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**An institutional and spatial consideration of markets
for financialised infrastructure**

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ABSTRACT

This thesis examines the contemporary and ongoing financialisation of infrastructure from an institutional and spatial perspective. It brings together the diverse and disconnected literature on infrastructure, markets, institutional capital and the state. More broadly, this research addresses a gap disclosed in the literature on financialisation in general, the financialisation of infrastructure in particular, and the role of private investment capital which, to date, has been criticised for lacking an in-depth and detailed understanding of the institutional drivers that shape the manifestation of contemporary capital markets in an increasingly financialised public space.

Its main contributions are to open up the *black box* of capital by taking a granular approach to the analysis of the institutional actors active in infrastructure investment; particularly highlighting the mediated actions of the state as an investment actor in infrastructure markets. It examines the ongoing engagement with investment markets by state, quasi-public and private institutional actors; and analyses the impact of the spatial derivations of capital on the markets in which that capital is ultimately deployed.

This study draws on original empirical research based on qualitative interviews with major institutional investors of equity and debt capital into financialised infrastructure assets and services; including multilateral financial institutions (MFIs), Sovereign Wealth Funds (SWFs), pension and annuity providers, infrastructure funds and private equity firms.

It is the proposition of this thesis that the financialisation of everyday utility services represents a locus wherein the state is taking on new and variegated forms to co-invest with and through private capital and to engage with institutional investment markets. It is a lens through which to examine ongoing processes of financialisation. It represents a clear institutional emphasis in the study of spatially variegated infrastructure markets, and charts the transformation of infrastructure from an essential social asset to an equally essential and politicised financial asset class.

Keywords: *infrastructure, financialisation, economic geography, neoliberalism, institutional capital*

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The thrust of this thesis has at its origin, the factors that impelled me to return to academia. Financing infrastructure in numerous countries, gave me a feel for the worlds of institutional investment and international capital markets. More recently time spent in regional economic development, and government supported regional funding, as well as living in the North East of England, gave me a strong sense of the importance of policy; and that if it is to be done well, then it must be robustly derived and based on empirical data. It has been my good fortune to spend the last four or so years within the Centre for Urban and Regional Development Studies (CURDS) at Newcastle University, a place where contributing to policy and the social impact of research, are guiding principles.

In that context I would like to specifically thank my main supervisor, academic mentor and Director of CURDS, Andy Pike. He has been a constant source of advice, encouragement and wise counsel as well as, I hope, a friend. I owe him a great debt. I would also like to thank my two other supervisors Jane Gibbon and Oliver Heidrich for their support, guidance and enthusiasm over the years.

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Chapter 1: Introduction

‘What is called for... is a nuanced analysis of the temporality *and spatiality* of capitalist development... This means moving beyond the routine pluralisation of capitalism... to probe the principles, sources and dimensions of *capitalist variegation*’ Peck & Theodore (2007: 760)

‘If we are to understand the economic landscape of twenty-first century capitalism, it should be understood through global financial institutions’ and their ‘investment practices’ Clark (2005: 99)

The firm in mainstream economic theory has often been described as a “black box”. And so it is’ (Coase, 1992: 714)

The above three quotes have deeply informed the direction and focus of this research; the aim of which is to take an institutional and spatial approach to understanding the mechanisms by which state, quasi-public and private actors make decisions on infrastructure provision and investment, and thereby to better understand how contemporary global infrastructure investment markets are constructed and maintained.

By pursuing an institutional approach to the understanding of investment and institutional capital, and its spatial accumulation and deployment, this thesis answers a recurrent call in the literature for more empirical research into the motivations and characteristics of institutional investment actors. This is undertaken in order to unpack the black box of the firm (Coase, 1992; Pollard, 2003), to move beyond the neo-classical theoretical construct of a representative or average firm (Marshall, 1961), and to arrive at a more institutionally contextualised view of 21st century capitalism (Clark, 2005). Through original empirical research derived from direct interviews with forty-five major market actors accounting for £10.3tn in Assets under Management (AuM) and advisory mandates, of which £780bn is invested in or allocated to infrastructure, a nuanced picture is formed of the relational links between public and private investment actors and the significant institutional variegation between these binary institutional poles. This study finds that this space is populated by quasi-public investment actors such as Multilateral Financial Institutions (MFIs) and

Sovereign Wealth Funds (SWFs), public pension and annuity funds, and by mediating entities such as Infrastructure funds, Private Equity firms (PE) and other asset managers who, when managing money over which the state exerts some measure of control or influence, contribute to a manifestation of mediated state investment (see also Fig 1.4).

