The Rise of Infrastructure Funds

- A Case Study of Macquarie's Arlanda Express Buyout

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Abstract

Infrastructure funds raise money from primarily institutions for investments in infrastructure assets like toll roads and electricity. The focus of the paper is on five issues relating to infrastructure funds; fundraising trends, structure of funds, the components of the infrastructure transaction, the risk and return profile of infrastructure assets, and finally value creation in the portfolio companies. Infrastructure funds have been contrasted to other private equity investment classes, particularly buyout funds. This paper is motivated by the fact that almost no research has been conducted on infrastructure funds.

The thesis concludes that there are both similarities and differences between infrastructure funds and traditional buyout funds. To some of the notable differences count; the way the infrastructure funds are structured raises new incentive issues between the general partner and limited partner, infrastructure assets have very special financial characteristics including low risk and low correlation to other major asset classes, and value creation in infrastructure buyouts has rather different features.

Investors in infrastructure assets need to pay attention to that the relationship with the state is sensitive due to the nature of the assets providing vital services. In addition, the economics of infrastructure assets is different from the assets traditional buyout firms buy. To the special characteristics of operating infrastructure assets count; physical constraints, often limited prices and limited opportunities to affect the costs as most costs are construction costs.

Key Words: Infrastructure funds, infrastructure investing, alternative investments, private equity, leveraged buyouts, case study, Macquarie Bank

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Comments regarding the contents are welcome. Phone is +46 73 685 38 86, e-mail 20003@student.hhs.se and address Skeviksstrandsvägen 44, 134 32 Värmdö. Anyone who is around Värmdö is also welcome to drop by; fresh strawberries and raspberries may be served at the height of the summer.

1. Introduction

Infrastructure assets are the systems and structures that provide a society with its essential services, for example toll roads, electricity and government buildings. Infrastructure funds are dedicated to invest in infrastructure assets, these though in many ways resemble traditional buyout funds.

While other notable private equity (PE) investment classes like buyout funds, real estate funds, and venture capital funds have been around for decades, infrastructure funds were almost non existent just a few years ago, but have since then grown dramatically. Annual inflows to infrastructure funds have increased from virtually zero in 2003 to almost $49 billion until October in 2007. In 2007 fundraising by infrastructure funds grew second fastest among all private equity investment classes, outstripped only by fundraising by distressed debt funds (Private Equity Intelligence (2008)). The names of the financial institutions which are raising or have raised infrastructure funds almost reads "who is who" in the financial industry. Dedicated infrastructure funds have been raised or will be raised by principally all major investment banks such as Macquarie Bank, Goldman Sachs, Citi, Deutsche Bank, Credit Suisse in co-operation with General Electric, traditional PE houses such as 3i, Carlyle, EQT and asset managers, such as Henderson and Innisfree. Pension funds in particular have been driving the demand for infrastructure assets, attracted by perceived benefits such as the low risk of the infrastructure sector, the low correlation to other classes, and a low valuation of infrastructure assets compared to similar asset classes like real estate. An escalating supply of infrastructure assets is also expected as primarily governments are increasingly looking towards the private sector to fund infrastructure investments. Recent events, like the bridge collapse in Minneapolis in the US in 2007, have put some tragic focus on the infrastructure deficiencies in the world.

Infrastructure funds belong to the alternative asset space. The umbrella of alternative investments comprises a variety of investment techniques, strategies and asset classes that are complimentary to the stock and bond portfolios traditionally used by investors. An investment is considered "alternative" if it has a relatively limited investment history, is relatively uncommon in investment portfolios, is relatively illiquid, has different performance characteristics than traditional assets, is rarely traded in public markets and requires specialized skills on the part of the manager (RREEF (September 2007)). The broad categories of alternative assets include private equity (with the subcategories venture capital, buyout, mezzanine capital and special situations)[1], hedge funds, real estate, and other categories (including physical commodities, currencies, interest rates and natural resources).

Since infrastructure funds have grown to a significant size, it seems important to understand the way they operate better. It also seems important to understand the risk and return characteristics of infrastructure assets in order to gain some knowledge about why institutional investors may be interested in this asset class. Infrastructure funds appear to be almost non-covered academically[2], and to search for concepts like "infrastructure fund" in the

[1] Kaplan and Strömberg (2008) use buyout funds (or leveraged buyout/LBO funds) and private equity funds synonymously, and they believe that it is confusing to denote other investment classes than buyouts, e.g. venture capital, as private equity. Buyout funds and private equity funds will be used interchangeably in this paper.

[2] Good academic websites were you can learn more about infrastructure investments (but not so much about the infrastructure funds though) include the Collaboratory for Research on Global Projects (CRGP) at Stanford University (http://crgp.stanford.edu/) and the Project Finance Portal (http://www.people.hbs.edu/besty/projfinportal/), organised by professor Benjamin C. Esty at Harvard Business School.

four leading finance journals[3] generates no hits. The scope of the thesis will thus be quite broad in order to try to cover some of the major issues relating to infrastructure funds. The purpose of the thesis is to answer the following five questions:
1. What are the fundraising trends among infrastructure funds?
2. How is the infrastructure fund organised?
3. What are the components of the infrastructure transaction?
4. What are the risk and return characteristics of infrastructure assets?
5. What are the value generation features in infrastructure buyouts?

As just mentioned, there has literally been no research conducted on infrastructure funds, yet to review the private equity and project finance research, has been useful in understanding infrastructure funds. To start with the private equity research, this could be divided into five broad areas; the structure of private equity firms/funds, fundraising, the private equity transaction, the risk and return characteristics of private equity and value creation in private equity. The basics in the structure of a PE firm/fund are as follows. The firms are usually structured as limited partnerships, where the managers of the firms are general partners (GPs), and investors are limited partners (LPs). To some famous GPs count Blackstone, KKR, EQT etc, and the LPs are pension funds, endowments etc. The GP raises a fund, for which they acquire companies in typically the first five years of the fund's life, and divest the companies in the last five years of the fund's life. The GP is compensated in different ways, in particular through an annual management fee (2% typically), deal fees and monitoring fees from companies, as well as the so-called carried interest (a profit sharing which is typically 20%). Metrick and Yasuda (2007) describe the fee structures in great detail and provide empirical evidence on those fees. The GP also hopes to raise additional funds after some while. Sahlman (1990) highlights that information asymmetries between the GP and LP are severe. The parties deal with this problem in several ways. One such example is that the life of the fund is limited, i.e. the PE manager cannot keep the money forever. Additionally, the fund managers are typically entitled to receive 20% of the profits generated by the fund and therefore have strong incentives to get involved in activities that will increase the total value of the portfolio.

Gompers and Lerner (2000) use two different models to shed further light on the incentive structures. The first so-called learning model assumes that neither the GP nor the LP initially knows the GP's capacity. One implication of this model is that compensation for new funds should be clustered. The second so-called signaling model assumes that the GP has better information about their ability and that high-ability GPs will try to signal their ability through the contracts they use. The signaling model predicts for example that new high-calibre PE organisations will increase their pay-for-performance sensitivity. One of Gomper and Lerner's empirical findings is that there is no relationship between incentive compensation and the subsequent performance of the fund. They believe that the most likely explanation for this pattern appears to be a learning model; even the GPs may find it difficult to know their ability when they raise their first fund and they will likely work hard even without strong incentives because they are eager to establish a reputation. Furthermore, the LP also controls the GP through the use of so-called covenants, clauses which limit what the GP can do. In the most comprehensive study of its kind, Gompers and Lerner (1996) examined 140 partnership agreements used by venture capital firms. They hypothesise that the use of covenants can be explained by one of two theories, or a combination of these. The first theory states that contracting is costly, and therefore covenants will be included only when the benefits of restricting the GPs are greater than the costs. The second theory predicts that supply and

[3] These four journals are: Journal of Finance, Journal of Financial Economics, Review of Financial Studies, and Journal of Financial and Quantitative Analysis.

demand for venture capital services determine how much covenants that are used. Their empirical finding illustrates the importance of general market conditions on the restrictiveness of venture capital limited partnerships. Fewer covenants are used during years with greater inflows of new capital, and funds where GPs enjoy higher levels of compensation.

PE fundraising has also attracted interest in the research community. Kaplan and Strömberg (2008) study trends in PE activity. Their main conclusions as regards commitments to PE funds are that these appear to be cyclical, and that the growth in the recent peak in 2006/2007 has been unprecedented. The experience is that fundraising has been easier for example when the IPO market has been hot and when the historical performance of venture capital funds has been good (Gompers and Lerner (2000)). In cold climates fundraising has been difficult and time consuming, even for top-tier funds (Strömberg (2004)).

The private equity transaction constitutes two phases; acquisition with supplementing financing and finally divestment. Some of the main takeaways from the acquisition literature are; (i) less experienced sellers, such as previously state-owned entities achieve lower returns than more experienced seller, e.g. PE firms (Gottschalg, Kreuter and Zollo (2005); Acharya and Kehoe (2008)), (ii) some of the most capable PE firms have an ability to generate an exclusive dealflow in less competition (Strömberg (2004); Gottschalg et al (2005)), (iii) the so-called club deals are motivated by either the participants not having enough fund capital, or the fact that a club deal may bring together diverse specialist skills (Wright et al (2006)), (iv) Axelson et al (2007) provide empirical evidence on the use of leverage in buyouts, and one of their findings is that the level of leverage has varied substantially over time in both Europe and the US. The divestment phase is also critical for ensuring attractive returns, and Strömberg and Kaplan (2008) provide empirical evidence on this and show that exit modes have varied significantly over time.

The risk and return aspects of private equity is a further area of major research interest. In a comprehensive study Kaplan and Schoar (2005) find that on average PE investments do not outperform the market, but some PE firms consistently outperform the market. The message to investors in PE funds is thus clear; these should try to identify and get access to top-tier funds (Strömberg (2004)). Most authors have assumed or calculated the risk of LBO investments to be similar to the market risk.

As regards the value creation literature, there is a bridge between two strands of literature. Jensen (1989b) represents one of these strands, and he argues that LBOs create value through high leverage and powerful incentives. Consistent with Jensen's view, for example Kaplan (1989a and 1989b) provide evidence that LBOs do create value by significantly improving operating performance of acquired firms. Cumming, Siegel and Wright (2007) summarise the current knowledge about PE value creation as "there is a general consensus across different methodologies, measures, and time periods regarding a key stylized face: LBOs and especially MBOs enhance performance and have a salient effect on work practices."[4] Some of the recent literature has also focused on the returns that PE funds generate for their investors. As just mentioned Kaplan and Schoar showed that some PE firms consistently outperform the market. As will be further discussed in the case study, successful buyouts can occur due to financial arbitrage, that is "buy well", or as a consequence of active ownership. Acharya and

[4] This finding may seem inconsistent with that it was just highlighted that the average PE firm does not seem to generate better returns than a market index. The paradox can however be explained by that PE firms sometimes pay high prices for the companies they acquire in competitive auctions, and by that the investors in the funds pay the GPs considerable fees (Kaplan and Strömberg (2008)).

Kehoe (2008) provide evidence on value creation in the recent wave of buyout activity, and some of their key findings will be discussed in more detail in the case study.

Infrastructure assets are typically financed using so-called project finance. The definition of project finance is ”the creation of a legally-independent project company financed with nonrecourse debt” (Esty (2003)). The most common applications of project finance are in the natural resource (mines, pipelines, and oil fields) and infrastructure sectors. Esty (2002c) highlights that infrastructure assets have some special characteristics, and which affects the way they are managed. Managers in operating infrastructure businesses are typically restricted for a number of reasons. Firstly, infrastructure assets often have physical constraints, such as that so many cars can pass through a tunnel. Secondly, prices too are often limited. For example, prices for infrastructure firms are for many instances regulated (water, power, toll roads etc). Thirdly, the manager of infrastructure firms cannot affect the costs very much since the bulk of the costs are construction costs which are spent upfront.

The thesis is divided into four main parts – an overview of the funds including fundraising trends and the structure of the funds, the infrastructure transaction, the risk and return characteristics of infrastructure assets, and at last a case study of an infrastructure buyout. Before going into the empirical findings there is a section about methodology. Finally, one part concludes. A glossary at the end of the paper gives definitions for key terms used.

2. Methodolodgy

One problem with studying private equity is that data is hard to come by as the industry takes the “private” label seriously. The lack of data is thus an even more severe problem when studying infrastructure funds as most funds have been established recently. As the thesis seeks to answer a couple of key, yet quite different, questions relating to infrastructure funds, different methods have been used. The thesis is both quantitative, especially the sections about risk/return characteristics of infrastructure, as well as qualitative, especially the case study.

Several different data sources have been used. First, a couple of databases have been found really useful, for example Private Equity Intelligence (Prequin). Prequin was used to collect fundraising statistics, fund terms statistics and return data (or confirming that there is a complete lack of it). Other databases that have been utilised include Mergermarket (for exit statistics) as well as Bloomberg and similar sources (for indices data). Other useful data sources embrace bank research reports and news articles. Some organisations have also kindly provided internal document, e.g. a placement memorandum (with a summary of principal terms) and investment documents. Yet, as there is relatively little published information on infrastructure funds, interviews have been a highly important information source. Interviews were conducted with more than 20 people. The interviewees were selected in order to gain many different views on infrastructure funds. The interviews lasted between 1 and 2.5 hours, and consisted of between 20 and 50 questions, but with three exceptions where fewer questions were asked. The interview questions mainly focused on the structure of infrastructure funds/private equity funds and various ways to create value in these investment classes. Follow-up questions were used after the interviews when needed.

3. An Overview of Infrastructure Funds

This section gives a background to the infrastructure sector, and analyses fundraising trends as well as the structure of infrastructure funds.

3.1 General Industry Background

Definition of Infrastructure Assets

"What differentiates infrastructure assets is not their physical but their financial attributes" - Financial Times, 25/10/2006

By infrastructure funds I mean a professionally managed pool of capital that invests equity or equity-linked securities in infrastructure assets. Infrastructure assets are defined as the permanent assets that a society requires to facilitate the orderly operation of an economy. Infrastructure is far from a homogenous asset class as it comes in many different physical forms, as highlighted in the table below.

Table 1. Infrastructure sectors

Economical infrastructure			**Social infrastructure (usually only providing the facility)**
Transport	Regulated utilities	Communications	
Toll roads	Electricity	Fixed line networks	Education
Bridges	Gas	Mobile masts	Hospitals & other
Tunnels	Water	Satellite systems	Health care
Sea ports		Broadcast facilities	Prisons
Airports	*Project types:*	Switching centres	Court houses
Rail	Distribution		Government
Ferries	Storage		Buildings
Tram	Generation		Government
Rapid transit	Treatment		Equipment
Car parks			

Source: ING Real Estate (2006)

It is also notable that infrastructure resembles other types of assets like real estate (as many infrastructure assets, for example ports, have a major element of property), fixed income (as investing in a mature, regulated utility is similar to a fixed income investment with the upside of having a degree of inflation protection), and private equity (for example if you invest in an airport you also invest in a running business).

One defining characteristic of infrastructure assets is their monopolistic position regarding the provision of a service. The monopolistic situation for infrastructure assets results in very special financial characteristics; long-term and predictable cashflows. How strong this monopolistic position is varies from asset to asset and a distinction is often drawn between "monopoly" (e.g. electricity or water utilities where the threat of new competition is removed by regulation), and "competition" (e.g. airports and toll roads assets).

Another key distinction between infrastructure assets is whether they are so-called demand or availability assets. Demand assets describe the situation where the revenue received by the operator is related to the actual use of the infrastructure service. The charge for the service is typically born by the consumer, but in some cases (such as a shadow toll road) the consumer will bear the cost indirectly. Fees and the standard of the service provided are often regulated. Availability assets on the other hand cover assets where the private sector is rewarded for making available the required infrastructure while a public body will continue to provide the underlying service. The private operator's fee will be paid directly from the public authority and not from the end user.

An additional key distinction between types of infrastructure assets is whether they are primary or secondary stage projects. Primary stage projects require a construction phase prior to the operation stage. A primary asset therefore involves an added element of risk to the investor compared to a secondary asset due to uncertainties involved with construction such as time lags, cost over-runs and also that the final demand for the service is unproven. The Eurotunnel is a well-known example of the risks involved in investing in infrastructure in its primary stage. By the time the tunnel opened in 1994, it was one year behind schedule and USD 3.6 billion over budget. To make matters worse, the demand for Eurostar, the London-Paris train service that uses the tunnel, turned out to be a third compared to the projections. The shareholders of the project have today lost approximately 98% of their invested capital. Institutional investors typically prefer to invest in operating infrastructure assets (Norges Bank (2006)). Further, infrastructure funds usually have a limitation how much they can invest in primary stage projects. This is due to that construction is complex and the infrastructure firms believe that construction risk is best handled by the construction firms. (Interview).

