



Should Taft-Hartley plans invest in roads, waste-water plants and airports?

A Review of Trends in Infrastructure Investment

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Since the deregulation movement of the 1980s, private interest in infrastructure investment has grown. In the last several years, attention in the US has been elevated by headline public-private deals such as the \$1.83 billion, 99-year concession to operate the Chicago Skyway in 2004 and the \$3.85 billion, 75-year concession for the Indiana Toll Road in 2005. In the first half of 2007 alone some \$18 billion has been invested in infrastructure funds with a total \$37 billion expected for the year.¹ This followed some \$68.1 billion in private deals signed during January 2005 and February 2007.²

Economic growth, demographic shifts, technological developments and the need to repair and maintain existing facilities assure stable demand for infrastructure projects. In the US, the failure of the levee system in New Orleans during Hurricane Katrina and the recent collapse of the 35W bridge in Minneapolis are sobering reminders of the costs associated with deferred repairs. The American Society of Civil Engineers projected in 2005 that the US would need to invest \$1.6 trillion before 2010 just to bring the nation's infrastructure into "a good condition".³ Globally, the International Energy Agency, an affiliated organization of the OECD, has projected the world will need to spend an additional \$20 trillion through 2030 to maintain and expand energy supplies alone.⁴ It is not outrageous to expect that infrastructure investment will continue to grow.

What is infrastructure?

As a class, "infrastructure" covers an amalgam of functional assets. Most can be characterized as physical structures or facilities which provide essential services for public use and which are subject to strict government regulation due to high barriers to entry. Generally spoken, infrastructure assets can be classified into four broad areas:

- Transportation – bridges, tunnels, toll roads, railroads, mass transit systems, airports, seaports, ferries, parking facilities
- Communication – radio/TV broadcast towers, wireless towers, cable networks, satellite networks
- Energy and utilities – electricity generation and transmission, oil and gas pipelines, electricity and gas distribution, oil and gas storage, water distribution, water treatment, wastewater collection and processing
- Social Infrastructure – schools, hospitals, prisons, courthouses

¹ Arleen Jacobius, "Infrastructure securities could be getting place at table," Pensions and Investments, July 23, 2007.

² Of these, \$33.8 billion were new projects and \$25.1 billion were acquisitions or privatizations. According to Infrastructure Journal, cited in Urban Land Institute and Ernst & Young, "Infrastructure 2007: A Global Perspective," 2007, 52. Accessed at: [http://www.ey.com/Global/assets.nsf/International/Industry_Real_Estate_ULI_Report/\\$file/Industry_Real_Estate_ULIReport.pdf](http://www.ey.com/Global/assets.nsf/International/Industry_Real_Estate_ULI_Report/$file/Industry_Real_Estate_ULIReport.pdf).

³ American Society of Civil Engineers, "Report Card for America's Infrastructure," 2005.

⁴ International Energy Agency, "World Energy Outlook 2006", 2006.

Unifying these assets are several characteristics which are shared in common to greater or lesser degree:

- *High barriers to entry.* Whether due to high initial capital costs, physical characteristics or regulatory factors, most infrastructure projects are either “quasi” or bona fide monopolies. Costs of replicating the service are typically prohibitive – a sole provider is typically designated to serve an entire community.⁵
- *Provide an essential public service.* Often being large facilities providing services essential for economic functions, most infrastructure projects are squarely in the public eye. Sensitivity to service failure or price manipulation on the part of consumers means that most facilities are strictly regulated.
- *Regulated industry.* Strict government regulation, while incurring costs for operators, can also provide substantial benefits in the form of assured long-term contracts and reduced financing costs. (Cost risks are generally mitigated through long-term contracts which cover initial construction costs as well as operation and maintenance.) In the US, tax breaks and private activity bonds issued by municipal governments to support infrastructure projects may also reduce financing costs beyond other market factors.⁶ While returns may be contractually fixed, they are also generally stable.

Public ownership of infrastructure facilities varies widely by country. Where many infrastructure assets in the US are held in private hands, schools, roadways, airports and rapid transit systems remain in the public domain. (According to the Bureau of Economic Analysis, some 53 percent of infrastructure assets in the US are privately-held.) In Canada, the UK, Australia and Western Europe where governments own a greater percentage of facilities there is greater reliance on public-private partnerships (PPPs) to provide facility management. PPPs are also gaining broader acceptance in Japan, South Korea and various emerging markets as an alternative to privatization.

