The Rise of a Global Infrastructure Market through Relational Investing

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Key words:
infrastructure
institutional investors
geographies of information
investment process
relational investing

abstract

Infrastructure assets around the world are shifting from public to private ownership. This article investigates how institutional investors are investing beyond their traditional financial and geographic borders and are increasingly serving as owners of infrastructure assets. It shows how infrastructure assets have specific geographies of information embedded in their investment returns and discusses the growing interest of institutional investors in investing in the infrastructure landscape. While infrastructure investments are considered globally, opportunities depend on the availability of specialist information in the region of investment. The article demonstrates that the low-risk, geographically varied returns match the diversification objectives of pension fund portfolios. Relational investing is important in implementing strategies for investing in the infrastructure, since the bidding on and ensuing ownership and management of infrastructure assets around the world require a combination of financial, legal, and technical expertise. The article addresses three distinct economic geography literatures: the geography of finance, pension fund research, and emerging debates on "relational geometries."

85(1):75–97. www.economicgeography.org

Acknowledgments

This research was financed by the British Economic and Social Research Council (PTA-030-2003-00773), the Prins Bernhard Cultuurfonds in Amsterdam, a Talent Scholarship from Nuffic and the Dutch Ministry of Education, and a fieldwork grant from Foreign Affairs Canada and the International Council for Canadian Studies. The assistance of various people (especially the institutional investors in Amsterdam and Toronto who prefer to remain anonymous) in facilitating the fieldwork is appreciated. I am grateful for the constructive comments and suggestions on earlier drafts of the article by Gordon Clark, Erik Swyngedouw, Neil Brenner, Collin McDonald, Laura James, and three anonymous referees. Any errors are, of course, mine.

In the summer of 2006, Britain's largest water company Thames Water, serving 13 million customers in London and a large part of the Southeast of England through 31,000 kilometers of water mains and 67,000 kilometers of sewers, was the source of a bidding war by various investment banks, managers of infrastructure funds, and private equity firms. Spurred by institutional investors around the world, the Australian investment bank Macquarie won the battle with an offer of £8 billion ($16 billion), effectively moving the water utility into institutional ownership. Sixteen institutional investors from around the world, including pension funds from Canada, the Netherlands, and Australia, backed the Macquarie bid and are now co-owners of the London water network, and these institutional investors now look to the water network for a return on their investments.

This article focuses on both the creation of infrastructure assets as investment products and the intricacies of the investment process. Infrastructure assets are increasingly becoming financial products owned by financial institutions that capture the value of a place while distributing the risk of ownership globally (Babcock-Lumish and Clark 2008). Although they have a local element, since they are defined as the "hardware" of a city and have certain specificities, global infrastructure equity players are increasingly participating in and producing these local private equity-type assets beyond their local geographies. Precisely because of their unique spatial information, the production of infrastructure assets depends on access to the holders of the necessary geographic information, which is often specific and local. While investors have many decades of experience in investing in foreign companies and real estate, infrastructure assets harness more complex and detailed local information on the long-term political economic framework, the legal regulatory framework, and detailed patronage forecasting for road and airport traffic that relies on growth figures (including the gross domestic product, population growth, and employment forecasts), which are often only locally available. The value of a toll road not only depends on macroeconomic outlooks for the region but is influenced by the social, physical, and political development of the larger urban landscape, with most of this information forecast 30 to 40 years into the future. Access to these local specialists can be gained through managers of infrastructure funds, if investors have outsourced investment and asset management, or, if

in-house infrastructure investments are involved, access is sought directly at the local level with the relevant contractors, operators, traffic forecasters, investment bankers, and lawyers. Institutional investors gain entry to this local geographic information through relationships with the various local financial, legal, and technical specialists. Building on this recent rise in the participation of institutional investors in the ownership of infrastructure assets, a "relational proximity" of actors is replacing traditional assumptions in economic geography that have argued that "spatial proximity" drives spatial and geographic change. Instead, this article demonstrates that actors who are involved in the current spatial changes to the infrastructure landscape are located in various continents and undertake the day-to-day-management from afar. By dissecting investors' participation in the development of the infrastructure landscape, one learns that contacts and track records of institutional investors and specialist managers of infrastructure investment play a vital role, investment options are limited owing to the large amounts of investors' capital that are required to fund acquisitions, and barriers to knowledge are high because experienced asset managers who specialize in infrastructure are scarce.

Although research within the geography of finance subfield of economic geography has grown over the past decade, not many economic geographers have focused on the underlying spatial implications of financial decision making (Clark 2005). The institutional decision-making process surrounding infrastructure is a perfect arena for developing an in-depth look at the spatial effects of investments, especially since institutional investing in infrastructure is driven by investors who seek the specific geographies of information that are embedded in the infrastructure assets returns to diversify their portfolios across asset classes and geographies, in the process spreading risks. Some pension fund researchers, most notably Martin and Minns (1995) and Clark (2000), embraced the notion of institutional investors bringing geography into their financial decision making. They subsequently demonstrated how flows of capital moved around geographically in the early 1990s.

With the rise of infrastructure investing by institutional investors, I focus on the links between multiple actors who make decisions that directly influence the spatial makeup of geographies across the world. I adopt the lens of portfolio managers and research analysts who are responsible for infrastructure equity investments within the investment-management group of a pension fund. Viewing infrastructure investing through their lens is useful for understanding their rationale and effort in obtaining access to the geographies of information that are embedded in the infrastructure asset returns. The holders of this type of information are often local specialists, such as traffic forecasters, engineers, politicians, lawyers, and construction firms. I argue that we learn more about the nature and focus of investment by highlighting how choices are made among investment products that may or may not have certain inherent spatial biases than by assuming an inevitable spatial preference. Not much research has been undertaken through the lens of portfolio managers, analysts, or specialist managers of funds (for some research, see Williams 2001; Babcock-Lumish 2004a); Sidaway and Bryson (2002, 403) remarked: "despite research into money and finance . . . fund managers and analysts have been somewhat neglected . . . a surprising omission." Adding space to this perspective (Bathelt and Glückler 2003) and focusing on economic actors and their actions and interactions (Boggs and Rantisi 2003), the relational lens offers a new dimension to understanding the global infrastructure market. This dimension is especially relevant because power and strategy play a large part in infrastructure investing, since deals are scarce, investors are increasingly plentiful, and local partners are much sought after but often difficult to access. This article diverts relational research away from the firm and the black box of innovation (Gertler 1995, 2003; Grabher 2002; Yeung 2003) and focuses on the actions,

interactions, and dependencies within the investments process (see Babcock-Lumish 2004a). Moreover, studying the microeconomic foundations of decision making enhances our understanding of institutional investors' influence on urban and regional areas (Clark 2000).

In this article, I argue that relational investing is at the heart of the geographies of information that are embedded in the investment returns. Financial modeling plays an important but limited role in seeking geographically varied investment returns, but it cannot fully express idiosyncratic risks that are not readily quantifiable yet are endemic to infrastructure investing. Instead, infrastructure investing is increasingly about investing time and energy in forming relationships, setting up consortia of partners, and investigating political and legal issues.

This article proceeds as follows: in the next section, I discuss relevant theories in the field of the geography of finance and elaborate on the growing body of relational research. In the third section, I discuss the growing appeal of owning infrastructure assets, and in the fourth section, I present the methodological statement. The fifth section includes empirical evidence on day-to-day investment strategies and practices of infrastructure investing. I discuss the role of relationships and power when investing in assets that have unique spatial information through an overview of some of the key findings of more than 18 months of research. Two types of investing and relationships are discussed: direct and indirect fund investments. In the conclusion, I focus on ways to reconceptualize traditional sociospatial relations, since global institutional investors and managers of infrastructure funds are slowly taking over the ownership and management of infrastructures in urban landscapes around the world.