The History of Infrastructure Funds

Throughout most of the history of the industrialized world, much of the funding for large-scale public infrastructure works such as the building of roads and canals has come from private sources of capital. It was only towards the end of the 19th century that public financing of large infrastructure projects began to dominate private finance, and this trend continued throughout most of the 20th century (Brealey, Cooper and Habib (1996)). Since the early 1980s, however, private-sector financing of infrastructure investments has experienced a dramatic revival. The initial modern private involvement in the infrastructure sector, for example in Spanish toll roads in the 1970s and in large UK bridge projects in the 1980s were nevertheless funded by banks and construction companies rather than by dedicated infrastructure funds, which is becoming the norm today. For this reason, most observers agree infrastructure funds sprung in Australia in the 1990s, when a debt-laden government turned to the sector to fund the development of public works. At the same time in Australia, there was the development of compulsory national pension insurance funds. The pension funds liked the stable long-term returns which the infrastructure funds could deliver. As a result, the pioneers in infrastructure investing have been Australian financial institutions, such as Macquarie Bank (FT, 25/10/2006). Macquarie bought its first toll road, Sydney's Hills motorway, in 1994. Two other Australian investment houses in the infrastructure sector, Allco and B&B, initially leasing specialists, date back to 1979 and 1981 respectively (The Banker, 01/12/2006).

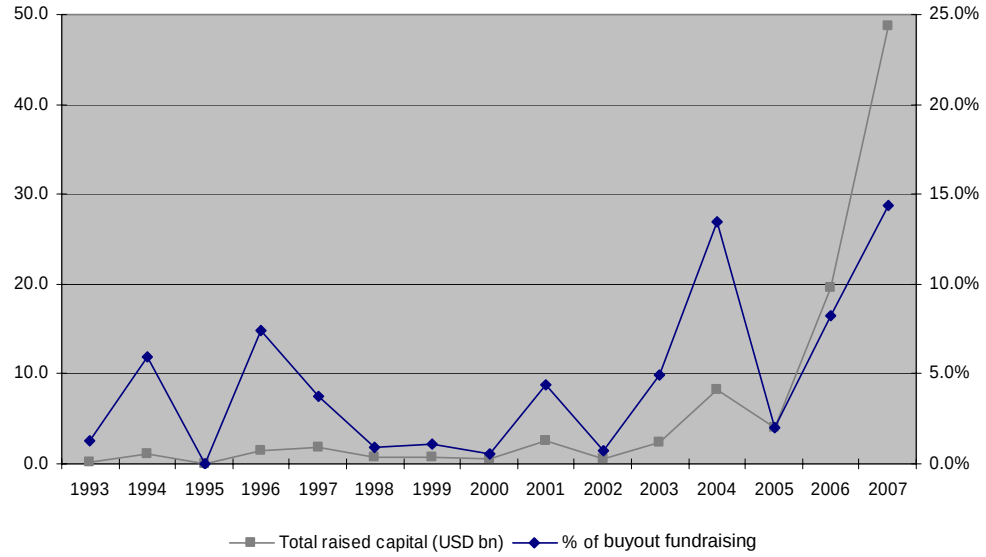
The first European infrastructure fund was according to the database that has been deployed set up by a British institution, namely Innisfree in 1996. The first infrastructure fund in the world was according to the same database launched in 1993 by Conduit Capital Partners, and focused on power investments in Latin America. As a comparison, it could be mentioned that the first modern venture capital fund in the world was raised much earlier, in 1946. The first dedicated infrastructure fund set up by a Swedish institution will be managed by Svenska Handelsbanken.[5] The initiative was announced in the summer of 2007 (Interview).

Fundraising

As figure 1 shows, funds flowing into infrastructure funds have increased dramatically since especially 2005, both on an absolute and a relative basis.

[5] The Swedish-based real estate private equity firm Sveafastigheter though received a mandate from their investors to invest in infrastructure already in 2003. It is unknown whether any other Swedish real estate fund has received a similar mandate earlier.

Figure 1. Commitments to infrastructure funds compared to buyout funds, 1993-2007



Sources: Private Equity Intelligence, Kaplan and Strömberg (2008). 2007 until Q3.

Even though the fundraising by infrastructure funds is becoming significant, the amounts raised by infrastructure funds are still just small fractions compared to the amounts raised by other notable private equity investment classes (especially looking at commitments over a 10-year period), as illustrated in the table below.

Table 2. Fundraising in different private equity investments asset classes, 1998-2007

In billion USD	**Infrastructure funds**	**Buyout funds**	**Venture capital funds**	**Real estate funds**
Until Q3 2007	49	339	94	109
1998-2007	88	1,252	502	414

Source: Private Equity Intelligence

There are likely a number of reasons that may explain the rapid growth in fundraising by infrastructure funds:

- **Supply of infrastructure assets:** There is a worldwide trend towards increasing private involvement in the infrastructure sector, which creates an investment opportunity that did not exist, say just 25 years ago. The potential opportunity is described by a market player as “awesome”. For example, the global GDP is estimated to close to USD 45 trillion, and if governments spend an average of 5% of GDP on infrastructure, and private infrastructure investments are in the range of 10 to 15%, then private investments are valued between USD 240 and 360 billion annually. To the expected infrastructure dealflow from governments can be added the expected dealflow form corporates with infrastructure assets (Ernst & Young (2007)).
- **Demand for infrastructure assets:** Pension funds have began to think of infrastructure as a substitute for long duration fixed income products. In addition, pension funds have been searching for alternatives in order enhance yields (although theory predicts that all markets become efficient after some while). Real estate is another relatively safe asset class. From 2002 to 2006, capitalization rates for investment-grade real estate in major markets such as the US fell about 250 basis points, and then investors have started looking elsewhere to gain better returns.
- **Extension of the private equity model:** Private equity and real estate funds have been successful, and it is natural to extend this model to new sectors and geographies.

Fund managers have also likely looked upon envy on the successes of pioneers like Macquarie Bank and been inspired.

- **Historically good returns in infrastructure:** Drawing a parallel to buyout fundraising, high levels of fundraising has generally been preceded by good returns. It is likely that the good returns generated by infrastructure assets over the last few years (see section 5 for details), have increased investors' interest for the sector.

We remember from the introduction that fundraising in PE has been very volatile historically. The question is if the history will repeat itself in this setting. Infrastructure funds should be affected by the same factors as their traditional counterparts, but maybe infrastructure fundraising can be somewhat smoother if investors continue to aim to allocate X percent to infrastructure. Additionally, the supply of suitable traditional buyout candidates is maybe somewhat fixed, whereas the supply of infrastructure assets is expected to grow very strongly. It may be easier for infrastructure funds to raise new capital if there is a good availability of targets.

Investors

Institutional investors around the world are starting to allocate to infrastructure. In many developed infrastructure markets, investors tend to treat infrastructure as an own asset class of its own. The following table gives an overview of the major pension markets in the world, and their current allocation to infrastructure.

Table 3. Allocation to infrastructure worldwide

In USD billions	**Europe**	**US**	**Canada**	**Australia**
Assets under management	2,500	5,000	500	400
Property allocation	6%	4%	10%	10%
Infrastructure allocation	<1%	n/a	2%	4%

Source: Goldman Sachs (2005)

As the table illustrates, Australia, and to some extent Canada, are the only national markets where institutional investors have traditionally invested significant amounts in infrastructure assets. A comment is thus that the exposure many investors get to infrastructure stocks through listed infrastructure companies is likely not included in the list above (see risk and return section for details).

Infrastructure Funds and Society

Private equity has become seemingly controversial especially over the last few years, and infrastructure funds can likely expect even more spotlight due to the nature of the assets they own. Judging from the debate so far, it also seems to matter who owns infrastructure assets. The concern has been that infrastructure funds will not make the necessary investments, overburden companies with debt, will lack transparency and be short-term (FT, 07/08/2006). There appear two be two reasons why society would allow private financing of sensitive infrastructure assets; (i) they do not have the financing, or (ii) private parties are seen as a more efficient provider of the infrastructure services. The efficiency component could further be analysed through looking at which party that has the lowest cost of capital and which party that is the most efficient operator. As regards the cost of capital issue, an often misunderstood argument is that governments have the lowest cost of capital because they can borrow very cheaply. This does not however imply that governments have the lowest cost of capital, because some investments will default and then the borrower (the state), will need to cover for it. Maybe the state has the higher cost of capital, because the tax system is likely worse at sharing risk than is capital markets (Brealey et al (1996)). There is also evidence that the private sector can be an operationally more efficient owner than the state. Esty (2002c) reports

that infrastructure projects financed with private funds as opposed to public funds, experience fewer expensive time overruns. In addition, Megginson and Netter (2001) find that privatisation improves financial performance. The UK government's research also reveals that Public Private Partnerships in the UK have delivered cost savings of 17% compared to public sector alternatives (2000). Corporate governance theories help in the understanding of why private ownership may work better in practice than state ownership. Firstly, state-owned enterprises could be very inefficient because they may have goals that are very different from social welfare, and the goals are dictated by political interests. Secondly, state-owned enterprises typically do not have incentives to be concerned about profits, because profits flow into the government budget. Corporate governance theory can also help explaining why privatisations sometimes fail. For example in the UK, there have been cases where managers of privatised firms such as water utilities receive large wage increases. This may be explained by these firms being privatised without the creation of large shareholders, thus the agency costs of managerial control may rise even when the costs of political control fall (Schleifer and Vishny (1997)). As the example showed, much care needs to be taken when the state allows the private sector to own infrastructure assets due to the monopoly power the owner of these assets obtains. In an article in Financial Times, Jospeh Stiglitz, points at how important it is that incentives are aligned in privatisation processes. He exemplifies by the airport delays in the UK during the summer of 2006. Flights were cancelled and delayed largely because BAA lacked sufficiently trained staff for security checks. BAA had no incentives to hire extra personnel, at the expense of lost time for people travelling.

The Different Types of Infrastructure Owners

The competitive environment in the infrastructure sector can be divided into three main groups – industrial firms, infrastructure funds and direct investors such as the pension funds. According to a recent presentation by Galaxy (2007) the competitors in the infrastructure sector, and the infrastructure funds in particular, can be segmented according to eight different criteria: 1) objective of investment (financial or industrial), 2) source of funds (third-party funds or own funds), 3) geographical area(s) (country-focused, Europe, OECD vs. emerging markets, global), 4) sector(s) specification (general infrastructure or specialisation), 5) project type (primary greenfield market, primary brownfield market, secondary market), 6) ownership of projects (from lead investor to passive investor), 7) financial objectives (return requirements from 10-20%), 8) fund size. The presentation concludes that the key criteria to determine the nature of an infrastructure investment vehicle are the first two criteria, i.e. objective of investment and sources of funds. The competitive map in the infrastructure sector is further illustrated according to these two main criteria in a picture in appendix 1. As illustrated in the picture, the trend among infrastructure funds is towards a more industrial investment rationale. The largest infrastructure funds in the world are listed in appendix 2, and compared to the largest buyout and real estate funds in the world. It is notable that 8 out of 10 of the largest funds are managed by investment banks, whereas all of the largest PE firms appear to be independent. This could maybe be explained by banks having an early mover advantage in this sector, due to the experience they have gained from debt financing in the sector. The fact that many of the largest infrastructure funds are affiliated with banks, could potentially represent conflict of interest problems. Some investors are also reluctant to invest in infrastructure funds sponsored by investment banks as they are not viewed as independent enough (Interviews, cf. Lerner (2006)).

3.2 The Structure of Infrastructure Funds

In this section we take a look at the infrastructure firm (fund) and the infrastructure partnership agreements.

Infrastructure Firms

The typical infrastructure firm is organised as a limited partnership (Hewitt (2007)), similar to buyout funds. The most notable exception is the "permanent capital" closed-end fund, e.g. the listed infrastructure funds. Due to stock market rules in the UK and the US, listings of infrastructure funds have been rare in these geographies, but they have been relatively common in Australia (FT, 25/10/2006). There are currently three listed infrastructure funds in Europe: HSBC Infrastructure Fund, 3i Infrastructure Limited and Babcock & Brown Public Partnerships. In Australia the listings of infrastructure funds have been much more common and as of June 2006 there were 20 listed funds in Australia with a market capitalisation of USD 31.8 billion (CFS (2006)). The investors in these funds are however often individual investors and they usually seek a small exposure to infrastructure (Peng and Newell (2006)).

The largest dedicated infrastructure firms typically employ roughly 20 investment professionals. Macquarie who runs a large number of infrastructure vehicles obviously employs many more investment professionals, while the smaller infrastructure funds generally only employ a few people. Some of the largest PE firms can employ more than 100 investment professionals, which is still little in relation to the companies in which they invest (Kaplan and Strömberg (2008)). The investment professionals in infrastructure funds tend to be former investment bankers with a sector focus on infrastructure (Interviews).

Infrastructure Partnership Agreements

The below table compares key terms used by infrastructure funds and buyout funds. Several different sources have been used for the table below, e.g. Private Equity Intelligence and interviews, but the results have also been verified against a confidential placement memorandum.

Table 4. Summary statistics on key fund terms for infrastructure funds and buyout funds

Panel A: Principal terms	**Infrastructure funds**	**Buyout funds**	
Term period	10-12	10-12	
Investment period	3-4	5	
GP contributions	2% (but examples of much higher contributions have been noted)	1%	
Panel B: Covenants	**Infrastructure funds**	**Venture capital funds**	
Investment restrictions	E.g. no investment may exceed 20-25% of comm. capital, total investments may not exceed 30-50% in certain currencies, geographical (e.g. no more than 20% of comm. in non-OECD countries), sector and greenfield restrictions as well as forbidden sectors (e.g. nuclear power stations), forbidden to invest in listed companies	Gompers and Lerner (1996) study 140 partnership agreements for VC funds and divide the covenants into fourteen covenant classes (both investment and GP restrictions)	
GP restrictions			
Key man clauses	2	2	
No-fault divorce	80% LP majority	75% LP majority	
Panel C: Fees	**Infrastructure funds**	**Listed infrastructure funds**	**Buyout funds**
Management fees	1-1.5% of commitments (typically based on net invested capital after commitment period)	1-1.5% of market cap (56% use 1%) of market cap	2% median (typically based on net invested capital after commitment period)
Fund formation costs	0.20%	n/a	0.20%
Transaction fee rebate	80%	n/a	60%
Carried interest	Usually 20%	10-20% (67% use 20%)	Usually 20%
Hurdle rate	Usually 8%, typically with catch-up	Overperformance of relevant index (usually a broad market index)	Usually 8%, typically with catch-up

Source: Private Equity Intelligence, Metrick and Yasuda (2007), Kaplan (1999) and UBS Investment Research (2005) for the listed funds (nine listed infrastructure funds listed in Australia are included in their research report), interviews, confidential placement memorandum with summary of principal terms.

A caveat with some of the above information is that it is based on limited data, and should thus be treated with some caution. Nevertheless, a couple of interesting comments can be made on the infrastructure partnership agreements.

Firstly, it is somewhat surprising that infrastructure funds have similar term periods as the buyout funds. This is surprising as many LPs would like to invest in infrastructure funds for at least 20 years (Interview and Financial News, 11/09/2006). However, the problem seems to

be that the mangers of the funds want to participate in the profit share (i.e. the carried interest), which under all traditional methods of calculating carried interest relies upon exit.[6] It would simply be impractical to have funds with longer maturities than say ten years because managers do not want to be tied up for very long periods of time (Interview). The short life of PE funds has been explained differently. Gompers and Lerner (2000) conclude that the need to terminate each fund imposes a healthy discipline, forcing PE investors to take the necessary, but painful, step of terminating underperforming firms in their portfolio.

Furthermore, short lifetimes of the funds imply short lifetimes for the investments. A Swedish PE manager explains that it is optimal to sell companies after 3-4 years in order to obtain a pressure of getting things done. The economic reasons that explain the short term periods for PE funds do not seem to apply for infrastructure funds, as infrastructure funds use quite different business strategies (see case study for details). Maybe the lifetime of the infrastructure funds will develop as the industry becomes more mature. Goldman Sachs is e.g. currently raising a new USD 7.5 billion infrastructure fund, which will be the largest infrastructure fund to date. The term period for this fund is going to be 15 years, which is quite long compared to the funds which have been raised so far (Financial News, 15/04/2008).

Secondly, investment periods are shorter for infrastructure funds. Infrastructure funds simply have incentives to fill their funds in shorter periods of time than buyout funds. The problem with the quite short investment periods, combined with the lower expected returns for infrastructure assets, may be that funds focus more on growing large and making money from the management fee than from meeting the hurdle return of 8%. Macquarie has also been heavily criticised on this basis (cnnmoney.com, 02/10/2007).

Thirdly, the covenants appear to be notably similar for infrastructure funds and venture capital (buyout) funds. Some clauses yet of course depend on that infrastructure is a different asset class, e.g. a restriction on how much can be invested in greenfield assets. There are still some signs that infrastructure fund covenants are less restrictive when it comes to leverage on the fund level, e.g. Macquarie Infrastructure Group (MIG) uses almost 30% leverage on a fund level in relation to leverage on an asset level (cnnmoney.com, 02/10/2007). Venture capital agreements often limit the ability of the partnership to use leverage themselves because the GP's carry compensation functions as an option. The GP simply has an incentive to increase the value of the option at the expense of the investor (Gompers and Lerner (1996)).