Rewards from infrastructure assets

Risks and rewards associated with infrastructure investments vary substantially by project and sector. For example, investing in a public utility is analogous to a fixed income investment with the upside of having a degree of inflation protection. Investing in an airport is akin to investing in an operating company. Investing in mature assets under privatization arrangements is similar to a private equity play, with focus on refinancing and restructuring to generate capital gains. Greenfield investments tend to have risks and returns similar to equities. For these and other reasons, pigeon-holing infrastructure assets into an existing asset category is fraught with difficulty.

Greenfield vs. brownfield projects

There are substantial differences in the risks and returns associated with greenfield and brownfield investments. In general, while greenfield investments have significantly higher returns, they also come with sizable capital, construction and usage risks.

- *Greenfield investment.* Beyond overrun costs and other unforeseen construction problems, greenfield investments are typically large projects – often with upfront expenses in the hundreds of millions of dollars. Investments that are highly levered can incur substantial interest rate risks, as construction loans are typically offered at higher rates. Most importantly, as demand is not established for the facility, there is a possibility forecast demand may not match actual usage. Relatively few companies operate in this space in developed markets, given that most infrastructure needs are already served. (Investments in developing markets have substantial potential gains but also carry additional risks.)
- *Brownfield investment.* Brownfield investments can be of two forms. The first is the privatization of a mature asset by a government agency. Fund investors in these assets generally, but not always, seek to improve management and financing with the intent of later resale. The second is the purchase of rights to an asset on the secondary

⁵ The level of competition can vary substantially. Competition is intense in electricity generation in the US but nearly all water projects are uncontested monopolies. Virtually all infrastructure investments, regardless of competition level, are regulated out of public concern over the stability of service.

⁶ Private activity bonds are tax-exempt bonds issued by municipal or state governments for funding projects with private returns.

market from an existing private entity – by far the most common market transaction. Brownfield investments have the benefit of established demand characteristics, eliminating much of the uncertainty about facility use.

Of these investment types, abnormal returns (15 to 20 percent) can generally only be found in privatization and greenfield deals. (Of these, only a small percentage of privatization investments yield abnormal returns.) Normal returns (low single-digits to low double digits) are characteristic of the vast majority of brownfield deals.

The following are a list of common project rewards:

Business-cycle hedge. As many projects provide essential services to a community, demand does not fluctuate much with the business cycle. (Technically speaking, demand is inelastic and does not change much with change in economic circumstance or price.) This hedge contributes to return stability.

Long duration. Infrastructure investments, as long-term investments, generally providing stable returns as long as demographic factors remain favorable and competing assets are restricted by market entry barriers. (Either by market-based factors or regulatory restrictions.) As previously mentioned, most cost risks are mitigated through long-term contracts which cover initial construction costs as well as operation and maintenance. Since contracts are often with government agencies and output is purchased by government or by a large number of end users with relatively stable usage patterns, returns are typically consistent over the life of the asset. The long life of the asset and return stability tend to minimize downside risks otherwise associated with large capital investments. Low risk of assets being outmoded by new technology also preserves long-term asset value.

Inflation-hedge. As user fees are generally negotiated to adjust with inflation (per concession agreements) income is hedged against this risk. Rate increases are typically tied to the consumer price index, growth in per capita GDP or a comparable established growth measure.

Steady cash flow. Most privately-funded infrastructure projects are supported by user fees which are collected at time of use. This makes cash flow available on a continuous basis with a high degree of reliability. Fee rate stability (under concession agreements) and steady demand also contribute to revenue consistency.

High leverage capacity. Because underlying assets are long-lived, have stable cash flows and are backed by government contracts, most infrastructure assets can readily be used as collateral. Most are consequently leveraged at 4:1 debt-to-equity ratios or higher, often with fixed interest rates. Given the predictability of returns, some cash flows may also be repackaged into securities which can be sold without transferring the underlying asset itself. Given these factors, nearly all infrastructure debt is listed at investment grade.

Low operating risk. Given a stable market environment and relatively low operating costs, the risk of an investment losing its value is small. (Operating costs range between 5 to 10 percent for large PPPs and 20 to 40 percent for airport concession contracts.)