It is also the view of this thesis that such an institutional and relational approach permits a better informed and more nuanced spatial understanding of the derivations of institutional capital, and the cultural, political and economic factors that guide its eventual investment in infrastructure markets that have come to sit at the interface of money, the state, engineering and society; and have formed the largest emergent asset class (Weber and Alfen, 2010) of the 21st century. It is important to note that the typology of investment approaches developed in Chapter 5, along with the mixed methods approach to the research as a whole, prevents any risk of descent into institutional particularism amongst the complexity of this study. Indeed, the strongly institutional approach is in fact a key point of entry into the complexity and heterogeneity of infrastructure markets.

Infrastructure can be seen as a multi-layered, spatially contextualised, aspect of society. It is integral to social, urban and industrial development (Pollard, 1981); it is the ‘foundation upon which our economy is built’ (IPA, 2016). It is regarded as a social good, an investment multiplier and agent of job creation (IMF, 2014), and a proxy for economic competitiveness in that ‘it is vital for economic growth and development’ (Estache, Serebrisky and Wren-Lewis, 2015: 7). As if these properties did not weigh heavily enough upon infrastructure, its potential for generating stable economic returns is regarded with increasing importance by the investment community as a compelling and attractive investment narrative (World Economic Forum, 2014), and one that occupies a unique niche within broader institutional portfolios (Ashton, Doussard and Weber, 2012; Della Croce, 2012; PWC, 2017).

The growth in institutional investment in infrastructure assets and markets in recent decades has been pronounced (Prequin, 2017; Thrower, 2014; Torrance, 2009a). The ongoing financialisation of infrastructure assets is a current and growing global phenomenon (O’Brien and Pike, 2015) and, as a result, infrastructure has become a major new global investment asset class (Allen and Pryke, 2013; Inderst, 2010; Weber and Alfen, 2010). Infrastructure assets, networks and services that might once have been regarded as within the purview of state actors to own and operate (Cumbers, 2012; Smith 2012 [1776];

Polanyi, 1994) are now routinely subject to market based models of delivery, and ultimately financialised on increasingly liquid global markets. Earlier state models of infrastructure ownership have increasingly been replaced with models of governance by regulation (Becker et al, 2010). Through these processes, the world of finance, institutional investors, and volatile capital markets are granted ingress into essential services that impact on our daily lives (Langley, 2008; Martin, 2002). This thesis, taking as it does a strongly institutional approach, argues that contemporary infrastructure markets encompassing actors from across the public to private spectrum, can be seen as a lens through which to understand contemporary capitalism. In turn, we can better understand the ways in which processes of financialisation manifested through market mechanisms and infrastructure assets into our social fabric.

It is the case that a principal focus of this study is why pools of investment capital coalesce around certain geographies and sectors and not others, the critical determinants of the quantum of these investment pools, and their public and private institutional mix. For the markets addressed by this thesis the investment opportunities around which this investment occurs are those of our everyday utility services, the emergent asset class that is infrastructure. It is the spatial variegation of this investment capital and the increasing financialisation of this infrastructure and the ways in which it is shaped and altered by the increasing extent of investor ownership, shareholder metrics and the exigencies of the markets that constitutes the core focus of the study.

Such considerations cannot entirely ignore that, for these investment opportunities to occur, there are a series of policymaking, legal and contractual decisions to be taken by the incumbent owners, who have in many cases been state or sovereign based entities. It is important to note that these processes, addressed in the academic literature on marketisation and essential to the creation of dynamic markets for institutional involvement in infrastructure, are not the primary focus of this thesis.

The interviews for this research focus on those entities, both public and private, who in the main are concerned with investing in infrastructure assets and services, and who are charged with creating investment returns (or desirable social outcomes in the case of Multilateral Financial Institutions) for their ultimate stakeholders, be they state governments, pension holders or fund investors. This focus to the empirical research reflects that financialisation

that is the core concern of this thesis. The construction of markets and more pertinently considerations of marketisation in the abstract are less of a focus. This is reflected in the approach to the literature and moreover in the findings chapters of the thesis.