Fourthly, the management fees appear to be lower for infrastructure funds. The levels of the management fees have yet been criticised as too high (Financial News, 11/09/2006). Investors in the infrastructure funds believe that it makes sense that fees are lower for infrastructure funds than buyout funds for two reasons: expected returns are lower in the infrastructure sector and investors are interested in net returns and it is believed that there is generally less work involved in managing infrastructure assets (Interview). A further problem with the incentives in the listed funds is that the carry is typically tied to overperformance of a broad market index, which does not seem to constitute a relevant measure.

[6] There are three traditional methods for computing the carried interest: (1) deal-by-deal, (2) aggregation, and (3) hurdle rates. Under the deal-by-deal method, the buyout fund would have a carried interest in the profits of each individual deal. Under the aggregation method, the buyout fund receives a carried interest in the profits of the entire portfolio. Using the aggregation method, two different calculations determine when the buyout fund receives payment, either 1) when all commitments have been returned to the investors, or 2) on any distribution as long as the value of the fund's portfolio is sufficiently greater, usually at least 20% greater, than the capital invested at the time. The hurdle rate method works exactly as the aggregation method except that the carried interest is only paid if the fund achieves a minimum rate of return - referred to as the hurdle rate or preferred rate. See Kaplan's Accel case (1999) for details.

Finally, the profit sharing for infrastructure funds in traditional PE style could seem very generous. The 20% carried interest has originally been used in venture capital and buyout settings, where there is likely more information asymmetries between the GP and the LP[7], and where returns are much more uncertain (at least excluding greenfield investments and the opportunity to use financial leverage, for details see the risk and return section). The investors in these funds thus want to insure that the GPs get involved in activities that increase the value of their investments. The 80/20 surprising profit distribution among infrastructure funds could maybe be explained by Gompers and Lerner's signaling model. To deviate from the 80/20 model would likely attract widespread attention, and anyone could guess what a lower profit share may signal about ability. Nevertheless, maybe this is not a too big problem after all, since expected returns are lower in infrastructure so is also the expected profit sharing. It could also be argued that it is a much more severe problem if infrastructure funds are mostly incentivised to grow large and make massive management fees, rather than investing well. From this perspective, it also appears positive that the author has seen several examples where the GP invests significant amounts in the fund, which is a further way to align incentives.

3.3 Conclusions

The fundraising statistics shows a very strong growth of the money raised by infrastructure funds. It will be interesting to follow the fundraising date, and see if the highly cyclical pattern from the buyout fundraising history will be repeated.

It has also been found that there are multiple differences between infrastructure funds and buyout/venture capital funds when it comes to the infrastructure partnership agreements. One dilemma for the infrastructure GPs seems to be that LPs would like the funds to have longer terms, but the GPs persist that because profit sharing in principle relies upon exit, and GPs do not want to be tied up for too long time periods. A further comment is that the covenants for infrastructure funds may well develop as investors learn about the industry. For example covenants for the venture capital industry have changed significantly over time (Gompers and Lerner (2000)).

4. The Infrastructure Transaction

The infrastructure transaction constitutes of two phases; acquisition phase with supplementing financing and the divestment phase which constitutes the end of the buyout.

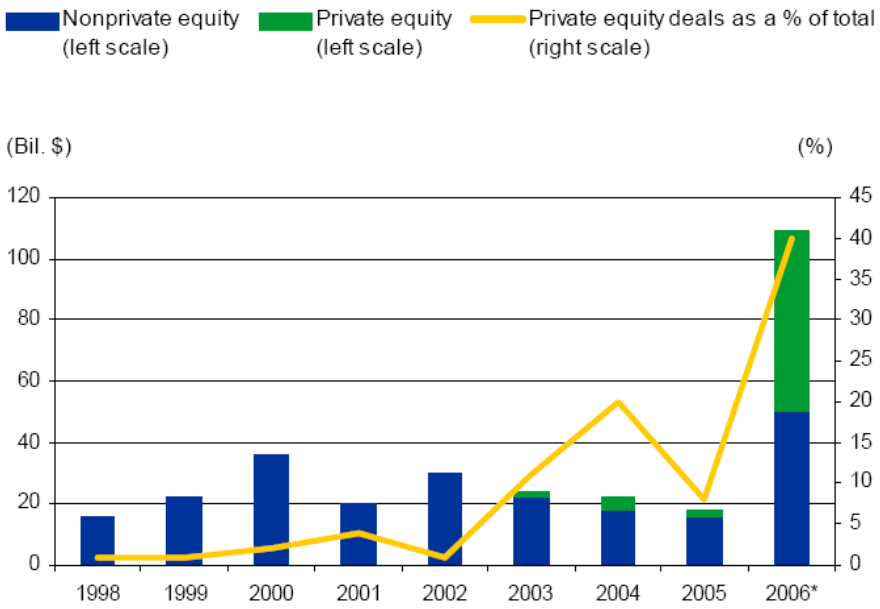
4.1 Acquisition Phase

The M&A activity in the infrastructure sector has increased strongly in recent years, similar to most sectors. Infrastructure funds also have a very significant contribution to M&A activity in the infrastructure sector, as illustrated in the figure below.[8]

[7] In a venture capital setting, how the investments develop is very difficult for the LPs to follow as the annual reports of the portfolio companies, for example, likely not indicate successfulness. Buyout investments are probably easier to follow, but still difficult as the portfolio companies often get involved in for example expensive expansions, or temporary cost-cuttings programmes where the effects may be seen several years later. Infrastructure investments on the other hand mostly occur in operating companies with minor investment opportunities. For the Arlanda Express buyout for example (see case study), the initial success of the investment seems relatively easy to follow by having a look in the annual report as soon as one or two years after the investment.

[8] Private equity is not defined in the article where the graph was found, but in this context a sign of equality can probably be drawn between private equity and infrastructure funds.

Figure 2. Private equity as percentage of infrastructure M&A activity



* Until December 2006. Source: Standard & Poor's (2006)

A special feature of the infrastructure acquisition is that it often requires a lot of capital as it is common that infrastructure assets are valued at well over euro one billion. There are several ways to acquire infrastructure assets, with the main modes being:

1. **Privatisations**

a.) Acquisition of public assets by private investors (e.g. acquisition of municipal water system)

b.) Acquisition of state-owned companies (e.g. buying an interest in or acquiring government owned-utility company)

2. **Public Private Partnerships (PPP)**

a.) New development (e.g. private company builds and operates toll road under a long-term concession agreement with government)

b.) Existing assets (e.g. concession to private company to operate bridge)

3. **Private-to-private infrastructure investments**
4. **Public-to-private transactions**
5. **Secondary buyouts**

From the list above we recognise all modes of buying from the buyout industry, except for the PPP transaction. It seems to be positive for infrastructure funds that they often acquire assets from governments, due to what has been previously established about buying from less experienced sellers. Proprietary deaflow is likely less important in an infrastructure setting as a lot of the dealflow is generated from the state which is not easily influenced (Interview). Nevertheless, getting access to a proprietary dealflow is regarded as possible also in an infrastructure setting (Interviews and FT, 07/01/2008). For example Babcock & Brown Infrastructure (BBI), an infrastructure manager with both listed and unlisted funds, have successfully pursued such a strategy. BBI has focused on sectors where there is a chance to get one-to-one negotiations, such as in the container terminal business where some deals can simply be below the radar for other investors. BBI has paid between around 11 and 13 times EBITDA for its businesses, which is deemed as low for infrastructure businesses (FT, 07/01/2008).

Infrastructure funds can buy companies either alone or as part of a consortium, in so-called "club deals". Club deals seem to be relatively common in an infrastructure context. Although the major funds that have been interviewed say that club deals is not really something they

want to do if they believe the target is good, they state the same reasons for undertaking club deals as traditional private equity firms; either because they lack the financial resources or because they need some special skill. Quite interestingly though, "special skills" may also mean to co-invest with for example local investors in order to win political approval. One such example is a deal which Macquarie executed in France in 2005. Macquarie won an auction for one of the three highway operators being sold by the French government in a EUR 14.8 billion privatisation. Industry insiders said the bank's decision to link up with French construction group Eiffage was instrumental in landing the deal (Financial News, 08/01/2007).

4.2 Financing

The technical term for how infrastructure assets are usually financed is project finance, as described in the introduction of the paper. For example all assets in Macquarie's first European infrastructure funds are financed in this way (Interview).

Infrastructure buyouts have a couple of different financing features compared to traditional buyouts, the most notable being:

1. **Higher leverage**
   Even though leverage is very dependent upon the underlying asset in the infrastructure sector, leverage is typically much higher in infrastructure buyouts compared to traditional buyouts. Debt-to-EBITDA multiples are currently around 6-8, as compared to around 3-4 for LBO deals. Before the credit crunch leverage was much higher, and could range between 12-30 times EBITDA, i.e. the cyclical pattern of debt levels experienced in LBOs reiterates. Senior infrastructure loans have not suffered very much on the secondary market after the credit crunch, as compared to junior infrastructure loans and both senior and 2nd lien LBO loans (see appendix 3). This serves as an indication for how safe the market regards infrastructure assets (see the risk and return section for details). Junior debt used to be common for infrastructure deals, but after the credit crunch most investors have lost their appetite for this type of loan (Interview).
2. **More sustainable financing**
   Financing infrastructure buyouts is more sustainable in the sense that leverage is permanently high, whereas buyout funds pay down debt quickly. Furthermore, infrastructure funds also aim to pay their investors an ongoing dividend that represents a competitive yield versus bonds, which buyout funds do not (Interview and FT, 25/10/2006).

4.3 Divestment Phase

Successful exits are critical to ensuring attractive returns for infrastructure funds and, in turn, to raising additional capital. Mangers of infrastructure funds believe that all the traditional methods of exiting a business that are utilised by traditional buyout funds will be used also in the infrastructure sector (Interviews). The table below presents a selection of Macquarie's divestments (excluding listings of whole funds). An industry insider has confirmed that the list is relatively complete.

Table 5. Selection of Macquarie's divestments in the infrastructure sector

Time	Target	Buyer	Type of buyer	EV (EUR m)	EV/EBITDA	Holding period (years)
Q2'07	Rome's two main airports (45% stake)	Gemina (Benetton family etc)	n/a	1,280.0*	n/a	4.2
Q3'07	Birmingham airport (24.1% stake)	Ontario Teachers' Pension Plan and partner	Financial	269.0*	n/a	5.8
Q4'07	Two wind farms in Germany	Martifer SGPS	Industrial	91.0	n/a	2.9
Q1'07	Operator of hospitals in Canada (81% stake)	John Laing	Industrial	n/a	n/a	1.1
Q1'07	Novera Macquarie Renewable Energy Limited (50% stake)	Novera Energy	Industrial	206.9	20.8	2.1
Q3'06	South East Water	Hastings Fund Management	Financial	953.0	10.7	3.0
Q3'06	Yorkshire Link shadow toll road (50% stake)	Secondary Market Infrastructure Fund	Financial	532.0	8.3	6.8

Sources: Mergermarket, www.macquarie.com and www.bhx.co.uk. *For Macquarie's stake only

It should be mentioned that the most common exit mode in a large buyout population was sales to a strategic buyer (38%), second most common a secondary buyout (24%), and third most common IPO (14%), (Kaplan and Strömberg (2008)). Even though no far-reaching conclusions can be drawn from the highly limited infrastructure data presented, the types of infrastructure fund exits have so far been quite similar to buyout fund exits. However, industry insiders say that one mode of exit that does not exist in the traditional buyout world is to list 3-4 infrastructure firms with a similar financial profile. This may be possible as infrastructure practitioners believe that the market views good infrastructure assets (long, strong concessions or similar) as mainly cash flows, as opposed to for example a heterogeneous portfolio of traditional PE assets. Even though infrastructure assets have traditionally been illiquid investments, Macquarie Bank is regarded to have improved the liquidity in the sector due to their activity (Orr (2007)).

The exit risk for infrastructure investments is in many cases lower than in traditional buyout investments as more of the returns are typically generated during the life of the investment (one such example is a concession where all returns are generated during the concession period after which the asset reverts to the government), (FT, 05/11/2007).

4.4 Conclusions

It has been highlighted that the infrastructure transaction has a couple of special features. First, the typical infrastructure transaction requires relatively much capital as infrastructure assets are often valued at above euro one billion. Second, getting access to a proprietary dealflow is less important in an infrastructure setting, since so many assets are acquired from the state which is not easily influenced, but yet not without importance. Third, leverage is even higher in infrastructure buyouts and the financing is a bit more sustainable, for example in order to provide the investors with a continuous dividend. Fourth, as many infrastructure assets generate more returns during the holding period, exit risk is typically lower.

5. The Risk and Return Profile of Infrastructure

"'Utility return' has become an investment cliché, applied to any asset that offers a high, stable yield over a long period." – Financial Times, 07/08/2006

"To buy an energy group is not a way to get rich, it's a way to stay rich." - Warren Buffet

One of the most commonly stated reasons for pension funds to invest in infrastructure is the low-risk nature of the asset class and the low correlation to other asset classes. This makes sense intuitively as infrastructure firms typically have a monopolistic position regarding the provision of a vital service, and therefore should have more predictable cash flows and also partly not be affected by the same economic factors as many other asset classes. However, this section takes a more quantitative approach to these issues.

5.1 Methodology

An emerging literature in finance has looked at risk and return characteristics of private equity investments. Even though measurement problems are substantial as good return data is hard to come by, the knowledge in this area has increased substantially in recent years. Returns have been assed by for example discounting the cash out flaws of a private equity fund by the S&P returns and then compare it to cash inflows (all net of fees), (see Kaplan and Schoar (2005)). It is even more complex to measure the risk of private equity investments as it is not possible to estimate risk at the fund level, using standard time-series correlations with the market return, as the fund's investments are realized fully only after the fund has been liquidated (Ljungqvist and Richardson (2003)). The following sections would ideally focus on the return and risk of investments undertaken by infrastructure funds. Due to a lack of data this is not possible, and the focus will instead be on listed infrastructure stocks as that is believed to be the best proxy.

Most of the below sections are self-explaining, but the risk and return calculations, mostly the time-series regressions, deserve some comments. Two indices have been utilised; the UBS infrastructure index (with two sub indices) which was gathered from Bloomberg, and the world equities index which was downloaded from MSCI Barra. Yields on 3-month US Treasury bills were downloaded from Mortgage X. The two most notable global infrastructure indices are UBS Global Infrastructure & Utilities index, as well as FTSE Macquarie Global Infrastructure Index. However, the Macquarie index is only available since 01/07/2000, while the UBS index is available since 01/01/1990. The UBS index has been used as it can generate findings with stronger statistical power.

The UBS Global Infrastructure & Utilities Index is designed to give a stable and objective basis for evaluating the performance of the growing global listed infrastructure & utilities market. In February 2006, the infrastructure & utilities sector accounted for 4.6% of the global S&P universe (S&P/Citigroup Broad Market Index). The broadest index (UBS Global Infrastructure & Utilities) is divided into a large number of sub indices based on sectors and geographies. The broadest two sub sectors are infrastructure (defined as the following sectors: airports, rail, ports, communications, diversified infrastructure) and utilities (defined as the following sectors: integrated utilities, regulated integrated utilities, transmission & distribution, generation, water, diversified utilities). UBS considers utilities to be a subset of infrastructure; however, due to the size and relative maturity of utilities as an asset class, UBS have chosen to identify infrastructure and utilities separately as second tier indices. Utilities companies made up more than 93% of the index per January 2006. The MSCI World Equity Index was selected as benchmark as it is a global stock index.

Monthly returns have been used if not otherwise stated. The index data was collected between 31/01/1990 and 31/01/2008. When subperiods have been used for calculations, five-year periods were utilised as that is a standard period in finance research.

The following formula has been used to calculate the Sharpe-ratio:

$$\frac{\bar{r}_i - \bar{r}_f}{\sigma_i} \qquad (1)$$

The average yield on the 3-month US Treasury bill over the period (60 months) when the Sharpe-ratio was calculated was approximately 3.0%.

When expected returns were estimated, the yield on the 10-year US Treasury bonds as of February 2008 were used (3.8%), and the risk premium was assumed to be 5.0%. Even though

many in the finance profession disagree about how to measure the market risk premium, Koller, Goedhart and Wessels (2005), believe 4.5 to 5.5% is an appropriate range.