Geographies of Information

The Geography of Finance

Research on money and finance came of age as a subfield of economic geography in the late 1990s (for overviews of the development of this subfield, see Tickell 2000; Pollard 2003). This industry became an interesting research area for economic geography because of the deregulation of traditional financial services and technological change (Tickell 2001). Research has focused largely on analyzing how the larger financial system is spatially restructuring financial centers (see, e.g., Grote, Lo, and Harscharr-Ehrnborg 2002; Leyshon and Thrift 1997; Leyshon 1998; Martin 1999; Pryke 1991, 1994), the spatial patterns of banking (Leyshon 1995; Porteous 1999), interactions between employees in the financial sector (Buenza and Stark 2003; Sassen 1996, 2000), and hierarchies of world cities based on their financial activities (Taylor 1995; Taylor, Walker, and Beaverstock 2002). The role of institutional investors in the infrastructure landscape is expanding and increasingly dominating private-sector investment, especially in urban areas. Geographers, however, have insufficiently considered how finance is actually geographically organized and structured, barely taking notice of the origins, destinations, and structuring of finance (Clark 2005).

Large institutional investors are becoming more dominant in the organization of society and the economy. As a result, some research at the level of pension funds has begun to illuminate how financial globalization truly works. Only a few economic geographers have studied pension funds, especially their spatial structure. Martin and Minns (1995) and Clark (2000) both researched the spatial configuration of the financial industry by tracking the origins and flows of capital within British and European pension funds and how funds move between regions and among fund managers. However, while finance is considered in the broader context of theorizing about changes

in society, the role of geography in financial decision making or the actual spatial implications of such decision making is not often considered. I adopt a "process geography" approach (Olds 2001) to understand how larger global processes are affecting localities in a similar fashion. With heightened participation by institutional investors in the production of a global infrastructure market, institutional investors are increasingly influencing the organization of localities around the world. A traditional "localist" perspective that focuses on local production and path dependence would not sufficiently address my research.

Designing the Geographic Content of a Financial Product

While finance can increasingly trade in and out of geographic jurisdictions, geography nevertheless continues to play an important role. O'Brien (1992) stated that no investor can profit by virtue of his or her location, since an efficient spatially integrated system of markets would be one in which location does not matter.[1] This statement has subsequently been challenged numerous times by academics in the field of economic geography (see, e.g., Tickell 2000; Clark and O'Connor 1998). Some geographers have argued that the extent to which location does not matter depends on the informational content of the financial product in question. Clark and O'Connor's (1998) article on the process of investment management and the underlying determinants of product innovation contended that the importance of location is felt through the creation and administration of information that is related to the design and structure of financial products. It concluded that geography does matter for the production of financial products: an often clear spatial configuration of information is imbedded in the designs of financial products. Rather than geography being a barrier to trading, "geographical differentiation is an opportunity set that offers discrete opportunities for profit" (Clark and O'Connor 1998, 102). Clark and O'Connor argued that geography is a vital ingredient in a global financial firm's portfolio of investment opportunities.

Relational Investing

To tap into the geographic differentiation and a "geography of the rate of return," institutional investors are building relationships and networking across the world so as to harness a full understanding of the geographies of information. While locally diversified returns are sought by institutional investors, investors require sound and reliable information. Initially, the term *relational investing* was coined to define agency problems in venture capital projects. Venture capitalists would often commit to buy and hold significant blocks of a corporation's stocks. The long-term commitment induced relational shareholders (investors) to invest more time and energy in acquiring information about the effectiveness of management that they would use to influence corporate policy (Ayres and Cramton 1994). This form of relational investing has lost its attractiveness because investors spent a lot of time and effort to understand firms' internal structures. Instead, investors now use specialist managers who have the resources both to acquire the information and to manage the day-to-day relationships with corporations to influence corporate policy on behalf of their investor clientele. Infrastructure investing can also be defined as relational investing. Institutional investors spend a lot of time and energy acquiring the information that is needed to make an investment in an infrastructure asset through both extensive investment due diligence and partnering with local

[1] He was not alone; sociologist Castells (1996) argued that with the rise of electronic means, time and space will be annihilated and capital from all origins is merged in, for example, mutual funds, since it is in constant movement.

specialists, such as operators, investment banks, contractors, and lawyers, who have specific local information that is needed to become comfortable with the investment and management metrics of such a long-term investment. In addition, many institutional investors are increasingly using specialist managers who have the resources to acquire the information and manage the day-to-day operations of an infrastructure asset on their behalf. These infrastructure assets embody geographies of information that can be tapped through the creation of relational proximity. A relational lens provides useful insights into the actions and behaviors of institutional players who aim to create unique spatial information. The "relational turn" in economic geography during the late 1990s focused on the ways in which economic actors' sociospatial relations are connected with processes of economic change at various geographic scales (Yeung 2005). Research in economic geography incorporates a relational element, from research within a political economy framework (Brenner 1999, 2001; Harvey 1982; Storper 1997; Swyngedouw 1992, 1997) to actor network theory (Thrift and Olds 1996; Olds and Yeung 1999). Other relational research has reworked important insights from new institutional economics (Williamson 1985).

Recent relational research has focused on investigating the relationships between actors and structures that influence transformations in the spatial organization of economic activities. Some research has argued that the quality of economic ties can be a key determinant of economic prosperity (Bathelt and Glückler 2003; Boggs and Rantisi 2003). Much of the work, however, has been abstract (Allen, Massey, and Cochrane 1998; Massey, Allen, and Sarre 1999; Lee and Wills 1997) and has not focused on describing the evolution and interaction of actual relationships. Yeung (2005) moved relational thinking forward by focusing on the spatial configurations of power relations. Rather than focusing on either structure or agency, he created an analytical focus on power relations between these categories. He made power relations his central focus through the investigation of "relational geometries," demonstrating his thinking through a case study of regional development. I work through the concept of relational geometries for the infrastructure investment process by conceptualizing relational geometries as the power relationships that develop among institutional investors, who hold equity interests; managers of infrastructure funds, who bring financial knowledge and contacts in the field but are tied to certain mandates that have specific rules of engagement with institutional investors who commit capital to their funds; and specialists, such as contractors, operators, and lawyers, who have crucial local knowledge and power. These specialists act as gatekeepers to networks and subsequent geographies of information that are embedded in these relationships and networks. All these actors—institutional investors, managers of infrastructure funds, and specialists like contractors, operators, and lawyers—develop a certain amount of relational complementarity to fulfill their institutional goals. At the same time, their relationships and membership in global networks create causal links to the development of the urban infrastructure. Local public-sector development authorities and contractors are no longer the sole developers and owners of infrastructure actors. Rather, actors worldwide are influencing the development of the urban infrastructure. Hence, global relational geometries are on the rise because of the need of institutional investors to partner with other actors within the rapidly developing and increasingly competitive structures in the infrastructure market. The infrastructure is becoming more and more competitive, with many new investors and fund managers appreciating the investment returns offered by infrastructure assets, and developing relational geometries contain additional levels of power relationships. The relational geometries not only have their own internal distinct spatial configurations but are creating new spatial configurations on the ground with local public owners. The

interactions among economic, spatial, social, and political processes are being reshaped by these developments.