Financialisation, throughout this research, refers to the increasing importance, power and influence of financial markets, financial motives, financial institutions, and financial elites in the operation of the economy and its governing institutions, at national and international levels (Epstein, 2001). This then being manifested, in an infrastructure context, by the transformative effects that turn infrastructure assets into investable financial instruments. This can be seen in a qualitative sense with the growing involvement of institutional investors and financial markets in the provision of infrastructure assets and services. It can also be evidenced quantitatively in terms of the size of infrastructure markets, the quantum of financially derived income compared to state finances and the *real* economy, and in the volume of transactional data referenced throughout this thesis, notably that derived from the Preqin database. The apparent enmeshment (O'Neill, 2004) of finance, the state and the economy, is here viewed through the locus of the market. It is proposed that it is precisely through contemporary infrastructure markets that we see the conjunction and blurring of the qualitative state and variegated capital, can witness the ongoing processes of market construction and reconstruction, and can observe financialisation in action.

This Chapter sets out the foundational principles on which the thesis is based. Firstly, in 1.1 it contextualises the nature of the growing phenomenon (O'Brien and Pike, 2015) of processes of financialisation occurring to infrastructure assets and systems, and proposes the importance of an institutional appreciation of market (re)construction. Section 1.2 expands further upon the framework of the research; namely the importance of, and rationale for, a spatially and institutionally contextualised reading of 21st Century capital. 1.3 Outlines the key conceptual and theoretical contributions of the study. The Chapter then closes at 1.4 with an overview of the structure of the thesis in its entirety.

1.1 Contextualising infrastructure financialisation; institutional and spatial approaches to market (re)construction

‘Urban infrastructure in developed nations is a persistent problem’ wrote O’Neill in 2017. The same is true for non-urban infrastructure and for emerging and frontier economies. In addition to the increasingly pressing current societal demands for new infrastructure, there is a need to correct for the adverse consequences of decades of relative underinvestment (Bhattacharya, Oppenheim, and Stern, 2015; McKinsey, 2017). Installed infrastructure needs ongoing maintenance, repair and upgrade and is often in an ageing, compromised or deteriorated condition (Picot *et al*, 2016; ASCE, 2017), as a result of a ‘legacy of historic under-investment’ (HM Treasury, 2013: 13). The fact that much infrastructure is currently operational beyond its original intended life and specification is nothing new (Choate and Walter, 1981). It has its origins in the sovereign debt crises and oil crisis of the 1970s, and is reflected in the words of the President of the American Society of Civil Engineers (ASCE), President B.D. Leonard ‘we are still driving on Eisenhower’s roads and sending our kids to Roosevelt’s schools’ (Kettl 2010:1; Pike *et al*, forthcoming). In aggregate the quantum of this investment gap is estimated at anywhere from \$1tn pa (Standard & Poor’s, 2014 cited by McKinsey & Co, 2017) up to \$2tn - \$3tn pa (Bhattacharya, Oppenheim, and Stern, 2015: 32); the discrepancy being partly accounted for by the inclusion (or not) of social infrastructure which the S&P/ McKinsey numbers exclude. In the US alone the shortfall between projected infrastructure spend and actual need is estimated at \$4tn between 2016 and 2040 (IJ Global, 2017b).

So new infrastructure must be designed, procured, built, financed and, importantly, also funded. One might logically turn to government, a traditional provider of these services, for a solution, but the scale of the task is enormous (Bhattacharya, Oppenheim, and Stern, 2015; OECD, 2007, 2015). A financing and funding challenge exacerbated by the generally acknowledged decades of under-investment. Despite the policy importance and profile of these infrastructure issues, the quantum of capital to solve the present infrastructure challenge is seemingly beyond the resources of fiscally and debt constrained sovereign governments to finance. Even where financing solutions (be they public or private in nature) can be found, there remains the difficulty of constructing robust funding models for

the long term servicing of the original finance (O'Neill, 2017, Strickland, 2016). There also seems to exist a disconnect between investors and their surplus investment capital on the one hand, and governments with their schedules of infrastructure projects on the other:

‘There is no fundamental scarcity of private capital – investors are frequently falling short of their target allocations. Despite infrastructure’s in-principle attractiveness as an asset class and the reduced role of traditional financing, investors struggle to find opportunities that are globally competitive on a risk-adjusted return basis... discussions exposed significant perception gaps between investors and governments, both in expectations for private investment and in understanding of investor mandates and preferences’ (World Economic Forum, 2014: 1).

