

**THE PRIVATE PROVISION OF
URBAN INFRASTRUCTURE:
FINANCIAL INTERMEDIATION THROUGH
LONG TERM CONTRACTS**

Gordon L Clark* and John Evans+

*School of Geography and St Peter's College
University of Oxford, Mansfield Road
Oxford OX1 3TB UK

+PGE (Australasia) Ltd and WorldInvest (London)
GPO Box 5098, Sydney NSW 2001
AUSTRALIA

WPG 97-2

Acknowledgements. This paper was sponsored by the Australian Housing and Urban Research Institute and the Australian Research Council (96-xxxx). The paper draws upon data and material supplied by Nippon Credit (Australia) and research assistance provided by Mojdeh Keykhah and Dominic Power. We have benefited from advice and conversations with Tim Pearson, William fforde, James Burkitt, Patrick Atiyah and Maurice Byers. Michael Berry and Michael Lindfield made comments on a previous draft. None of the above should be held responsible for any errors or omissions.

Abstract. This paper deals with pension fund investment in urban infrastructure projects. It is suggested that the potential returns (and risks) with such projects are significantly greater than fixed income products though they have long gestation periods like gilt-edge securities. Our argument begins with recent evidence collected from a Nippon Credit industry-sponsored research study of Australian infrastructure investment performance. Also analysed are the internal and external characteristics of various kinds of urban infrastructure projects, ranging from roads and bridges through to hospitals and urban development recognising that these characteristics are important in determining investors' likelihood of realising their expectations. It is shown that, notwithstanding the uncertainty endemic to these kinds of projects, a commonly desired form of financial intermediation is a formal contract binding the parties to one-another over the long-term (as much as twenty years or more). While no doubt valuable for many reasons, matching in effect the formal structure of bonds, it is suggested that these institutional structures can be more problematic than often understood once the world of short-term discrete contracts is left behind. At issue here is the management of these contracts given that investment performance is a function of both the level of management resources (relative to capital investment) and the expertise of those who operate such facilities over the long term.

INTRODUCTION

In a previous paper (Clark 1997), pension fund investment in the urban domain was analysed by reference to information costs and vendor veracity. The result was a four-fold classification of intermediation ranging from those institutional forms that mimic the market through to those that are project-led and lead the market. Clearly there is significant interest on behalf of pension funds in these types of alternative investment products (AIPs) and experience of investing in market-related products; there is even some experience of investing in intermediaries or products that lead the market. It is also true, of course, that governments are increasingly promoting the development of AIPs: for many Anglo-American governments, pension fund investment in urban infrastructure of all kinds (roads, bridges, hospitals, housing, etc.) is a necessary step towards reducing public sector spending and borrowing. In this respect, we believe that understanding the potential for pension fund investment in the provision of urban infrastructure requires an understanding of institutional design in the investment management industry (in general) and the role of financial intermediation in promoting product innovation (in particular).

In this paper, the previous analysis of product innovation is extended by focusing upon infrastructure investments which are not directly amenable to market solutions. We are interested in the process whereby pension funds invest in urban projects or products which have long gestation periods, few opportunities for liquidation (exit) and few opportunities for risk discounting through risk sharing. To be even more specific, our concern is AIPs (or products) which can be thought consistent with the United Kingdom's private finance initiative (PFI) and may be

related to state and local government investments in urban infrastructure in Australia and the United States.¹ One contribution of the paper is an analysis of infrastructure investments comparing and contrasting the characteristics of pension fund investments in roads and bridges (at one end of the spectrum) with investments in hospitals and housing (at the other end of the spectrum). Another contribution of the paper is an assessment of the risk and return profiles of infrastructure projects compared to other, more conventional, asset classes. Most significantly, the paper focuses upon the logic behind contractual solutions to problems of financial intermediation involving urban and public infrastructure.² The paper concentrates on infrastructure investment projects that involve long term contracts which bind parties (like governments and pension funds) together for the provision of urban infrastructure in exchange for an agreed allocation of risks and returns.

In the next section the demand for infrastructure investments is discussed, focusing attention on their risk and return profiles. The goal of this section is to identify and characterise the nature of infrastructure projects according to the formal language of the investment industry. We then identify and analyse three steps taken by pension funds in their evaluation of the risks and returns that flow from different types of infrastructure investment projects. The following two sections consider the advantages and disadvantages of managing risk and uncertainty through formal long term contracts before dealing, in the conclusion, with the political context of infrastructure investment. The paper reports on new initiatives in the pension fund investment management industry, drawing upon interviews in the US, the UK and Australia (summarised in Clark 1997). Note that one of the authors is closely

involved with a number of pensions funds and related consulting firms. Unfortunately, we have not been able to directly attribute sources for our arguments and opinions for reasons of confidentiality.

INFRASTRUCTURE AS AN INVESTMENT PRODUCT

As suggested in Clark (1998a), convention dominates pension fund investment strategies -- in Australia and the US this means, more often than not, that funds are allocated to a mix (in order of importance) of equity products, fixed income products, property and 'other' investments (including cash). Whereas equities and bonds together dominate US and Australian pension fund investments, in the UK equities tend to dominate the other asset classes (for details see EPRP 1996). These differences are significant. But reasons for these differences between countries need not detain us here. It is sufficient to observe that in Anglo-American countries industry practice is dominated by the largest pension funds and the largest service providers. The industry is remarkably concentrated on both sides of the equation (pension funds and investment managers) even if there are many thousands of funds and many service providers (see Clark et al. 1996 for Australian data).

The mix of pension fund investments also varies according to the type of pension fund, its relative maturity, and (sometimes) its membership base. To illustrate, defined contribution plans (or accumulation plans) do not promise a final benefit or retirement value. Rather, they rely on the flow of contributions and the accumulated short-term performance of investments to generate an individual retirement annuity for plan beneficiaries. Defined contribution plans tend to balance their assets between equities and fixed interest securities. Note, however, in recent

years Australian and UK equities' performance have been less buoyant than in the US. And even there it would appear that for the US, at least, bonds out-performed equities over much of the twentieth century (Siegel 1994). Contribution plans are particularly sensitive to the relative short-term performance of different asset classes. By contrast, defined benefit plans typically take account of the expected in-flow of contributions, the expected out-flow of benefits, and match both against anticipated interest rate and investment returns. Not surprisingly, this matching process places a premium on long term performance and predictability.

Performance data for traded products like equities and bonds can be obtained from specialist industry consultants. But there are few data bases on infrastructure investment performance that can match the scope of standard data bases. This is for a variety of reasons. Because few pension funds have been committed to infrastructure investment, data collection exercises across the industry are expensive relative to the size of the market for the collected data. Because much of the data is proprietary, reflecting the interests of particular investors and vendors of infrastructure projects in maintaining confidentiality regarding the design of such products, there has been reluctance to report performance results. And because it has been difficult to come to common agreement on the appropriate benchmark against which to evaluate infrastructure performance it has also been difficult to assess the significance of the available performance data. In this context, a research project on infrastructure performance sponsored by Nippon Credit and a group of major financial institutions has provided valuable insights into the performance of infrastructure as an asset class and according to different kinds of Australian infrastructure projects.