The Evolution of Infrastructure as a Financial Product

Capital has been circulating in search of suitable returns since the technology, media, and telecommunications (TMT) equity bubble burst in the late 1990s, when investors were reminded that net worth on paper is abstract (Babcock-Lumish 2004b). The demand for infrastructure assets started growing in the early years of the twenty-first century, since many of the largest global institutional investors came to appreciate the characteristics and benefits of investing in infrastructure.

The Rise of Infrastructure Assets

Although private ownership of infrastructure networks is not new—many rail and canal networks in the United Kingdom and United States were built by private owners during the nineteenth century—governments have been introducing regulatory mechanisms that support the "splintering" of infrastructure networks (Graham and Marvin 2001). While the early part of the twentieth century saw the ownership and management of private infrastructure assets transfer to the public sector, this splintering resurfaced in the early 1980s when private investors began investing in roads and utilities in Australia. Since the global financial markets are awash with capital seeking a home, traditional equity allocations have been reduced owing to the stock market turbulence of the late 1990s, and institutional investors are expanding into alternative investment opportunities, this splintering is set to rise. A global infrastructure market has started to develop with as much as $500 billion in equity commitments required just to fund "economically sound" (as opposed to unsound or speculative) toll-road projects worldwide (Organization for Economic Cooperation and Development, OECD 2006). The asset-class "infrastructure" has been one of the fastest-growing and most-hyped investment classes since hedge fund investing entered the mainstream. While it took 10 years for infrastructure to develop as an asset class, 2006–2007 saw heightened activity in the field, with 35 percent more infrastructure deals being completed involving $212 billion of capital and 25 infrastructure funds being raised globally by investment banks, insurers, and fund managers.

Infrastructure assets are defined as essential services that a society cannot do without (OECD 1991, 2004, 2006). As an asset class, infrastructure is usually split into (1) transport infrastructure, such as roads, rail tracks, and airports with user fees; (2) regulated infrastructure, such as water-, electricity-, and gas-distribution networks with regulated service contracts with availability fees; and (3) social infrastructure, such as schools and hospitals, for which governments pay an availability fee over a 20- to 30-year term, effectively mortgaging their current payments. Long-term contracts are key, since infrastructure investments have regulated rate settings, service levels, or both (Timms 1995). Rather than use physical characteristics to define the asset class, many institutional investors define infrastructure assets by the nature of the returns: stable, predictable, long term, and low risk. All these developments are spurring higher infrastructure allocations in investors' portfolios and the growth of specialist managers of infrastructure funds (Liem and Timotijevic 2005). Current infrastructure equity allocations within pension funds vary from $5 million to $8 billion. The allocations range from less than 1 percent of the total assets under management up to approximately 15 percent. With the first use of private capital in infrastructure provisions in Australia in the mid-1980s and spreading to Canada in the early 2000s after the TMT bust in 2001–2002, some of the first-mover pension funds recently announced a restructured asset allocation, with a prominent

position for infrastructure.[2] It is no surprise that the leading investment firm in the infrastructure market is an Australian firm, Macquarie Bank, which is set to continue to grow, since more institutional investors, especially in the United States and continental Europe, are now following the Canadian pioneers such as Ontario Teachers' Pension Plan and Ontario Municipal Employees Retirement System and are restructuring asset allocations to include larger commitments to alternative investments and infrastructure. One of the most interesting characteristics for geographers, however, is the fact that infrastructure returns have unique spatial information embedded in their investment returns, and these specific geographies of information are of added value to investors who are looking to diversify their investments across geographies (Clark and O'Connor 1998).

Infrastructure investments offer long-duration, stable, inflation-linked returns, which fit with the asset liability management and expanding liability-driven investment strategies of pension funds. Infrastructure equity is patient capital, seeking returns over a long duration since pension funds' sole fiduciary responsibility is to provide pension benefits to members when they retire. The characteristics of infrastructure returns match institutional investors' liabilities closely (Coggan 2003); they diverge from traditional equities and real estate and serve to reduce overall volatility in the portfolio. Some of the largest institutional investors, such as sovereign wealth funds, are interested in infrastructure purely because infrastructure makes it possible for them to invest large amounts of capital for a long period. These investors, with often $100 billion-plus in assets under management, are generally successful in private equity investing, but since these returns have a short time scale relative to these investor's needs, portfolio managers are forced to place large amounts of capital and engage in risk assessment more frequently than is efficient for their management structure. Infrastructure assets are capital intensive and offer opportunities to invest far larger sums of money than through private equity activities. Moreover, infrastructure investments have predictable underlying cash flows, since patronage on a road or demand for water is relatively stable. Many investors (both pension funds and managers of specialist infrastructure funds) in the infrastructure field take a private equity approach to the investment, however, gearing up assets to increase the returns. Assuming that debt is available at an attractive rate, many in the infrastructure sector leverage their investments with a high level of debt, greatly increasing equity returns but making the investments financially riskier. The rationale for investing in infrastructure is diluted in such a case, since infrastructure assets become less stable and riskier due to the increased financing risk.[3] In general, however, institutional investors are switching more assets to alternative investments, such as infrastructure, timber, and inflation-linked bonds, lowering the dependence on returns from high but risky and volatile equities and aiming to secure the accumulation of lower but real returns.

Geography of Risk

Institutional investors favor infrastructure assets that have a long economic life, stable long-term cash flows, attractive returns on a risk-adjusted basis, and explicit protection

[2] Equities: between 40 percent and 50 percent, fixed income about 20 percent, and alternatives about 30 percent.

[3] Some refer to this rationale for infrastructure pricing as the "Australian finance model," since the Macquarie Bank was the first to value infrastructure assets this way. This model entails a mixture of equity, bank debt, and taxable revenue debt and has become a widespread model in the past five years, with low inflation and real interest rates.

from inflation. Assets that fit these requirements are described in Table 1, with the least risky investments at the top.[4]

Table 1 also displays examples of assets that have been purchased in recent years by various institutional investors. While most institutional investors aim to build a diversified portfolio with multiple types of assets in various countries with different durations, the infrastructure market is now opportunistic, since the supply of assets is still limited. Although some pension funds would like to make specific portfolio allocations on the basis of geography, spreading their capital in Europe, North America, and Australasia, for example, the availability of infrastructure projects is almost entirely dependent on governmental leasing. Assets in North America are still mostly government owned, and the leasing of roads or airports to private investors is not common. Many pension funds have, however, constructed global mandates because geographic diversification is preferred and assets worldwide are expected to see increased participation by private investors in the near future. In addition, the recent relaxation of limits on foreign investments for Canadian institutional investors has made international investments a real option, particularly in the European Union (including Eastern Europe), South America, Asia, and Australia. The U.K. market is considered "deeper and more liquid." Assets in the United Kingdom are priced lower than in other jurisdictions, the regulatory environment is stable, and there is a perceived greater acceptance of foreign ownership.[5] North America and Europe continue to be of greatest interest to largely risk-averse institutional investors, most of whom restrict their investment mandates to OECD-like countries. Recently, a number of airports in Australia, Europe, and the United States have come on the market, and gas networks in Spain are being sold to institutional investors. Meanwhile, the U.S. toll-road market is in its infancy, with many interviewees predicting multiple deals in the next few years. Identifying local partners is critical to gain access to infrastructure investments around the world; infrastructure equity investors are able to invest in infrastructure assets at a distance because of both the globalization of legal services and the building of relationships and networks of partners, specialists, and collegial institutional investor networks, as can be seen in Figure 1.