5.2 Findings About Risk and Return in Private Equity

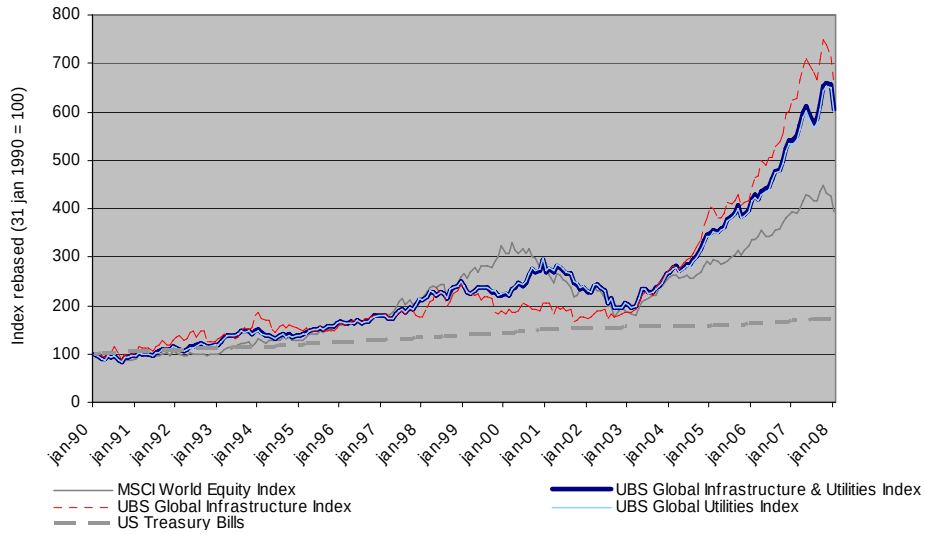
Probably the most reliable performance study of private equity was conducted by Kaplan and Schoar (2005). This is so because the researchers had a careful methodology and a relatively complete data. A shortcoming of this study is however that they did not adjust for beta risk. Their three main findings regarding buyout funds are:

- On average, LBO fund returns net of fees are slightly less than those of the S&P 500
- There is substantial persistence in LBO and fund performance, i.e. GPs whose funds outperform the industry are likely to outperform the industry in the next and vice versa
- Funds with good track-records tend to be more attractive in raising future funds

Kaplan and Schoar assumed a beta of one in their study, although they believe that the systematic risk for LBO funds exceeds one because these funds invest in highly leveraged companies. Jones and Rhodes-Kropf (2003) estimated the beta to 0.66 for buyout funds. They relied on self-reported IRR numbers and a somewhat less complete data set than Kaplan and Schoar.

5.3 18 Years of Listed Infrastructure Returns

Figure 3. 18-year total return performance for a global infrastructure indices compared to a global equity index (USD), 31/01/1990-31/01/2008



Source: Bloomberg, MSCI Barra and Mortage X

Looking at the figure above, we can conclude that infrastructure returns have been better than equity returns over the time period. Returns for infrastructure stocks have been particularly strong since the beginning of 2004. This fact could economically somewhat be motivated by borrowing costs having been historically low recently, which benefits the capital-intensive infrastructure firms. However, a further explanation could be that low-risk asset classes like infrastructure and real estate have received an increased interest from investors. An explanation given is that especially many institutional investors shifted their portfolios somewhat towards more low-volatile assets after the severe losses many investors experienced early in the decade (RREEF (September 2007)). The below table presents risk and return data for infrastructure stocks.

Table 6. Summary statistics for index calculations

	UBS Global Infrastructure & Utilities Index	UBS Global Infrastructure Index	UBS Global Utilities Index	MSCI World Equity Index	T-Bills
Panel A: Historical returns					
Annual, 1990-2008	12.36%	13.53%	12.30%	9.58%	3.11%
Monthly, 1990-2008	0.90%	1.00%	0.89%	0.72%	0.26%
1990-1994	0.61%	0.97%	0.60%	0.52%	0.29%
1995-1999	0.84%	0.42%	0.86%	1.62%	0.31%
2000-2004	0.83%	1.28%	0.80%	-0.07%	0.17%
2005-2008	1.56%	1.54%	1.56%	0.84%	0.25%
Panel B: Standard deviations					
Monthly, 1990-2008	3.53%	5.06%	3.55%	4.00%	0.10%
Panel C: Betas					
1990-2008	0.51	0.65	0.50	n/a	n/a
Adj. R2	0.86	0.73	0.87	n/a	n/a
P-value	0.00	0.00	0.00	n/a	n/a
1990-1994	0.47	0.66	0.47	n/a	n/a
Adj. R2	0.82	0.74	0.82	n/a	n/a
P-value	0.16	0.10	0.17	n/a	n/a
1995-1999	0.24	0.21	0.24	n/a	n/a
Adj. R2	0.86	0.68	0.86	n/a	n/a
P-value	0.00	0.00	0.00	n/a	n/a
2000-2004	0.20	0.14	0.20	n/a	n/a
Adj. R2	0.33	0.04	0.35	n/a	n/a
P-value	0.00	0.00	0.00	n/a	n/a
2005-2008	0.76	1.10	0.74	n/a	n/a
Adj. R2	0.96	0.97	0.96	n/a	n/a
P-value	0.00	0.00	0.00	n/a	n/a
Panel D: Expected returns					
Approx. beta, 1990-2008	0.5	0.6	0.5	1	n/a
Expected return, February 2008	6.3%	6.8%	6.3%	8.8%	n/a
Panel E: Sharpe ratios					
Last 60 months	0.54	0.55	0.53	0.37	n/a
Panel F: Correlations					
Correlation, last 60 months	0.74	0.68	0.74	n/a	n/a
Correlation, preceding 60 months	0.40	0.47	0.39	n/a	n/a

The results present many important findings about the risk and return of infrastructure stocks. The results confirm that returns for infrastructure stocks have been very strong historically.[9] It has also been found that infrastructure securities have had a less variable journey than common stocks.[10] The standard deviation for the infrastructure index had also been less variable, if it had not been for the strong returns in recent years, which likely pushes the standard deviation upwards. Another very important measure of risk, namely market risk, is beta. The calculations of the so-called raw (leveraged) beta risk of the infrastructure index indicate that infrastructure is a low-risk asset class with a beta of 0.51 for the entire time

[9] The annual rates of returns have quite a weak statistical power as there are only 18 observations. With a 95% confidence degree the returns for the first index, for example, are between 4.3% and 20.3%.

[10] There are too few observations to use annual standard deviations. Monthly standard deviations can be converted to annual standard deviations by multiplying by the square root of 12. However this conversion assumes that successive monthly returns are statistically independent.

period.[11] The UBS Global Infrastructure Index has had a higher beta over the entire time period, but it seems as this is mostly connected with the strong performance of these stocks in recent years. It is also possible that the infrastructure assets typically targeted by infrastructure funds have even lower betas (at least not taking leverage into consideration) than presented in the table above. The reason is that listed infrastructure companies may also have exposure to both projects in a development phase and also revenues from other sources than infrastructure (Norges Bank (2006)).

It has thus been found that infrastructure stocks have historically outperformed the market index, but even so have a low market risk, which is quite contradictory to the classical SLB (Sharpe-Lintner-Black) Capital Asset Pricing Model. However, some researchers have argued that CAPM is "dead" and that factors such as book-to-market value can much better predict returns (Fama and French (1992)). To investigate for these factors is thus beyond the scope of this thesis. A further caveat is that the time-series used here are quite short and that the results could be due to chance.

As the beta risk of the infrastructure index is quite low, the expected return is also lower than for the market index (6.3% compared to 8.8%). The return investors in unlisted infrastructure funds expect could still be different. Firstly, infrastructure funds might invest in companies with lower operating risk as previously mentioned. Secondly, infrastructure funds likely utilise a higher financial risk. In order to reflect that the beta just estimated should first be unlevered and then multiplied with the leverage factor. Thirdly, investors in infrastructure funds should maybe as a consequence of the illiquidity premium expect some extra return for this factor. But one could also argue that the marginal investor in infrastructure funds places a zero premium on illiquidity as they may get liquidity from their other portfolio holdings (Ljungqvist and Richardson (2003)).

The performance measure sharpe ratio also confirms the favourable return related to risk of infrastructure stocks. Over the last 60 months, the sharpe ratios for the infrastructure indices have been slightly better than for the world equity index, as shown in the table. The good performance of the indices over this time period is however somewhat offset by historically high standard deviations of the returns.

A very interesting and conceptually expected result is that the infrastructure indices show low correlations with the market index (0.74 over the last 60 months and 0.40 over the preceding 60 months). Research by RREEF (2007) also shows that infrastructure has a weak correlation to public real estate (0.58), which confirms that infrastructure may have different financial characteristics than any other asset class, especially as infrastructure is often compared to real estate. The low correlation between infrastructure and other major asset classes is an important finding for investors. Combining types of investments that do not move in lock step is one of the very few instances in the investment world where there is a free lunch – investors can trim the volatility of an investment portfolio without reducing the expected return.

Even though the performance of listed infrastructure securities probably gives an indication of the risk and return characteristics of infrastructure assets, the listed infrastructure securities are not necessarily representative of the whole infrastructure sector. The UBS and Macquarie Bank infrastructure indices have neither won broad support as a benchmark for the institutional investors who invest in the asset class. Some experienced investors have instead

[11] Listed infrastructure companies likely use somewhat higher leverage than the average company (the exact leverage for this sample is not known, see thus Strömberg's calculations soon below for a large number of listed utilities companies).

set their return benchmarks on an absolute basis, looking for returns of at least 8% to 10% in the sector. Others investors prefer benchmarks that are inflation-linked (e.g., 400 basis points over inflation), which clearly reflects the purpose of infrastructure in their portfolios (Probitas (2007)).

The risk and return evidence from the unlisted infrastructure universe as well as from project finance will studied in the coming sections to get a more comprehensive risk analysis.

5.4 The Evidence from Unlisted Infrastructure Funds

Private equity intelligence has started to track the performance of individual infrastructure funds, but the database in October 2007 only contained return data for 5 out of 116 funds. The return data Private equity intelligence has collected for real estate funds, for example, is far more extensive.

Possibly the only academic study on the performance and risk of unlisted infrastructure, was conducted by Peng and Newell (2007). The researchers obtained return data from five major Australian unlisted infrastructure funds: AMP Infrastructure Equity Fund, CFS Wholesale Infrastructure Income Fund, Perpetual Diversified Infrastructure Fund, Hastings Infrastructure Fund and Hastings Utilities Trust of Australia. The main results from their study are shown in the table below.

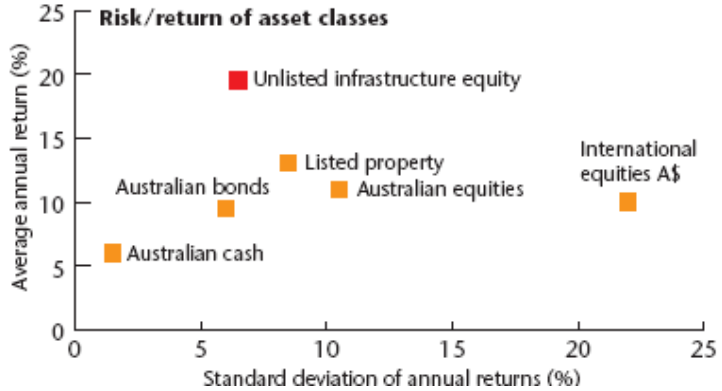
Table 7. Peng and Newell's risk and return analysis for various asset classes in Australia, Q3 1995 - Q2 2006

Asset class	Average annual rate of return	Annual volatility
Composite infrastructure	22.4%	16.0%
Unlisted infrastructure	14.1%	5.8%
Direct property	10.9%	1.5%
Stocks	12.9%	11.0%
Bonds	7.2%	4.3%

The results should be treated with caution, as the dataset for the unlisted infrastructure returns was limited. There could be a couple of reasons for the low volatilities reported for unlisted infrastructure and direct property; listed stocks are more volatile than unlisted, unlisted has the issue of valuation smoothing which under-estimates the risk, and the specific timeframe was very stable for both infrastructure and property (Interview Newell).

Macquarie Bank has conducted a similar study, and the results are shown in the figure below.

Figure 4. Relative performance of unlisted infrastructure equity, June 1995 - June 2002



Source: Rakowski (Macquarie Bank), (2004)

The problem about Macquarie's study is that it is very vague in details, and they do not reveal what funds are included in the definition of "unlisted infrastructure equity" for example, but we may assume that it is Macquarie's own funds. In Macquarie's marketing material they also claim that all their listed and non-listed infrastructure funds combined have produced an annual return of 20.1%. The measurement period was between founding (earliest December 1994) and March 2006 for the listed funds, and between founding and December 2005 for the unlisted funds. The market capitalisation was used to measure performance for the listed funds, and net asset value for the non-listed funds, (Macquarie Prospectus (2006)).

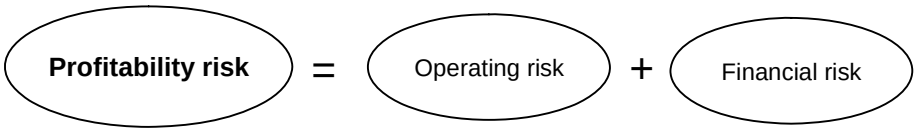
5.5 The Evidence from Project Finance

Project-financed investments are usually in the infrastructure sector, but do not necessarily have the same risk and return characteristics as listed infrastructure companies. However, it is important to note that the empirical experience from project finance relates to projects in their primary (construction) stage, as opposed to the secondary (up-and-running) stage which many infrastructure funds prefer to invest in. Esty (2002c) has reviewed the return experience from project finance. Similar to the situation in private equity, return data in project finance is very limited and hard to come by. Some of the most extensive studies are also from emerging markets, whereas most infrastructure funds focus on investments in OECD countries. However, the return data that we have indicates quite poor performance for projects financially. Esty nevertheless concludes that more data on historical performance would be needed to determine whether returns in project finance are a problem or not. Esty also concludes that the best returns in project finance are not very high. This implies that a high fraction of the investments must be successful in order for the capital providers to earn an acceptable return. This is very different to the situation in venture capital, where the capital providers can achieve an acceptable return even though they only succeed with say one or two out of ten investments, which is often the case. An extensive study has for example found that 8% of 1,004 venture capital projects generated 41% of the total value.

5.6 Asset Risk and Use of Leverage in Infrastructure

Through studying security returns of listed infrastructure firms, it was established that the infrastructure sector seems to be a low-risk sector. However, risk is a multifaceted concept, and another way to study the risk of a sector or asset is through analysing accounting measures. Shareholders are interested in the profitability risk, which refers to the probability that future profitability will deviate from expected profitability. Profitability risk is a combination of operating risk and financial risk, as illustrated in the figure below.

Figure 5. Types of risk



Operating risk can be measured as the variability in return on capital employed (ROCE), (Hamberg (2001)). Looking at the table below, which summarises the standard deviation of ROCE for a very large number of listed utilities companies (as has been mentioned before, utilities companies make up more than 90% of the UBS Infrastructure & Utilities index), we can conclude that infrastructure seems to be a low-risk asset class by using also accounting measures.

Table 8. The risk of infrastructure companies using accounting measures, 1980-2005

	ROCE	Standard deviation of ROCE
Utilities	16.0%	4.8%
Average	18.7%	23.6%
Max	37.4%	140.7%
Min	-0.8%	0.5%

Source: Strömberg calculations. Data from Worldscope.

In theory the value of a firm is equal to its value all-equity-financed plus the present value of the tax shield minus the present value of the costs of financial distress. The trade-off theory predicts that companies with safe, tangible assets and plenty of taxable income to shield should have high leverage, for example infrastructure companies. Unprofitable companies with risky, intangible assets, on the other hand, ought to rely on equity financing to a larger extent (Brealey and Myers (2000)). The empirical evidence gives strong support for this theory, as infrastructure companies utilise leverage to a much greater extent than the average company. See table below.

Table 9. The use of leverage by infrastructure companies, 1980-2005

	Net debt/EBITDA	Net debt/Enterprise value
Utilities	2.3	35.8%
Average	1.1	14.9%
Max	4.6	53.0%
Min	0.0	-4.4%

Source: Strömberg calculations. Data from Worldscope.

5.7 Conclusions

The expression “utility return” has good foundation in stock market data for infrastructure companies, which shows that infrastructure stocks have had a smooth ride (i.e. low beta) with low correlation to other major asset classes. The low-risk nature of infrastructure assets is further supported by accounting data which reveals a low average standard deviation of ROCE for listed infrastructure companies. The nature of infrastructure assets indicate that a similar journey may be expected going forward, through using financial theory we would expect returns to become more “normal”. The low correlation infrastructure stocks show to other asset classes is a very important finding for investors who can reduce the volatility of their portfolios through investing in infrastructure, without reducing expected returns. This is also a difference to traditional buyout funds where diversification arguments could unlikely motivate an investment.

What we do not know about infrastructure funds is how they will perform compared to their listed counterparts. It nevertheless seems plausible to expect that there will be less difference between the top-tier infrastructure funds and the average listed infrastructure stock, than their traditional counterparts. This is believed as there is generally less scope for value added activities in infrastructure companies as the case study below relives. An express service will take you to the next section.

6. Value Generation in Infrastructure Buyouts: The Arlanda Express Case

6.1 Introduction

Arlanda Express is a 42 km high-speed rail link between Stockholm's principal international and domestic airport, and Stockholm Central Station. 100% of the operator of Arlanda Express, A-train AB and A-Train Invest AB (together A-train), was acquired by Macquarie Bank in October 2003 for a total equity consideration of EUR 51 million (SEK 450 million). The sellers were a consortium comprising NCC (44%), Vattenfall (20%), Alstom (29%) and Mowlem (7%). Concurrent with achieving the first close of the Macquarie European Infrastructure Fund (MEIF) in April 2004, MEIF acquired Macquarie's 100% interest in A-train.[12] The total investment of SEK 450 million comprised a combination of payments to the vendors, cash collateralisation of contingent liabilities and transaction costs. Macquarie plans to hold the investment until 2040 when the right to supply the express service expires.[13]

The purpose of the case study is to highlight the ways in which infrastructure fund may work to increase the value of their investments. Before going into value drivers in an infrastructure context, methodology and previous private equity research in this are reviewed, and the Arlanda Express buyout is presented in some more detail.