The results of the project are summarized in Figure 1. Infrastructure performance is located in relation to the risk-return relationship for conventional asset classes consistent with the theoretical expectations of the capital asset pricing model (see Sharpe and Alexander 1990). This is to facilitate comparison with the performance of other common asset classes over the period 1984-1994. Notice that the intercept at zero risk may be higher in Australia than in the US or in the UK because interest rates, and hence the long-term rate of return on government bonds, are typically higher and have been so for more than one hundred years. Notice also that the relatively poor performance of property compared to the other asset classes, including infrastructure, reflects the remarkable boom-bust cycles of this asset class in Australia over the past few decades.³ The asset class A Fixed refers to Australian government securities while the class A Equity refers to the main listed Australian equities and I Equity refers to international equities (measured by reference to the Morgan Stanley Capital International index). The results for the infrastructure assets were determined by taking the yearly returns for each group and then adjusting for commercial considerations such as debt/equity ratios and dividend payouts. Whilst the results for infrastructure should be understood as “adjusted”, industry consultants believe the results reasonably represent the nature and scope of sector risk and returns.⁴ Naturally the results also reflect the past national and international environment, and great care would be needed if extrapolating these results into the future.⁵

Recognizing there may be considerable value in individual infrastructure projects, the research program sought to distinguish between different kinds of infrastructure investments. Hence the identification in Figure 1 of bridges and other

kinds of infrastructure like power generation stations where the evidence can be generalized beyond identifiable individual projects. No infrastructure study, however well conceived and implemented, can hope to be as comprehensive as the available data bases on national and global securities' performance over the past one hundred years. So the results summarized in Figure 1 should be considered as tentative and indicative rather than conclusive, representing a comparatively limited period of time and particular sample. Nevertheless, there are striking patterns apparent in the results summarized in Figure 1. As a class, infrastructure had significantly higher returns relative to risk than any other class. As a class, infrastructure is far more desirable than A Fixed and certainly a great deal more desirable than property recognizing that it might be reasonably supposed that property would be the most likely reference point to infrastructure. Note, however, that a pooled or combined infrastructure product which could be traded would appear to be less rewarding than investment in specific infrastructure projects.

Nevertheless, a diverse portfolio of infrastructure projects could be a useful strategy in enhancing a fund's risk-adjusted returns. The issue here is the extent to which portfolio managers ought to invest in infrastructure. Experiments have been conducted by the Nippon Credit research group aimed at determining the optimal mix of infrastructure with other asset classes. To illustrate, Figure 2 summarizes the results of a simulation designed to test the effect of an infrastructure portfolio on an Australian "averaged balanced manager's" risk and return profile over the ten year period 1984 to 1994.⁶ Two patterns emerged from the simulation exercise. Adding a small infrastructure portfolio to the average balanced manager's overall mix of assets would

make an immediate beneficial difference to the average manager's risk and return profile. As well, it is clear that the effect increases with an increasing proportion of assets (more than 30 percent) allocated to infrastructure. Thus an average balanced manager could justify a significant investment in infrastructure, and by implication, most pension funds should hold some exposure to this asset class. This analysis ignores, of course, issues such as the supply of infrastructure investment opportunities and the particular liquidity needs of pension funds, and it also assumes that a diversified investment portfolio could be established within the parameters set by investing pension funds.

With respect to the correlation of infrastructure with other asset classes, it was found that infrastructure returns were positively correlated with A Fixed (0.53) but otherwise negatively correlated with A Equity (-0.47), I Equity (-0.38), Cash (-0.55), and most significantly Property (-0.86). These results reinforce the point made above about the value of infrastructure to a balanced portfolio and the assumption that infrastructure is a form of higher-value fixed income. Notice, however, that the range of returns within the infrastructure class is quite large compared to other conventional classes raising questions about the internal logic of a pooled infrastructure investment trust. More problematical, the number of observations which is the basis of these results is very small when compared to conventional asset classes like equities and bonds. We must take care not to under-estimate the risks inherent in infrastructure.

EVALUATION AND INVESTMENT DECISION MAKING

In two previous papers, Clark (1998a,b) emphasized the framing process behind pension fund investment decision making. Here we deal with what Kahneman and Tversky

(1979) have identified as the evaluation phase of decision making. As in the framing phase, habits of prudence, rules of proprietary conduct, and norms of relationships play a role in the evaluation phase. But because infrastructure investment is an unusual investment choice for a pension fund, clearly departing from the conventions of the industry, the evaluation phase is often more comprehensive than is the case of investment in conventional asset classes. Risk aversion is an important prudential habit promoting caution in project assessment and selection. Trustees' concerns about being seen to meet their fiduciary responsibilities encourages an exhaustive evaluation process. Likewise trustees' necessary reliance upon external expertise for the assessment of infrastructure investment options encourages a close scrutiny of the motives and interests of their investment consultants. The process of evaluation is hopefully justifiable if, in the worst case scenario, the selected infrastructure investment project were to fail (Clark 1998b). In the industry, trustees and consultants refer to the evaluation phase in summary legal terms, specifically the duty of due diligence: the duty to use all reasonable care and skill (including expert advice) in assessing investment options given trustees' obligations to protect plan beneficiaries' interests (see Moffat 1994, pp. 322-24).

In this context, the evaluation phase is best understood as having three related steps of assessment (see Figure 3). These steps have a logical order and structure, as indicated below, summarising the relevant issues important in any comprehensive assessment. Implied by Figure 3 is a hierarchy of steps, suggesting that the third step presupposes affirmative decisions in the first two steps. But it is likely, more often than not, that the three steps are executed simultaneously one with the others. Also implied

is a certain symmetry or logical coherence, the product (we suspect) of the design of the Figure itself. It should be recognised that trustee behaviour need not be as ordered as implied, and that decision trees like Figure 3 are more valuable as “maps” of decisions than normative claims about the proper structure of investment decisions (compare Clark 1998a,b with Machina 1991). The first step of evaluation is identified as functional risk assessment, and involves a close analysis of the internal structure of the project. The second step of evaluation is environmental uncertainty assessment which involves analysis of the place of the project in the wider "environment" not directly part of (or controlled by) the project. And the third step is commitment assessment, referring to the desired level of investment by the fund given the investment of other partners or parties involved in the project.

Risk assessment refers to the likely consequences of an investment decision given the distribution of possible outcomes (paraphrasing Knight 1921, 233). But risk assessment does not guarantee a particular outcome. Rather, it allows investors to predict the flow of revenue given a set of possible outcomes weighted by their respective probabilities (Clark 1998a). For trustees, predicting a project's revenue stream depends, in part, upon the internal, functional coherence of the project. At one level, the predictability of revenue depends upon the closeness of the match made between the location of the revenue stream and the boundaries of the infrastructure facility. More directly, the predictability of revenue depends upon the control of the infrastructure facility, especially if net revenue is a function of the use of that facility. And most importantly, the stream of revenue would seem to depend upon a clear connection or relationship between responsibility for control of the facility and the interests of the

pension fund. To illustrate, if a pension fund was to invest in a bridge it would have to ensure that the revenue stream matched the volume of automobile use of the bridge, that maintenance costs were directly linked to its use, and that responsibility for the operation of the bridge was consistent with investors' interests in maintaining the flow of revenue.

The internal coherence of an infrastructure project is an issue open to close scrutiny, and possibly influence. As suggested in Clark (1997), the performance of alternative investment products like infrastructure projects is as much a matter of institutional design as it is a matter of simple prediction. And as suggested elsewhere, to make an adequate assessment of the risks involved in such investments requires making an assessment, as well, of the available information and the veracity of investment vendors. For pension funds involved in the initial stages of an infrastructure project, there may well be opportunities to set information disclosure standards and influence the functional design of a project in ways consistent with their own interests in risk minimization and revenue maximization. On the other hand, funds coming late to an infrastructure project may find it more difficult to establish their preferred disclosure standards and change the internal, functional structure of infrastructure facility investment. Thus, there are considerable advantages in being the lead fund on a project, even if such a role requires a level of experience and expertise that few funds can command. More likely, funds may have to accept that their risk assessments are imperfect given the offered infrastructure investment opportunities.