The barriers to global capital are slowly being removed as capital is increasingly flowing to geographies that welcome their arrival. Institutional investors steer clear of jurisdictions that are hostile to the participation of private investors in the development, ownership, and management of infrastructure. Since Australia and the United Kingdom, for example, offer a transparent legal contract without much political interference (they use independent regulators instead), many global pension funds are attracted to these geographic jurisdictions. Some of the most advanced investors in infrastructure, especially in Canada, argue that it is not so much the location that affects the risks and returns, but how an asset's economics are controlled. Since the demand for infrastructure assets is growing and many institutional investors and infrastructure funds are chasing the same deals, some assets are claimed to be infrastructure but are rather competitive businesses that will not offer stable, predictable returns, for example, power generation plants and

[4] Note that 90 percent of interest is in operating assets owing to the risks involved in greenfields developments, the large amounts of assets coming on the market, and the fact that portfolios cannot take them, since such new construction projects have no income for the first few years. In general, the level of risk may depend on the financial structuring (including the debt-equity mix and hedging policy), construction and development risk (tunnels versus existing roads), the risks of country and exchange rates, and the project's life cycle. Moreover, the level of information arbitration influences the risk profiles.

[5] In contrast, the United States has recently allowed the international ownership of toll roads, such as the Indiana turnpike and the Chicago Skyway, while the heavily publicized controversy over Dubai Ports World evidences resistance to certain foreign ownership.

Table 1

Types of Infrastructure Assets

Type	Risk	Examples	Unlisted Ownership	Equity Stake (Percentage)	Length
Water network	Low–medium	• Water company (United Kingdom, 2003)	MEIF[a]	50.1	10-year fund[b]
		• Water company (United Kingdom, 2006)	MEIF, with 16 other pension funds	Undisclosed	10-year fund
Electricity transmission network	Low–medium	• Electricity transmission (Canada, 2001)	CA pension fund[c] and engineering firm, U.S. operator and Australian bank	100	Undisclosed
		• Electricity transmission (the Netherlands, 2005)	MEIF	49	10-year fund
Gas network	Low–medium	• Gas distribution network (United Kingdom, 2004)	CA pension funds and U.K. energy company	50 each	Undisclosed
		• Gas network (United Kingdom, 2005)	MEIF	31	10-year fund
		• Gas network (the Netherlands, 2005)	MEIF	49	10-year fund
Pipeline (oil)	Low–medium	• Pipe from Canada into the United States	CA pension funds	100	Indefinite
Social infrastructure	Low–medium	• 16 schools and 12 long-term-care facilities (Canada, 2000)	CA pension fund	Undisclosed	Lease for 20 years
		• Schools and hospitals (United Kingdom, 1999)	HSBC secondary fund		10-year fund
		• Parking lots (United States, 2007)	Morgan Stanley	100	10-year fund
Toll road—operating	Low–medium	• Toll bridge (Canada, 1999)	CA pension fund	34	Undisclosed
		• Toll road operator (Australia, 2003)	CA pension fund	10	Indefinite
Airport	Medium	• Airport (Australia, 2001)	MAG	Various	10-year funds
		• Airports (Continental Europe, 2004–2005)	MEIF, MAG		
		• Airport (United Kingdom, 2006)	Canadian and Singaporean pension/sovereign funds and Spanish operator	Various	Indefinite
Port	Medium	• Port (United Kingdom, 2006)	Goldman Sachs and various CA pension funds	Various	10-year fund
		• Port (Canada, 2006)	AIG and various CA pension funds	Various	Indefinite
Broadcast towers	Medium	—	—	—	—
Rail	Medium	• River rail tunnel (Canada and United States)	CA pension fund and railway company	50 each	Undisclosed
		• Airport express train (Continental Europe, 2004)	MEIF	10	10-year fund
District energy network	Medium/High	• Renewable airco system with deep lake water cooling (Canada, 1999)	CA pension fund and city council	+50	Indefinite
Toll road—green	High	—	—	—	—
Communication towers	High	—	—	—	—
Electricity generator	High	• 10 power plants in 6 countries (2005)	CA pension fund and U.S. insurance group	100	Indefinite
		• Nuclear plant (Canada, 2003)	CA pension fund	31.6	Lease
		• Generation assets across six wind farms (France and Sweden, 2005)	MEIF	100	10-year fund
		• Portfolio of biomass fueled renewable energy assets (United Kingdom, 2005)	MEIF	100	10-year fund

Source: Based on interviews, institutional investors' websites, and projectfinancemagazine.com.
[a] This unlisted Macquarie European Infrastructure Fund invests in infrastructure assets in Europe on behalf of international institutional investors from around the world.
[b] This is not the length of the possible concession but the length of the fund. Assets may be listed or sold at the end of the fund's term.
[c] CA = Canadian pension fund.

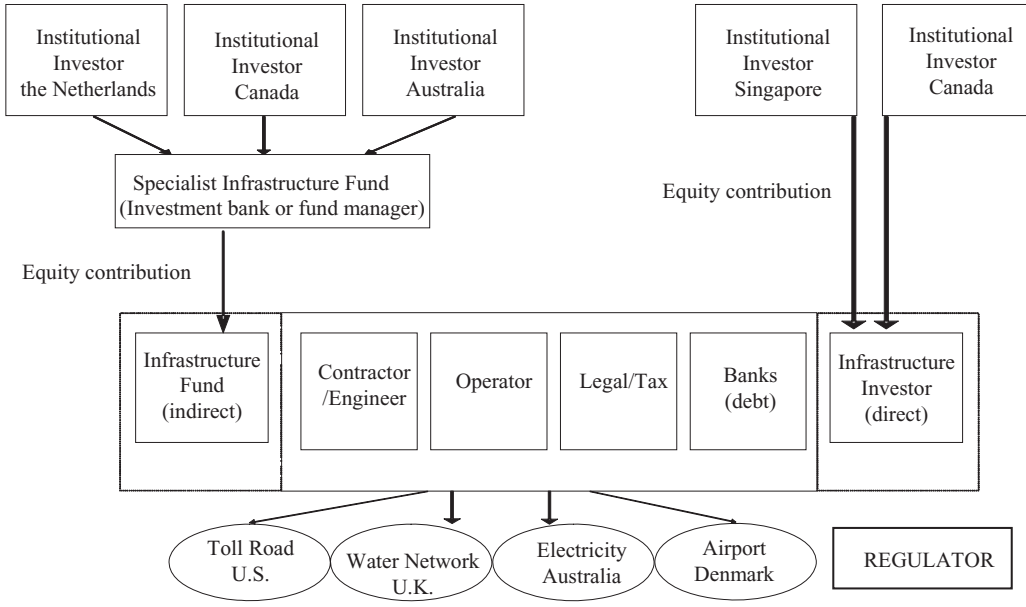

Figure 1. Structure of the industry.

parking garages. In addition, although there has been a first-mover advantage, with returns at the largest Canadian pension funds 20-percent-plus in about 2000, these returns have fallen to 12 to 13 percent, with returns predicted eventually to stabilize at about 6 percent (interview B, vice president of insurance company, Toronto and Oxford, 2005). Risks and rewards change rapidly as experience is gained. For example, the Canadian 407 toll-road transaction in Toronto, auctioned to private investors for C$3.1 billion ($2.05 billion) in 1999 and currently valued at double this price, will never be repeated for this price. At the time, investors considered the dynamic market-pricing system risky and were not sure enough that drivers would use the road as a result of this toll-pricing mechanism (tolls can be increased, depending on usage). The investors adjusted for this risk in their valuation and subsequent offer. Seven years later, the transaction was considered cheap in retrospect, since this road has proven that a dynamic market-pricing system will attract sufficient users. Future bids on toll roads will be higher, and deals will have lower predicted rates of return.

