% annualized return on a standard deviation of less than 4%.

Less diversified individual unlisted infrastructure streams carried somewhat higher risks, but returns were still in line with the overall unlisted index, with transport showing particularly strong performance.

Yet the elevated volatility of individual sectors, even if the differential is moderate, only serves to underscore the potential risk for unlisted infrastructure as a whole. Transport and power account for two-thirds of the composition of the MSCI Global Infrastructure Asset Index. While these two streams helped to boost infrastructure's performance during the recovery years, we do not yet have a long enough time series to understand the impacts these two streams might have on unlisted performance over one or two full business cycles.

RETURN / RISK FOR UNLISTED GLOBAL INFRASTRUCTURE INVESTMENTS

Based on 5 years ending december 2014



Source: MSCI Global Infrastructure Asset Index (UNLISTED INFRA).

OUTLOOK & CONCLUSION

With allocations to infrastructure rising, capital inflows are likely to put upward pressure on pricing in the short term. [3] The impact on pricing could be compounded further if privatization programs continue to progress slowly (as has been the case in Greece). Over the longer term, however, the prospects for equilibrium in fundamentals are better. The International Energy Agency (IEA) estimates that annual investments of USD 2 trillion will be needed to supply global energy demands through 2035. [16] And based on projected global GDP growth to 2030, the OECD expects increases of two- to four-fold for various measures of air and sea transport volumes. [8] Other forecasts have shown similar increases in transportation demand. [20] Meanwhile, the backdrop for infrastructure demand continues to expand: By 2050, two-thirds of the global populaton will live in cities compared to around half today, and this rising urbanization rate will occur alongside a net increase in global population of about 2.2 billion over the same period. [21]

These projections provide a degree of long-term context and perspective in which to gauge the relatively brief history provided by the unlisted MSCI Global Infrastructure Asset Index. The unlisted index is relatively new and the time series is in its early stages, covering just the post-crisis period since the global recession of 2009. From such a brief period, it is difficult to make sweeping assessments of unlisted infrastructure, let alone individual sectors. Yet there are nonetheless important nuances that are already emerging within the new index. Transport and power have clearly experienced both differential performance and differential volatility in the post-crisis recovery. The timing of each sector’s cyclical recovery has also varied. By matching the quarterly sector weights in the unlisted index to create a listed proxy, we see strong evidence that sectoral composition can explain performance patterns to some degree. The evolving sectoral composition of the unlisted index has also contributed to some extent in the apparent decline in the use of leverage. As we show in this paper, the decline is due in part to the evolving sectoral weighting of the index. Finally, it is worth reiterating in this second MSCI report on infrastructure—as we did in the first report—that near-term disequilibrium of market fundamentals is having an impact on pricing and this will continue to occur as long as allocations to infrastructure rise faster than political will to execute programs for privatization and private participation.

ENDNOTES

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