The next step in the evaluation phase is more problematic. It involves assessing the scope and possible consequences of changes in the external environment with respect

to the functional performance of the project. Whereas internal risk assessment may prompt the introduction of risk control measures by pension fund investors, the external environment is not so amenable to control. Trustees may not be able to determine the scope of possible changes in the external environment nor may they be able to use past experience to estimate the likely consequences of possible changes in the environment: uncertainty is a real threat to trustees' long term residual value of their investment. To illustrate, the long term value of a bridge may depend upon the relative accessibility of that site given the evolving pattern of urban development (most generally) and the ancillary development of competing facilities (more specifically). While it may be possible to limit direct competition, no government could guarantee the shape or pattern of urban structure. Likewise, it would be difficult for a government to stop the introduction of private communications technologies that would indirectly affect the profitability of an investment.

It is impossible to be precise about the scope and nature of the uncertain environment. Nevertheless, in recent years pension funds have been concerned about two categories of uncertainty, both of which have implications for the residual value of an infrastructure project if not the predictability of its income stream. Technological change might be thought as an especially important category of uncertainty for investments in facilities that have fixed capital structures (like bridges). But it is also important for investments in facilities (like hospitals and airports) where technological change is rapid and the inherited capital stock is subject to obsolescence. Either way, a fund may become trapped in an obsolete facility or trapped in a facility that requires recurrent rounds of re-investment simply to maintain its revenue base let alone its long

term residual value. The fact that many infrastructure facilities have political significance, being the symbolic objects of debates about governments' fiscal responsibilities or perhaps because such facilities are a crucial part of peoples' everyday lives, suggests that the second category of uncertainty is the long term public commitment to the private financing of urban infrastructure projects.⁷

Both categories of uncertainty loom large in pension funds' assessments of infrastructure investment projects. And in some ways, these categories intersect with, and amplify, one-another. For example, imagine that a pension fund invests through the UK private finance initiative in a hospital treatment facility which will require at least two phases of re-investment over the life of the investment (say twenty years). And let us also assume the costs of these two phases of re-investment are to be met through higher user charges. If, as it seems likely, government funding of the health sector falls behind the escalating costs of changing medical technology, users (the public) may have to pay a higher and higher proportion of the costs of health care. Either that or the hospital itself may have to divert scarce resources into the PFI facility. The danger is that the priority assigned to maintaining the revenue flow and residual value of a PFI facility may bankrupt a community health program. Recognizing this possibility, the UK government passed the National Health Service (Residual Liabilities) Act of 1996. But in doing so, the government effectively politicized the question of who (investors, users or governments) should pay for technological change in privately financed infrastructure projects. Pension funds have become wary of their potential exposure to substantial shifts in political opinion and control with respect to the responsibility for providing urban infrastructure.⁸

The third step in the evaluation phase concerns commitment assessment: the level of investment in an infrastructure project given the interests of other partners in the project. Here we must recognize that pension funds rarely take the lead on a project. More often than not, pension funds are investing (limited) partners rather than project developers (general partners). There are exceptions to this rule. Some of the largest funds with assets of more than \$10 billion, have such a wide scope of activities that they are able to build-up and maintain in-house expertise in the area of project initiation and design. And as discussed in Clark (1997), groups of pension funds may join together to share expertise and knowledge if projects are large enough and in sufficient numbers to sustain the added costs of being project entrepreneurs. Of course, the initial stages of project development can carry significant profit opportunities. For pension funds, commitment assessment involves two separate but related issues: the stage at which investment ought to be placed, and the level of investment in each stage of development given partners' commitments.

Characteristically, in the earlier the stage of development the more committed is the investment and the higher the risks of total loss. In the early stages of project development, there are many development costs which can not be recovered until the project is either passed-on to other investors once the project has been successfully launched or the project has been totally completed. While these costs may appear, at one level, to be an investment, there are substantial risks that these "investments" may become sunk costs in the sense that they can not be recovered in later stages of development. The discounting of initial stakes in development is a common enough experience in the property development industry. Furthermore, in the early stages of

development investors typically have no opportunities to liquidate their investments: they are, more often than not, locked-in by prior agreement with other partners who have much less in the way of financial resources. Not surprisingly, given the risk averse nature of trustee decision making, pension fund investment in the early stages of a project may only occur if: (1) other decision criteria like commitment to on-going relationships with other partners overwhelm prudential caution; (2) if pension funds have prior experience of such complex and intricate projects; or less likely (3) if pension funds are able to convince themselves that the potential returns are such that they are able to justify the risks.

The stage of investment and the level of investment also depend, profoundly, upon trustees' assessment of the integrity of their general partners. In many cases, however, partners do not have deep pockets. They are general partners by virtue of their special knowledge, expertise or skill. They are partners because pension funds are unwilling or unable to internalize project development expertise. The relationship between limited partners and general partners is complex and the subject of considerable dispute in the industry (see the report by W M Mercer 1996 on behalf of a group of nine large US pension funds).⁹ The very small financial stake of general partners in most projects, and the rather different interests and time horizons of those interests (short term versus long term) are all contentious issues reflecting the particular nature of infrastructure investments. The institutional organisation of these relationships is at the heart of the infrastructure investment management process.

DEMAND FOR CONTRACT

Pension fund investment in urban infrastructure relies upon the financial intermediation process -- an institutional process of mobilizing and managing pension fund assets for placement in unconventional sectors and products (compare with Merton 1994). Whereas so much of financial activity takes for granted the existence of markets, networks of exchange and information one of the most important functions of intermediation is to organize disparate sources of funds and relevant investment opportunities in circumstances where markets are either missing or transaction costs are so significant that existing market institutions have few incentives to spontaneously price risk and allocate funds (compare Hahn 1989 with Houthakker and Williamson 1996). In this context, intermediation is a vital ingredient in infrastructure investment where the opportunities of project-specific investments cut-against the attraction of relatively lower risk investments in infrastructure trusts.

We would also suggest that contracts are a necessary ingredient in pension fund investment in urban infrastructure and we would also suggest that the language of contract is pervasive throughout the finance industry. And yet, there are a number of social scientists and analysts who would contend that contracts are either superficial (being a reflection of deeper moral sentiments) or only a formal device to be invoked when all else fails. One way or another contracts are thought less important than the social relationships which structure and focus the finance industry. Casson (1991) and Baier (1995), for example, might argue that trust relations are more important than formal contracts, trust being the “real” basis for long-term relationships in general, and in the investment industry in particular. They might also reference Luhmann (1979), who suggested some time ago that trust is a most important social institution for coping with

complexity and risk and uncertainty. Luhmann's argument was that in either case formal institutions like contracts are inadequate: trust means relying upon others to bridge the "gap" when complexity or risk and uncertainty overwhelm customary practice. Luhmann's argument and Gambetta's (1988) edited volume are crucial references for recent research on economic relationships. But we are not convinced of the resilience of trust in the finance industry.

One way to explain this opinion would be to recount the logic of trustee decision making introduced in Clark (1998a,b). There it was suggested that decision making is framed by three sets of imperatives -- at the core habits of prudence, then the rules of proprietary conduct and then the norms of relationships. The implication of this framing process for trust is clear: risk aversion (from the core frame) and fiduciary responsibility (from the second frame) would normally dominate trust (from the third frame) unless trust was consistent with, or a means of enhancing, risk aversion and fiduciary care. A more empirical, less theoretical response would be to observe that distrust is endemic to the investment management industry and to finance in general. We believe it is particularly acute in project-specific investments where information is unreliable and often unavailable and the motives and interests of potential partners are hard to discern before making investment commitments. It is difficult to assess *a priori* whether potential investment partners are committed to a long-term relationship or are seeking a one-time cash-out opportunity at the expense of the pension fund. Likewise the possibility of corruption looms large in pension fund trustees' minds encouraging a formal, justifiable process of decision making rather than a less deliberate process apparently implied by the social institution of trust in other parties. Even if trust was

warranted, reflecting expectations formed through the continuity of relationships between trustees and their advisors, it would be alarming to external regulators searching for evidence of preferential decision making (compare with Misztal 1996).