6.2 Methodology

The case study started with reviewing public information about the company, especially annual reports. As the public information about the company is very limited, it has also been pivotal to interview several people who have worked directly with the company. Interviewees include the CEO of Arlanda Express Per Thorstenson, an investment professional at Macquarie, the board member Georg Vietor, as well as Greeg Nordqvist who works for one of the previous owners. Macquarie has also provided some internal documents about the buyout and the investment fund who conducted it.

Arlanda Express was selected as the case study as it is one of the most "mature" buyouts conducted by an infrastructure fund in Europe. Another reason for selecting Arlanda Express was that it was deemed as easier to gather the most comprehensive data for a Swedish company, which should result in more reliable results.

6.3 Findings About Value Creation in Private Equity

Researchers have during two decades studied value generation in buyouts. The early buyouts investors, KKR for example, discovered the benefits of buyouts. These benefits are nowadays applied in most buyouts. The broad categories of value generation in a buyout context have been identified to be:

- Financial arbitrage, i.e. "buy low-sell high" (e.g. Acharya and Kehoe (2008))
- Add value to the target through "active" ownership (e.g. Jensen (1989a), Kaplan (1989a), Acharya and Kehoe (2008))

Financial arbitrage reflects the situations where the value of a company increases without any change in the underlying financial performance. This occurs for example when a company is divested at a higher valuation multiple than it was acquired for, i.e. multiple arbitrage.

[12] Macquarie Bank and MEIF are presented in appendix 4.

[13] MEIF which holds the investment is a limited partnership with a maturity of approximately ten years, so in order to be able to hold the company until 2040, Macquarie would need to for example list the fund or shift the investment between funds etc.

Multiple arbitrage can also occur because the underlying business is improved, but financial arbitrage excludes such situations and instead focuses on situations where a business is acquired cheaply for various reasons as will be discussed in detail further on.

The "active" ownership category can be divided into two subcategories; namely direct and indirect value drivers (Loos (2005)). Direct value drivers have a direct effect on the cash flows in a company, through for example cutting costs, while indirect value drivers have an indirect effect on the cash flows by improving for example incentives. Acharya and Kehoe (2008) further find that outperformance in buyout transactions is mostly due to changes that take place mainly before or right after the acquisition, sometimes denoted the "100 day programme". These early activities include creating a new value creation plan, replacing management and spending significant time with the portfolio companies, e.g.. interacting with the CEO/CFO multiple times a week. Acharya and Kehoe deployed a sample of 59 large buyouts from 1997 to 2004 in the UK. Financial arbitrage as well as the value of active ownership (direct and indirect value drivers), are illustrated with examples in the figure below.

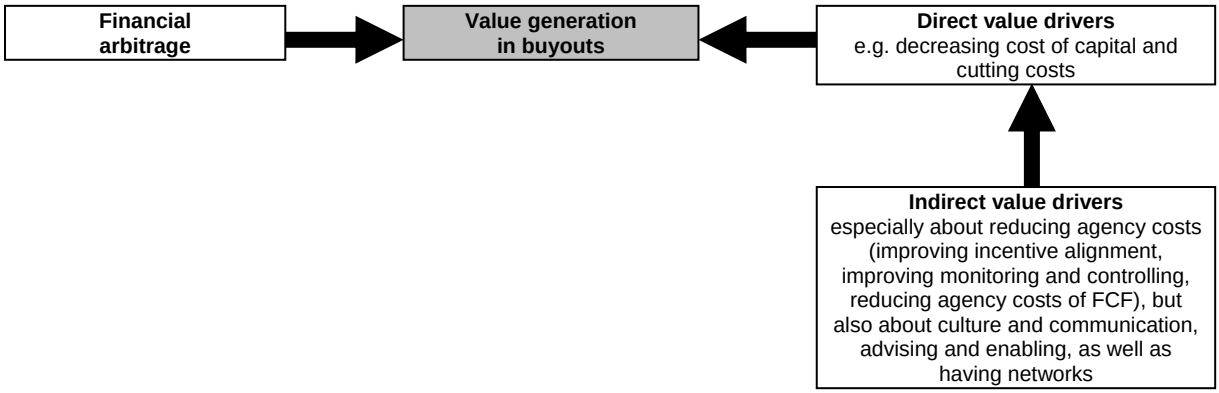


Figure 6. Value generation in buyouts

Many of the early buyout techniques to improve portfolio companies became common good both among all buyout firms, and also listed companies after a while. The industry has responded to this change through developing what Kaplan and Strömberg call "operational engineering". Operational engineering has traces of both direct and indirect value drivers. Operational engineering is achieved in several different ways; many top-tier PE firms are organised around industries, PE firms hire not only investment bankers but also people with consulting and operating backgrounds, management consulting firms are used to identify operational improvements and most of the top firms additionally have operating executives at the firm or in their network, (Kaplan and Strömberg (2008)).

6.4 Company Profile

A Brief History of the Company

The concession to design, construct, finance and operate Arlanda Express was publicly tendered by the Swedish Government in 1993. The winning consortium, A-Train, signed the Concession Agreement in 1995 and operation of Arlanda Express commenced in November 1999. As a part of the Concession Agreement, the Government agrees not to support or subsidise competing modes of transport. The aim of the new transport route to Arlanda airport was to improve transport links to the airport and reduce anticipated levels of traffic congestion arising from air traffic and associated passengers. Arlanda link was the first major infrastructure project in Sweden in more than 100 years to be financed mainly through private

funds. Traditionally, the funding of infrastructure projects have been provided by taxpayers, but this was not a viable option due to the strained Swedish economy. A number of major international banks were persuaded to provide loans with future ticket revenues as their only guarantee. This became what was, for Sweden, a unique cooperative project between the government and industry. The Concession Agreement extends to 2040. The Concession Agreement also includes provisions for a single 10-year extension, on application by A-train to the Government at a price to be market tested at the time. The Concession Agreement does not impose any restrictions on the setting of fare levels.

Macquarie's Investment Case

A-train fulfilled Macquarie European Infrastructure Fund's basic investment criteria (see appendix 4), i.e. located in a European OECD country, offers basic services to the community, possesses a strategic competitive advantage and provides sustainable and predictable cashflows. Besides, Macquarie considered the timing of the investment very good, since the number of passengers using Arlanda airport had decreased relatively drastic after September 11. Macquarie realized that this downturn was temporary especially since the air traffic has increased steadily during the past 50 years, but with certain chocks such as September 11. The previous owners of A-train also wanted to sell since running a rail link was not considered a core business for them. Macquarie negotiated the deal on an exclusive basis.

Macquarie saw two ways to add value to the investment. Firstly, they could reduce the financing costs through a re-financing of the loans. This raises the question why the previous owners could not make the same thing, but research by Demiroglu and James (2007) has shown that reputable PE firms get better lending terms. Secondly, Macquarie probably also had a better commercial understanding of the business since they had experience from investing in about 100 infrastructure assets. In this way they could bring in new ideas to the company (Interview Vietor and Macquarie professional).

Arlanda Express' Competitive Situation

Arlanda Express is a typical infrastructure asset in this sense that the company has a relatively monopolistic position regarding providing their service. However, Arlanda Express' future financial health depends both on that Arlanda airport can remain strong and that Arlanda Express can compete well with other transport modes to Arlanda airport. Arlanda airport is the largest airport in Sweden and the second largest in Scandinavia, after Copenhagen airport. There are four airports in the Stockholm region, but Arlanda is by far the dominant. A negative factor for Arlanda Express is that there are potential road projects in the Stockholm region which will improve the accessibility to Arlanda by car or bus. That the government should buy the service is sometimes on the agenda, and they are also allowed to do so after 2010, but they then need to compensate the owner fully economically (Hultkrantz, Karlström and Nilsson (2005)).

Arlanda Express' market share for travelling to Arlanda airport was approx. 18% in 2003, but much higher for the sub-market for trips between downtown Stockholm and the airport only, approx. 25-30%. Car and taxi are the leading transport modes. Arlanda Express' greatest competitive advantage is the time saved of using the train, as highlighted in the table below.

Table 10. Arlanda Express catchment area – modes of transport

	Arlanda Express	Bus	Taxi	Private car
Time of journey (mins)	20	40*	32-50**	32-50**
Cost of journey (SEK)	220	99	385-475	n/a***
Frequency of service	6 per hour peak	6 per hour peak	n/a	n/a

	4 per hour off-peak	4 per hour off-peak		

* This is considered a minimum
** Based on a 42km distance using an average speed of 50-80kph
*** Cost of journey not available. However, cost of parking at the Sky City Car Park for 24 hours is SEK 280.

Source: Macquarie and author

Financing the Transaction

Right after the buyout, in January 2004, Macquarie undertook a refinancing of the company, and table 11 describes the financial structure at the end of 2004 as compared to the end of 2003.

Table 11. Financing pre and post buyout (book values)

In SEK millions	**31/12/2003**	**%**	**31/12/2004**	**%**	**Interest rate**	**Amortization**
Equity (and shareholder loans)	269.5	10.4%	441.9	16.0%	13.0%*	First: 2009 + 2026
Long-term loans from the Swedish state	1,000.0	38.6%	1,000.0	36.1%	Depends on future CFs	First planned to 2020
Long-term loans from credit institutes	1,118.8	43.2%	1,139.0	41.1%	6.5%	Depends on the cash flows (re-paid after five years)
Other long-term loans	50.9	2.0%	52	1.9%	n/a	
Short-term loans	153.3	5.9%	136.3	4.9%	n/a	
	2,592.5	100.0%	2,769.2	100.0%		

* Interest-rate is only paid if the company fulfils certain ratios.

Only a lease of the train sets from Nordea which has a state guarantee, as well as the loan from the Swedish state (the Swedish National Debt Office, Sw. Riksgäldskontoret), remained unchanged after the refinancing. The shareholder loans are the most junior loans. The shareholder loans should be viewed as equity and is used to gain tax benefits and to facilitate paying dividends to the owners. The shareholder loans increased quite much after Macquarie's buyout, from SEK 130 millions to SEK 370 millions. The conditions for the loan to the Swedish state is unclear in A-train's annual reports. However, in the annual report 2003, it was assumed that the first amortization would take place in year 2020. How much interest that there will be on the loan also depends on future cash flows, but in the annual report 1995, it was assumed to be 3.85% to be paid back in the future rather than ongoing (Riksrevisionen (2004)). The Debt/EBITDA multiple at the transaction was fairly high at almost 18 (using figures for 2004), but more normal for an infrastructure transaction if the favourable loan from the State is excluded, namely 10.

The refinancing of the loans to the credit institutes were conducted in order to gain better terms on the loans, and in order to allow for a stable dividend to the owners. The old owners would have re-paid all commercial loans in year 2015 while the concession runs until year 2040. Macquarie on the other hand wants to match the cash flows with the interest payments.

The Operating Performance after the Buyout

Table 12. The operating performance pre and post the buyout

In SEK millions	Pre buyout: 2003	Post buyout: 2004	Change, %	Post buyout: 2005	Change, %	Post buyout: 2006	Change, %
Income statement							
Net revenues	354.0	394.0	11.3%	430.0	9.1%	464.1	7.9%
Other revenues	4.8	7.5	56.2%	10.6	40.2%	5.0	-52.8%
Total revenues	358.8	401.6	11.9%	440.5	9.7%	469.1	6.5%
Running expenses	-73.1	-101.4	38.7%	-86.6	-14.6%	-119.8	38.3%
Other external costs	-55.7	-41.7	-25.2%	-42.9	2.9%	-46.8	9.0%
Staff expenses	-88.5	-89.7	1.4%	-87.9	-2.1%	-86.7	-1.4%
Leasing costs for the train set	-42.6	-36.6	-14.0%	-33.8	-7.8%	-37.7	11.8%
Depreciation and amorti.	-49.9	-45.1	-9.6%	-46.8	3.8%	-46.8	0.1%
Total operating expenses	-309.8	-314.6	1.5%	-297.9	-5.3%	-337.8	13.4%
Operating profit (EBIT)	**49.0**	**87.0**	**77.7%**	**142.6**	**63.9%**	**131.3**	**-7.9%**
EBIT margin	**13.7%**	**19.8%**		**32.4%**		**28.0%**	
Interest income and similar	5.3	7.1	33.1%	6.2	-12.9%	8.4	36.5%
Interest expense	-105.1	-161.7	54.0%	-140.2	-13.4%	-135.7	-3.2%
Total financial items	-99.7	-154.7	55.1%	-134.0	-13.4%	-127.3	-5.0%
Net earnings	**-50.8**	**-67.6**	**33.3%**	**8.6**	**n/a**	**4.0**	**-53.4%**
EBITDA	**98.8**	**132.1**	**33.6%**	**189.4**	**43.4%**	**178.1**	**-5.9%**
EBITDA margin	**22.4%**	**30.0%**		**43.0%**		**38.0%**	
Balance sheet							
Average working capital	-9.6	50.7	n/a	110.0	117.0%	156.3	42.1%
Total assets	2,592.6	2,769.2	6.8%	2,728.6	-1.5%	2746.4	0.7%
Other							
Employment	174	176	1.1%	172	-2.3%	180	4.7%

Source: A-train annual reports

Note: The company leases 6 of 7 train sets and therefore had an operating lease of roughly SEK 650 million in 2003. A-train's annual report is vague in details about this lease, and therefore no adjustments have been made above. However, the proper treatment of this operating lease would be to capitalize the value of the lease on the balance sheet and add corresponding debt, break down the rental expense into interest expense and depreciation, and finally add back the implied interest payment to EBITA and adjust for that the loss of some tax shield. If these adjustments were made, A-train would likely have a somewhat higher operating profit (because rental expenses for the train set include the implicit interest expense), and more assets on the balance sheet.

The operating performance of Arlanda Express has improved substantially since Macquarie's buyout, with a strong increase in sales and EBITDA margins. See table above. Arlanda Express has actually grown slower than Arlanda airport, and the strong increase in revenues partly seems to be connected with that the ticket costs have been raised[14]. Arlanda Express also benefits from that the costs are partly fixed. The only negative in Arlanda Express' financial development is that the amount of working capital has increased by SEK 166 million, mainly due to an increased bank balance.

6.5 Financial Arbitrage

It has previously been established that one of the sources of value generation in a buyout context could be to buy cheap. The following section will investigate whether Arlanda

[14] For example the standard single ticket cost SEK 180 in 2003, and SEK 220 in 2007. Stakeholder effect, so-called wealth transfers, have sometimes been analysed in buyout settings (for an overview see Ippolito and James (1992)). Since the takeover the staff expenses have also declined by 2%, while the revenues have increased by 31%. It would nevertheless be rather far-fetch to claim that the higher ticket prices, and reduced staff expenses, are due to a new ownership, especially since Macquarie does not seem to be very active as owners.

Express was acquired cheaply using a discounted cash flow (DCF) analysis. The DCF valuation is commonly used both among academics and practitioners (Kaplan and Ruback (1995)). The formula for the unlevered FCF is: FCF = EBIT – taxes – increases in working capital +/- deferred taxes + D&A – capital expenditures. The present value obtained is the value of the assets, assuming no debt or excess cash (Enterprise value). Debt associated with the business is subtracted and excess cash balances are added to determine the present value of the equity (Equity value). Cash flows are discounted at the weighted average cost of capital ("WACC"). It is of course somewhat subjective to make a valuation without an insider's knowledge, but some of the major valuation assumptions are Macquarie's own.

The key value drivers for Arlanda Express' performance is the growth of Arlanda Express, as well as the train service's market share. The pricing is an additional value driver and the company strives to maximise the average price, although the market share also needs to be taken into consideration. The valuation assumptions, as well as the cash flows for the years until terminal year are presented in appendix 5. The greatest weakness of the model is that it assumes that costs are a proportion of net sales, while costs in reality are much more fixed. More careful projections are thus difficult without an insider's knowledge. The cash flows and the sensitivity analyses are thus not fully realistic, but the model yields a value of the business which is not that far away from Macquarie's value (at least as long as the equity requirement using CAPM, 7.1%, is replaced by Macquarie's forecasted equity IRR of 20%).

The cash flow model estimates the value of Arlanda Express to approximately SEK 1,400 million, while Macquarie paid SEK 450 million. The sensitivity analysis also reveals that you probably both need to be a fool and be unlucky in order not to succeed with this investment.

