

Infrastructure Research Paper

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A review of the Australian infrastructure investment market

- Infrastructure assets are characterised by several main features. These include: long asset lives, large initial capital outlays, monopolistic qualities such as relatively inelastic demand and stable, often regulated, income streams which act as an inflation hedge.
- Investors can gain exposure to infrastructure assets in various ways. Listed infrastructure offers investors liquidity, whereas unlisted infrastructure offers lower volatility, improving risk-adjusted returns.
- Historically, listed and unlisted infrastructure returns have exhibited low correlation. This suggests there are diversification benefits from holding a mix of both listed and unlisted infrastructure.
- The range of infrastructure investment products has grown beyond the core region of the risk-reward product space in an attempt to meet different investor risk-return preferences.
- In the short term, increased risk aversion and deteriorating macroeconomic conditions will place downward pressure on infrastructure asset prices via higher debt costs and lower expected revenues. This will provide attractive investment opportunities.
- The longer term prospects for infrastructure remain positive, supported by favourable demographic shifts and changing investor objectives.
- Real assets such as unlisted infrastructure are a particularly appealing alternative for liability matching or absolute return focused pension funds, although the recent focus on liquidity throughout the credit crisis is a reminder that listed infrastructure plays an important role in a portfolio as well. As such, the infrastructure sector should experience strong capital inflows in the years ahead.

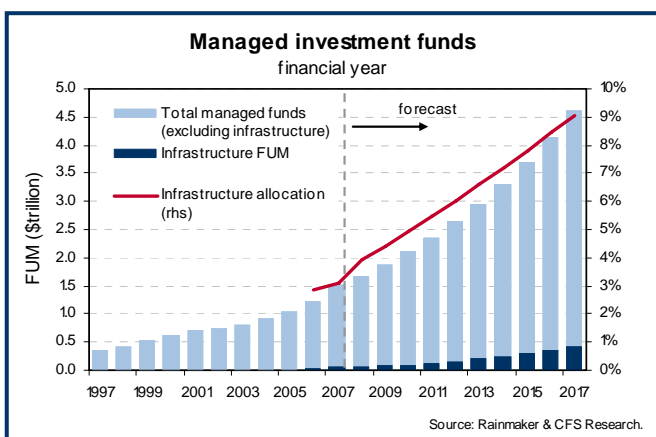


1. Introduction

Interest in infrastructure as an asset class has increased over recent years driven by the shift to yield-based products sought by ageing populations worldwide. This demand has been met by the increased willingness of governments to allow private sector participation in infrastructure through privatisation initiatives and public-private partnerships (PPPs). These trends, accompanied by greater investor awareness and understanding, have led to infrastructure's emergence as a genuine asset class, marked by a growing range of investment products.

The growing interest in infrastructure as an asset class is highlighted in Figure 1 which shows that the exposure to infrastructure of Australian managed funds is expected to grow rapidly over the next ten years. Allocations to infrastructure are expected to grow from 3% currently to 9% in 2017. On the demand side, these projections reflect the market dynamics described previously, while on the supply side, more products are expected to be developed to cater for investors' diverse desired risk–return profiles.

Figure 1



The aim of this report is to provide an overview of infrastructure as an asset class, outline some of its key features and contrast unlisted and listed infrastructure return performance in the Australian context. This report is organised as follows. Section 2 briefly discusses the types of infrastructure assets and investment vehicles. Section 3 highlights the infrastructure product offering. Section 4 reviews investment performance while Section 5 examines the potential for diversification benefits. Pricing considerations are discussed in Section 6 before summary remarks are presented in Section 7.

2. What is infrastructure?

Infrastructure refers to the fundamental physical assets of a society that provide the essential services to its population and promotes economic prosperity. Infrastructure assets can be partitioned into the following two categories: economic or social. Examples of each of these are listed in Table 1.

Table 1

Infrastructure sector classifications		
Economic		Social
Transport	Utilities	Healthcare
Toll roads	Gas	Education
Airports	Electricity	Housing
Ports	Water	Civic
Rail	Communications	

Source: CFS Research

Economic infrastructure refers to infrastructure services; access for which is paid by the user. Such assets include airports, roads, railways, and utilities. Social infrastructure is typically provided by the government with a lower prevalence of user-pay services. Private sector participation in social infrastructure often takes the form of private-public partnerships (PPPs).