Low correlation to other asset classes. With relatively stable cash flows, returns from infrastructure investments typically have a low correlation to asset classes commonly affected by economic fluctuations, such as stocks and bonds. This increases the attractiveness of holding a portion of infrastructure investments in a diversified portfolio.

Established exit strategies. With the heightened degree of interest shown in infrastructure investments in recent years, secondary markets for infrastructure assets have grown substantially. The most readily available exit strategies for asset holders include: sale to a strategic investor, sale to a publicly-listed fund, sale to an institutional investor or initial public offering.

Risks associated with infrastructure assets

While the benefits listed above paint an attractive picture, there are also tangible risks associated with infrastructure investment. Changes in demographics, regulatory requirements or other operational factors could significantly impact investment returns. A list of some risks relevant to infrastructure assets, beyond the general economic and market risks held in common with other assets, are listed on the following page.

High initial investment. As large capital projects, nearly all infrastructure investments require large, upfront lump-sum payments with returns realized over a long time frame. Costs of providing the initial investment and potential changes in conditions over time (some of which are outlined below) can incur substantial risks for managing firms.

Concentration risk. As infrastructure investments are large, most unlisted funds only typically seek to invest in 10 to 20 deals. (Some more or less, depending on the fund.) This concentration exposes funds to geographic and concentration risks not found in more liquid assets such as equities or bonds.

Regulatory risk. As most infrastructure assets are heavily regulated there is always the possibility a change in regulation could increase project costs. Changes in environmental standards in developed countries or inconsistent regulation in emerging markets could involve substantial expenses. The long-term nature of these investments increases the possibility that regulations may change unfavorably over time.

Sovereign risk. Although generally not applicable to OECD markets, risks from political factors in emerging markets may be substantial. Lack of contractual frameworks and well-defined concession laws may interfere with successful project management. Nationalization or the regime change may challenge ownership rights. Corruption, graft or lack of regulatory transparency may impede operations. Risks associated with currency fluctuation and lower GDP growth may adversely affect project profitability.

Competitive risk. For greenfield toll roads in particular, as some projects run in close parallel to existing public highways, the possibility exists that system use may not meet initial forecasts. A high profile example is the Cross City Tunnel in Sydney. Traffic flows turned out to be one-third of original estimates due to high tolls and available alternative routes, leading the concession holder into bankruptcy.⁷ Also, unless strict covenants are included prohibiting competing projects, it is possible governments may permit construction of adjacent facilities over time, particularly with demographic changes.

Demographic risk. As economic conditions change populations may move to different locations, reducing use of existing facilities. These changes can reduce returns from these assets. (Although demographic changes could conversely also increase use if people move into a location.)

Construction risk. Risks associated with new projects, such as cost overruns, contractor financial failure or plan modifications, can be substantial.⁸ (Substantiating the higher risk premiums for greenfield investments.)

Inflation/interest rate risk. Most infrastructure projects are funded with instruments that have fixed interest rates. If financial structuring, however, includes floating rate debt, costs associated with changes in interest rates for highly-levered projects could be substantial.

Regardless of these factors, general economic and market risk can be substantial. While demand for many projects is inelastic, it is not completely insensitive to market change. Economic downturns can reduce transportation, communication and utility use as customers reduce their use of facilities and purchase fewer goods. These risks are important to bear in mind before investing in infrastructure assets.

Infrastructure investment as an emerging market in the US?

Following the Chicago Skyway and Indiana Toll Road deals, speculation has focused on whether PPP arrangements will expand into the remaining 47 percent of public assets in the US. Questions about the service benefits of PPPs relative to politician's interests to "sell the farm" abound. The fact that the winners of the Chicago Skyway and Indiana Toll Road concessions were both foreign only adds fuel to the fire.

⁷The Cross City Tunnel in Sydney was completed for A\$900 million in 2005. In December 2006 the company which built and operated the concession went into receivership due to limited traffic. Service remained in doubt until an alternate buyer was found for the tunnel in June 2007.

⁸ Cost overruns for the South Bay Expressway in San Diego increased project costs from \$400 million to \$700 million, raising question if the soon-to-be-opened 35-year concession will be profitable.

By definition, a PPP is a partnership between the public and private sectors to provide a product or service traditionally provided solely by government. Within these partnerships private investors typically contract to collect user fees over a fixed period while government retains rights of ownership. Deal sizes range from small contracts to maintain street lights to concessions permitting operation of toll road systems worth tens of billions of dollars.