It thus seems as Macquarie "bought well" when they acquired Arlanda Express. The academic literature gives several explanations for why financial arbitrage occurs (for an overview see Berg and Gotthschalg (2003)):

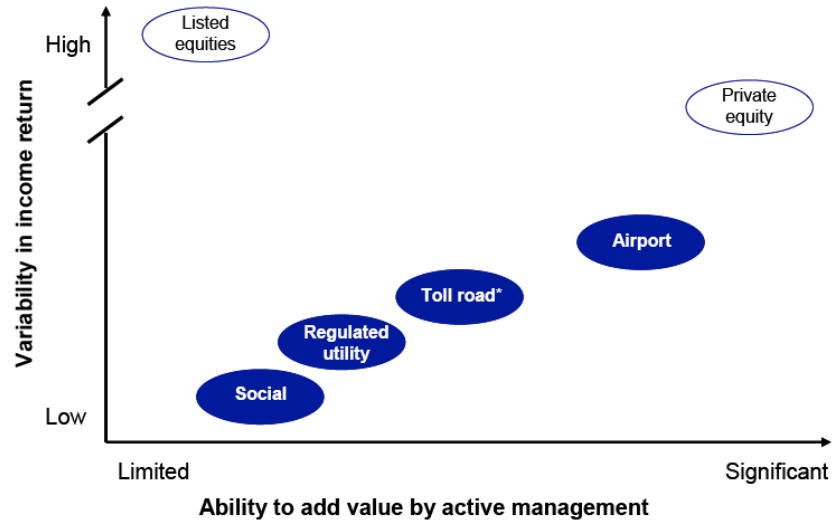
1. Financial arbitrage based on changes in market valuation, often mentioned by practitioners as "multiple riding"
2. Financial arbitrage based on private information about the portfolio company
3. Financial arbitrage through superior market information
4. Financial arbitrage through superior dealmaking capabilities

Several of the points above can well explain why Macquarie was able to buy Arlanda Express cheaply. The first point, multiple riding, is relevant as the competition for infrastructure assets was much lower in 2003 when the asset was acquired (Interview). For example, Macquarie has calculated that between 2001-2005 the average EV/EBITDA paid for airports acquired in Europe was 14.8x, while it increased to 25.5x on average between 2006-2007 (Macquarie (2007)). The third point, dealing with having superior market information, is also relevant as Macquarie has a deep understanding of infrastructure assets, and likely a deeper understanding than the previous owners, after having acquired more than 100 infrastructure assets. Finally, that Macquarie was able to negotiate the deal on an exclusive basis, should be a sign of good dealmaking capabilities. As has been mentioned before, the former owners of Arlanda Express had no interest in taking part in the operating phase. However, they wanted to run the express service some while after the opening for warranty reasons, i.e. to make sure that they had delivered a product that worked. The previous owners did the assessment that the number of potential buyers was fairly limited. The former owners also needed to think about that the transaction required governmental approval, and considered that Macquarie was a good owner of the business, i.e. they were strong financially and they could develop the business (Interview Nordqvist).

6.6 Active Ownership

The following picture is RREEF's view on how much value an active investor can add to investments in various infrastructure classes, compared to listed equities and private equity.

Figure 7. The importance of active management in different investment sectors



Source: RREEF research (2005)

We can see for example that the scope for value added in infrastructure is generally believed to be smaller than in traditional private equity. Not so surprisingly though, how much value an infrastructure investor can add very much depends on the sector. One sector where more value can be added is in the airports business. For example, there will often be opportunities to increase revenues other than through increasing passenger numbers. Retail facilities or hotels can be added or perhaps adjoining land can be profitably developed. The scope for value added in the social infrastructure sector is on the other hand deemed to be much lower. This is due that that social infrastructure investments generally are structure in a highly regulated form. The income stream is often provided directly by the government and is structured as a payment for making a facility (e.g. a school or hospital) available to an agreed standard over a concession period.

Direct Drivers of Value Creation

The most significant direct value driver in the Arlanda Express buyout is that the borrowing costs were reduced, as will be shown below. The 100-day programme covers both direct and indirect drivers, but it is notable that no such programme or similar seems to have been used in the buyout.

Financial engineering

Financial engineering, i.e. the optimisation of the capital structure and minimization of after-tax cost of capital of the portfolio company is one of the most widely acknowledged ways by buyout associations to create value (Anders (1992)). Demiroglu and James (2007) also finds that LBOs of reputable PE firms get better lending terms than other investors because creditors perceive them as less risky.

Financial engineering was quite an important value driver in the Arlanda Express takeover. The re-financing that was undertaken after the buyout resulted in decreased borrowing costs (Interview Vietor). However, very contrary to the experience from traditional buyouts the

leverage actually decreased after the buyout. Nevertheless, Macquarie's financing of Arlanda Express implies a long-term higher debt level since the amortizations are much lower than what previous owners used. Speaking generally about infrastructure assets, for some of these there is nothing you can do differently with them operationally. Infrastructure funds can in these situations only compete with having the lowest cost of capital. The capital structure choice simply seems to be relatively more important than in buyouts as infrastructure assets are very capital intensive. A bank report three years ago revealed that "tremendous value is created through financing" in infrastructure investments. Today industry insiders claim that gains from financial engineering are already "on the table".

Improving operational effectiveness

Operational effectiveness can be improved through cost-cuttings, reduction of capital requirements and removal of managerial inefficiencies.

According to the CEO of Arlanda Express Macquarie is not directly involved in day-to-day business activities such as cost cuttings, since they regard all business as local business. The CEO of another Macquarie-owned company, South East Water, Margaret Devlin, has a similar experience: "We have the support of a big organisation but the company is encouraged to manage the business on our own. [Macquarie] is not on our shoulder day-in, day-out. They appreciate there are people here who know how to do things.", (FT 17/05/2006.). However, this does not imply that Macquarie never gets involved in day-to-day business issues. For example about 1/3 of Macquarie's professionals have a background as industry specialists in the infrastructure sector. They can for example advice airport firms about the optimal location of retailing facilities and benchmark best practice between Macquarie's airports (Interview Macquarie professional).

According to the CEO of A-train nothing dramatic has been made to reduce the capital requirements in Arlanda Express since Macquarie's takeover. It has also been shown that the working capital has increased, although we do not now if this effect is just temporary.

The management of Arlanda Express has also been kept entirely after the takeover. Macquarie's view is that it is very important to buy firms with a good management team and they very seldom change management teams (Interview Macquarie professional). Traditional PE has typically a different strategy, and Acharya and Kehoe (2008) report that the CEO is replaced in 65% of the deals, and 35% in the 1st 100 days.

Generating growth in buyouts

Traditional buyout houses do not only rely on operational improvements to increase value in buyout investments, but also aggressively seek to boost revenues. Buyout firms are known for their tendency to produce ambitious business plans, hence raising the standards for management performance (McKinsey Quarterly (2001)). Two common strategies utilised in buyouts to generate growth are a corporate refocusing strategy and a buy-and-build strategy. However, these strategies can probably not be used in infrastructure buyouts. A corporate refocusing strategy is not possible since project-financed companies generally only has one business unit, and when it comes to the buy-and-build strategy few synergies could probably be achieved through an acquisition strategy. However, bear in mind that infrastructure businesses are often affected by macro issues, which means that you may buy a growth story if you buy an infrastructure asset. Macquarie also likes showing a powerpoint slide illustrating that air traffic has since 1970 grown at twice the rate the global GDP. There are several reasons behind this development; airfares have become more affordable and the airline industry has become increasingly deregulated.

In A-train, the main tool to affect the revenues is through the pricing. The operator of Arlanda Express wants to maximise the average price, but just as with the operational effectiveness issues, Macquarie is not directly involved in these tactical issues such as pricing. Arlanda Express is though an example of how macro factors, in this case the growth of air travelling, may affect infrastructure firms positively.

Indirect Drivers of Value Creation

To the most significant indirect value drivers in the Arlanda Express buyout count different means of getting rid of free cash flow, the supporting effect of belonging to the Macquarie "family", as well as the supporting effect of Macquarie's networks. See below.

Management and employee incentivation

"Compared to venture-backed firms where managers are responsible for managing growth options and for transforming small amounts of capital into large companies worth 100 to 1000 times the original investment amount, project company managers are responsible for transforming large amounts of capital into something worth just a little more." - Esty (2003)

Traditional buyout firms provide incentives in order to align the interests of all parties involved and to reduce the agency conflict after the buyout (Jensen (1989b)). Acharya and Kehoe (2008) study 59 large buyouts from 1997 to 2004 in the United Kingdom and conclude that the CEO obtains 3% of the equity (stocks and options), while the whole management team gets 15%. The Swedish buyout professionals interviewed compensate their managers by a fixed salary and a performance-based bonus. In addition, the managers are allowed and often required to co-invest in stocks and stock options of the portfolio company. How much the management of the portfolio company invests depends on their wealth, but it should be at least 2-3 years' salaries, but could also be much higher if the management has a significant financial wealth. If the earnings of the company is highly dependent of the acts of the employees Swedish buyout firms sometimes also invite more employees to take part in the incentive programme.

Infrastructure funds seem to employ management co-ownership to a much smaller extent than in traditional buyouts, which is also confirmed by the Arlanda Express buyout where Macquarie owns 100% of the company. Overall no major changes were made in management compensation in Arlanda Express after the buyout according to the CEO. However, in 2005, the first year ever A-train showed a positive net profit, all people in the staff received a bonus of SEK 1,000. All the same, the compensation to the management has increased quite much since the takeover, as illustrated in the table below.

Table 13. Management compensation (CEO and board) in Arlanda Express

In million SEK	**Pre-buyout: 2003**	**Post-buyout: 2004**	**Change, %**	**Post-buyout: 2005**	**Change, %**	**Post-buyout: 2006**	**Change, %**
Fixed compensation	1.068	1.122	5.1%	1.286	14.6%	1.644	27.8%
Bonus	0.264	0.684	159.1%	0.998	45.9%	1.765	76.9%
Total	1.332	1.806	35.6%	2.284	26.5%	3.409	49.3%

Source: Annual reports A-train

Unfortunately, the information in the annual reports does not separate the compensation to the CEO and the compensation to the board. However, both the fixed compensation and the bonus to management have increased strongly since the buyout. This is also despite that the size of the board decreased from 11 to 6 people (including employee representatives) after the buyout. This may indicate that the new owners are more generous with the fixed pay, but not necessarily that a more generous bonus scheme is used since the performance of the company has improved significantly after the buyout.

It is thus possible that employee and management incentives is not an important part of Macquarie's value-creation strategy. This makes sense if we consider the research showing that managers of regulated firms have a much lower pay-performance sensitivity than managers of unregulated manufacturing firms (Baker and Hall (1998) and Palia (2000)). Arlanda Express is partly regulated since they have the sole right to operate an express service to Arlanda airport. To understand why the managers of infrastructure companies should not be very performance sensitive to changes in payment, we can consider the quote in the beginning of this section. Managers of venture capital firms or managers of traditional buyout businesses can probably affect the upside of a company to a much larger extent than the manager of an infrastructure company, especially remembering the delimitations of infrastructure businesses as highlighted in the introduction of the paper.

Monitoring and controlling

Buyouts firms typically change the governance structure in a way that increases the possibilities to reduce the agency conflict through monitoring and controlling of the company management (Anders (1992); Cotter and Peck (2001)). Acharya and Kehoe (2008) find that boards of PE portfolio companies are smaller than comparable public corporations and that they meet more frequently. Arlanda Express is monitored by Macquarie through receiving financial reports regularly and through controlling the whole the board.

A-train sends monthly reports to Macquarie with for example financial data and key ratios (punctuality, average price on tickets etc). The key ratios have not been out of line since Macquarie's takeover and hence the CEO of Arlanda Express does not know how Macquarie would react in such a situation. However, when A-train makes the budget and business plan for a three-year period Macquarie is "tremendously active".

An important aspect of the monitoring of Arlanda Express is that the company got a new board of directors after the buyout. The board size decreased from 11 to 6 people (including employee representatives). The new directors were all leading people from Macquarie. One of the board members has a background as the CFO of an infrastructure company, and the other two from Macquarie are former investment bankers. The new board was definitely seen as a strengthening in competence since they had a long experience from the infrastructure market. The current board of Arlanda Express is listed below.

Table 14. A-train's board

People	Position
Martin Stanley, Chairman	Responsible for Macquarie's European infrastructure funds
Georg Vietor	Division Director Macquarie
Philip White	Division Director Macquarie
Per Thorstenson	CEO A-train

The board meets approximately every third months. The former board met more frequently, approximately 6-8 times per year, but that was during a time that the travelling to Arlanda airport decreased from 18 to 15 million people per year. In addition one of the owners, Alstom, was according to the media under the threat of bankruptcy during this period. The new board is perceived to be more active and competent. The board has got two main functions (Interview Vietor). Firstly, it has a controlling effect, i.e. Macquarie wants to know what is going on in the company through seeing and speaking to the management of the company. Secondly, the board has also got an encouraging effect since Macquarie wants to show that they are a committed owner. It is also very important to exchange views during the board meetings. According to Vietor Macquarie learns a lot from A-train which they could

use if they would acquire any similar asset, and A-train can also learn things from Macquarie's comprehensive infrastructure experience.

Reducing agency costs of free cash flow

Mangers of infrastructure firms need to be disciplined, since infrastructure firms usually generate large amounts of free cash flows during the operating phase (Jensen (1986); Esty (2002c)). The large free cash flows are created because project companies mainly require investments upfront, and because they have high operating margins (partly as a consequence that most investments are taken upfront). For example a gas-fired power plant might generate operating (EBIT) margins of 20-50%, while other project can generate operating margins of 70-95%. Arlanda Express' EBIT margin was roughly 30% in 2005 and 2006. Project companies actually provide some of the strongest empirical support for agency-based theories of capital structure. Even projects not subject to taxes use high leverage. Even though Macquarie decreased the initial leverage in the Arlanda Express buyout, the long-term leverage with Macquarie will be higher since the previous owners had a much more aggressive amortization plan. This higher long-term leverage will put some pressure on Arlanda Express. But it also seems as infrastructure funds put pressure on their portfolio companies in an additional way; they require high dividends. Macquarie's infrastructure funds in principle promise their investors a dividend, and if the portfolio companies then cannot deliver a sufficient dividend, management will "panic" (Interview Macquarie professional). Macquarie has an explicit forecasted dividend for A-train, which is 10-11% per annum on average over the first five years (Macquarie Information Memorandum).

Buyout culture and communication

An effect often reported in companies that have been involved in a buyout is something that researchers call "LBO fever" or "adrenalin", meaning that energized and highly motivated management teams are willing to take nearly any action to make their buyout a success (Beaver (2001)). The communication in the company may also be improved since owners and managers are usually much closer than in traditional organizations. No "LBO fever" has been reported in Arlanda Express after the Macquarie takeover, but according to the CEO Arlanda Express was perceived as a colloquial company also before the buyout. This description is similar to the experience by the South East Water CEO. According to her cultural changes after Macquarie's takeover were "subtle, rather than a shake-up".

Advising and enabling

A positive effect of belonging to a particular buyout association or the "parent company" can come from the constructive interaction between portfolio company managers and their counterparts in the buyout associations (Kester and Luehrman (1995)). Based on the material from the interviews, it is perceived to be an advantage for a company like Arlanda Express belonging to a group with experience from more than 100 infrastructure investments, and there are several examples of this. Firstly, Macquarie has a good understanding of the transport market and from times sends Arlanda Express reports about how they think the transport market is going to evolve. Secondly, Macquarie can also serve as a discussion partner regarding how to run the business. It has also previously been mentioned that a major task of the board is to share knowledge in the "family" of Macquarie companies. Thirdly, Macquarie encourages senior managers in their portfolio companies to meet in order to share views, and to meet investors. The CEO of Arlanda Express has for example met investors in connection to meetings in among others Stockholm and Paris. Fourthly, Macquarie's network can also serve as a support for their portfolio companies, which the following section will highlight.

Networks

Buyout firms rely on a network of outside people, usually CEOs or former CEOs, that help them in several ways; serving in the company selection process, sitting on boards or giving advices in other ways. Macquarie relies on such a network too. For example five people are advising their European infrastructure funds. See table below.

Table 15. Senior advisers to Macquarie's European infrastructure funds

Senior adviser	Main background
Noreen Doyle	Vice President of the European Bank for Reconstruction and Development (ERBD)
Lord Gus Macdonald	Minister for Transport in the UK government
Dr. Dieter Pommerang	Managing Director Lazard, 20 years with McKinsey
Dr. Andrzej Olechowski	Polish politics; Minister of Foreign Affairs etc.
Sir Stephen Wall	EU Advisor to Tony Blair

The criteria for being selected as a senior adviser to Macquarie are to have a good reputation and a good knowledge (Interview Vietor). Macquarie uses their network in two different ways. Firstly, they use them as relationship builders. For example if Arlanda Express wants to get in touch with someone in the Swedish government it is useful to have access to Macquarie's network. Secondly, Macquarie also uses this network as a competence, for example in privatisation processes the network can help Macquarie to understand how politicians think. It is confidential how the senior advisers are remunerated (Interview Thorstenson and Vietor).

A clear difference between Macquarie and traditional PE firms when it comes to networks is that Macquarie's network is dominated by people with a political background, whereas the latter mostly uses people with industrial backgrounds. There are however signs that some of the more recently set up infrastructure funds run by investment banks and private equity houses use their networks in a more traditional private equity style. Firstly, some funds have hired networks with more industrial backgrounds. For example, to EQT's network counts people with industrial infrastructure backgrounds like Hans-Peter Keitel (ex Hochtief), Robert Lewis (ex GE), Mikael Lilius (Fortum), Göran Lundberg (ex ABB). A further example is Global Infrastructure Partners (GIP). GIP hired the former British Prime Minister John Major as chairman, but the other people on their advisory board have more industrial infrastructure backgrounds, e.g. as CEOs of infrastructure companies. Secondly, some of these new funds also use the networks during the whole holding period, and not mostly during the sourcing phase as Macquarie does (Interview).