Infrastructure assets are characterised by several main features. These include: long asset lives, large initial capital outlays, monopolistic qualities, relatively inelastic demand and stable, often regulated, income streams which act as a natural inflationary hedge.

Infrastructure assets may be regulated or unregulated. Regulated assets are among the most stable infrastructure assets. In the UK, which has one of the most advanced regulatory regimes, tariffs are typically determined by the regulator for five-year periods, and are inflation-linked. Unregulated assets offer a lower degree of certainty, but the potential for higher income streams.

Infrastructure investment vehicles

Investors can gain exposure to infrastructure in two main ways: the share market (listed) and through direct (unlisted) vehicles. Each vehicle offers different characteristics which are summarised in Table 2.

Unlisted infrastructure is priced using an appraisal-based method, which results in a smoothed return profile. The frequency in re-pricing is lower than listed, which is priced almost continually. Hence investment in

unlisted infrastructure offers lower volatility and lower correlation with equity markets, providing diversification benefits when included in a portfolio. The importance of active management in unlisted infrastructure is also greater.

Table 2

Infrastructure investment vehicles		
Feature	Unlisted	Listed
Minimum investment	larger	smaller
Liquidity	lower	higher
Volatility	lower	higher
Gearing	higher	lower
Transparency	lower	higher
Active management at asset level	higher	lower

Source: CFS Research

The strengths of listed infrastructure include higher liquidity and transparency associated with exchange-listed assets. Diversification within listed infrastructure is easily achieved via exposure across different regions and sub-sectors. The minimum investment required is also lower, making this more accessible to retail investors.

The allocation between listed and unlisted infrastructure will depend on a given investor's investment objectives and preferences. Some investors will sacrifice liquidity in order to reduce exposure to listed market volatility. Others will find the relative accessibility of listed infrastructure an attractive feature.

One issue surrounding infrastructure investment vehicles over recent years has been the use of 'financial engineering.' This is where 'artificial yield' – heavily reliant on perpetual asset revaluations instead of operating cash flows – is delivered to investors. This trend was driven by the low-interest rate environment of the last few years, which broadly encouraged the use of leverage. As a consequence, the risk-return characteristics of some infrastructure funds changed – moving them away from the stable, defensive characteristics of the underlying infrastructure assets, and instead becoming quasi-finance vehicles.

3. Product offering

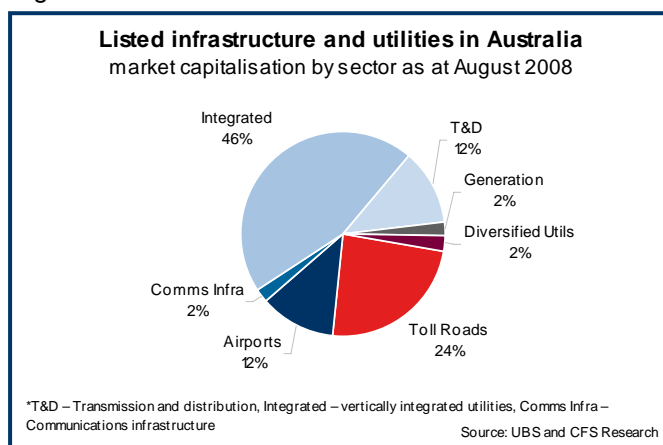
Sector diversity

As mentioned in Section 2, there is a diversity of infrastructure sector assets. This diversity offers investors a wide range of infrastructure investment products which cater for their differing risk tolerance

levels. Figure 3 highlights the sector diversity for the listed Australian index based on market capitalisation as at August 2008.

Apart from asset/sector diversity, other factors which influence the risk-return characteristics of infrastructure investment products include: regional market exposure, varying levels of gearing; and whether the asset is a new development or a mature asset.