Methodology

The current global players in this rapidly developing infrastructure market are Canadian and Dutch institutional investors, often using Australian financial intermediaries.[6] I conducted a total of 40 interviews in Amsterdam, Toronto, and London between January 2005 and February 2006 with key players in the infrastructure equity field. Employees at 10 key pension funds that are actively investing in infrastructure around the world assisted in this research. The respondents included managers of infrastructure equity portfolios, executive vice presidents, managing directors, and chief executive officers. To unravel the

[6] Australia is the leader in this new market because of the delegation of public infrastructure assets to private investors in the early 1990s, owing to the bankruptcy of the state of Victoria.

dynamics between investors and their partners, I also interviewed specialists in financial intermediaries, such as investment banks, engineers, and operators, who were based in Canada, the United Kingdom, Australia, and the Netherlands.[7] Through these semistructured interviews with key stakeholders in infrastructure investing, I compared quantitative financial modeling to the creation of trust, personal relationships, and legal contracts in the investment decision-making process. While interviewing managers of infrastructure equity portfolios at pension funds, I tried to understand their relationships with other investors, banks, lawyers, and regulators around the world. The interviews lasted about an hour, and key questions revolved around why institutional investors were interested in infrastructure as an asset class and factual questions regarding how they locate, value, and partner on deals. Infrastructure assets are highly sensitive to assumptions in each scenario; one small change in an assumption projected over 40 years can change the price of an asset by, for example, $50 million.

Since the infrastructure equity market is highly secretive and becoming more competitive each day owing to the raising of many more infrastructure funds, accessing interviewees posed a significant challenge. I therefore approached most of the respondents through the network I developed during my 14-week internship in the infrastructure equity group of the investment management group of a Dutch pension fund. This internship facilitated firsthand interaction with professionals who had worked in this field for a relatively long time. During this 14-week period, I undertook participant observation, where I assumed a "relational" position in relation to the object of study (Bradbury and Lichtenstein 2000). By doing research in the midst of daily investment decision making and strategies, I developed a deeper understanding of the limits, opportunities, and tactics that active institutional investors are exposed to daily. However, I also expended a lot of energy on maintaining an independent research objective by trying to understand the rationale for investment decisions within the institutional framework in which I was working. The professionals at the Dutch pension fund introduced me to the gatekeeper of some of the most active and experienced Canadian pension funds in the infrastructure market in Toronto, which was extremely important in gaining access to some of the key global players. The internship and subsequent interviews with key Canadian actors in the global infrastructure market not only introduced me to the actors' financial methods to distill the specific geographies of information in the investment returns but also created an opportunity to learn about the network by being part of it (Yeung 2003).

Money, Relationships, and Power

The French government has always retained a small stake in private companies that operate its many developed and privately owned toll roads. In 2005, however, the French federal government decided to sell its final stakes in three toll-road networks that connected most roads across the country. It sold its remaining 70.2 percent in early 2006, totaling €12 billion ($14.3 billion), to decrease the national debt. While two of the stakes were sold to French and Spanish construction companies, the bid to manage the Autoroutes Paris-Rine-Rhône until 2032 was won by Macquarie Bank, and the stake was placed into both the Macquarie European Infrastructure Fund (MEIF), a private unlisted fund

[7] It is interesting that while U.K. pension funds did not contemplate infrastructure as an asset class, many of the Canadian and Australian investments are in the United Kingdom. Therefore, interviews with the investment banks and intermediaries in the United Kingdom were valuable. The interviews with the Australian respondents were conducted in Toronto, London, and by telephone.

that manages infrastructure equity for various European and North American investors, and Macquarie Infrastructure Group, the world's largest listed infrastructure fund. To win this deal, Macquarie Bank teamed up with the French construction group Eiffage. Since the specifics of infrastructure assets are known only within the local market, investment in information assists an institutional investor to weigh risks and returns (Clark and O'Connor 1998). Increasingly, though, the information acquired is not the only aim of this partnering; local partners are crucial to win a bid in some countries, so local operators, banks, and advisers strategically position themselves as much as the large global specialist funds and direct investors.

Although some institutional investors commit their capital to specialist infrastructure fund managers who are dedicated to acquiring and managing infrastructure products, others actively invest in producing local assets outside their own national contexts by paying local due-diligence specialists for transaction-specific information and traveling around the world to gauge potential assets and partners, all by direct investment. The pension funds' investments are channeled either into direct investments or via specialist managers of infrastructure funds into consortia of operational, legal, technical, and financial partners. These consortia own and develop roads, tunnels, bridges, airports, and utility (electricity, gas, and water) networks around the world (for an overview, see Löwik, Hobbs, and Cam 2005). While most institutional investors commit capital to specialist managers of infrastructure funds, a few large Canadian and Australian pension funds—pioneers in this area and the most active in this space—have developed their own in-house teams.

Figure 2 depicts the various relationships that institutional investors manage when adopting such a direct investment approach. The direct approach has its own opportunities, challenges, and limits. Note that these direct investors are increasingly working in consortia that include other institutional investors who participate indirectly through an infrastructure fund manager in the same assets. For each asset depicted at the bottom of the figure, they rely on partners, relations, and networks in each country. For simplicity, however, these lines have been omitted.

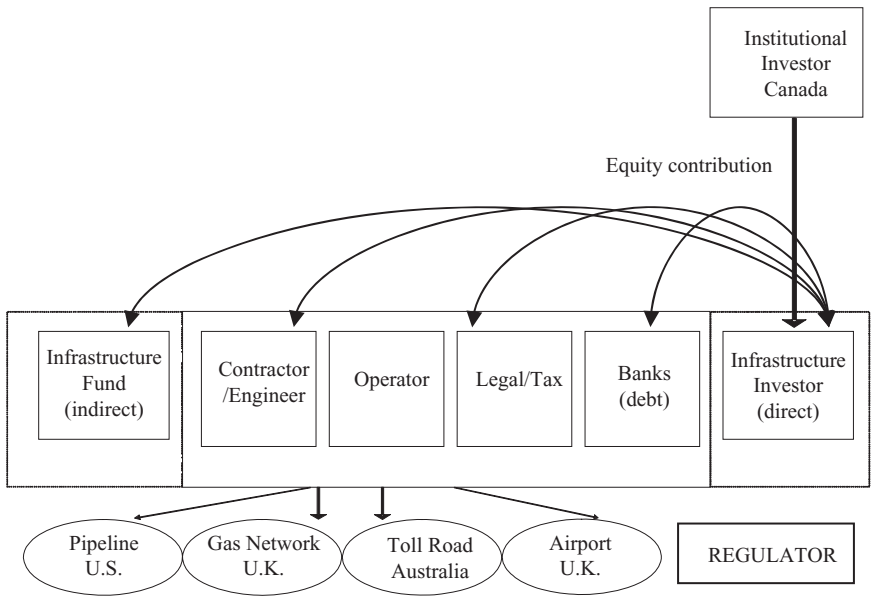

Figure 2. Managing multiple relationships as a direct infrastructure investor.