It is nevertheless not so surprising that it is common with former politicians advising infrastructure funds. Political connections are important during the acquisition phase since infrastructure assets are often acquired from the state or need governmental approval. Furthermore, political connections are also important ongoing since infrastructure firms are more or less regulated, and you need to have good connections with the regulators not to be harmfully regulated (Interview). There are several examples of how political aspects have played a pivotal role in infrastructure buyouts. A famous example is the TXU buyout, the largest infrastructure buyout so far and one of the largest buyouts ever. The KKR consortium buying the company was as an adviser using the Secretary of State in the administration of President George H. W. Bush. This move may have been due to that they were rejected by the State of Arizona when they tried to acquire Unisource. Some people also explain part of Macquarie's successes by that they have a good grasp of social and political issues, for example shown by the recruitment of former politicians as senior advisers.

6.7 Conclusions

"While financial skill is a vital component of LBO investing, we seek firms that build fundamentally better businesses. Financial engineering skill is a commodity, readily available and cheaply priced. Value-added operational experience, however, is rare." – David Swensen, legendary LP, 2006

"Bidders for infrastructure assets that can show an awareness of the political and social dimension to infrastructure deals are likely to be more successful" – Investment Banker, Financial News 08/01/2007

The case study reveals that Macquarie is an owner with a deep knowledge of the management of infrastructure companies, which seems to benefit the companies they invest in. The buyout of Arlanda Express is yet radically different to a traditional buyout. The table below summarises some of the differences.

Table 16. Value drivers in an infrastructure buyout as compared to a traditional buyout

		Infrastructure fund model	PE model
Direct value drivers	Financial engineering	• Used to be an important value driver, but appears to have become a commodity	• Typically a commodity
	Operational effectiveness	• Operational strategies tend to be mild and straightforward. The Arlanda Express buyout was not motivated by operational improvements • Very rare changing senior management	• Part of the value creation plan • CEO changed in 65% of deals
	Generating growth	• Macro economic factors such as GDP growth and demographic trends (e.g. population growth) often fundamental value driver	• E.g. uses corporate refocusing and buy-and-build strategies
Indirect value drivers	Reducing agency costs (incentives, monitoring and controlling, cost of FCF)	• Infrastructure fund owns 100% of equity in deal, or co-invests but typically not with management • Monitoring "not very intense" • Major issue getting rid of free cash flows (through high leverage and requiring a high dividend)	• Management co-invests and owns 15% of equity (CEO ~3%) • Monitoring "very intensive" • Leverage disciplines
	Boards	• Small boards • Mostly directors from the infrastructure firm • Little interaction between board meetings	• Smaller boards than listed corporations • 45% of directors from PE firm • Many informal contacts between board meetings
	Culture and communication	• No change	• LBO fever!
	Advising and enabling	• "Family effect", e.g. receiving advice, CEOs in portfolio companies can meet	• PE firm and portfolio company have close co-operation
	Networks	• Former politicians dominate, but the trend is that funds increasingly hire advisers with industrial experience	• Typically networks of industrialists

The most notable difference between the infrastructure fund model and PE model concerns governance issues. Many of the features that have become the DNA of buyouts – e.g. intensive monitoring, management incentives and board structures – are rather different in infrastructure buyouts. This particular buyout is neither an example of the use operational engineering, e.g. cost-cutting activities, productivity improvements and strategic changes. Based on the findings from the case study, it may appear to be a puzzle what is the formula for success in an infrastructure buyout setting, if there is such a formula. It is yet believed that most of the value creation in successful infrastructure buyouts will occur due to operational engineering, and several infrastructure funds have tied up significant industry expertise. Operational engineering is yet challenging in infrastructure buyouts. A McKinsey study (2007) reveals that best-in-class road operators, for example, manage their assets up to 30 percent more cost effectively than their peers do by optimizing the cost of capital repairs, routine maintenance, toll collection, and traffic management. The same article still relieves that these operational cost advantages are notoriously difficult to sustain. There are thus signs

that there is generally less scope for operational engineering in an infrastructure buyout setting. Some of the most skilful funds may yet generate some excess returns in complex transactions due to operational engineering skills, but also as a consequence of an ability to generate exclusive dealflows, and possessing an edge when it comes having a grasp of political considerations.

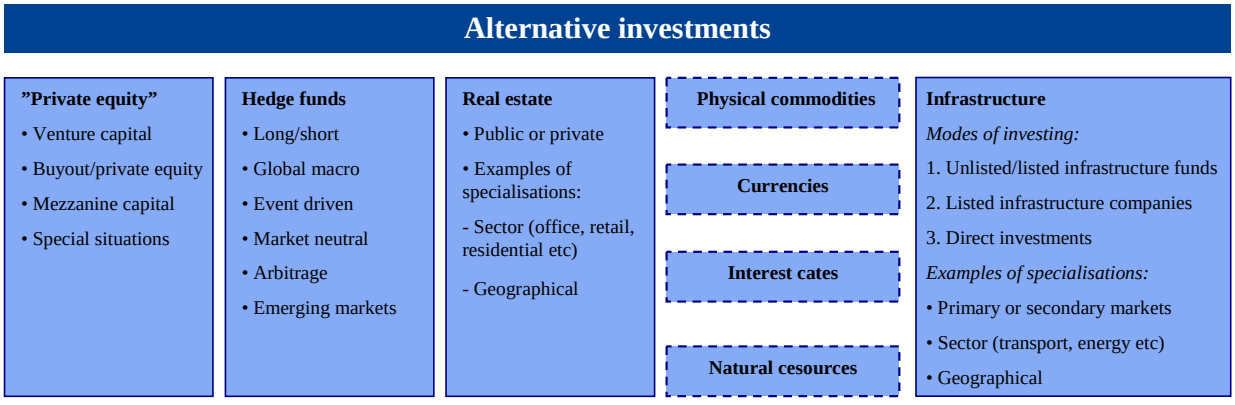
8. Bottom Line / Future

"So teach us to number our days, that we may gain a heart of wisdom." - Psalms, 90 v. 12

"Because of the consistency of performance by its best firms, private equity has established itself as a 'permanent' asset class; there's little doubt in my mind that private equity is here to stay." - Steven Kaplan, 2007

Infrastructure funds are a new field of the alternative investment universe, yet fastly growing. It has also been predicted that over the next ten years, the infrastructure sector will experience the same explosive growth as real estate has experienced over the last decade. Comparing infrastructure funds and traditional buyout funds from several angles, the thesis has found several differences. As regards infrastructure assets it is important to note that the relationship between the private investor and the state is a sensitive one as the assets are sometimes acquired from the state and since infrastructure is more or less regulated. In addition, the economics of infrastructure assets is different from the assets traditional buyout firms buy. To the special characteristics of operating infrastructure assets count; physical constraints, often limited prices and limited opportunities to affect the costs as most costs are construction costs. Many investors in the infrastructure sector have also started to treat infrastructure as a separate asset class. An overall conclusion of the thesis is therefore that it makes sense to add a box to the traditional umbrella of alternative assets. See below.

Table 17. The "new" umbrella of alternative investments



A key question as regards the future is also how institutional investors in this sector should operate. We do not know yet if persistent excess returns will be generated by some infrastructure investors, but it makes sense in any case for institutional investors to consider this asset class as it can add valuable diversification. The table below shows the pros and cons of the various means of getting access to infrastructure assets.

Table 18. Pros and cons of different means getting exposure to infrastructure

Unlisted infra fund	Listed infra fund	Listed infra company	Direct investment
Strengths			
Potentially have unique skills	Potentially have unique skills	Industrial knowledge	Do not have to pay high fund fees
	Daily liquidity		Not tied to a structure, such as a limited life
Weaknesses			
Fees are considered high	Fees are considered high + misaligned incentives		Likely more difficult to diversify and thereby reduce asset specific risk
	Quoted private equity funds have historically often traded at a discount to asset value		Can likely not add much value
	Limited ability to return cash to investors which can dilute performance		Requires in-house experience
	Due to the accounting rules pension funds follow, appear more volatile	Due to the accounting rules pension funds follow, appear more volatile	

Potential advantages with investing in infrastructure funds have been highlighted through the thesis and especially in the case study; operational engineering skills, ability to buy assets in less competition, and having a grasp of political issues. What should then investors look for when selecting infrastructure funds? Strömberg (2004) has developed a checklist for institutional investments in buyout funds and venture capital funds (see appendix 6). Institutional investors interested in infrastructure funds should ask themselves similar questions. The most severe headache for potential LPs should be that almost none of the infrastructure funds have an investment track record, something that has been quite a good indicator for future performance among buyout and venture funds (Strömberg (2004); Bance (2002)).

The drawback of the whole infrastructure fund industry is nevertheless that even though the industry likes to denote itself “infrastructure private equity”, it cannot live up to the meaning of private equity as they generally do few of the things traditional private equity does. The typical infrastructure assets appear to be easy in operation compared to buyout investments or venture capital investments. The case is simply stronger for direct investments, which would for example save some high fees otherwise going to the infrastructure funds. Researchers have come to the opposite conclusion regarding direct investments in buyouts and venture capital (Strömberg (2004)). Firstly, this is so because successful investments rely on being to add value, something institutional investors could probably not do. Secondly, if institutional investors would co-invest with private equity funds, they would probably not get access to the most interesting deals, i.e. the problem of adverse selection. The conclusion that we may see much more of direct institutional investments in infrastructure going forward, is also supported by the experience so far. Surveys conducted by CFS (2006) and Probitas Partners (2007), show that direct investments have become increasingly popular among veteran infrastructure investors. For example one of Macquarie's biggest investors traditionally, OMERS, a leading Canadian pension fund, now prefers to invest directly in infrastructure rather than pay Macquarie to invest through its funds.

To predict a soon fall of infrastructure funds still does not seem to be the likely development despite a tendency that experienced infrastructure investors like direct investments. Direct investments are highly time consuming and require specialised skills. For example Borealis Infrastructure, the infrastructure arm of OMERS, seem to employ more than 20 senior

investment professionals. This is quite much given that many pension funds and endowments typically have very small staffs (Gompers and Lerner (2000)). People with experience from infrastructure investing are also a scarcity (Probitas (2007)). Furthermore, the legendary LP David Swensen would likely favor infrastructure funds. Swensen was hired to head the Investment Office which manages Yale University's endowments in 1985. Under his management, the endowment has produced an annual net return f 15.4%, which ranks them in the top 1% in comparison with institutional investors in the US. Swensen seeks opportunities in less efficient markets, and only one-third of Yale's investment is in liquid investments such as public stocks and bonds. Swensen believes strongly in utilising outside managers for all but the most routine or indexed of investments. It is not known whether Swensen invests in infrastructure, but if he did he would likely use external managers, but making sure that they have the right incentives, and not prosper if they just grow large, but prosper if they perform well for their clients (Lerner (2007)).

Directions for future research could maybe best be described by the words "more, more, more". Many of the analyses in the thesis have been based on a limited data, mostly because there is currently limited data available. One of the most interesting research questions in this area is how infrastructure funds will perform returnwise compared to their peers like listed infrastructure companies. If the infrastructure fund model will appear to work well, it is also important for both academics and practitioners to understand why it works. A further area of interest is the special incentive problems that arise between for example the infrastructure GP and the LP, and which are not necessarily the same as in a buyout setting.

-- END --

Glossary for Infrastructure Funds

Asset: The physical project and its associated contracts, rights, and interests of every kind, in the present or future, which can be valued or used to repay debt.

Carried interest: Also known as "carry" or performance fee. The substantial share, often around 20 percent, of profits that are allocated to the general partner of the partnership. Typically, carried interest is only paid after investors receive their original investment back plus a preferred return.

Catch-up: Means that once the hurdle is met, the GP receives some percent of all profits, not just the profit above the priority return.

Closed-end fund: A publicly traded mutual fund whose share must be sold to other investors (rather than redeemed from the issuing firm, as is the case with open-end mutual funds).

Club deal: A deal which involves more than one private equity house.

Commitment: An investor's obligation to provide a certain amount of capital to a fund.

Concession: The duration for which the private sector will operate the service/asset for. At the end of the concession the asset is handed back to the government authority in a pre-agreed condition.

Consortium: All of the participants or developers associated with a specific project. In the early stage of a project, it may be a loose association not a legal or contractual entity or joint venture.

EBITDA: Earnings before interest, taxes, depreciation and amortization.

Free Cash Flow (FCF): Cash available for capital providers. It is defined in the methodology section.

Fund: The investment vehicle, often a limited partnership, to which the investors commit capital.

General partner (GP): A partner in a limited partnership who is responsible for the day-to-day operations of the fund. In the case of an infrastructure fund, the investment professionals are either general partners or own the corporation that serves as the general partner.

Holding period: The amount of time an investment remains in a portfolio.

Key man clause: The purpose of key-man provisions are to insure that the fund manager making the investments in the fund are the same people who produced the previous fund's track record. These provisions allow investors to suspend further investments in the fund.

Lead investor: Member of a syndicate of private equity investors usually holding the largest stake, in charge of arranging the financing and most actively involved in the overall project.

Leveraged buyout (LBO)/buyout: The acquisition of a firm or business unit, typically in a mature industry, with a considerable amount of debt.

Limited partner (LP): An investor in a limited partnership. Limited partners can monitor the partnership's progress, but cannot become involved in its day-to-day management if they are to retain limited liability.

Limited partnerships: The legal structure used by most private equity funds. Usually fixed life investment vehicles. The general partner or management firm manages the partnership using policy laid down in a Partnership Agreement. The Agreement also covers terms, fees, structures and other items agreed between the limited partners and the general partner.

Management fee: Compensation for the management of a fund's activities, generally paid quarterly from the fund to the general partner or management company.

Mezzanine: A fund investment strategy involving subordinated debt (the level of financing senior to equity and below senior debt).

Net invested capital: Invested capital, minus the cost basis of any exited investments.

No-fault divorce clause: Typically states that if a specified majority of the limited partners decide that they do not want to stay invested in the partnership, they can withhold additional capital take-downs.

Portfolio company: The company or entity into which a fund invests directly.

Project finance: Involves the creation of a legally independent project company financed with equity from one or more sponsoring firms and non-recourse debt for the purpose of investing in a capital asset. The most commonly used way to finance infrastructure companies.

Primary infrastructure project: Often termed a development stage project and require a construction phase prior to operation. Typically involves an added element of risk compared to secondary projects due to for example construction risk (time lags and cost over-runs), or demand risk (i.e. the final demand for the project is unknown). Divided into greenfield (completely new infrastructure) and brownfield (second construction phase to an existing asset) projects. See also **"**Secondary infrastructure project".

Private Finance Initiative (PFI): A program launched in 1992 by the UK Government to encourage private sector investment in the public sector.

Private Public Partnership (PPP): Projects, typically infrastructure developments, which involve both the

Secondary buyout/sale: Exit mechanism whereby one investment firm sells its position in a company on to another investment firm.

Secondary infrastructure project: Investors acquire an up and running asset. See also **"**Primary infrastructure project".

Transaction fee rebate: GPs are providing certain services to their portfolio companies for which they receive payment (this can be: sitting on a company board or advising on merger and acquisition etc). LPs are receiving a "Transaction Fee Rebate" on the GPs management fees relative to the amount of "special payments" received by the GPs.

Trade sale: Sale of a portfolio company to another company, typically operating in the same industry.

Venture capital: Funds that focus on investments in privately held, high growth companies.

Vintage year: The group of funds whose first closing was in a certain year.