As a result, new models for attracting and structuring infrastructure investment are being proposed and deployed. These make use of fiscal incentives such as tax increment financing (Strickland, 2016), and borrowing against projected uplift in land values (O'Brien, Pike and Tomaney, 2015). Also older models such as PFI and PFI2 have been re-purposed and globally disseminated as PPP/ P3 structures with variegated roles, responsibilities, and degrees of ownership apportioned between public and private actors (Birch and Siemiatycki, 2015; Whiteside, 2013). To the power of the state has been added the capital resources of the capital markets and investment institutions. Traditionally seen in a binary (and often adversarial) fashion of public versus private, suddenly the contemporary financial landscape seems considerably more nuanced and variegated. The old model of state run, owned and financed infrastructure is changing. The previous involvement of non-state investors in the form of sovereign bond investors and banks, persists in terms of debt, but an empowered and hungry institutional investor base has, over the last few decades, assumed a material position in terms of controlling capital, as an equity or concession owner, financier and provider of previously state owned infrastructure assets and services.

Infrastructure is neither in itself necessarily a public or private good but is essential in the construction of market economies (O'Neill, 2013). The degree of public sector prominence at any time reflects the prevailing ideological tussle between state infrastructure provision versus an increasingly influential orthodoxy of market primacy and financialised solutions. In turn the *opportunity* for private sector financing and provision reflects the extent of

unbundling enabled and enacted by the state over time (Jacobson and Tarr, 1996) as outlined in Fig 1.1:

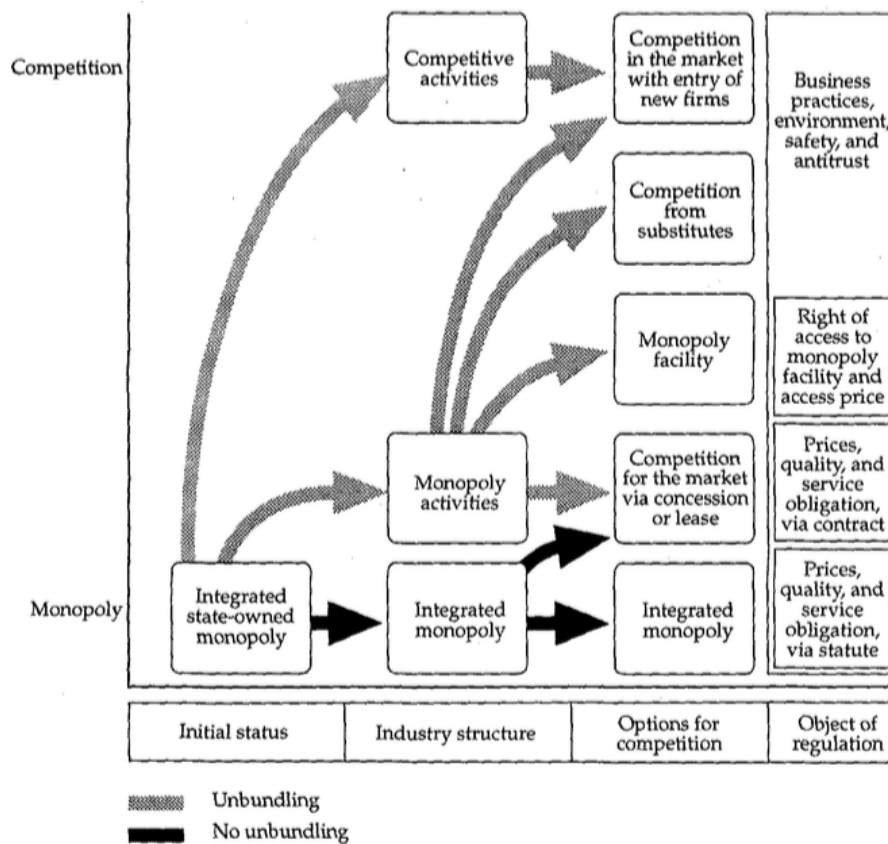


Fig 1.1: Unbundling activities increase the options for competition and private sector development