Figure 3



Risk-reward product space

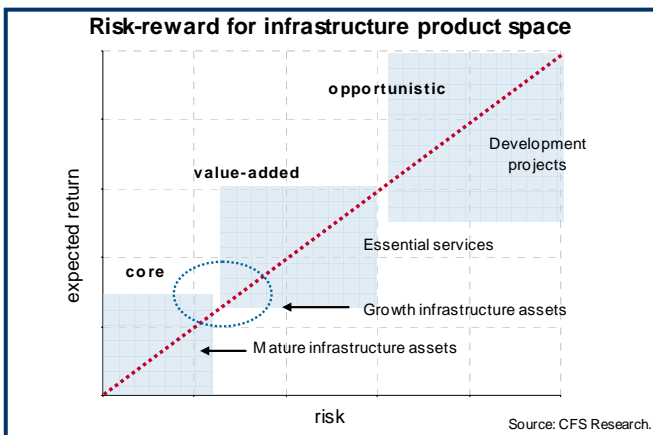
Figure 4 highlights the stylised investment segments in terms of the risk-return profile. They range from core products, such as mature infrastructure assets offering low risk and low return, to opportunistic products, which contain development or emerging market exposure. The risk return profile of these latter investments is comparable to private equity. Essential services, which lie between mature and opportunistic products on the risk-reward spectrum, represent investment in businesses that are exposed to infrastructure assets rather than infrastructure assets themselves.

Over recent years, in conjunction with an expanding infrastructure investment market, the offering of infrastructure investment products has expanded beyond the original core region of the risk-reward space in an attempt to deliver enhanced risk-adjusted returns to investors, as well as catering to a wider variety of risk-return objectives. In the low-interest rate environment prior to the credit crisis, some products met this demand through leverage, resulting in 'leveraged beta' instead of pure alpha.

The post-credit crisis environment is likely to see a return to normalcy in this respect, with a reemphasis on active management in the unlisted sector. Product designs are also likely to undergo change, with a general de-risking of investor portfolios in the short-term favouring core products.

One such product type is hybrid products, which comprise both listed and unlisted infrastructure. Hybrids are appealing to investors as they offer liquidity but mitigate the impact of listed market volatility. Such products are also diverse in terms of their position on the risk-reward product space, and consequently can be tailored to match an investors' risk-reward preference.

Figure 4



4. Investment performance

This section reviews the historical investment performance of infrastructure in terms of absolute, relative and risk-adjusted return.

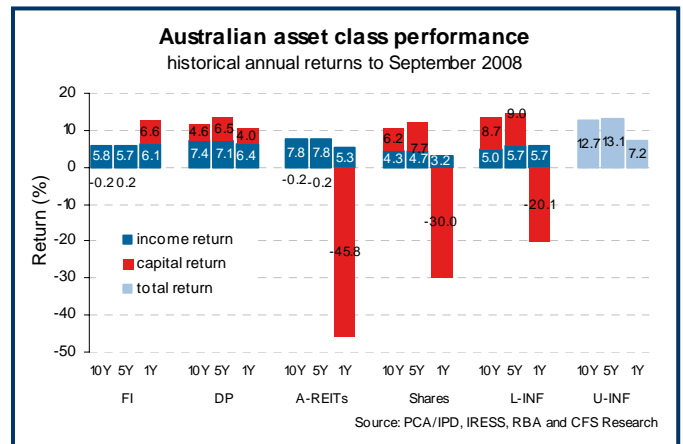
Absolute return performance

The Australian infrastructure market is one of the most mature globally. It is therefore one of the few countries for which unlisted infrastructure return data is publicly available. Figure 5 provides a snapshot of the historical investment performance of infrastructure against other asset classes in Australia. This is shown for the ten years, five years and twelve months ending September 2008 respectively.

Fixed income has seen a positive capital return over the last year due to falling interest rates. The three listed asset classes: equities, listed property (A-REITs) and listed infrastructure (L-INF) have all experienced significant declines over the past year on the back of the fall-out from the credit crisis.

The two unlisted assets classes of property (U-P) and infrastructure (U-INF) have both performed well over each of the three time periods. This outcome has been supported by relatively favourable macroeconomic conditions (mainly, in terms of solid economic growth) across Australia and globally (in the case of infrastructure) up to recent times.

Figure 5



To further highlight the disparity between listed and unlisted returns, Figure 6 plots rolling annual total returns for unlisted and listed infrastructure.¹

The unlisted infrastructure series used is an equal weighted portfolio of five wholesale Australian diversified infrastructure funds with varying inception dates. The return profile for listed infrastructure is based on the UBS infrastructure and utilities index (L-INF)².

