

IS INFRASTRUCTURE THE ULTIMATE INFLATION PROOF ASSET CLASS?

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Inflation: An Investment Threat Forgotten?

Inflation has not been a concern for a long time for today's investors. However, it is now conventional wisdom that the threat of global inflation is now once again on the agenda. Of greatest concern is that the primary inputs to this inflation threat (energy and food) face very inelastic demand curves, forming part of compulsory weekly spending for the average family, making the management of inflation for international policymakers harder – and thus the threat greater.

In considering the impact of inflation to their investment portfolios, the most apparent strategy may be to invest into the very factors that are producing the inflation threat. However, a direct investment into soft or hard commodities is likely to produce a highly volatile return outcome due to the extensive speculation already taking place in these sectors. More appropriately, it is now the time for investors to rethink their portfolios, and consider the impact of inflation on the underlying asset classes.

Impact of Inflation on Asset Values

Under discounted cashflow valuation the value of any asset is calculated as the discounted value of any future cashflows created by that asset. Critical to this process are the inputs and when discounting cashflows to equity (which shareholders are most interested in) the appropriate discount rate is cost of equity (R_E). While there are a number of variations to how R_E is determined, in its simplest form:

$$R_E = R_f + \beta(\text{MRP})$$

Where R_f is the available risk-free return (in practice the yield on a long term Government bond), β is the Asset Beta (reflecting how sensitive the asset's returns are to the general equities market) and MRP is the Market Risk Premium (the additional return achieved by the general equities market compared to the risk free return).

A sustained increase in inflation will negatively impact the value of any company as follows:

1. From a valuation perspective, nominal bond yields will increase, increasing R_f thus R_E and reduce the valuation of the company; and
2. From a company fundamental perspective input costs will increase; and likely higher short term interest rates, will increase borrowing costs

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To the extent that any company is unable to pass through increases in input costs or borrowing costs without impacting demand or market share, inflation will negatively impact profits and thus returns to shareholders. The scale of this impact will be determined by the buying power, competitive position, leverage of the company, and price elasticity of demand for the company's product or service. Very few companies operating in competitive markets will not suffer some diminution in value if inflation increases.

The Impact of Inflation on Infrastructure Assets

The discussion in this paper assumes a strict definition of the term "infrastructure". Under this definition two criteria must be fulfilled:

- i. The asset either has to be a monopoly or behave like a monopoly (for example a toll road faces competition from alternative routes but typically has pricing power and highly inelastic demand similar to a monopoly); and
- ii. The asset must be required for the efficient functioning of a community

This definition is particularly important, as assets that meet the above requirements provide significant cashflow predictability and thus an attractive investment proposition within the defensive component of an investor's portfolio. Notably, existing market indices and a number of investment managers use a broader definition. The findings of this paper cannot necessarily be extended to these investments, as pricing power and low demand elasticity may be compromised in certain instances.

The primary sectors falling within the asset class of infrastructure are:

1. utilities;
2. toll roads;
3. airports;
4. ports;
5. communications (broadcast communication towers and satellites).

Each of these sectors exhibit different investment characteristics and are impacted differently by increases in inflation, and these unique features are examined further in the following sub-sections.

2.1 Utilities

Utilities include electricity transmission (high voltage power lines) and electricity distribution (urban power lines) as well as gas transmission and distribution. In most markets (unlike Australia), these are pure monopolies. Consequently, the prices these entities charge to transport the electricity or gas are controlled by a government appointed regulator.

The regulator will, after a period of public consultation, adjust charge out rates to provide the utility with an appropriate return on invested capital. This process therefore requires the regulator to take into account the impact of:

- higher nominal bond rates on their weighted average cost of capital (WACC);

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- higher inflation on their operating costs;
- higher interest rates on their debt costs;
- higher construction costs on new assets being built;
- inflation on the value of the assets they own

The timing of these regulatory resets varies according to the jurisdiction. Generally, the reviews are done annually or at the request of either the utility or community groups, thus the utility is afforded a high level of protection from the impacts of inflation

Australia is the exception, with reviews completed every five years leaving them more exposed to inflation in the short term. There are four major types of participants in the Australian electricity industry:

1. Energy generators use coal or gas to generate electricity. There are numerous generating firms and this segment is competitive;
2. Electricity is then transported from the generators over high voltage transmission lines by transmission companies. There is no need for multiple transmission lines so this segment is a natural monopoly and is regulated by the Australian Energy Regulator;
3. Distribution companies transport the electricity over low voltage lines to consumers. As for transmission it is not practical to build multiple sets of distribution and this segment is also a natural monopoly and is regulated by state based regulators.
4. Electricity retailers arrange for the delivery of electricity to the consumer. There are a number of companies who undertake this role and compete directly and, hence, this function is not regulated.