Contemporary interest in PPPs followed the construction of private toll tunnels in Hong Kong in the 1970s and investment in private prisons in the US in the early 1980s.⁹ The deregulation movement of the 1980s provided philosophical rationale for broader transfer of “public” assets to private interests to improve service efficiency, reduce public expenditures and force users to pay more for the services they enjoyed. By the late 1990s public-private arrangements had become established policy in the UK, Australia, Canada and parts of Western Europe. The Private Finance Initiative (PFI) initiated in the UK in 1992 institutionalized PPP arrangements as a national policy directive. Between 1992 and July 2007 PFI deals worth a combined value of £54 billion had been signed in the UK under both Labour and Conservative governments, accounting for some 10 to 15 percent of annual infrastructure investment. Evolving acceptance of deregulation philosophies, successful implementation of initial projects and budgetary demands in other areas such as education, health care and retirement have encouraged other countries to take a closer look at PPP options. Today, PPP arrangements in various forms have been adopted in most OECD countries and emerging markets are increasingly looking to private investors to fund greenfield highways, electricity plants and water projects.

One notable exception is the US, where public-private deals are still testing market waters. Although a large number of infrastructure industries are already private or semi-private (including rail service, air travel, energy, communications, port services and health care) there are relatively few PPPs in sectors such as roads, schools or airport management, sectors with mature PPP arrangements in other OECD countries. This has led some to suggest that the US may be an emerging market for PPPs in these areas. Within recent years twenty-eight states have passed legislation permitting states and municipalities to establish public-private deals. Recent studies, such as the ASCE’s “Report Card for America’s Infrastructure”, have cast a bald spotlight on the decaying state of American infrastructure.¹⁰ (The ASCE gave American infrastructure a “D” grade.) The condition of road and water systems following the rupturing of a steam pipe in downtown Manhattan in July 2007 and the collapse of the 35W bridge in Minneapolis has received directed attention. In early August legislation to establish a blue-ribbon commission to investigate infrastructure problems passed the Senate with limited opposition. (As of August 15, 2007 the House was still considering the bill.) Whether these pressures will lead to greater reliance on PPP arrangements remains to be seen.

Market opportunities

There is little question that infrastructure needs are prevalent the world over. While “gee whizz” statistics on infrastructure deficiencies provide compelling marketing material, the reality of market conditions is conspicuously more nuanced. While recent inflows into funds raise concerns that infrastructure asset prices may be reaching “bubble” levels and may eventually need to decline, there is no doubt that underfunding more generally characterizes infrastructure investment.¹¹

A few compelling market numbers

- In the US, federal infrastructure spending has declined substantially relative to state and local governments. In the mid-1960s during the highway construction boom infrastructure spending was 10 percent of non-defense spending. By 2006 that share had fallen to 3.5 percent. Where the federal government spent nearly as much as state and local governments on infrastructure in the 1970s by 2006 the federal government only spent roughly one-third that of state and local authorities. Increased health care, education and other expenses for state and local governments will continue to constrict funding for infrastructure improvements. This will likely increase pressures to use PPP arrangements for state and local government projects.

⁹ The paradigm of private interests investing in projects with broad public use is not new. The first known PPP was established in France in 1853 when Compagnie Générale des Eaux (CGE) was contracted to supply water to the city of Lyons under a 50-year deal. Later in 1867 the company was contracted to clear manure and refuse from the streets of Nantes, likely constituting one of the world’s first recycling contracts. (Confederation of British Industry, “Going global: the world of public private partnerships,” July 2007. Accessed at <http://www.cbi.org.uk/pdf/goingglobal0707.pdf>.)

¹⁰ American Society of Civil Engineers, “Report Card for America’s Infrastructure,” 2005.

¹¹ Mike Clowes, “More bubbles that could spell trouble,” Investment News, May 29, 2007.