Most importantly it could be argued that trust is itself the product of contractual relationships. In an analysis of Luhmann's trust model, Hardin (1996) argues that trust presupposes the existence of past commitments or relationships that encourage trust in others. In this analysis, trust derives from relationships rather than creating relationships unless trust is to be understood as an emotional (non-cognitive) disposition about the world in general. This non-cognitive approach is common enough (see Becker 1996), but seems somewhat irrelevant for strategic and defensive thinking about financial relationships with others. Hardin believes that trust is the result of a variety of social processes including the structure of incentives in exchange relations, institutional patterns of decision making, and social conventions of all kinds. It is clear from Clark's model of trustee decision making that the structure of incentives are such in the investment management industry that distrust is the more likely disposition than trust. In this context, contracts can provide a formal mechanism through which informality can flourish bounded by a set of sanctions and a process of recovery if trust is misplaced. It may be, of course, that the investment industry is unusual.¹⁰

For pension funds concerned about the reliability of information and the veracity of investment partners, contracts could be thought to function like other financial intermediaries. And there is no doubt that contracts offer a kind of institutional formality different from, but nonetheless consistent with, the types of intermediaries identified in Clark (1997). But it is also the case that contracts have other virtues --

virtues that may have contributed to the re-emerging significance of private contracts in Anglo-American economies (compared to twenty years or so ago, see Atiyah 1995). In recent years, the institution of contract has been rediscovered, practically and theoretically. Neoclassical economic theory now dominates the theory of contract emphasizing concepts like voluntary commitment, informed decision making, and (at the limit) pareto optimal exchange relations (Easterbrook and Fischel 1991). In place of paternalism, the ruling ethos justifying past regulation of contract, the neoclassical contract assumes economic agents are, necessarily, autonomous and fully responsible for their actions. In this context, pension funds are increasingly seen as just another kind of investor rather than being our agents with general responsibility for social welfare. The formal language of contract matches in substance the presumed separation of pension funds from the public arena, and the increasing importance of pension funds as institutions at the heart of economic decision making.

In particular, contract provides pension funds a formal mechanism for (1) allocating risk and uncertainty between investment partners (2) for setting partners' performance standards in relation to accepted benchmarks, (3) for defining the rewards and penalties of performance, and (4) for setting the time horizons of investment projects. Formality is essential to the contractual process, either deliberately or indirectly using the language of contract law to set out (in an impersonal manner) the terms of agreement between investment partners. In doing so, contract is an essential mechanism clearly for establishing parties' obligations and responsibilities prior to entering a long-term investment relationship. And by implication, having signed a contract the investment partners are presumed to accept the terms and conditions of the

contract. In theory, at least, the contract is also a means of establishing pension funds' rights to abrogate an investment contract when a partner can not perform according to previously agreed conditions.

Given the advantages of contract, pension funds have come to demand extensive negotiations over the structure of infrastructure investments contracts. The negotiation process is highly involved and must deal at least with three issues: the identification of pension fund investment partners' initial costs and benefits, the allocation of risks and rewards over time, and the terms and conditions of compliance (see Coleman 1992 for a theoretical treatment of these issues). There is a temptation to negotiate contracts that are at once extraordinarily detailed (about the terms and conditions of performance, for example) and comprehensive (about partners obligations and responsibilities with respect to anticipated contingencies, for example). In part, this is because detailed and comprehensive contracts allow pension funds to assess, independently of their advisors, the interests of their partners. And just as importantly, complex contractual specifications are consistent with trustees' habits of prudence and rules of proprietary conduct.

Nevertheless, complexity can involve very high transactions costs, often sunk costs. In this environment pension funds, and other related financial institutions, normally require potential investment projects to meet certain size and structural thresholds so as to spread the costs of due diligence and contractual negotiation. And absent third parties, like governments, that are willing to bear the costs of contractual complexity pension funds and their partners have strong incentives to develop decision making templates which can reduce the costs of contractual complexity in particular

projects. Not surprisingly, the search for templates may also be a search for common types of infrastructure investment projects.

LONG TERM CONTRACTS AS MANAGERIAL INSTITUTIONS

In theory, at least, “[c]ontracts allocate risks; they specify who bears what costs in the event such-and-such occurs” (Coleman 1992, 80). So far we have argued that contracts are essential instruments in pension funds’ relationships with project partners. And we have suggested that contracts fulfill certain, crucial functions -- functions that enable pension fund investment in projects otherwise deemed too illiquid, too risky and too costly compared to conventional investment products. Underlying trustees’ reliance upon contracts is a combination of formalism and idealism. As we have seen, formalism has many advantages including the systematic evaluation, and deliberate allocation, of risks between partners. But, notwithstanding the perceived advantages of formalism, many pension funds seem to imagine that contracts have a desirable ideal form: the promise of performance according to a priori defined terms and conditions and, if necessary, termination and the assessment of damages for non-performance. Rakoff (1994, 204-205) refers to this ideal as the “perfect tender” model of contract, analogous to neoclassical discrete exchange models of contractual relationships.

There are reasons to be skeptical of the idealism embedded in the perfect tender model of contract. For a start, it presumes the existence of complete (and comprehensive) contracts covering all possible contingencies. No doubt such contracts are designed and executed; UK industry analysts report contracts for privately financed infrastructure projects like hospitals running for more than 15,000 pages of legal script.

But mistakes can be made, a party's interests hidden in obscure detail, and gaps left unfilled simply because of the incoherence of such large documents. Not surprisingly, there are financial limits to scrutinizing contractual documents just as there are cognitive limits to conceptualizing the overall structure of such complex documents. In any event, it is impossible to foresee all possible contingencies and it is not always possible to incorporate unlikely but recognized possibilities into contracts. Hence the prospect of injustices, misallocations of risks and returns, and mutually undesirable outcomes looms large. Inevitably the contracting parties may have to establish their own arbitration procedures to provide advice on a wide range of issues short of the dissolution of an investment contract (W M Mercer 1996). Alternatively, they may have to rely upon the courts to settle *ex post* disputes over the implementation of such contracts.¹¹ There are real, unresolved issues about the relative costs and benefits of these types of dispute resolution procedures (see generally Cooter and Rubinfeld 1989).

This argument (the inefficiency of complete contracts) is not universally accepted. Nevertheless it is apparent in the common law and some areas of economics.¹² Rakoff (1994, 204) identifies an alternative notion: the "substantial performance contract". Here, the execution of a contract should be evaluated against its substantive design: a contract should not be terminated nor punitive damages awarded for non-negotiated variations from its terms and conditions if the substantive performance of the contract is unaffected. Rakoff (1994, 205) makes a crucial observation about the relevance of this notion and cites an important majority opinion of Cardozo in Jacob & Youngs v Kent (1921) to illustrate his point.¹³ By his assessment, "the archetypical case ... of substantial performance is the building contract" (footnote omitted). In the

Jacob case, a building contractor had substituted one brand of pipe for another (specified in the contract) leading to a claim for damages from the injured party. The court argued that since the terms of the contract had been substantially met, and since the costs of reparation were disproportionate with respect to the harm inflicted, on balance it was better to honor the performance of the contract than its literal terms and conditions.¹⁴

In coming to his decision, Cardozo (p. 890) observed that the nature of an object (service or commodity) subject to contract can have an important bearing upon the courts' determination of non-performance. Referring to the construction of large buildings, he noted "[t]here will be harshness sometimes and oppression in the implication of a condition when the thing upon which labor has been expended is incapable of surrender because united to land, equity and reason in the implication of a like condition when the subject matter, if defective, is in shape to be returned." Many urban infrastructure projects are "united to land". Likewise, they can not be "returned". Indeed part of their value (risk-adjusted returns) may be directly attributed to their spatial and functional fixity. Two implications follow from the fixity of infrastructure investments for the contractual relationships between pension funds and their partners. One is entirely obvious. Once construction has begun, pension funds may not be able to simply terminate a contract with an investment partner for unacceptable variations on the agreed terms and conditions. The second is less obvious, but no less important. The courts may allow considerable latitude in meeting the terms and conditions of contractual performance given the economic consequences of an excessively narrow reading of a contract: the courts have an interest in the overall efficiency of the contractual institution (see Coleman 1992).