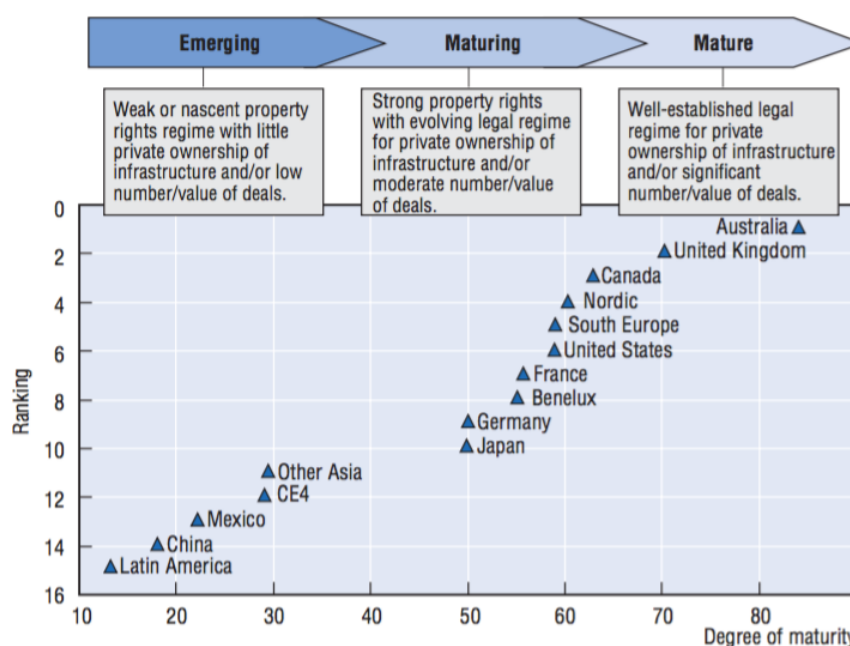
Source: World Bank (1994), cited in Jacobson and Tarr (1996)

The important thing to note, is that the above unbundling schematic represents an insight into the processes by which private sector actors (investors and operators) become involved with the provision of essential infrastructure, in concert with and replacement of public sector actors. What is clear is that the extent of this process; its character, pace of implementation and sectoral profile, is highly spatially variegated across different economies and governmental cycles.

There is however a caveat to be made when considering such schematics as Fig 1.1; and that is the implicit assumption of state or private as the two polar solutions or options in the provision of infrastructure. This study will address and challenge such assumptions, identify a number of variegated institutional actors that exist between these public and

private poles, and analyse the implications of a continuum of hybrid public-private actors and capital, in terms of the spatially uneven nature of investment activity and infrastructure provision.

What can also be observed is that necessary pre-conditions for the unbundling envisaged in Fig 1.1 include the administrative capacity of the state (in terms of new statute and regulatory frameworks) and the likelihood (ideally even pre-existing presence) of significant non-state investor interest in assuming an ownership or provision role in the infrastructure sector being unbundled. In that context Fig 1.2 is illuminating in that it places the likes of Australia, the UK and Canada at the head of those countries with the most mature infrastructure markets globally. As shall be demonstrated in Chapters 4, 5 and 6; it is these very geographies that have benefitted from substantial pools of endogenous capital over time, and have been most active in the promulgation of new and financialised forms of infrastructure investing and asset construction.



Note: This figure, developed by RREEF Infrastructure, ranks countries by maturity based on country risk (including legal and regulatory risk along with political, economical and financial risk) together with the value of completed deals in the last 24 months as a percentage of GDP (reflecting a country's experience with private involvement in infrastructure projects). CE4 are Poland, Hungary, the Czech Republic and the Slovak Republic.

Fig 1.2: Variations in infrastructure market maturity across global markets

Source: Löwik and Hobbs (2006) of RREEF Infrastructure, using data and analysis from IMF (April 2006), Thomson Financial (11 April 2006), Euromoney (March 2006).