- For US highways, lane miles in the US have only increased 5 percent since 1980 even though vehicle-miles traveled have increased nearly 100 percent.¹² As a result, Americans now annually spend 3.5 billion hours in traffic per year at a cost of \$63.2 billion in wasted time and fuel.¹³ The Federal Highway Administration estimates that \$141.1 billion will be needed annually over the next 20 years to repair deficient roads and bridges.¹⁴ Because the 18.3 cent federal gasoline tax which funds the Highway Trust Fund (providing most federal block grants for road construction) has been fixed since 1993 and highway repair costs have risen 70 percent since 1993, the Fund is forecasted to run a deficit of \$4 billion in 2009. To increase private investment, the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users Act of 2005 (SAFETEA-LU for short) included provisions expanding use of private activity bonds, additional flexibility to use tolls for infrastructure improvements, established provisions for 3 large trial PPPs and expanded previously established loan programs encouraging public-private projects. Twenty-three states are currently planning new toll roads, including seven states which do not currently have any toll roads, largely due to shortfalls in traditional funding. A number of these are likely to be PPPs.
- For US water systems, most water pipelines in the US were laid down in the 1890s or during the suburban expansion of 1920-1950. Given the technologies used, the useful lives for all of these pipes will be coming to an end within the next 20-40 years. The Environmental Protection Agency estimates that \$270 billion will be necessary to repair drinking water systems and \$263 billion will be necessary to repair wastewater systems through 2019.¹⁵ In FY2005 Congress actually cut wastewater funding through the Clean Water Act State Revolving Fund from \$1.3 billion to \$1.1 billion. As most water systems are owned by municipalities, analysts believe private investment may be essential for system upgrades.
- For US electricity markets, from 1955 to 1985 investment in the US transmission grid closely tracked or exceeded growth in electricity sales. Between 1985 and 2000, though, investment increased at only one-third to one-half the growth rate of electricity sales.¹⁶ Passage of the Energy Policy Act of 1992 separating pricing schemes for electricity generation and transmission permitted establishment of “wholesale” pricing for generation and encouraged growth of competitive markets. The Energy Policy Act of 2005 further extended these private investment opportunities without directly addressing transmission concerns. While investment in transmission has picked up in recent years, there is still need for new capacity.¹⁷ Recent interest in renewable energy has increased investment in these technologies, leading a number of states have instituted legislation establishing renewable energy targets. The North American Electric Reliability Corporation estimates that electricity demand will increase by 19 percent in the US and 13 percent in Canada over the next 10 years, even though committed resources will only provide an additional 6 percent of capacity in the US and 9 percent in Canada.¹⁸
- In addition to the 28 states which have passed enabling legislation for PPPs, a number of Canadian provinces have passed legislation encouraging PPPs in transport and social infrastructure. British Columbia, Ontario and Quebec particularly have been at the forefront of this legislation. Some twenty new projects have been announced in these three provinces alone in the last two years.
- Between January 2004 and September 2006 some \$250 billion in infrastructure transactions were completed in the US and Canada alone, including acquisitions, mergers, PPPs and privatizations.¹⁹
- There were an estimated \$120 billion in PPP deals in Europe between January 1994 and September 2005.²⁰ (Some two-thirds of those deals were in the UK.) With the €14.8 billion concession of ASF, APRR and Sanef tollways in France in 2005, some three-fourths of France’s 7,400 mile motorway system are now operated by private or

¹² US Department of Transportation Bureau of Transportation Statistics, “National Transportation Statistics,” 2006.

¹³ U.S. Congress, House Committee on Transportation and Infrastructure, Views and Estimates of the House Committee on Transportation and Infrastructure for FY 2006, 109th Cong., 2005, available at <http://www.house.gov/transportation/views2006.pdf>.

¹⁴ According to the ASCE 2005 Report Card, some 27 percent of the nation’s 590,750 bridges were structurally deficient or obsolete.

¹⁵ Environmental Protection Agency, “Clean Water and Drinking Water Gap Analysis Report,” September 2002. Figures in 2001 dollars.

¹⁶ Power Finance & Risk, May 29, 2000. The Edison Foundation further estimates that “normalized” transmission capacity (the number of new transmission line miles per unit of demand) has declined by 19 percent between 1992 and 2002.

¹⁷ Between 2000 and 2005 electric companies invested more than \$28 billion in transmission systems. An additional \$31.5 billion is planned for 2006-09. (Edison Electric Institute, “Meeting U.S. Transmission Needs,” July 2005. Accessed at: http://www.eei.org/industry_issues/energy_infrastructure/transmission/meeting_trans_needs.pdf.)

¹⁸ North American Electric Reliability Council, “2006 Long-Term Reliability Assessment: The Reliability of the Bulk Power Systems in North America”, October 2006, 6.