There is another reason why the idealism of the perfect tender model is misplaced with respect to pension fund investment in urban infrastructure -- it ignores or trivialises the process whereby value (risk-adjusted returns) is generated and the long term residual value of investment protected (even enhanced). The conventional discrete choice model of contract assumes “performance is more or less instantaneous” (Bell 1989, 195). In fact, in some long term contracts there may never be a point in time when the contract is deemed to have been executed and concluded. In these cases, contracts are an umbrella for long term committed relationships of one kind or another. For many infrastructure projects, “performance” occurs incrementally over many years, and depends upon the actions and behaviour of pension funds’ agents and their consortium partners. To illustrate, while pension funds may be the ultimate “owners” of a bridge they either rely upon a partner to manage the facility or contract-out the management task to third parties that specialise in the management of bridges. Different kinds of infrastructure investments demand more or less management expertise. Notwithstanding the inherent risks of construction, bridges appear to be a relatively simple kind of infrastructure investment often involving known technology and well-defined performance protocols.

This point is illustrated by Figure 4. The figure summarises the intersection between two essential components in the management of value (performance) in long term infrastructure investment projects. These components are management intensity (compared to capital investment) and management autonomy (compared to automated revenue collection). To illustrate, let us return to the bridge example. Assuming the investing pension funds and consortium partners manage the facility, the management

task appears trivial compared to other types of facilities. The management resources necessary to operate the facility are small and management autonomy practically non-existent. Automated toll booths could easily replace those employed to collect tolls if toll agents proved unreliable. But hospitals seem to be an entirely different matter. Management resources are a significant component of the operation of such a facility, and are essential to the delivery of quality care and hence the flow of patients to the facility. While it is possible to squeeze management resources in the short run thereby either producing higher levels of performance and/or greater resources for capital investment, the quality of care could suffer (thereby affecting the longer term flow of revenue) and facility managers could face resistance from the relatively autonomous professionals they rely upon to deliver quality services.

These are two extreme examples, separated by management complexity (low and high) as well as management expertise (low and high). There are clearly other kinds of facilities with very different combinations of management intensity and management autonomy. For example, owning and operating a railway station or airport may require significant management resources but, nevertheless, rely less on the expertise of specialist professionals than the willing cooperation of employees to meet performance targets. We do not mean to suggest, of course, that this is necessarily an easier task; there are many other variables to be considered and cases to be studied before making a categorical determination of the “best” type of facility with regard to management ease and performance predictability.¹⁵ But it is clear from the UK, at least, that hospital professionals have been better able to claim the sympathy and support of the general public than unionized railway workers whose skill and competence are believed (rightly

or wrongly) to be less significant in the provision of essential services. Some pension funds and their partners, having become aware of these issues have come to recognise that the out-sourcing of management through long term performance contracts may be a desirable option in mitigating any direct responsibility for what are, after all, contentious political issues.

Pension funds are the agents of plan beneficiaries, fund administrators are the agents of trustees, and investment managers are agents of pension funds (Black 1992). Many funds delegate the investment decision making process to investment managers who are expert in particular products and conventional asset classes. Delegation is desired for all kinds of reasons including the relative costs associated with different scales of investment management (see Demski and Sappington 1987). What remains unclear to pension funds, however, is the proper design of agency relationships and the allocation of delegated powers in the context of long term investment contracts. Most delegated, agency relationships are designed for the short term; they mimic the logic of discrete exchange contracts. And like discrete contracts, there is an implied threat of termination if performance less than acceptable. But to run a hospital (for example) by this kind of institutional arrangement would seem problematic. The management resources and expertise necessary to sustain performance are such that neither pension funds nor their agents would benefit from such short term arrangements. At the same time, pension funds are wary of long term reliance upon particular managers; the costs of status quo bias are apparent to many in the industry (see Samuelson and Zeckhauser 1988).¹⁶

CONCLUSIONS

In this paper, we introduced recent evidence which suggests that infrastructure projects may be quite desirable kinds of investments for pension funds. This evidence is, of course, partial in that it reflects the risk and returns results for a set of large infrastructure projects located at a particular point in time (1984-1994) and space (Australia). While it is clear that there are many commonalities between Australia, the US and the UK (and the Anglo-American world in general) in terms of their underlying regulatory structures controlling financial markets and pension fund investments it is just as clear that there are considerable differences between these countries in terms of their pension funds' asset allocations and investment performance. We should be cautious of the implications of any argument which generalises the results of the Australian study. Nevertheless, given the uniqueness of the study, it is apparent that pension funds' interest in alternative investment products in general and urban infrastructure projects in particular will be enhanced by this new evidence.

Having reviewed evidence which would seem to justify project-based pension fund investment, we looked closely at both the nature of these projects and the nature of the investment management process. At first sight it may appear that all infrastructure projects are much the same (and like property investment in general): risk pooling is difficult, liquidity often problematic, and transaction costs significant compared to conventional investment options.¹⁷ In this context, it is apparent that infrastructure investments will not be immediately attractive to all pension funds or, perhaps, even the majority of pension funds. Given the risk averse nature of pension fund trustee decision making, to invest in infrastructure would be to rely on specific internal expertise not widely available in the industry or to rely upon external advisors

and partners in the financial world of considerable distrust rather than trust. Given the rise of the US stock market over recent years it would seem obvious that there are cheaper, safer, and less innovative ways of enhancing short term pension fund returns. Even so, for those funds with the necessary expertise and experience, urban infrastructure investments are a very attractive fixed-income option if expected plan benefit liabilities have long time horizons.

On the basis of the evidence, and our knowledge of the industry, we would argue that all infrastructure projects are not as alike as commonly assumed. To illustrate, we discussed different kinds of urban infrastructure facilities including roads and bridges all the way through to hospitals and housing. The simplest facilities are highly capital intensive relative to management intensity and are rarely subject to profound shifts in technology and demand that would significantly discount the residual value of those facilities. By contrast, there are other kinds of infrastructure projects like hospitals which may be subject to rapid and unexpected shifts in technological quality. Not only do such facilities require massive upfront investment, they may require re-current rounds of re-investment in response to exogenous shifts in medical and treatment technologies. Adding to these risks is a further problem: the fact that such infrastructure facilities tend to depend upon relatively autonomous professional experts for management of the facility. In these cases, the risks are considerable and may be intangible; uncertainty is equally important as risk. We argued that the investment evaluation process is normally quite aware of these risks and the prospects of unaccountable uncertainty. And we argued that the existence of uncertainty may be a significant barrier to investment.