Many institutional investors prefer to invest outside their own countries owing to political sensitivity. One of the largest Canadian institutional investors produces much sought-after investments in the United Kingdom through its ownership of gas and water networks (interview C, portfolio manager of pension fund, Toronto, 2005) and feels comfortable with such foreign purchases because it trusts its advisers. International strategic partners in such transactions are most often local operators who have expertise in large investments, a similar investment philosophy, and an extensive network and are willing to invest along with the institutional investor. These strategic partners are considered crucial, since operational management of assets is difficult for pension funds: they are investors and generally do not know how to operate a toll road (interview I, investment bank head of global infrastructure, Toronto and Oxford, 2005; interview M, toll road operator, Toronto, 2005). One example of an institutional investor buying an asset outside its home jurisdictions for political reasons is the purchase of a gas network in the United Kingdom in 2004 by a group of investors from Canada, who invested about C$3 billion ($2.3 billion) in equity (interview C, portfolio manager of pension fund, Toronto, 2005; interview F, portfolio manager of insurance company, Toronto, 2005). The deal was sourced, underwritten, and negotiated by the pension fund, and the asset is now under the investors' direct management. This infrastructure product was purchased through contacts in an investment bank with whom the pension fund's infrastructure team had built a relationship over a five-year period, since the team had identified the United Kingdom as a possible area of investment and were confident in the U.K.'s regulatory environment. By engaging U.K. lawyers and accountants in a big-four global accounting firm for the local due diligence, this Canadian pension became confident and comfortable with a foreign direct investment.

Within such consortia, every partner focuses solely on his or her aspects of a bid (interview K, portfolio manager of pension fund, Toronto, 2005), although a few international engineering companies are becoming desirable banking partners because they are shifting to do both designing and equity investing (interview L, vice president of infrastructure investments, Toronto, 2005). Making the decision to invest is becoming easier; limits on regions of the world and types of infrastructure are relatively easy to decide; however, finding the right partners is more of a challenge. These pension funds are building large internal teams of analysts, deal makers, lawyers, engineers, and operational asset managers. They also liaise externally with construction firms, traffic engineers, debt financiers, lawyers, tax specialists, and governments to source the ideal infrastructure assets for the pension fund. Increasingly, they are also partnering in consortia that include managers of infrastructure funds who represent a collection of pension fund investors. Most of these actors represent large amounts of capital, sometimes as much as a billion dollars of equity, which is a powerful source in negotiations and deal making. At the same time, they rely on actors who have a great deal of information or specialist expertise that is needed to be comfortable with the investment metrics and to be successful in infrastructure investing. The relationships that develop in such consortia embody power that is capable of spatial change: each actor relies on the participation of the other actor while trying to maintain his or her independence and assertion of power in the decision-making process. These specialists act as gatekeepers to various networks and geographies of information around the world, and relational "complementarity" is developing to fulfill their different institutional goals, subsequently creating causal links to the new ownership and management patterns of urban infrastructure landscapes worldwide.

Figure 3 demonstrates how several institutional investors rely on specialist fund managers. Crucial in the financial relationships between pension funds and their infrastructure fund managers is an alignment of the fund managers' incentive structures with the

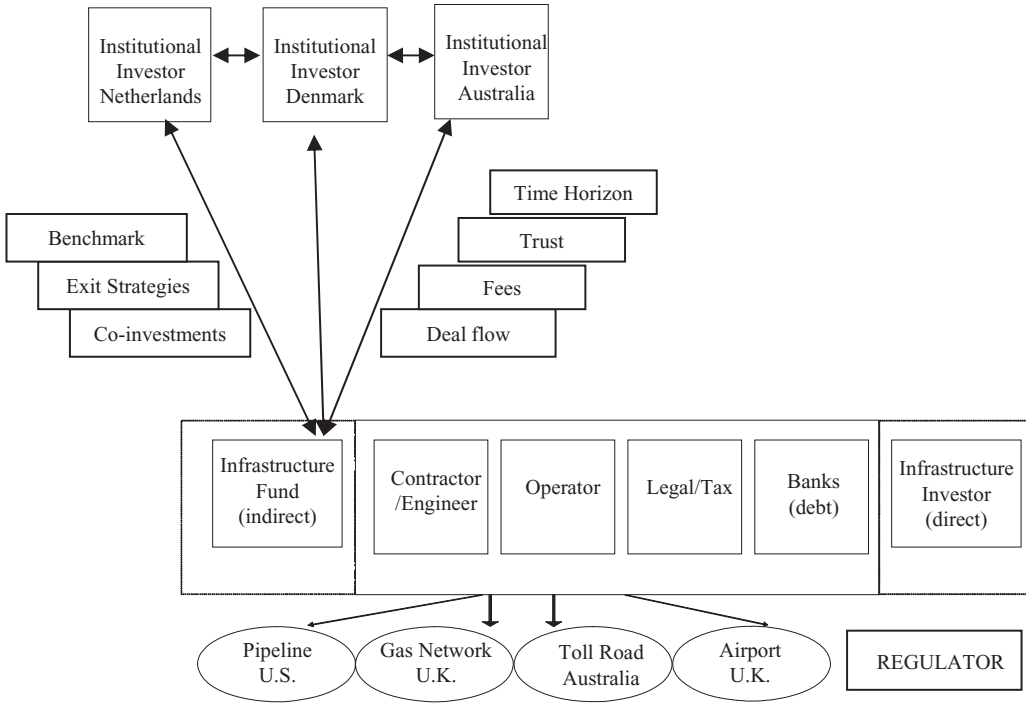

Figure 3. The fund manager relationship as an indirect investor and co-investor.

objectives of institutional investors (Torrance 2007). For example, performance benchmarks are set to provide incentives to the specialist managers of infrastructure funds to outperform the benchmark and receive a percentage of the extra returns. The initial investment mandate, with its portfolio and geographic limits, is fundamental to achieving alignment and a common goal. A balance must be struck between setting strict portfolios around types of infrastructure assets that a manager can buy and maintaining maneuvering space for a specialist manager, so that time and money are not wasted on transactions that do not fit the objective of an institutional investor or on unnecessary meetings to approve investment decisions (interview A, head of infrastructure equity pension fund, Amsterdam, 2005). Rather than the institutional investor building direct relationships with the various specialists who have access to the specific geographies of information across the global infrastructure landscape, the investor builds the relationship with the manager, depending on the manager's analysis of infrastructure assets and access to deals through networks and relationships across the global infrastructure and financial markets. For example, Goldman Sachs Infrastructure Partners is a specialist infrastructure fund that is heavily focused on infrastructure assets in the transportation sector, especially ports. By investing in this fund, which was launched in 2006, institutional investors from North America, Scandinavia, Asia, and the United Kingdom increased their bargaining power by grouping capital with other investors around the world. This fund closed in late 2007 with $6.5 billion in equity commitments. The institutional investors were also accessing Goldman Sachs's investment banking expertise and contacts through the dedicated Goldman Sachs's deal teams in offices around the world. Their experience and relationships in the transportation sector brought a port deal to them while the fund was still being raised, and Goldman Sachs bought AB Ports, the U.K.'s biggest port operator on behalf of its clients in the summer of 2006 for £2.8 billion ($4.9 billion).