¹⁹ Figures taken from various online database.

²⁰ PriceWaterhouseCoopers, “Delivering the PPP Promise: A Review of PPP Issues and Activity,” November 2005, 8.

semiprivate entities. Substantial investment in new toll roads is continuing in the UK, Spain, Italy, Hungary and Poland. For the future, the EU's Trans-European Networks program to expand rail, airport and port systems is expected to require an investment of €550 billion by 2020, including €110 billion provisioned for private sector investment. As EU member countries open their gas and electricity markets to competition (as mandated by an EU ruling effective July 1, 2007) industry mergers can be expected to increase sales of non-core assets. Adoption of the Kyoto Treaty has increased interest in renewable energy projects in Europe, particularly in wind power.²¹ In the UK, the Treasury projects the PFI pipeline for 2006-2011 to include roughly 200 projects worth £26 billion.²² Enabling legislation for PPPs exists in nearly all EU countries.

- Secondary markets for infrastructure assets continue to deepen. The sale of concession rights to the ASF, APRR and Sanef tollways attracted 19 bidders. Purchase of listed companies ABP Ports and BAA Plc by Goldman Sachs and Ferrovial and Macquarie's purchase of unlisted Global Tower Partners from the Blackstone Group suggest strength in other private deals. Most recently, the Ontario Teachers' Pension Fund purchased ports in Vancouver, New York and New Jersey for \$2.35 billion (August 6, 2007) and Trinergy Wind Portfolio was purchased by International Power PLC for \$1.2 billion (August 6, 2007).
- In Australia, some A\$30 billion of infrastructure assets are held by publicly traded investments funds alone. Privately-operated assets include roads, railways, airports, hospitals and schools. An additional A\$100 billion in overall investment is scheduled for 2006-2010.
- In Japan, changes in the law in 2001 allowing the central government to sign contracts longer than 5 years have substantially increased adoption of PPP arrangements since 2001. Ninety-four projects have been launched including contracts in government facilities, health care, waste disposal, leisure, education, serviced accommodation for public sector workers and toll roads.
- Indian planning officials are seeking to increase infrastructure investment from 4.7 percent of GDP in 2006 to 8 percent by 2012. Much of this increase (some \$320 billion) is expected to come from private investors.²³ To facilitate PPP deals, the federal government has enacted tax exemptions, permitted 100 percent foreign equity ownership in selected projects, provided public sector subsidies for projects of up to 20 percent of cost and established a Public-Private Partnership Appraisal Committee within the federal government to review large deals and eliminate red tape. The government has announced plans to offer over 300 airports and airstrips for PPP development. Several toll roads, airport renovations and port projects funded with private capital are expected to be completed soon. Citigroup and the Blackstone Group announced formation of a \$5 billion fund dedicated to investment in Indian PPP projects in February 2007.
- In the Middle East, successful water and wastewater PPPs in Jeddah and Riyadh in Saudi Arabia and in Oman and the United Arab Emirates have increased regional interest in water-related public-private projects. Additional projects are expected.
- The Asian Development Bank estimates that East Asia alone will need \$1 trillion to fund infrastructure construction and maintenance between 2005 and 2010. (The private sector has invested \$190 billion in East Asian infrastructure since 1990.)²⁴

²¹ According to the European Wind Energy Association, wind power capacity increased by 40 percent between 2004 and 2006 alone. (2006 capacity was 48,027 megawatts.) Accessed at: <http://www.ewea.org/index.php?id=11>.

²² HM Treasury, "PFI: Strengthening long-term partnerships," March 2006.

²³ Manmohan Singh, Prime Minister of India, noted that only with business investment in infrastructure could India realize target 10 percent annual GDP growth. (Wall Street Journal News Roundup, "Indian Leader Links Infrastructure Work to 10% Growth Goal," October 9, 2006.)

²⁴ Asian Development Bank, Japan Bank for International Cooperation and the World Bank, "Connecting East Asia: A New Framework for Infrastructure," 2005. Accessed at <http://www.worldbank.org/eap>.

A more nuanced reality

While the figures above are compelling, there are also pitfalls associated with infrastructure investment. A few examples follow.