Whilst we note that Fig 1.2 has been produced by one institutional investor and thus is, to an extent, one perspective on market maturity. It is relevant here as it is based on a wide range of quantitative transactional data gathered and collated by the IMF, Thomson Financial and Euromoney. It is therefore an empirically derived view on relative market maturity and, importantly, accords closely with other transactional evidence seen by this study from Preqin and in background data relating to empirical interviews.

1.2 Outlining the guiding principles of the research: a spatially and institutionally informed analysis of investment capital and markets

This thesis has as its core concern, and as a key contribution to the literature, an analysis of the evolving behaviours of investment institutions and actors across a spectrum of identities that might simplistically in the past have been characterised as ranging from public to private.

The analysis of the literature makes clear an institutional absence in the academic framings of 21st century capitalism. In the relatively recent constructions that are investment markets for financialised infrastructure we can see clearly the enmeshment (O'Neill, 2004) of the state, quasi-public actors and broader forms of private institutional capital. By taking a granular approach to institutional capital and the ongoing (re)construction of markets, this thesis argues that it is possible to arrive at a more spatially informed comprehension of institutional capital origination and deployment, and to better understand the relational arrangements and linkages between variegated institutional actors.

The thesis first examines the quantitative data garnered from transactional records across the infrastructure sector and held within the industry leading Preqin database. This analysis enables the major infrastructure market players to be readily identified. This in turn then informs the types of market actor and institutional investor that are selected for interview. Within each category those entities with the largest investment in or allocation to infrastructure become the focus of the research. The empirical interview research data from these institutional actors is then analysed to derive the principal findings with which to answer the three research questions.

The actions of the state and extended quasi-public actors, both through direct interventions and investments and via their commitments to third party structures such as funds, together referred to as the mediated state, are examined alongside those of other private forms of institutional capital, to derive a detailed understanding of current infrastructure markets. This, taken in conjunction with the thesis focus on a profoundly spatial understanding of institutional capital, allows for a comparison of the geographies of investment capital and infrastructure need. In turn conclusions can then be drawn as to how the spatial and institutional configuration of markets are either enabling or constraining the ability of those markets to meet the social, political and economic demand for new and upgraded infrastructure.

Contemporary readings of academic literature and public policy suggest that the rise of the institutional investor in the context of infrastructure investment and ownership is a consequence of the opportunities occasioned by an increasing regard for market based solutions and of financialisation. The wave of policymaking around privatisation and concession granting, and pertaining to key infrastructure assets, being a consequence of neoliberal economic thinking (Henisz, Zelner, and Guillén, 2005), a belief in the competitive value to be derived from markets, and the abstraction and delegation of state financial liabilities to variegated institutional capital. In major part however, it could also be viewed differently, as being borne out of a simple economic factor, surplus investment capital seeking a return.

Positioned at the conjunction of these forces of supply and demand, the need for new infrastructure, the constrained financial resources of the state, and the investment exigencies of surplus capital; are the growing markets for infrastructure investment. The complex interplay and enmeshment between the state, other public actors, and private institutional capital in the context of the development of infrastructure as an asset class (Inderst, 2010: 70) has remained stubbornly undocumented.

In the present climate of fiscal austerity, market-based infrastructure solutions are in the ascendancy. Despite this fact ‘markets...have rarely been made an object of study’ (Berndt and Boeckler, 2009: abstract), and have remained stubbornly ‘under-theorised’ and ‘peripheral in economic geography’ (Christophers, 2015). Nevertheless, society is seeing

previously monopolistic, publicly provided utility services being exposed to and traded on international markets to an unprecedented degree; a development that has profound societal and financial implications. In order to understand the empirical imperative of observable infrastructure financialisation, and to address the under-theorising of markets in the literature, this thesis places markets, and a spatial understanding of the investment institutions that constitute them, at the core of its research. This rigorous spatial and institutional focus has been developed to address the key gaps identified in the extant literature on infrastructure markets and their construction and reconstruction. The detailed examination of this literature is the topic of Chapter 2 of this thesis.

By examining these gaps in the literature, it is intended that the following Research Questions, relevant to an institutionally and spatially contextualised understanding of infrastructure markets, can be answered.