Similarly, in the Australian gas industry gas producers are not regulated, gas transmission pipelines are regulated by the Australian Energy Regulator, gas distribution pipelines transporting gas to the end user is regulated by state based regulators while gas retailers are not regulated.

Finally, utilities exhibit low price elasticity of demand. Very high barriers to entry (due to the natural monopoly characteristics of power lines and gas pipelines) prevent competition. Coupled with these entry barriers there is usually no available alternative for the electricity or gas producer to transport their product to the end user thus demand is highly price inelastic.

2.2. Toll Roads

Around the world, the typical business model for a toll road is that a government agency enters into a concession agreement (contract) that entitles the company to collect tolls for a defined period and increase those tolls on a regular basis in a defined way, at the end of this concession the road is handed back to the government in a good state of repair.

In most markets the toll road is not the only road route available to motorists (water crossings like bridges being an exception). Consequently, the toll road is not a pure monopoly. However, the toll road is generally built in the first place because either:

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1. The alternative routes are not suitable for high speed distance travel, e.g. almost all European toll roads offer the only viable route for long distance travellers with time imperatives; or
2. The alternative routes are highly congested.

The opening of a new toll road inevitably reduces traffic on the free alternative. But over time, the free alternative will become heavily congested much more quickly than the toll road. As that occurs, the toll road behaves much like a monopoly. For instance, the following table shows analysis of the demand impact of toll increases on two Sydney toll roads over the last decade. As can be seen, traffic has been very price inelastic except for the first toll increase on the M5 back in 1996.

Table 1: Observed Elasticity Impacts on Toll Roads

Asset	Date of Increase	% Toll Increase	Traffic Growth on PCP	
			3 months	12 months
Eastern Distributor - Sydney	July 2001	17.0%	9.2%	15.6%
Eastern Distributor - Sydney	April 2003	14.0%	5.8%	5.0%
Eastern Distributor - Sydney	October 2004	13.0%	5.5%	4.8%
M5 – Sydney	March 1996	25.0%	-6.7%	3.2%
M5 – Sydney	March 2001	20.0%	10.6%	14.9%
M5 – Sydney	June 2006	17.0%	6.9%	4.4%

Source: Magellan Asset Management, Macquarie Infrastructure Group

Note that the above data covers assets where cash tolling exists and therefore toll increase occur in sizeable increments and in a highly publicised manner. Fully electronic toll roads, like Melbourne's CityLink and Sydney's Westlink M7, increase tolls quarterly with little fanfare and no apparent impact on demand.

As already mentioned, the basis on which tolls are increased is controlled by the terms of the concession agreement. There are only three toll roads of any significance in the western world where the concessions effectively allow the concessionaire the discretion on toll increases (the M6Toll in the UK, the 407ETR in Canada and the SR125 in California). All other concessions have specific formulae that are generally related to inflation. The table below provides a typical cross section.

Table 2: Toll Road Concession Agreements

Asset	Location	Basis of Toll Increases	Frequency
407ETR	Canada	At owner discretion	Discretionary
APRR	France	85% of CPI	Annually
Atlantia	Italy	70% of CPI	Annually
Brisa	Portugal	90% of CPI	Annually
Chicago Skyway	USA	>of 2%, CPI or nominal GDP per cap	Annually
CityLink	Au	> of 4.5% or CPI to 2015 then CPI	Quarterly
Eastern Distributor	Au	> of 4.1% or 67% AWE and 33% CPI	\$0.50 increments ¹
Indiana Toll Road	USA	> of 2%, CPI or Nominal GDP per cap	Annually
M5	Au	CPI	Annually
M6Toll	UK	At owner discretion	Discretionary
Western Harbour Tunnel	HK	CPI	Annually

¹ Formula is applied to theoretical toll each quarter but tolls only increase when rounding takes it to next \$0.50 increment
Source: Magellan Asset Management, underlying operators. As at 30 June 2008

As can be seen, the pricing mechanism for these toll roads picks up any increases in inflation with minimal lag. Consequently, the majority of toll roads have the ability to respond quickly to any spike in inflation. And as the data in Table 1 highlights, toll roads can expect that there will be minimal if any loss in traffic when the tolls increase so revenues will fully recover the inflationary impact.