- One of the major investors in the £14.8 billion London Underground PPP, Metronet, went into receivership in July 2007, throwing system maintenance on the affected lines into question. Even before Metronet's failure, a report to Parliament on the PPP noted that "[O]n the evidence we received, improvements in facilities and performance are not in proportion to the huge sums of money flowing into the PPP."²⁵ Although three firms have shown interest in purchasing the contract, concerns about public costs associated with maintaining current service remain. (Transport for London, regulator for the private London Underground operators, has announced hopes that Parliament will reimburse them for money already spent covering Metronet expenses.)
- In July 2007 the state legislatures of New Jersey and Texas voted to limit or restrict proposed private toll road investments. In Texas in particular, an accepted bid from a foreign partnership (Cintra/Zachary) to build State Highway 121 was rescinded and awarded to a public toll operator, the North Texas Tollway Authority. Major doubts now remain over the future of the Trans-Texas Corridor, New Jersey Turnpike and Garden State Parkway. The development raises questions about the future of private toll concessions in other states. Forecasts by the Urban Land Institute and Ernst & Young in early 2007 that 5 to 10 percent of US highways will be privatized now appear optimistic.²⁶
- PPP markets in the UK, parts of Western Europe, Australia and Canada are largely mature. The UK Treasury in 2006 projected the percentage of total infrastructure investments involved in PPPs will remain between 10 to 15 percent well into the future, a figure it has been at since 2003.²⁷ Maturity in these markets will limit realization of anything except normal returns from investments in these markets.
- The US government does not face the same problems accessing credit markets which encouraged other national governments to rely on PPPs, decreasing the likelihood they will be adopted in the US. The privatization of many infrastructure areas also limits opportunities for new PPP projects. Considering debt as a percentage of GDP, the US government still has substantial borrowing capacity to fund future infrastructure projects. In certain target areas, federal infrastructure funding remains strong. Passage of legislation in 2007 provided \$15.8 billion in annual federal funding for airport investment and security through 2011. (Only 5 out of 510 commercial airports in the US are privately managed.) The Water Quality Investment Act of 2007 provided \$1.5 billion for overflow control grants along with \$14 billion in loan guarantees for local government projects. SAFETEA-LU, the Energy Policy Act of 2005 and other legislation have also provided substantial resources for upgrades and new investments. As long as the federal government retains access to credit markets and is willing to support infrastructure investments, private investment may not be necessary to preserve infrastructure quality.
- The Energy Information Administration at the US Department of Energy estimates that electricity consumption will only grow at an average annual rate of 1.5 percent per year through 2020. (Consumption grew by 4.2 percent, 2.6 percent and 2.3 percent in the 1970s, 1980s and 1990s respectively.) Increased power costs, improvements in conservation and use of energy efficient equipment is limiting need for new investment.²⁸ Following the blackouts in California and the Northeast investment in power generation was substantial. Between 2000 and 2004 annual capacity additions averaged 38 gigawatts, well above previous build patterns. As a result, between 2004 and 2006 additions fell to 16 gigawatts as the market adjusted to its overcapacity. The EIA forecasts that electricity prices will decline from 8.3 cents per kilowatthour in 2006 to 7.7 cents in 2015 (figures in 2005 dollars), providing little incentive for future investment.²⁹
- The substantial sums raised by infrastructure funds will not all find deals providing 15 to 20 percent returns. The sums raised and amounts paid in deals elevate contentions about an infrastructure "bubble". The Ontario

²⁵ House of Commons Transport Committee, "The Performance of the London Underground: Sixth Report of Session 2004-05", March 2005. Accessed at <http://www.publications.parliament.uk/pa/cm200405/cmselect/cmtran/94/94.pdf>

²⁶ Urban Land Institute and Ernst & Young, "Infrastructure 2007: A Global Perspective," 2007, 58.

²⁷ HM Treasury, "PFI: Strengthening long-term partnerships," March 2006.

²⁸ Department of Energy Energy Information Administration, "Annual Energy Outlook", 2007, 9.

²⁹ Department of Energy Energy Information Administration, "Annual Energy Outlook", 2007, 41.

Teachers' Pension Plan ports purchase on August 6 was priced at 22 times 2006 EBITDA, higher than the 18 to 19 times of other recent port deals. Similarly, the City of Chicago originally priced the Skyway deal at \$900 million (below its \$1.83 billion sale price) and the State of Indiana originally priced the Toll Road deal at \$1.8 billion (below its \$3.85 billion price tag). Fundamental concerns exist that funds may be overpaying for assets or may be willing to accept overly liberal risk-to-return profiles for projects in order to meet return targets, increasing the possibility of fund failure.