Some crucial conflicts of interest have arisen in the governance of these infrastructure funds, which are generally managed by investment bankers who focus on doing deals. The fees associated with funds are huge (and some believe unsustainable), since they resemble private equity fees (while private equity returns are higher), but infrastructure assets have lower risks and therefore lower returns. In addition, many institutional investors worry about the relatively short horizon of the specialist managers of infrastructure funds, with most offering closed-end models with an average term of 10 years. Infrastructure assets are considered a perfect investment to hold for 30 to 50 years owing to their inherent long duration, and investors do not want to sell the assets after just 10 years. These conflicts around the time horizon are set to continue, however, since up to 30 closed-end models are currently being raised around the world. Finally, investors believe that banks sometimes lack financial discipline and are conflicted—some are involved in advising governments on deals while bidding on the same assets. Partnering on deals can be challenging, especially in large infrastructure projects. Capital contributions are equated with power in most of these relationships: the larger the investment (in infrastructure, $500 million is often the average investment in a fund), the more power investors wield with both the infrastructure manager and other investors. While the managers rely on the capital to succeed, the investor relies on the fund manager to find investments. A delicate power balance is needed to be successful. These factors led some of the institutional investors listed in Figure 2 to invest directly in consortia; they are an exception, however, since most pension funds cannot build in-house expertise because of their limited expertise in this area, the lack of relationships to secure appropriate deal flows, and the lack of time to be involved and immersed in this specialist area. The sought-after geographies of information are best approached by constructing a relational proximity to the local knowledgeable actors who have the relationships and networks.

Investments into specialist funds have multiple layers and potential conflicts: while the infrastructure fund managers go about their daily business of sourcing, structuring, and investing in infrastructure assets, the relationships between managers and investors are complicated, especially when co-investment opportunities develop. Co-investment opportunities in infrastructure deals are common because of the large size of the investments. In these instances, the institutional investor is offered the opportunity to invest a large amount of capital along with the fund managers' allocation to a deal (most often with no extra fees attached). Infrastructure investors then invest both indirectly through funds and directly into the geographically varied assets. Trust, expertise, and power relationships are all recurrent themes in these investment structures, since investors are relying on the infrastructure fund manager's assessment of the investment opportunity and are investing along with the fund manager, with the potential of holding this asset directly on a balance sheet beyond the life of the fund raised and invested by the infrastructure manager.

Networks

Infrastructure products have developed because previously publicly owned assets have become available to investors. The specialist geographic information that is embedded in the infrastructure assets comes at a price. Either investors pay a fee to fund managers to access these assets and this information, or they build up their in-house teams. For all investors to access this information, networks and relational investing have become key: both indirect and direct investors need to build relationships with their fund managers, but direct investors do so with multiple specialists involved in infrastructure development. Relationships are overriding issues of distance (through trusted contacts in a locality) and time (through long-term contracts), since portfolio managers of public-sector pension

funds and specialist infrastructure funds in one country are directly investing in utilities or roads in another country. For example, the Singapore Government Investment Corporation (GIC) is a key direct investor in the British Airport Authority (BAA) along with the Spanish airport operator Ferrovial and the Canadian Caisse de Depot de Quebec, which bought BAA for £10.3 billion ($18.2 billion) in 2006. GIC now directly owns a share of the seven British airports, including London Heathrow and London Gatwick (Lima 2006).

As I mentioned earlier, many public-sector pension funds or sovereign funds prefer investing outside their geographic jurisdictions to avoid political sensitivities around the lease of former public assets. For the small number of key (Canadian and Australian) institutional investors who are involved in direct infrastructure investing, the field is close-knit and almost paradoxical because active investors are sometimes partners on one bid and competitors on the next: "Sometimes we are enemies on a deal and working together on another deal a week later; it depends on the deal you're chasing" (interview C, portfolio manager of pension fund, Toronto, 2005). The sourcing of deals or knowledge about new infrastructure funds also occurs through intimate, albeit temporary, teamwork: "Most of the investing is who you know, who you partner with" (interview C, portfolio manager of pension fund, Toronto, 2005). These relationships are complicated tactical games, with openness about capital commitments, ideas on financial structuring and valuations crucial but difficult for the various partners to discuss, since all involved are second-guessing the different interests, expertise, and aims of a potential transaction.

In addition, since many of these pension funds have billions under management, their scale, sheer size, public-sector backing, and often-prestigious fund managers are introduced into the bidding game and the consortia. In the BAA case, a bidding war developed between Ferrovial, backed by a Canadian and the Singaporean GIC, and a Goldman Sachs consortium that included the Ontario Teachers' Pension Fund, the infrastructure arm of the Ontario Municipal Employees Retirement Fund, the Abu Dhabi investment firm Mubadala, and the Commonwealth Bank of Australia (Lima 2006). Takeover attempts over three months ended by Ferrovial winning the bid by building up a 29-percent blocking stake in the publicly listed company, thus thwarting a potential challenge even though Goldman Sachs offered a higher price. The Goldman Sachs bankers were reported to be furious because they were prematurely halted from carrying out due diligence on BAA in the afternoon before the evening auction of BAA.

Some direct institutional investors have decided to invest actively in local assets abroad by purchasing transaction-specific information through the engagement of investment banks as advisers or collecting the information directly by sending deal teams to the country of investment. In other instances, specialist traffic forecasters are hired who visit projects around the world to determine the future growth in traffic in urban areas within a span of three to six weeks. With the harmonization of specialist information that is included in requests for proposals, more and more nonlocal investors are bidding on infrastructure assets. For example, the Chicago Skyway auction in 2004 was won by the Cintra-Macquarie consortium, a partnership of a Spanish toll-road operator and an Australian investment bank. The four other consortia were comprised of (1) Abertis Infraestructuras SA (Spain); (2) VINCI Concessions (France), Borealis Infrastructure Management (Canada), Canadian Highways Infrastructure Corp., ABN AMRO, Parsons (United States), American Bridge (United States), and Kenny Construction (France); (3) Bilfinger Berger BOT (Germany) and Cheung Kong Infrastructure Holdings (Hong Kong); and (4) Transurban Infrastructure Developments Limited (Australia), in association with VMS Inc. (United States), Ontario Teachers' Pension Plan (Canada), Gary/Chicago International Airport Authority, Bear Stearns & Co. (United States), and Vollmer

Associates (United States) ("Cintra-Macquarie to Take Over Chicago Skyway" 2004). In addition, the debt syndication was undertaken by French and Spanish investment banks.

The bidding for deals by nonlocal investors is not limited to transport infrastructure; one of the largest Canadian institutional investors expanded its foreign products through the purchase of 10 power plants in 6 countries (the United Kingdom, the Netherlands, China, Mexico, Australia, and the Philippines). Two things stand out in this purchase: the potentially high-risk environment of electricity generation and the diverse geographies in which these infrastructure assets are located, many of them non-OECD jurisdictions that carry risk in the legal realm.

Relational Investing Unraveled

The long-term commitment required for investing directly in an (often-foreign) infrastructure asset spurs institutional investors to expend a lot of time and energy acquiring information about both the specific geographic information that is sought in the investment returns and the effectiveness of the operator of the asset, originally coined "relational investing" because of the time and energy that shareholders need to find information and influence corporate policy, often by spending time building up relationships with managers. Instead, more institutional investors are using specialist managers who have the resources to acquire the information and manage the day-to-day operations of an infrastructure asset on their behalf. Relational investing has stimulated the bridging of geographic distance as necessary business partnerships are created with those who have acquired the specific geographic information on the ground. Keeping in mind that much trade within financial markets is designed using computers to construct quantitative analyses of projects and that possible investments are executed via computerized trading, external human specialists are vital to investment decisions in sophisticated and localized financial products. The interviewees noted that it is vital for them to be knowledgeable about the product designers' reputation, since the product designers such as managers of specialist infrastructure funds work independently from pension fund and other institutional investors. The specialist managers as "product designers" are the key determinants of the price of an asset. Not only are managers of infrastructure funds, with their financial expertise, such product designers, but strategic and industrial partners, such as construction firms and toll road or airport operators, are also considered product designers because of their specialist information. In addition, institutional investors are averse to relational investing when they buy and hold significant block of stocks with the aim of acquiring more information about a firm, since significant time, costs, and trust are needed to build relationships. Institutional investors are, however, continuing to commit capital to specialist private funds, like those that are available from such specialist financial institutions as Macquarie Bank, which is making privately held, unlisted infrastructure funds a core component of its growing presence. Besides outsourcing to specialists, the local reputation of some of the banks that manage infrastructure funds in certain geographic areas is important in the decision-making process. This approach offers the potential to sell assets on a negotiated basis, but governments generally want auctions, requiring the institutional investors or infrastructure fund managers acting on their behalf to participate in public auctions. Mostly these "auctions" have favored winners—in continental Europe especially, local actors tend to win the bids.