In much of the investment industry, markets provide the means by which risks and returns are allocated between investors (and pension funds). This third-party mechanism allows for risk shifting, reflecting the risk preferences of investors and the capacity of investors to manage or in some way discount those risks. The market for urban infrastructure investment hardly exists and, given the spatial and functional specificity of such projects, may never exist. Instead, the currently desired institutional form of financial intermediation is the legal, binding contract: a formal mechanism through which risks are allocated and performance protocols established. We have argued that formality is desired for a number of reasons including pension fund trustees' concerns that their actions and commitments be externally justifiable. But we also argued that contracts are sometimes wrongly idealised: governments and investors sometimes seem to assume that infrastructure investment contracts have all the virtues of the theory of discrete exchange transactions. In this respect we have argued that in law, and in fact, this is a contentious assumption. We have suggested that long term contracts are not so easily terminated or altered as theory would suggest and we have suggested that the necessary reliance of pension funds upon facility managers for the flow of revenue may combine to lock-in pension funds to urban infrastructure projects.

Now this does not mean that contracts are not a desirable form of financial intermediation, nor does it mean that being locked-in to an investment is necessarily bad. As has been noted elsewhere (Clark 1997), there are a variety of ways of institutionally managing risk and uncertainty in the urban environment. None are perfect any more than the conventional investment process is a perfect. Indeed, the

inability of markets to completely accommodate risk is an important source of institutional innovation and, at times, significant reward. Likewise, those funds willing to risk the dangers of irrevocable commitment are also the institutions that may benefit from such commitment. The problem with contracts as a form of financial intermediation is political. The UK government seems to believe that contracts are an efficient and natural way of pursuing their private finance initiative. For instance, time and again in response to questions from the Opposition, Major's Conservative government argued that investment contracts would absolve the government from fiscal responsibility and the risks of technological change in the hospital sector (for one).¹⁸ The model of financial intermediation implied by such argument would seem to be entirely plausible even if experience of this form of intermediation is limited. However the notion that such contracts are just like discrete exchange contracts is not plausible especially for infrastructure projects that have a significant management component.¹⁹

Pension fund investment in urban infrastructure will obviously develop and expand. It will develop in terms of its sophistication and institutional organisation, recognising and managing risk in ways that, over time, will allow for the application of standard techniques of risk pooling and risk discounting. At present, the most important impediment to development has to do with institutional design: the proper and efficient ways of managing the investment process given the absence of third-party (market) intermediaries. Expansion of pension fund investment in urban infrastructure could be thought to depend upon generalising investment performance: with more experience in infrastructure investment, less knowledgeable pension funds

will be more able to assess or evaluate investment opportunities and hence make the appropriate level of commitments. This notion underpinned the Nippon Credit research project. It is also the case that a better understanding of the institutional process of intermediation is necessary if pension funds are to expand their commitment to urban infrastructure.

NOTES

¹ There is considerable interest in pension fund investment in urban infrastructure, in part allied to moves towards the privatisation of infrastructure facilities in the UK, US and Australia. See for example the General Accounting Office (1996) review of the opportunities and consequences of the privatisation of US airports including reference to new investment, revenue effects and shareholder value. In Australia, the previous Labour government instituted an inquiry into the potential of pension funds contribution to infrastructure provision including recommendations for encouraging the process (see the report of the Economic Planning Advisory Commission 1995 and the December 1996 report of the Senate inquiry). And in the UK, the previous Conservative government sought to speed the private role in infrastructure financing through the PFI process (see HM Treasury 1995). The recently elected Labour government has indicated that it too will use a PFI type of process. See Terry (1996) for a general overview.

² Inevitably, this focus requires broader literature and analytical perspectives than that apparent in the urban studies and economic geography literatures. There are few studies in any discipline of the financial intermediation process in areas such as pension fund investment in urban infrastructure, and few studies in the urban studies literature linking portfolio asset management investment with the provision of infrastructure. Useful methodological perspectives are provided by Thrift and Olds (1996) and Hahn (1989) although it will become apparent that we diverge from both on crucial issues.

³ Over the past two years, the S & P 500 index has increased by 65 per cent. Although other Anglo-American markets have benefited from this rise both the Australian and UK stock markets have been more volatile and have not risen near as much. Even so, the buoyant performance of Anglo-American stock markets have had significant consequences for pension funds and individual portfolio managers. The temptation to delay or switch fixed income investments into equities is clear and has been rewarded in many cases. Likewise, the virtues of alternative investments in areas

like housing while apparent in “normal” conditions are less obvious at present. By contrast, private equity deals (direct investments or leveraged buyouts) which have a market placement option look increasingly advantageous.

⁴ In this case, risk and returns were calculated using actual, historical data. However, estimating returns on project-based investments would be a more complex task. Any comprehensive treatment should presumably involve assessing the expected values of net cash flows discounted by the cost of capital to arrive at the net present value of an investment. Inevitably, this would also involve choosing an appropriate discount rate in the context of expected market values. Fama (1996) provides an intriguing insight into these issues.

⁵ By convention, reflecting the apparent reality of investment management and regulatory requirements, fund managers are properly very circumspect about forecasting past performance into the future. Fidelity Investments (The Times, 18 January 1997, p. 31) in advertising their funds note (in part) “[p]ast performance is no guarantee of future returns. The value of investments and the income from them can go down as well as up and an investor may not get back the amount invested.” These cautions apply here as with any investment product.

⁶ A balanced manager provides a well-diversified pooled product for pension fund trustees to use for investment and the returns are publicly available. Data on the average balanced manager was obtained through industry sources and compiled using PGE’s software programme SuperCMS.

⁷ A great deal has been written about the political and symbolic significance of the urban landscape, including reference to the power of major infrastructure projects and their representation of citizenship in the city. Gregory (1996) has a wide-ranging survey and Harvey (1985) develops a close reading of this issue with respect to the historical urban landscape.

⁸ For some time there has been debate in the industry about the probable legal liability of future governments for past and current investment contracts written with private investment institutions to provide urban infrastructure. The issue debated is whether future governments could arbitrarily abrogate such contracts given a change in political philosophy with respect to the proper responsibilities of government. Clearly, if a government was to do so they would face a law suit for damages consistent with the expectations and entitlements of the aggrieved financial institution. Could a future government argue, however, that its sovereignty should not be fettered by a previous commercial contract? Could a future government simply walk away from past commitments without compensation? Conclusive answers to these questions are difficult to find (see Rudden 1989). Legal opinion is involved rather than substantive doctrine. In conversation Maurice Byers (a previous Commonwealth Solicitor General of Australia) and Patrick Atiyah (the most eminent authority on contract law) have observed that there are few (if any) relevant cases where governments were excused from their contractual obligations for reasons of a change in

political philosophy. They also observe that even in circumstances where nationalisation effectively abrogated private contracts, compensation was deemed necessary even if, at times, inadequate.

⁹ The Mercer report was commissioned by a group of nine large public sector pension funds (including CALPERS and the Pension Reserves Investment Management Board of Massachusetts) with a strong interest in private equity deals and the emerging alternative investment market. Mercers emphasised the need to design “proper incentives”, the need to “minimise distractions” on general partners and the need to recognise “the long-term nature of private equity investing” (p. 71). They also argued for industry-wide benchmarks against which general partners would have to justify their fees and transaction costs. These recommendations have not been universally accepted by project developers concerned to maintain their discretion in the face of concerted pressure from the pension funds.

¹⁰ One of the issues we have not discussed but which has been noted a number of times by industry observers is the fact that relationships in the finance industry are often very fragile over time. People move between institutions, and past commitments established between individuals which require the commitment of their employing institutions are difficult to maintain when people move. This is apparent in the short term, witness the mobility of some of the most prominent investment managers, and is highly likely over the long term as the institutions are themselves subject to considerable restructuring through mergers and acquisitions. Amin and Thrift (1992, 582) discuss the transformation of the City financial industry since the 1960s arguing that “there has been a sea change in the way the City of London has been able to go about its business”. They would be more circumspect about the implications of these changes for the significance and continuity of relationships and institutions than us although it is clear that the old model of trust relationships amongst peers has had to give way in the face of profound changes in the gender, age and ethnic composition of the City (and global) financial workforce.