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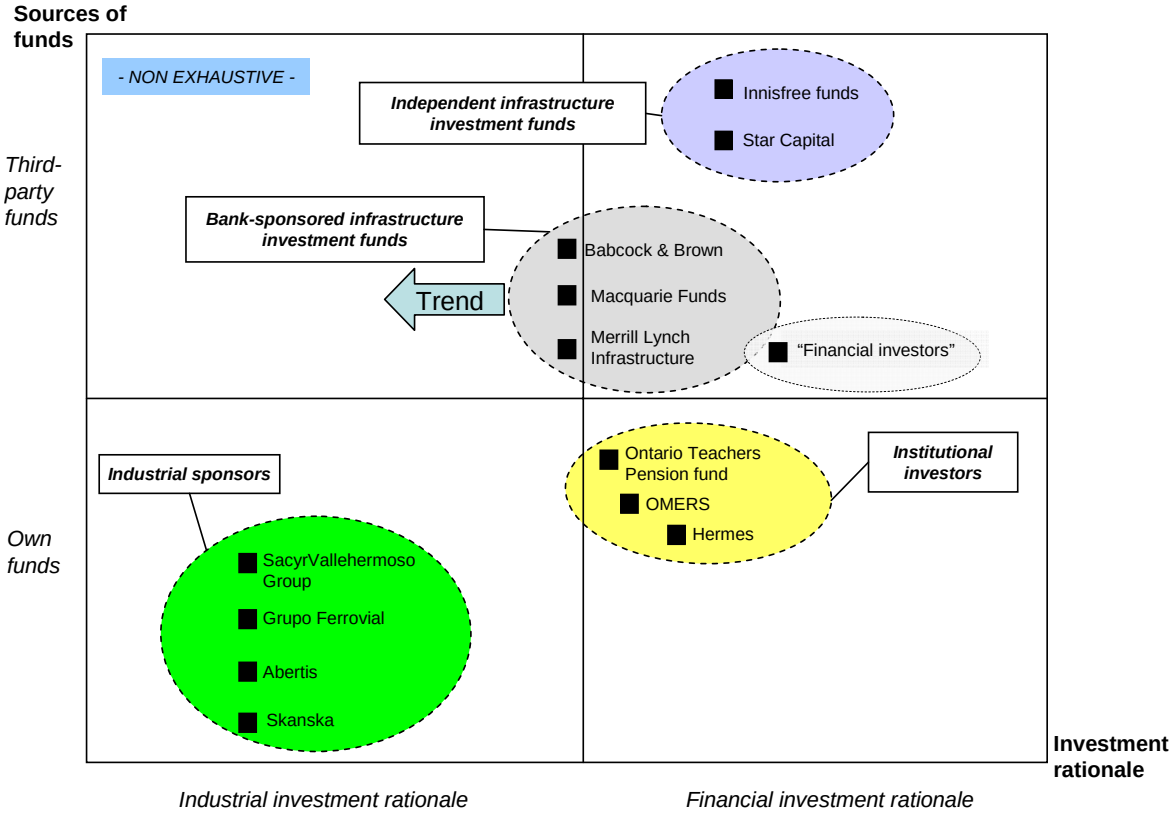
Interviewees

Name	Company	Position
Karin Aspström-Eriksson	Handelsbanken International	Vice President (Infrastructure fund)
Caspar Callerström	EQT	Partner
Michael Carrick	Merrill Lynch	Head and Managing Director (Infrastructure fund)
Christina Fagerberg	Industri Kapital	Director
Per Forsberg	Valedo Partners	Partner
Stefan Glevén	EQT	Director (Infrastructure fund)
Bengt Hellström	AP3	Head of Alternative Assets
Per Jäderberg	Svenska Handelsbanken	Head of Structured Finance
Gavin Merchant	Merrill Lynch	Vice President (Infrastructure fund)
Michael McGhee	Global Infrastructure Partners	Partner
Graeme Newell	University of Western Sydney	Professor
Greeg Nordqvist	NCC	Vice President (M&A)
Petter Odhnoff	Handelsbanken International	Head (Infrastructure fund)

David Robinson	Global Infrastructure Partners	Associate
Sally Stott	Dresdner Kleinwort	Director (Infrastructure finance)
Per Thorstenson	A-train	CEO
Georg Vietor	Macquarie	Division Director
Karl-Johan Wattsgård	EQT	Associate (Infrastructure fund)
Michael Wilkins	Standard & Poor's	Managing Director (Infrastructure)
Tobias Wägnert	UBS	Director (Infrastructure advisory)
Anonymous	Macquarie	

Appendix 1: Infrastructure Competitive Environment

Figure 8. Competitive segments in the infrastructure sector



Source: Galaxy presentation 2007 (picture developed by author). The picture should not be seen as an exact representation of the infrastructure competitive environment, but rather as a broad overview.

Appendix 2: The Largest Infrastructure Funds, Buyout Funds and Real Estate Funds in the World

Table 19. Largest infrastructure funds to date

Fund name	Firm	Fund size ($Mn)	Location focus	GP location	Vintage
Macquarie European Infrastructure Fund III	Macquarie Funds Management Group	8,000*	Europe	Australia	2008
GS Infrastructure Partners II	Goldman Sachs Private Equity Group	7,500*	North America, Europe	US	2008
GS Infrastructure Partners I	Goldman Sachs Private Equity Group	6,500	North America, Europe	US	2007
Macquarie European Infrastructure Fund II	Macquarie Funds Management Group	6,146	Europe, West and East Europe, Scandinavia	Australia	2006
Macquarie Infrastructure Partners	Macquarie Funds Management Group	4,000	US, North America	Australia	2007
Global Infrastructure Partners	Credit Suisse and General Electric	3,500*	Global	US	2007
AIG Highstar Capital III	AIG Global Investment Group	3,000*	US, North America	US	2007
Citigroup Infrastructure Investors	Citigroup Infrastructure Investors	3,000*	US, North America, Europe	US	2007
Morgan Stanley Infrastructure	Morgan Stanley	3,000*	US, North America	US	2007
Alinda Capital Partners I	Alinda Capital Partners	3,000	North America, Europe	US	2007

A * by the fund size indicates a target value. Source: Private Equity Intelligence (Global Infrastructure Partners, GS Infrastructure Partners II and Macquarie European Infrastructure Fund III added by author), data accessed 10/07.

Table 20. Largest buyout funds to date

Fund	Firm	Fund Size ($Mn)	Location focus	GP Location	Vintage
Blackstone Capital Partners V	Blackstone Group	21,700	North America, Europe, Global	US	2005
GS Capital Partners VI	Goldman Sachs Private Equity Group	20,000	Global	US	2007
KKR Fund 2006	Kohlberg Kravis Roberts	16,625	North America, Europe, Asia, Global	US	2006
Carlyle Partners V	Carlyle Group	15,000	US, North America	US	2007
Apollo Investment Fund VII	Apollo Management	15,000	US, North America	US	2007
Texas Pacific Group Partners V	TPG	15,000	US, North America, West Europe, Global	US	2006
Permira IV	Permira	14,830	North America, Europe, Asia	UK	2006
Apax Europe VII	Apax Partners	13,360	Europé	UK	2007
Providence Equity Partners VI	Providence Equity Partners	12,000	US, North America, West Europe	US	2007
KKR European Fund III	Kohlberg Kravis Roberts	10,688	Europé	US	2007

Source: Private Equity Intelligence, data accessed 10/07.

Table 21. Largest real estate funds to date

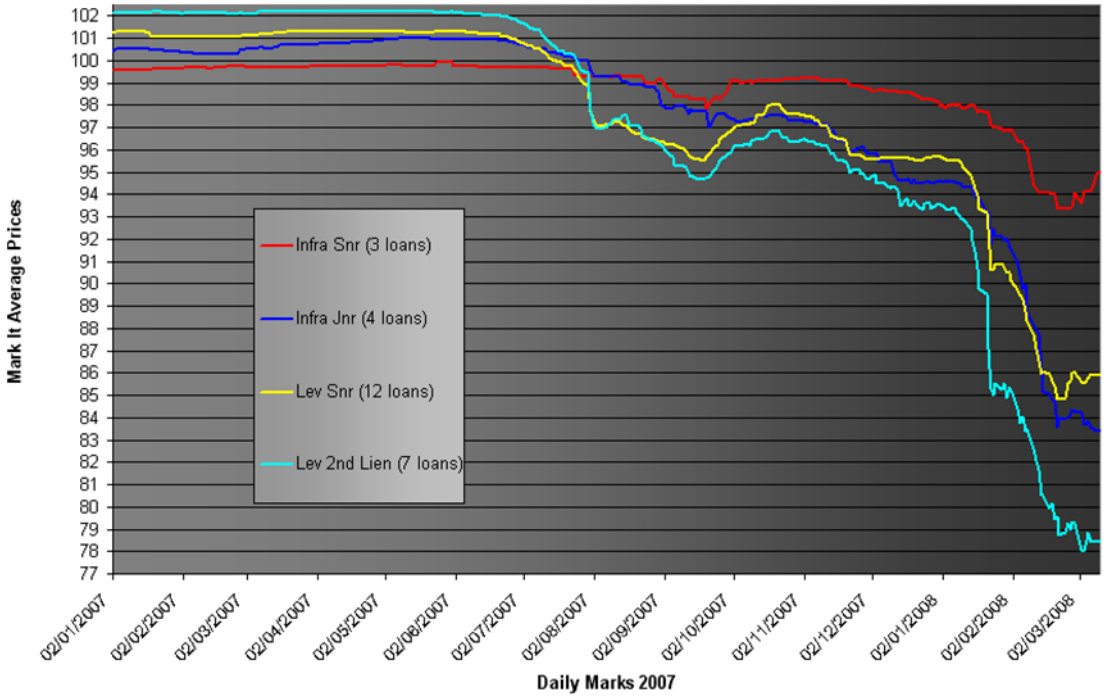
Fund	Firm	Fund Size ($Mn)	Location Focus	GP Location	Vintage
Blackstone Real Estate Partners VI	Blackstone Real Estate Group	10,000*	US, Global	US	2007
Morgan Stanley Real Estate Fund VI Intl	Morgan Stanley Real Estate	8,000	China, India, Japan, West Europe, Asia	US	2006
Blackstone Real Estate Partners V	Blackstone Real Estate Group	5,250	US, Global	US	2006
Lone Star Fund V	Lone Star Funds	5,000		US	2005
Lone Star Fund IV	Lone Star Funds	4,200	Japan, South Korea, US, North America, Europe, Asia, Global	US	2001
Morgan Stanley Real Estate Fund V Intl	Morgan Stanley Real Estate	4,200	China, Japan, West Europe, Asia	US	2006
Whitehall Street Global Real Estate 2007	Goldman Sachs / Archon Group	4,007	US, Global	US	2007
Colony Investors VIII	Colony Capital	4,000	North America, Europe, Asia, Pacific Rim, Global	US	2006
Beacon Capital Strategic Partners V	Beacon Capital Partners	4,000	US, North America, West Europe	US	2007
CB Richard Ellis Strategic Partners V	CB Richard Ellis Investors	4,000*	US, North America	US	2007

(A * by the fund size indicates a target value)

Source: Private Equity Intelligence, data accessed 10/07.

Appendix 3: Secondary Trading Prices on Infrastructure and LBO Loans

Figure 9. Secondary trading prices on two types of infrastructure and LBO loans



Source: Dresdner Kleinwort

Appendix 4: Presentation of Macquarie Bank and Macquarie European Infrastructure Fund

Macquarie Bank was established in Australia in 1969. Macquarie Bank and its 31 infrastructure funds is the world's biggest private owner of infrastructure assets, including Thames Water in the UK, airports in Sydney and Copenhagen, toll roads in the US, Canada and Japan, and the transport asset Arlanda Express in Sweden. Macquarie has assets under management totalling more than EUR 142 billion, where more than half are infrastructure investments (FT, 16/10/2007).

One of Macquarie's unlisted funds is the Macquarie European Infrastructure Fund (MEIF). The fund has invested a stake of between 10 and 100% in 13 infrastructure assets (which are listed right below), including A-train, the operator of Arlanda Express. MEIF is a fund designed for professional investors and focuses on investments in infrastructure and related assets with the following asset characteristics:

- Located in European OECD countries
- Provide essential services to the community
- Have a strategic competitive advantage
- Provide sustainable and predictable cashflows

The fund was established in April 2004 and targeted pensions funds and other institutional investors. MEIF announced its final close in July 2005, well oversubscribed after reaching its cap of GBP 1.5 billion in investor commitments. The institutional investors included Stichting Pensioenfonds ABP of the Netherlands, Generali, Italy's largest insurer, Oslo Pensjonsforsikring, Norway's largest municipal pension plan, Dexia Credit Local of France and Caisse de dépôt et placement du Québec of Canada.

MEIF has invested in the following assets:

- **Arlanda Express (100% interest)** - the high-speed, dedicated rail link between Stockholm's main international and domestic airport at Arlanda and Stockholm Central Station. The acquisition was completed in January 2004 for USD 76 million (SEK 450 million).

- **Wales & West Utilities (31% interest) -** a regulated gas distribution network located in Wales and the South West of England. The acquisition was announced in August 2004 and completed in June 2005 for GBP 1.2 billion.

- **Brussels Airport (10% interest) -** Belgium's largest airport in both passengers and size. The acquisition was announced in November and completed in December 2004.

- **Energy Power Resources Ltd (UK) (100% interest) -** the UK's largest portfolio of biomass fuelled renewable energy assets with total electricity capacity of 122 megawatts. It was acquired in March 2005 for GBP 184 million.

- **Energy Power Resources Ltd (Europe) (100% interest) -** a portfolio of generation assets across six wind farms in France and Sweden, acquired in June 2005.

- **NRE Holdings (49% interest) -** a gas and electricity distribution network in the Netherlands. The EUR 80 million acquisition was announced in June 2005 and completion conditional on Dutch Government approval.

- **Wightlink (100% interest) -** the leading operator of vehicle and passenger ferry services between the UK mainland and the Isle of Wight, acquired in June 2005.

- **Autoroutes Paris-Rhin-Rhône (APRR) -** a French motorway network, in partnership with the Macquarie Infrastructure Group and Eiffage SA.

- **Bristol Airport (50% interest) -** the dominant airport in South West England.

- **Thames Water (12% interest)** – Thames Water Utilities is the UK's largest water and wastewater services company with over 4,000 employees.

- **CLP Envirogas (100% interest)** – a portfolio of 24 landfill gas power generating facilities across England, Wales and Scotland. Equity invested EUR 56.7 million.

- **Obragas Net (49% interest)** – Gas distribution networks in the Netherlands. Acquired together with the municipality of Eindhoven, the fifth largest city in the Netherlands.

- **Netbeheer Haarlemmermeer (49% interest) -** Gas distribution networks in the Netherlands. Acquired together with the municipality of Eindhoven.

Appendix 5: DCF Valuation of Arlanda Express

Table 21. Cash flow assumptions for Arlanda Express

		Forward estimates					Terminal year
Fiscal year	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
In SEK millions							
Net sales	359	394	433	475	520	569	586
Net sales function of:							
Market share	17.8%	18.5%	19.2%	19.8%	20.5%	21.2%	21.2%
Growth of Arlanda airport		3.8%	3.8%	3.8%	3.8%	3.8%	1.0%
Increase of ticket prices		2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Op. costs and capex (70% of net sales)	-310	-276	-303	-332	-364	-398	-410
Tax effect (28%)		-33	-36	-40	-44	-48	-49
Tax adjusted ebit	49	85	94	103	112	123	127
Depreciation and amort.	39	39	39	39	39	39	39
Unlevered FCF	**88**	**124**	**132**	**141**	**151**	**161**	**165**
Discount rate (WACC)		4.52%	4.52%	4.52%	4.52%	4.52%	4.52%
Sum of PV of FCF		3,637					
Terminal value as % of total value		83%					

Notes: It has been assumed that the level of working capital is unaffected by higher revenues. This is a rather conservative assumption as the business requires very little working capital, or negative working capital, since the customers pay in cash. Depreciation and amortization have been allocated straight over the concession period.

Net debt is for this case defined as short and long term debt minus excess cash and cash equivalents. Assumed that all cash is excess. Assumed that the company currently has a debt for non-paid interests to the Swedish state of approximately SEK 170.9 million which is deducted when the fair value is calculated. Assumed that the present value of this debt is 143 millions through the calculations.

Table 22. WACC worksheet

Discount rate (WACC) worksheet	
Acquisition price and shareholder loans	580
Debt 2003A	2,239
Cash 2003A	-138
"Market enterprise value"	**2,682**
E/(D+E)	22%
D/(D+E)	78%
Cost of debt (loan from State)	3.85%
Cost of debt (other loans)	6.50%
Cost of debt (average)	5.32%
Marginal tax rate	28.00%
Cost of equity=rf+beta(Rm-Rf)	**7.05%**
Risk free rate: Rf	4.80%
Unlevered beta (approx. as calculated in 5.3)	0.5
Risk premium (Rm-Rf)	4.50%
WACC=E/(D+E) * Re + D/(D+E) * Rd(1-T)	**4.52%**

Table 23. DCF valuation per 31/12/2003

Intrinsic ("fair") value calculation	
EV (equity value + net debt)	**3,637**
Debt	-2,239
Loan to State	-143
Cash	138
Net debt	-2,245
Equity value	**1,393**

Table 24. Sensitivity analysis

Sensitivity analysis		
	Change in equity value	**New equity value**
Ticket prices +0.5% (percentage units)	19%	1,663
Ticket prices -0.5%	-17%	1,151
Operating costs +10%	-49%	704
Operating costs -10%	49%	2,081
Airport passenger growth +1%	41%	1,968
Airport passenger growth -1%	-33%	934
Market share +1%	10%	1,533
Market share -1%	-10%	1,252
WACC +1%	-38%	864
WACC -1%	48%	2,060

Appendix 6: Checklist for Investors in Infrastructure Funds

- What is unique or special about the partnership's ability to generate returns? Do the GPs have skills that are not easily replicable by other funds?
- Do the GPs have the management, operating, and industry expertise to truly help build the business of their portfolio companies?
- Do the GPs have the contacts and network to be able to generate proprietary deal-flow? Do they have a record of co-investing with top-tier, international funds?
- What is the track record of the GPs? More importantly, how much of their past performance is due to riding a bubble, versus creating real companies?
- *Additional question for infrastructure funds: Do the GPs have a grasp of political issues?*

Source: Strömberg (2004) and developed by author.