The law of contracts is critical in infrastructure investing through specialist infrastructure funds, since the long-term commitment creates a long-term reliance on specialist managers' expertise. Contractual provisions assume a central role in constructing the investment relationship. Contracts play an even larger role when direct investments are undertaken in concessions for 30 to 99 years, since increases in tolls, passengers, or prices

are fixed in these contracts for the entire 30- to 99-year period. This is especially the case in the lease of the Toronto 407 toll road to a consortium of Spanish, Canadian, and Australian engineers and investors for 99 years in 1999. In 2003, the incoming Ontario provincial government took the owners to court to roll back the increases in tolls. After a two-year court battle, the contract withstood the political challenge, and the increases in tolls based on the contractual mechanism will be maintained for the duration of the contract (Torrance 2008). As such, contracts are the formal mechanism that allocates risk between investment partners, defines time horizons and the rewards and penalties of performance, and sets partners' performance standards in relation to accepted benchmarks. Babcock-Lumish and Clark (2008) also refer to this mechanism as the governance of a project; contracts form the basis of the governing process. This is a somewhat neoclassical understanding of contracts in which these mechanisms and benchmarks are decided beforehand, with all the involved actors (investors and receiving end) rationally drawing up contracts. In this article, contracts are viewed through a lens that takes account of the relationships between parties (Macauley 1963). Heated discussion and negotiation around the creation of an adequate alignment of interests is present throughout this emerging asset class.

When institutional investors have decided to outsource the investment-management process to specialists, selecting which managed fund to invest in is more than making a decision on the basis of quantitative financial modeling. Infrastructure investing is relatively new, and numerical track records are often missing, while public benchmarks are still being developed to measure performance. Performance numbers are available only over a 12- to 36-month period since the managed funds have only been in existence for a few years, and these numbers are often for private market investments, since publicly listed infrastructure is generally not of interest. Comparing the performance of the private market against a public benchmark, such as the S&P 500 infrastructure index, does not help in the investment decision-making process, since the two measure different things. Instead, trust and personal relationships are vital, highlighting how interactions among actors, along with personal preferences, influence decision making and ultimately economic performance. All specialist infrastructure funds are analyzed on their track records, proposed size, global focus, and expertise, but intuition also plays a role: "Managers need to be people we trust, with good recommendations. It's not about being greedy; this is a steady long-term market, and we want people with long-term vision" (interview J, institutional infrastructure portfolio manager, London, 2005). Therefore, some pension funds prefer to be founding partners in specialist infrastructure funds, so they can steer the mandate from the beginning. However, since many of these managers make their money upfront from the deal transaction and do not focus on long-term management, tensions have begun to develop between institutional investors and specialist managers of infrastructure funds. Another point of tension is the bidding process. Investors have a pure economic interest in infrastructures.[8] Institutional investors are wary of the political-economic consequences of such investments, since the services are essential for the public and therefore can have major political implications. Pension funds, in particular, advocate a fair and transparent bidding process on sustainable assets, and most steer clear of politically contentious, private finance initiative–like projects, such as schools or hospitals, or social infrastructure. Bankers, however, focus mainly on deal flow and upfront

[8] Some would like to consider infrastructure investing as socially responsible investing (SRI) or economically targeted investing (ETI) as investments are made in formerly public goods. Only 1 of 10 key institutional investors who were involved in infrastructure in 2005 stated that SRI or ETI was a part of their investment rationale.

remuneration. Infrastructure fund managers' investment horizons are generally shorter, and their political-economic position on privatization issues is less contentious than is their institutional investor clientele's position. Since all parties must commit to a set time and a given management style, trust is transformed into a contractual relationship. With some potential partners on the lookout to sell acquired infrastructure assets, a contractual relationship may be difficult to achieve. Wary institutional investors who are new to the sector are therefore more inclined to set up contractual relationships with specialist managers who have established expertise, rather than co-invest with other investors directly into assets where they may lack an understanding of the value and day-to-day management.

Conclusion

By unraveling the growing participation of private actors in the development of the infrastructure landscape, I established that institutional investors have become actively involved in the rising global infrastructure market. These investors are acquiring infrastructure products because infrastructure assets have stable, geographically varied returns. This situation has given rise to a "geography of the rate of return," rather than continued local production of infrastructure assets, since the geographic content of these particular financial products is of added value to investors who are looking to diversify their asset allocations. Hence, not only are institutional investors looking outside their traditional financial borders of equity and fixed-income investing, but innovative financial instruments have been created that allow long-term direct investments in infrastructure assets in both OECD and emerging markets.

This article has added to three distinct economic geography literatures, namely, the geography of finance, pension fund research, and, tying the findings from these two together, research on relational geometries. These subfields within economic geography are surprisingly under-researched; studies of the role of finance have grown substantially during the past 15 years since the establishment and development of pension funds (Martin and Minns 1995; Clark 2000), and research in geography has not reflected these trends. Knowing where capital originates and where it flows around the world is crucial to understanding how current urban-infrastructure landscapes are developing. A whole new way of investigating urban infrastructures can be developed if the behavior of global pools of capital is tied to theories on relational geometries and the changing role that relationships are beginning to play in spatial development (Yeung 2005). The relational turn in economic geography provides useful insights into the behavior of institutional investors in this recent global trend. The power relationships that develop among institutional investors with equity interests; managers of infrastructure funds, who bring financial knowledge and contacts in the field, but are tied to certain mandates that have specific rules of engagement with those institutional investors that commit capital to their funds; and specialists, such as contractors, operators, and lawyers, who have crucial local knowledge and power, were conceptualized in this article as relational geometries, building on the work by Yeung (2005), who called for research on causal power capable of spatial change. The specialists act as gatekeepers to various networks and geographies of information around the world, developing a certain amount of relational complementarity to fulfill their different institutional goals and creating causal links to the development of urban infrastructure.

Because of the nature of the financial product, the production of infrastructure assets has a local element, but global institutional investors are increasingly able to produce these local private equity–type and unlisted infrastructure assets at a distance. The nexus

in this production is the creation of relational proximity by these investors, since infrastructure assets embody specific geographies of information. The prospect of creating a geography of the rate of return across the world, such as the purchase of a toll road in Spain, an electricity-distribution network in Australia, or an airport in Mexico, encourages institutional investors to select managers of infrastructure funds or advisers such as investment bankers, lawyers, and traffic engineers, who have the essential relationships to achieve the objectives. This new phenomenon is developing new geometries of power, since investors team up with consortia of operators, banks, lawyers, and tax advisers. As Yeung (2005) demonstrated for regional development, the role of power, strategy, and tactics in the partnerships that invest in and build the infrastructure landscape is intensifying with the rise of a global infrastructure market. In addition, the produced infrastructure assets affect the traditional sociospatial relations, since global pension funds and infrastructure managers take over the ownership and management of infrastructures in landscapes around the world. Future research questions for geographers should focus on how geographers reconceptualize the infrastructure landscape with these shifts in ownership and management.

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