1. What are the roles and strategies of the state and private institutional capital in the construction, maintenance, and reconstruction of contemporary infrastructure markets?
2. What is the extent and nature of relations between the state and private capital as a consequence of their involvement in the co-creation of, and investment in, markets for the ongoing financialisation of infrastructure?
3. What is the role of geography in creating markets that are able to reconcile issues of infrastructure need and capital surplus?

The questions with which this thesis is concerned are critically relevant at this point in time. We are reaching a tipping point, with 67% of all OECD privatisations occurring between 1990 and 2006 relating to infrastructure transfers from the state (Bhattacharya, Oppenheim, and Stern, 2015: 25), 60% of the UK's National Infrastructure and Construction Pipeline to be delivered by institutional private capital (IPA, 2016: 10, Institute for Government, 2017: 7) (Fig 1.3), and where the private sector now 'provides more than 40% of public goods' (Peters, 2012: 229). Government agencies and departments and Multilateral Financial Institutions (MFIs, a term used throughout this study to also encompass Development Banks) are co-invested with infrastructure funds and Private Equity (PE) firms. Public and Private sector pension funds (PFs) and other annuity providers (such as

the big insurance companies) are investing in the infrastructure *asset class*, itself not even a term a few decades ago, in ever greater numbers. Indeed, pension companies in some cases are becoming infrastructure firms; the Canadian pension giant, CDPQ forming CDPQ Infra for example. We have reached a point where infrastructure has now become firmly established as a mainstream financial market, and in terms of quantum one wherein the European infrastructure market is bigger than its real estate counterpart (Inderst, 2013: 14-15, RREEF, 2011).

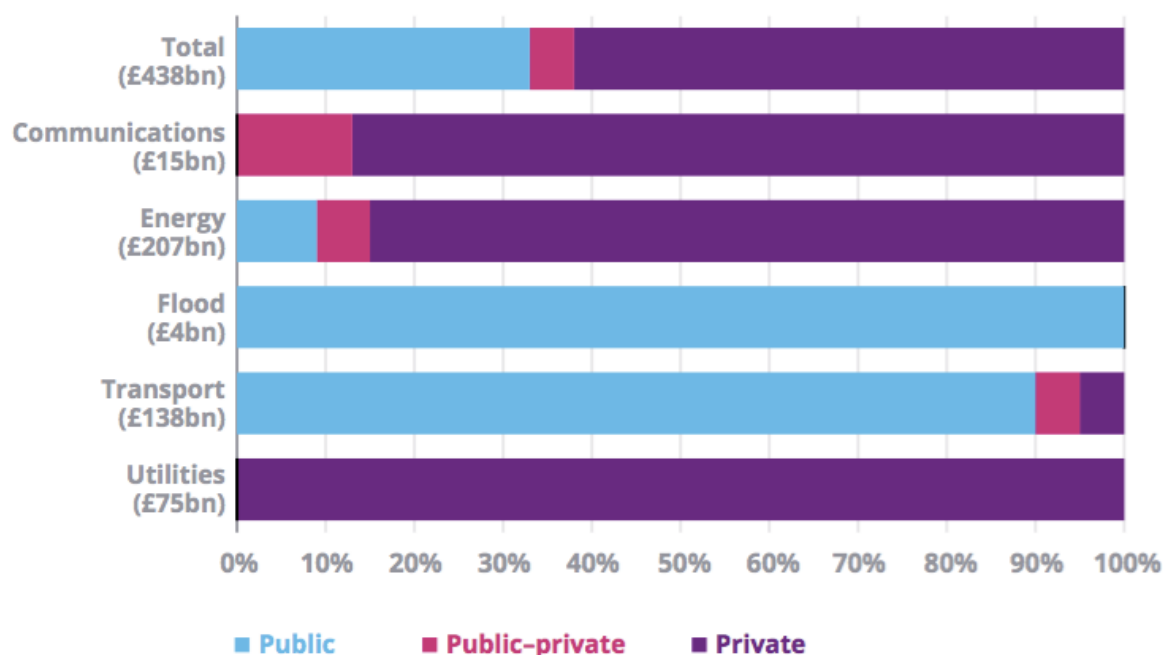


Fig 1.3: Investment in economic infrastructure sectors, by finance model 2016/17 onwards (UK market data)