Figure 6

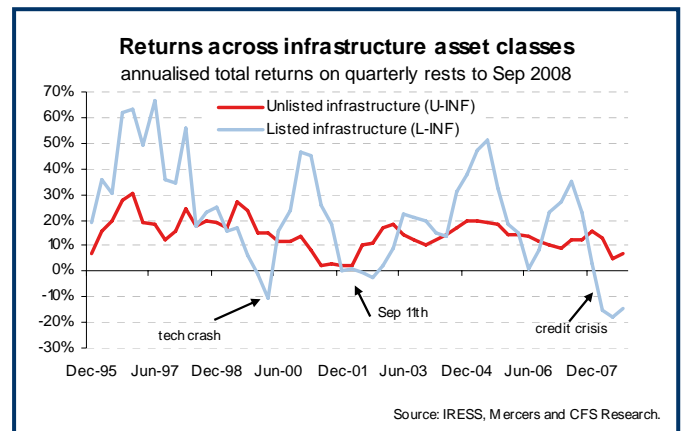


Figure 6 shows that listed infrastructure returns have demonstrated greater volatility than unlisted infrastructure returns over time. The smoother return profile for unlisted infrastructure is partly attributable to the appraisal method of valuation as mentioned in Section 2, while the influence of macroeconomic conditions is visible in the lower returns around 2001 due to the global slowdown. The greater variability exhibited by the listed infrastructure is primarily due to

¹ These include the AMP Diversified Infrastructure Equity Fund (Sept. 1995), the Colonial First State Wholesale Infrastructure Income Fund (Oct. 2003), the Perpetual Diversified Infrastructure Fund (Jan. 2005), Hastings' The Infrastructure Fund (Oct. 2000), and the Utilities Trust of Australia (Dec. 1994).
² Sourced from IRESS, with index code SIINFUAI.

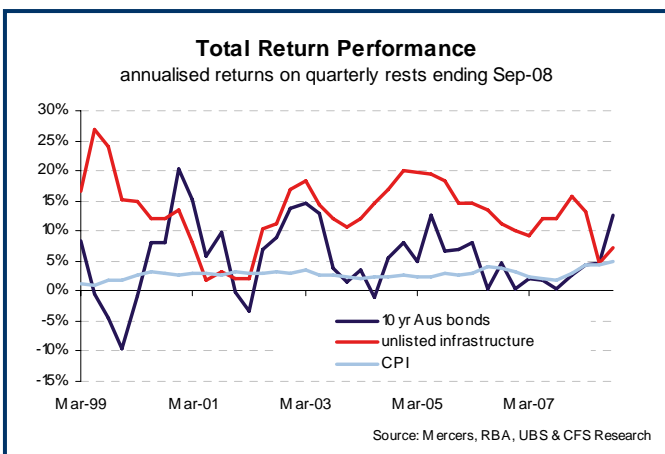
its listed nature which exposes the sector to general share market volatility.

Note that the recent divergence between the listed and unlisted property and infrastructure sectors highlights the negative impact that liquidity can have for what are really long term asset classes.

Relative return performance

Relative return performance compares the return of an asset to some benchmark. Common benchmarks for unlisted infrastructure investments include price inflation (as measured by the Consumer Price Index or CPI), or the long-term bond rate. This is shown for unlisted infrastructure in Figure 7. Notably, for almost a twenty year period, unlisted infrastructure has provided both a hedge against inflation (which has averaged 2.4% per annum over this period) as well as an attractive return against the 10-year Treasury bond rate which averaged 6.7% for the same period.

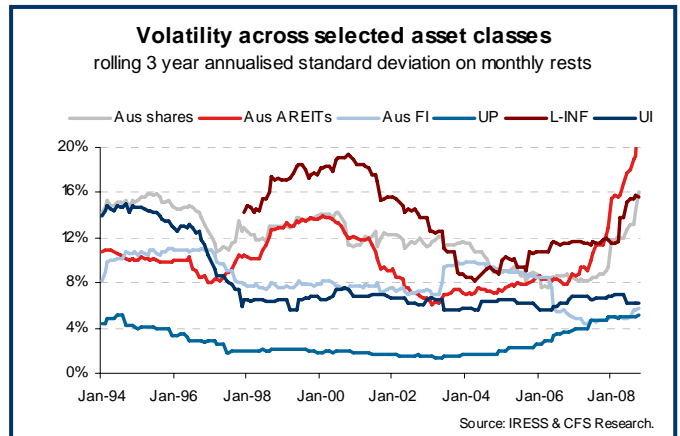
Figure 7



Risk-adjusted returns

When discussing asset returns, it is important to consider the variability of returns. Figure 8 shows rolling three year annualised volatility across selected asset classes over a ten year period. It is suggested that, in general, the lower the volatility, the greater the defensive characteristics of an asset. Notably, both the unlisted property and infrastructure series display the lowest and most stable volatilities. This is mainly a result of the different valuation method used for unlisted assets. In contrast, the volatility for the three different listed sectors is relatively high and variable over time. The recent dramatic rise seen in equities and listed property is mostly an outcome of the credit crisis.