¹¹ The courts do allow for the rectification of mistakes in written contracts, especially if there are commitments in the contract which one party or more did not intend. More importantly, the courts have been willing to review contracts which one party or more contends were agreed to under duress or undue influence as long as unequal bargaining power can be shown to have affected the bargain to the detriment of the aggrieved party (Cartwright 1991). For a more critical perspective see Dalton (1986) who argues that the courts have also been willing to look at the substantive fairness of contracts referencing social standards of performance not just the terms and conditions of private bargains. Compare with Klein and Leffler (1981) who contend that the market is a common mechanism by which such disputes may be resolved.

¹² Recent research on firms’ optimal investment has come to suggest that, given the existence of asymmetrically distributed information between owners and managers and the scale of investment, there may be instances where contracts are unstable and vulnerable to renegotiation (and renegotiation). Chan and Huang (1995) show that in

these circumstances under and over investment can occur, creating the possibility of investment traps which are not resolved by internal negotiation. Their argument is analogous to our argument in that we contend that given unrevealed different interests between the investing parties (pension funds, general partners, etc) and given the level of commitment implied by many infrastructure projects, it is unlikely that an initial contract will survive over the long term.

¹³ Cited as 129 NE 889, rehearing denied, 130 NE 933 (NY, 1921).

¹⁴ Note that the minority opinion argued for a perfect tender model of contractual obligation. Judge McLaughlin (p.892) began his opinion by noting “[t]he plaintiff did not perform its contract. Its failure to do so was either intentional or due to gross neglect which, under the uncontradicted facts, amounted to the same thing...”. Also, latter, in the dissenting opinion, the Judge observed that even if a person’s preference is “mere whim” if he contracts for performance of that whim he would be entitled to that contracted performance.

¹⁵ In Clark and Wrigley (1997), this kind of management problem is comprehensively examined making reference to a set of crucial variables which seem to be important in deriving value from capital intensive operations. That paper is, in part, about the spatial structure of the firm and the strategic allocation of resources within firms and between spatially separated plants with respect to overall management objectives. Here, we can only observe that there are few case studies of pension fund investment in public infrastructure available to analyse with respect to the issue of management and performance and even fewer available which would allow for comparative analysis of different models of management.

¹⁶ Thaler (1980) coined the phrase “endowment effect” to recognise circumstances where people hold on to something or some commitment beyond that justified by standard rational assessment. He suggested that such behaviour is closely related to risk aversion in that losses are valued more highly (in a sense) than equivalent gains in the market. Given the significance of risk aversion for pension fund trustees, it would seem that Thaler’s observation is of considerable significance for the issue of long term investment contracts.

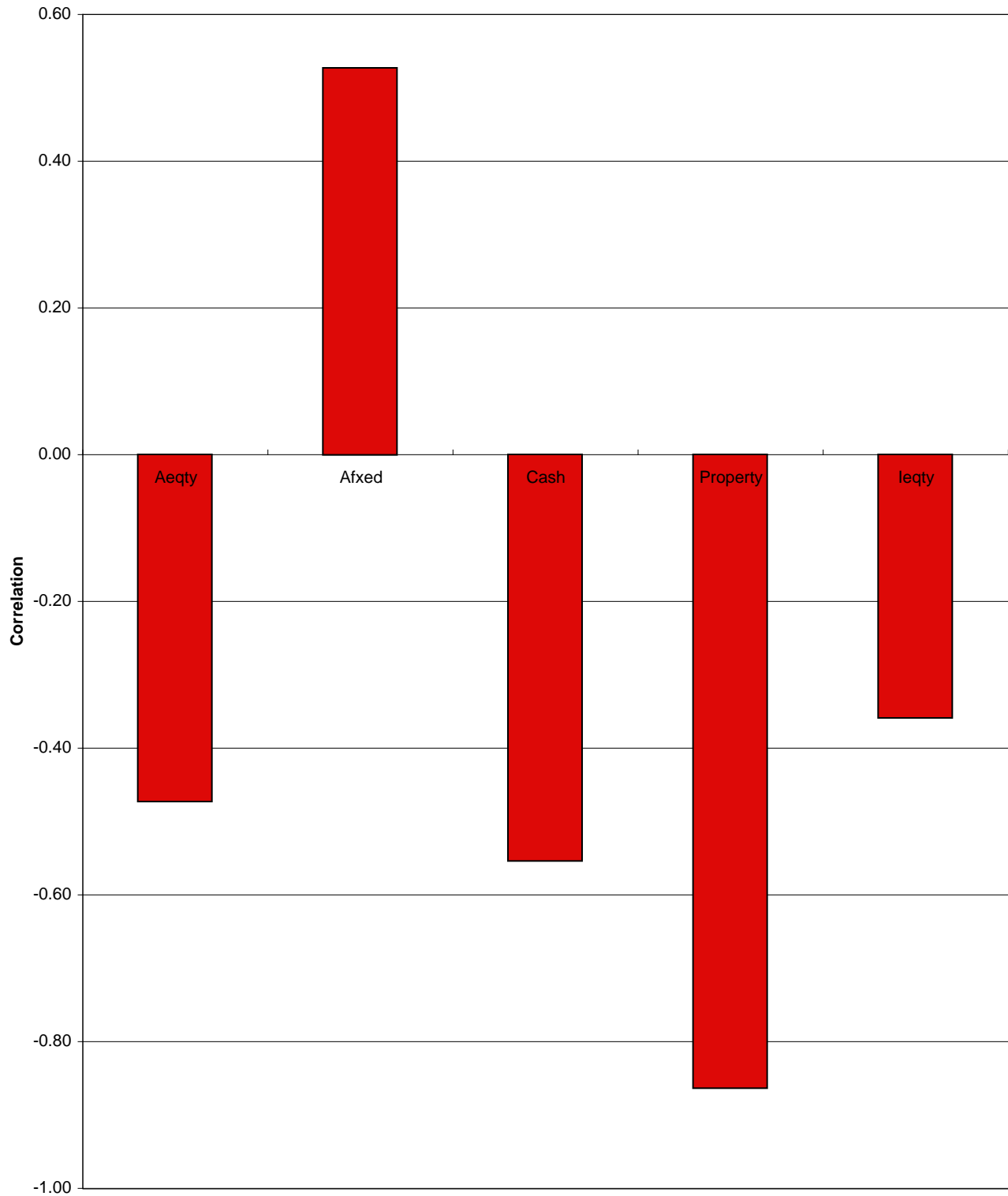
¹⁷ This is a widely shared perception, notwithstanding the existence and success of some property investment trusts. In part, the development of the market for infrastructure investment for many pension funds will depend upon the development of property as an investment class in general. Compared to the US, UK pension funds have been reluctant investors in property. The UK pension fund industry has sought to encourage this kind of development by setting-out established criteria for investment including reference to issues such as transparency, simplification, fee structures and liquidity (see Investment Property Forum 1996).

¹⁸ In debate over the passage of the National Health Service (Residual Liabilities) Act of 1996, the Government argued that the PFI process is a process of risk transfer,

shifting to the private sector all kinds of risks that the public sector can now no longer afford to carry. See the parliamentary debate in the Second Reading, 12 March 1996, Vol. 273, No 68, Column 851. Arguments against the PFI, and its relationship to the hospital sector dominated the Opposition's commentary. They argued that the PFI process is actually a process of "privatisation by stealth" (Column 821), implying the "cherry picking" of investment opportunities (Column 825-26), and worse (the loss of flexibility in resource decisions in NHS Trusts)(Column 858). This last point has been also suggested by analysts more sympathetic to the PFI process. See for example Tyrie (1996).