But what about the impact of inflation on the costs of running a toll road? One of the key characteristics of toll roads that insulates them from inflationary impacts is their high EBITDA margins. The table below shows the EBITDA margin for a selection of international toll roads, with an average EBITDA margin from the sample of 77%, substantially above other industrial companies (which globally exhibit EBITDA margins of 14.6%)ⁱ.

Table 3: Toll Road EBITDA Margins

Asset	Location	EBITDA Margin
407ETR	Canada	80%
APRR	France	68%
Atlantia	Italy	61%
Brisa	Portugal	78%
Chicago Skyway	USA	79%
CityLink	Australia	78%
Eastern Distributor	Australia	73%
Indiana Toll Road	USA	74%
M5	Australia	86%
M6Toll	UK	88%
Western Harbour Tunnel	Hong Kong	85%

Source: Magellan Asset Management, underlying operators. As at 30 June 2008

The other key area where inflation can have an impact is on capital expenditure. With most toll roads capital expenditure on operating roads is minimal and generally limited to resurfacing and replacement of aging crash barriers etc. By way of example, Hills Motorway, the entity that owns the M2 Motorway in Sydney (and is itself owned 100% by the Transurban Group), generated \$123m in revenue in the 2007 financial year but only incurred \$4.3m of capital expenditure (i.e. capital expenditure accounted for less than 4% of revenue). These economics are typical of toll roads, and thus inflation has no material importance to capital expenditure for this sector.

Finally, toll roads like most infrastructure assets are generally more highly geared than average industrial companies. The impact of higher inflation on the debt costs of toll roads is covered in Section Three of this paper.

2.3 Airports

Airports need to be considered as two separate businesses:

- The “airside” operations primarily involve the management of the runways and taxiways of the airport. Airside revenue is generated by either a charge levied per passenger or a charge levied on the weight of the plane or a combination of both. In most jurisdictions, the onus is on the airport to negotiate appropriate charges with the airlines with some form of regulation as a fall back position. This side of the operations therefore behaves much like a regulated utility.
- The “landside” operations involve the remainder of the airport and fall into three primary areas: retail, car parking and property development.

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In most airports, the airport does not directly run the retail outlets. Instead, it acts as the lessor and receives a guaranteed minimal rental (that is normally CPI linked) and a share of sales. There is therefore a direct protection of these revenues from a spike in inflation.

The car parking operations at the airport generally behave like a monopoly although there is some substitution threat, i.e. the potential for airport users to use a taxi instead of driving. As such, the airport has significant potential to increase prices in response to inflationary spikes.

In regard to costs, airport operating margins exhibit much greater variability than toll roads as evident from the following:

Table 4: Airport EBITDA Margins

Asset	EBITDA Margin
Sydney	80%
Auckland	78%
Beijing	70%
Copenhagen	61%
Brussels	55%
Zurich	51%
Rome	48%
Bangkok	42%
Venice	37%
Paris	30%
Frankfurt	25%

Source: Magellan Asset Management, underlying operators. As at 30 June 2008

Clearly, the more efficient airports like Sydney and Auckland are more insulated from inflationary spikes than those (typically European) airports that are still struggling to reduce the workforces that were in place when they were privatised (notably these less efficient airports still exhibit higher EBITDA margins than the average industrial company).

Finally, airports also have the highest capital expenditure requirements of any of the infrastructure subsectors. Airside capital expenditure includes widening and extension of runways and taxiways and is generally only undertaken after consultation and agreement with the airlines and any regulatory authority. Consequently, airside charges will be increased to recover these costs over time. Landside capital expenditure relates to increasing the retail, parking and general property leasing facilities. Higher inflation may impact the financial viability of such capital expenditure but the airport has an unregulated monopoly in these areas and has the ability to increase prices as

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required to recover inflation. Consequently, inflation is unlikely to have a material impact on the value of an airport asset as a result of higher capital expenditure.