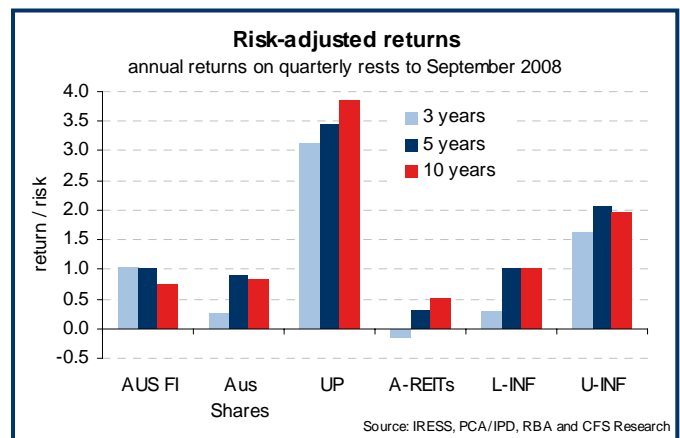
Figure 8



Having discussed both the return and risk profile for listed and unlisted infrastructure separately, we now combine these aspects by considering risk-adjusted return performance. A simple way of gauging this is by dividing the average annual return by its standard deviation. This metric is presented in Figure 9 for the three, five, and ten year historical periods ending September 2008.

Clearly, investment in real assets (i.e., unlisted property and unlisted infrastructure) has provided superior risk-adjusted returns over the three time periods.

Figure 9



5. Diversification benefits

Portfolio benefits and return correlations

An important aspect of portfolio construction is the potential for portfolio diversification benefits. This is usually gauged by examining return correlations across assets. When the returns of two asset classes move closely together, then the correlation value is high and approaches the value of one. In contrast, when asset classes move counter cyclically to each other, then the

correlation value will be negative. When the assets are not correlated, then the correlation value will assume a value close to zero.

Table 3 reports the estimated correlation coefficient for listed and unlisted infrastructure returns with selected asset classes over the last ten years ending September 2008. Notably, the correlation between listed and unlisted infrastructure is relatively low (at 0.19), suggesting the potential for diversification benefits. This is due to different underlying drivers of listed and unlisted infrastructure. While unlisted infrastructure is underpinned by real economic variables, listed infrastructure is influenced more by financial variables. While in the short term there is often divergence between listed and unlisted infrastructure returns, these should tend to converge in the long run providing factors such financial engineering are not at play.

Table 3

Correlation matrix: Australian asset classes						
Monthly nominal total returns						
10 years ending September 2008						
	Equities	FI	U-P	A-REITs	L-INF	U-INF
Equities	1	-0.13	0.13	0.53	0.44	0.18
Fixed Income		1	-0.05	0.12	0.19	0.01
U-P			1	0.03	0.17	0.51
A-REITs				1	0.52	0.11
L-INF					1	0.21
U-INF						1

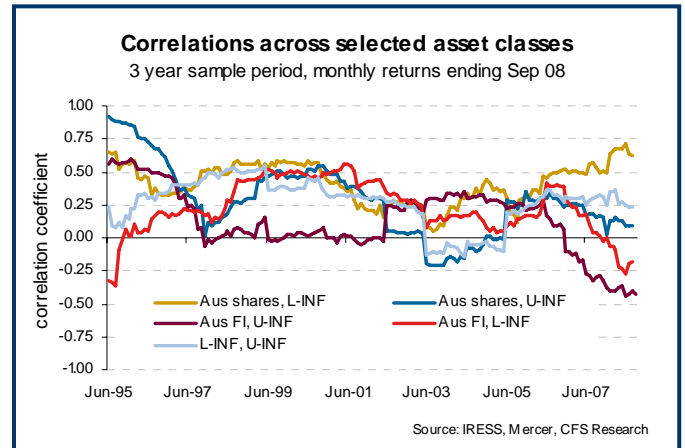
Source: IRESS, Mercers, MSCI, JPM and CFS Research

Furthermore, unlisted infrastructure returns shows low correlation with listed property and equities as well as negative correlation with fixed interest. In contrast, listed infrastructure is relatively more correlated with these same asset classes.