- The recent nationalizations of investments in Venezuela and Peru exemplify concerns about sovereign risk in emerging markets. Among the more attractive BRIC countries, both China and Russia have sufficient foreign reserves to self-fund projects and are less actively soliciting private investment. PPPs in Brazil are only just beginning to gain acceptance, led by projects in the states of Sao Paulo and Minas Gerais. (There is at present no enabling legislation from the federal government.) Although there are attractive deals available, risks associated with corruption, regulatory requirements, political factors, currency fluctuation and other pitfalls militate against free-wheeling decisions.

Avenues for infrastructure investment

With the rising interest in infrastructure investments there are an increasing number of investment products available, including direct investments, unlisted infrastructure funds, listed infrastructure funds and unlisted infrastructure securities funds.

Most unlisted funds seek returns of 10 to 15 percent net of fees. Investment terms vary from 10 years (typically with 2 to 4 years of extensions) up to unlimited terms. Investment strategies vary widely by sector (among the four listed sectors above) and region (some focus only on OECD countries, some more on emerging markets). Most seek to acquire between 10-20 assets over the life of the fund. Many short-term funds focus on privatization deals, seeking to leverage in-house management and financial acumen to optimize investments. The objective is generally to retool the asset within 4 to 7 years and then resell it to other investors. Longer-term funds maintain flexibility to hold an asset as opposed to largely retooling for resale.

There is no question infrastructure funds are attracting investors. A large number of institutional investors have added infrastructure to their portfolios in the last few years, as witnessed by the oversubscription of most unlisted funds in the last half year. Goldman Sachs closed their GS Infrastructure Partners Fund in December 2006 with more than \$6.5 billion, well over their \$3 billion target. Alinda Infrastructure Fund closed in June 2007 with \$3 billion, higher than the \$1 billion they were seeking. Macquarie raised \$10 billion in two funds in 2006-07 and is likely to open a new fund next year. The flow of investments raises some question as to whether or not enough opportunities exist to accommodate all parties.

Aside from traditional infrastructure funds (of which there are many), three primary indices are tracked by listed index funds. Launched in June 2005, the FTSE Macquarie Global Infrastructure Index tracks 258 stocks. Backwards projections suggest the index would have had a return of 10.4 percent since 2000.³⁰ The UBS Global Infrastructure & Utilities Index includes a group of 85 indices covered 4.6 percent of the global S&P universe. (Making it a fairly imprecise industry measure.) On a ten-year basis returns averaged 12.7 percent with a volatility measure of 18.3 percent. The index had a 0.59 correlation with public equity (MSCI EAFE) and a -0.04 correlation with fixed income (Lehman Global Aggregate).³¹ The S&P Global Infrastructure Index includes 75 listed large-cap companies with an annual average net total return of 25.4 percent since its inception in 2001 and a volatility measure of 12.5 percent.

³⁰ Asieh Mansour and Hope Nadj, "Performance Characteristics of Infrastructure Investments," RREEF Research, August 2007. During 2000-2002 the MGII would have declined by 14 percent. (The FTSE Global All Cap Index declined by 46 percent.)

³¹ Asieh Mansour and Hope Nadj (RREEF Research), "Performance Characteristics of Infrastructure Investments," August 2007.

Conclusion

As an asset class with moderate returns (high single-digit to low double-digits), low correlation to bonds and equities, relative cash flow stability, inflation and business cycle hedges and “hard” characteristics, infrastructure assets are arguably an attractive addition to any portfolio with long-term liabilities. While “abnormal” returns (15 to 20 percent) may be realized in certain funds optimized for privatization deals, moderate returns for a given level of risk are far more likely. With the growing adoption of PPP models around the globe, incidence of high-profile infrastructure failures and hard budget constraints faced by governments, it should be expected that more public infrastructure projects in the US will open to private investment in the future. As these deals are adopted, upfront concessions will likely give way to revenue-sharing arrangements and contracts for lowest-cost operation, putting additional pressure on investor returns. While infrastructure investment will not prove to be the goose that lays the golden egg, the long-term stability of the asset class is undeniably attractive. The question is whether it is preferable, in this case, to be the tortoise or the hare.