2.4. Other infrastructure assets - Ports and Communications

Ports and broadcast communications towers make up less than 5% of the infrastructure sector.

Ports face economics very similar to those exhibited by airside operations of airports, however they typically face lower levels of regulation (or regulatory threat) and thus exhibit real price increases over time and relatively high EBITDA margins.

Communications assets relate to the carriage and delivery of information (such as television and radio broadcasts, telephones and data services). These face very little susceptibility to inflation due to pricing power driven by high barriers to entry and an inelastic demand profile.

Implications of high gearing levels in infrastructure

Due to the relatively robust and long term nature of the revenues produced by infrastructure assets, many infrastructure companies are able to obtain relatively cheap and long term debt by comparison with the average industrial company. Gearing levels are generally high by industrial company standards - for example utilities carry a net debt/equity ratio of 78.1% (transport assets are similar) whilst the average industrial company carries a net debt/equity ratio of 48.4%ⁱⁱ, thus the management of the debt exposures is of significant importance to infrastructure companies and generally very professionally managed. During the turmoil in global credit markets (unlike other highly leveraged businesses like banks and property trusts) very few infrastructure stocks globally have experienced any problems in meeting their debt obligations or funding new debt requirements over the last year (the isolated problems that have occurred for infrastructure stocks in raising capital have arisen for those that provide limited transparency of their funding requirements and debt obligations to the credit and equity markets).

As already discussed, regulated utilities have the ability to recover the cost implications of any inflationary spike through the periodic regulatory process. This generally includes the costs of servicing higher interest rates on their debt, thus exposure to interest rates will be limited to the length of time between reset periods.

But the other infrastructure sectors do not enjoy such automatic linkages, and while, as demonstrated above their revenue streams enjoy inflation linkages they there are few mechanisms to recover increased borrowing costs from customers. In light of this, the management of most infrastructure companies normally swap their floating rate debt obligations for fixed rate debt, thereby eliminating (at least until the swaps terminate) any exposure to short term spikes in interest rates. Consequently, the majority of infrastructure companies are well protected from any inflationary spike.

Table 5: Debt Levels and Hedging of Infrastructure Subsectors

Sector	Gearing ¹	% Hedged ²
Toll Roads	44%	83%
Airports	34%	84%
Ports	8%	85%
Utilities	47%	93%
Communications	68%	95%
Diversified	51%	83%

¹ Proportionate Debt / (Proportionate Debt + Equity Value)

² Proportion of debt interest rate hedged for next 2 years

Source: Magellan Asset Management, underlying operators. Magellan Infrastructure Fund portfolio as at 30 June 2008

The role of infrastructure in a portfolio

The role of infrastructure in investor portfolios has been discussed a number of times within this journalⁱⁱⁱ and thus this paper will not investigate the portfolio considerations quantitatively. Previously published papers in Portfolio Construction Journal advocate an allocation of 8-10% in a balanced portfolio.

The key question for investors is how to fund an allocation to infrastructure. Some investors consider that infrastructure is a potential replacement for property in a portfolio. However this conclusion should be treated with caution for two primary reasons (as cited above):

- The inflation linkages of infrastructure listed above do not hold true for property, and rental income streams typically increase at a rate below CPI; and
- Both property and infrastructure exhibit robust revenue streams that have a lower correlation to economic activity than other industrial companies, however rental income streams derived from property investment are likely to have a higher correlation to economic activity

The risk/return outcomes from property and infrastructure should be expected to be different over time. Thus, investors, in consideration of their desired portfolio outcomes should consider infrastructure a standalone asset class and certainly one worthy of consideration, particularly in the current market environment.

Conclusion

Infrastructure is a new asset class to many investors globally and increasingly is seen as attractive investment in a portfolio due to their inflation linked revenues with low operating costs and thus high EBITDA margins. Additionally, the relatively high levels of debt carried by infrastructure assets are prudently managed and often hedged, muting exposure to interest rate movements. These



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combined characteristics provide an attractive platform for investors seeking a 'safe haven' in an inflationary environment.

ENDNOTES

ⁱ Source: Merrill Lynch 2008.

ⁱⁱ Source: Merrill Lynch 2008

ⁱⁱⁱ Source: Portfolio Construction Journal (2007 Conference edition) and Portfolio Construction Journal, Summer 2006-2007,