Dynamic correlation

Due to the dynamic nature of correlations, it is important to consider correlation values over time. Figure 10, which plots rolling three year correlations between asset classes, highlights how variable correlation values can be. The higher correlation between listed infrastructure and equities is often witnessed during times of crisis such as the recent financial market turmoil. The flight to safety, and resulting capital flows to fixed income has also made this asset class less correlated with both listed and unlisted infrastructure. The point to note in both these cases is that short-term capital flows are a key driver of correlation structures.

Figure 10



6. Pricing considerations

As noted earlier, both listed and unlisted infrastructure exhibit different return profiles. An important aspect in deciding between the two investment segments is an assessment of relative value.

The credit crisis has a number of implications for infrastructure pricing:

- The most immediate impact is the rise in the cost of capital, arising from a higher cost of debt (in turn, via higher spreads); as well as a higher cost of equity through increased equity risk premia. This will negatively impact asset values. An important caveat here is that those funds which did not aggressively reduce their risk premium assumption in the first instance (as part of conservative valuations) will not need to increase their risk premia by as much.
- A countervailing influence in the short term is the fall in the risk-free rate used in valuations. This, in turn, is being driven by large capital flows away from risky asset classes into fixed income, as well as the lower shorter-term interest rates prevailing as a result of monetary policy action around the world.
- We see the fall in the risk-free rate as a temporary phenomenon, which should unwind over the next 12-18 months as the economy recovers. Naturally, this recovery is likely to coincide with a moderation in spreads; however the net effect is likely to be an increase in the cost of both debt and equity.

The increased level of risk aversion will see heavily geared, financially engineered investments fall from favour. The fact that these have been particularly prevalent in the listed space explains why listed infrastructure returns have dropped precipitously so far. At a competitive level, the diminished presence of

private equity and other investors reliant on high gearing should ease pricing levels of infrastructure assets.

As the macroeconomic environment continues to deteriorate, asset returns are likely to moderate from their previously robust levels. This will typically be greater for unregulated assets or those highly geared to economic activity. This will place additional downward pressure on pricing for infrastructure assets.

Despite the credit crisis, however, the future of infrastructure as an asset class looks assured with strong capital inflows expected to be maintained. In the short-term, changing investor preferences favour infrastructure. For example:-

- In a more risk-averse environment, investors will favour 'low-risk' asset classes such as infrastructure.
- Yield or absolute return focused investors are likely to reduce allocations to highly leveraged, less transparent vehicles such as hedge funds and private equity; and increase allocations to other alternatives such as infrastructure.

Longer-term, ageing populations with absolute return or liability matching objectives will continue to demand the stable yields provided by infrastructure. There remains considerable potential, too, from less mature investment markets with more a limited range of investment products

7. Summary Remarks

Infrastructure is a relatively new asset class which is characterised by several main features. These include;

long duration, relatively large initial capital outlays, monopolistic qualities, stable income streams which act as an inflationary hedge.

The two main methods for investing in infrastructure are listed and unlisted vehicles. Each offers different features, allowing investors to select an allocation between these vehicles in order to match their own investment objectives and preferences. Because listed and unlisted infrastructure returns show a relatively low correlation coefficient, there are potential diversification benefits from holding a mix of both in a portfolio.

On a risk-adjusted basis, unlisted infrastructure has historically outperformed all other main asset classes except unlisted property and reflects its defensive characteristics. Nevertheless, it is likely to experience some softening in line with other sectors.

The range of product offering in the infrastructure investment space has grown beyond the core region of the risk-reward space in an attempt to deliver enhanced risk-adjusted returns. While there is likely to be a reemphasis on the core space as investors de-risk their portfolios, the proliferation of products is likely to resume in the longer term as market conditions return to normal.

The longer term prospects for infrastructure as an asset class remain positive, supported by favourable demographic shifts and changing investor objectives. Real assets such as unlisted infrastructure are a particularly appealing alternative for liability matching or absolute return focused pension funds, although the recent focus on liquidity throughout the credit crisis is a reminder that listed infrastructure plays an important role in a portfolio as well. As such the sector should experience strong capital inflows in the years ahead.

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