¹⁹ Oddly, the Secretary of State for Health argued in debate over the passage of the National Health Service (Residual Liabilities) Act of 1996 that PFI investment contracts in the health service (like related PFI investments in urban infrastructure in general) is no different than a contract to buy potatoes (see generally the introduction to the Second Reading, March 12 1996). These sentiments were then repeated in discussion about the virtues of contracts in hearings of the Standing Committee E, Second Sitting 21 March 1996 (Columns 49-50). Not surprisingly, the Opposition were uncomfortable with the analogy although none thought to tackle the plausibility of the analogy.

**Correlations over 10 Years to June 1994
of Infrastructure with Other Major Sectors**



REFERENCES

- Amin, A. and Thrift, N. 1992. Neo-marshallian nodes in global networks. International Journal of Urban and Regional Research 16, 571-87
- Atiyah, P.S. 1995. An Introduction to the Law of Contract. 5th Edition. Oxford: Oxford University Press
- Baier, A. 1995. Moral Prejudices. Cambridge MA: Harvard University Press
- Becker, C. 1996. Trust as non-cognitive security about motives. Ethics 107, 43-61
- Bell, J. 1989. The effect of changes in circumstances on long term contracts 1: English report. In Contract Law Today edited by D. R. Harris and D. Tallon. Oxford: Clarendon Press
- Black, B. 1992. Agents watching agents: the promise of institutional voice. UCLA Law Review 39, 811-93
- Cartwright, J. 1991. Unequal Bargaining: A Study of Vitiating Factors in the Formation of Contracts. Oxford: Clarendon Press
- Casson, M. 1991. The Economics of Business Culture. Oxford: Clarendon Press
- Chen, Z. and Huang, H. 1995. Investment trap. Discussion Paper 227. London: London School of Economics, Financial Markets Group
- Clark, G.L. 1997. Pension funds and urban investment: four models of financial intermediation. Environment and Planning A (forthcoming)
- Clark, G.L. 1998a. Why convention dominates pension fund trustees' decision making. Environment and Planning A (forthcoming)
- Clark, G.L. 1998b. The anatomy of corruption: the practice of pension fund investment decision making. Environment and Planning A (forthcoming)
- Clark, G.L., Burkitt, J., Caldow, W. and Jobling, M. 1996. The Australian Superannuation Industry. Working Paper 7. Melbourne: Australian Housing and Urban Research Institute
- Clark, G. L. and Wrigley, N. 1997. The spatial configuration of the firm and the management of sunk costs. Economic Geography (forthcoming)
- Coleman, J.L. 1992. Risks and Wrongs. Cambridge: Cambridge University Press
- Commonwealth of Australia. 1996. 21st Report of the Senate Select Committee on Superannuation: Investment of Australia's Superannuation Savings. Canberra (http://www.senate.aph.gov.au/committee/super_ctte/report_21/)

- Cooter, R. D. and D. L. Rubinfeld. 1989. Economic analysis of legal disputes and their resolution. Journal of Economic Literature 27, 1067-97
- Dalton, C. 1986. An essay in the deconstruction of contract doctrine. Yale Law Journal 94, 997-1114
- Demski, J. S. and Sappington, D. 1987. Delegated expertise. Journal of Accounting Research 25, 68-89
- Easterbrook, F. and Fischel, D. 1991. The Economic Structure of Corporate Law. Cambridge MA: Harvard University Press
- Economic Planning Advisory Commission. 1995. Private Infrastructure Task Force Report. Canberra: Australian Government Printing Service
- European Federation for Retirement Provision (EFRP). 1996. European Pension Funds: Their Impact on European Capital Markets and Competitiveness. London
- Fama, E. 1996. Discounting under uncertainty. Journal of Business 69, 415-28
- Gambetta, N. ed. 1988. Trust: Making and Breaking Cooperative Relations. Oxford: Blackwell
- General Accounting Office. 1996. Airport Privatisation: Issues Related to the Sale or Lease of US Commercial Airports. RCED-97-3. Washington DC
- Gregory, D. 1996. Geographical Imaginations. Oxford: Blackwell
- Hahn, F. ed. 1989. The Economics of Missing Markets, Information and Games. Oxford: Clarendon Press
- Hardin, R. 1996. Trustworthiness. Ethics 107, 26-42
- Harvey, D. 1985. Consciousness and the Urban Experience. Oxford: Blackwell
- HM Treasury. 1995. Private Opportunity, Public Benefit: Progressing the Private Finance Initiative. London
- Houthakker, H. and Williamson, J. 1996. The Economics of Financial Markets. Oxford: Oxford University Press
- Investment Property Forum. 1996. Property for UK Pension Funds. London: National Association of Pension Funds
- Kahneman, D. and Tversky, A. 1979. Prospect theory: an analysis of decision under risk. Econometrica 47, 263-91

- Klein, B. K. and Leffler, K. 1981. The role of market forces in assuring contractual performance. Journal of Political Economy 89, 615-40
- Knight, F. 1964 [1921] Risk, Uncertainty and Profit. Reprints of Economic Classics. New York: Augustus M. Kelley
- Luhmann, N. 1979. Trust and Power. New York: Wiley
- Machina, M. 1991. Dynamic consistency and non-expected utility. In Foundations of Decision Theory edited by M. Bacharach and S. Hurley. Oxford: Blackwell, pp. 39-91
- Merton, R. C. 1994. Influence of mathematical models in finance on practice: past, present, and future. Philosophical Transactions, Royal Society (London) 347, 451-63
- Misztal, B. A. 1996. Trust in Modern Societies. Oxford: Polity Press
- Moffat, G. 1994. Trust Law: Text and Materials. 2nd Edition. London: Butterworths
- Rakoff, T. 1993. Social structure, legal structure and default rules: a comment. Southern California Interdisciplinary Law Journal 3, 19-28
- Rakoff, T. 1994. The implied terms of contracts: of default rules and 'situation sence'. In Good Faith and Fault in Contract Law edited by J. Beatson and D. Friedman. Oxford: Clarendon Press, pp. 191-228
- Rudden, B. 1989. The domain of contract 1: English report. In Contract Law Today edited by D. R. Harris and D. Tallon. Oxford: Clarendon Press pp. 81-113
- Samuelson, W. and Zeckhauser, R. 1988. Status quo bias in decision making. Journal of Risk and Uncertainty 1, 7-59
- Sharpe, W. and Alexander, G. 1990. Investments. 4th Edition. Englewood Cliffs: Prentice Hall
- Siegel, J. J. 1994. Stocks for the Long Run: A Guide to Selecting Markets for Long-Term Growth. Homewood IL: Irwin Professional Publishing
- Terry, F. 1996. The Private Finance Initiative--overview reform or policy breakthrough. Public Money & Management (January-March) 9-15
- Thaler, R. 1980. Toward a positive theory of consumer choice. Journal of Economic Behaviour and Organisation 1, 39-60
- Thrift, N. and Olds, C. 1996. Refiguring the economic in economic geography. Progress in Human Geography 20, 311-337

Tversky, A. and Kahneman, D. 1986. Rational choice and the framing of decisions.
Journal of Business 59, S251-78

Tyrie, A. 1996. The Prospects for Public Spending. London: Social Market Foundation

W M Mercer. 1996. Key Terms and Conditions for Private Equity Investing.
Report available from the Pension Reserves Investment Management Board of
Massachusetts, 125 Summer St, Boston 02110