Source: Institute for Government (2016)

This process, the construction of a largely new market in infrastructure securities, assets and services, has occurred to some degree by stealth. Certainly, the privatisation of some utilities has been criticised for being undertaken at an undervalue (Albaladejo, 2014; Allen and Pryke, 2013; Pike, 2006; Whitfield, 2011). In other instances, long term concessions granted to financial actors have raised concerns about taxpayer value (Farmer, 2014; Froud *et al*, 2000; Hearne, 2011; Hoffman, 2009; Weber, 2002) and compromised policy flexibility for the state (Harvey, 2014; O’Neill, 2015). Some private service providers have also attracted opprobrium for poor levels of service (Hillier and Van Wezemael, 2008). Despite all of these examples (and there are many more) the broader movement towards market metrics in the delivery of essential services and financial markets as the vehicle for

the ownership and trading of infrastructure assets has, the growing body of political economy literature aside, seen relatively little public debate or political dissent until recently.

This thesis then, brings these elements together by considering the role of different institutional investment actors, and of public and private capital, in the provision of infrastructure. It is an analysis of how these institutional examples of variegated capital are, in aggregate, and aided by the heterogeneous nature of infrastructure, constructing and re-constructing contemporary infrastructure markets and thereby having an increasing impact on the nature of the essential services that affect our daily lives.

As has been outlined already, and is explained further in Chapter 4, in the context of this institutional analysis, the state is not merely seen as a policy maker and regulator, but also as a multi-faceted financial actor. The narrative of fiscal austerity may present the state as capital constrained and suggest that the public sector cupboard is bare. This thesis, the Preqin industry data, and the work of (among others) Hildyard (2012), would suggest that it is not. Table 3.3, derived by the author from Preqin data on over 3,000 investment institutions, suggests that some £25tn of AuM, out of a total investment market of circa £62tn, have some kind of public sector derivation or ownership (Preqin, 2016; OECD 2016, 2017; Willis Towers Watson, 2016, 2017; author's own calculations) and constitute the capital manifestation of the state and the mediated state in infrastructure markets. What is undeniable is that there is an increasing evidence of state and quasi-state actors as economic co-investors alongside or through private sector institutions.

The public actors that are the object of this study are those entities wherein there is some state linked aspect or derivation to the role in which they are playing in the context of financialised infrastructure, and investment therein. This study therefore considers the actions of Government agencies (through loan, grant or subsidy), SWFs, Public Sector Pension Funds (PSPFs), and state supported MFIs, including those supported by a single state such as the China Investment Corporation (CIC), as having the characteristics of public actors. Private actors, in this study, refers to institutional capital that would conventionally be regarded as market, shareholder or investor driven; and outside of immediate state control. Such institutions encompass infrastructure funds, private pension funds, banks, private equity firms, hedge funds, and other aggregators and deployers of

privately derived financial resources such as Family Offices (in the Continental European use of that phrase) and more general asset managers. Financialised infrastructure is simply those utility services, assets and systems of economic and social infrastructure that have been opened up to the influence of the markets (Pike and Pollard, 2010) and market investment, and where it is possible for non-state actors to acquire either a financial interest in the delivery of these services, the asset through which services are delivered, or indeed outright ownership of these hitherto publicly controlled networks and systems.

It is reasonable to ask what *are* the respective roles and inter-relationships of the state actors, extended quasi-public institutions and private institutional capital present in processes of financialisation and market (re)construction? To enquire, how do these infrastructure markets come about, by what process are they created and by whom, and how are they sustained and evolving going forward? This thesis also considers the role of geography in the growth of markets for financialised previously state based services and assets; and what implications this has for variances in infrastructure provision across geographies. This study seeks to answer these questions by using a spatially and institutionally driven approach. It examines these markets, themselves largely a product of the last few decades, as a lens through which to explore the twin manifestations of neoliberal orthodoxy promulgated over the last half century namely; the marketisation of essential services and the financialisation of the assets and networks over which those services are delivered.

So this study examines the ways in which the state (and public actors) and the markets (and private actors) interact and are addressed in the academic literature. O'Neill reimagines the interaction of state and markets and describes it as enmeshed (2004). He does not recognize the totalized entity of monopoly capital and Fordism, nor does he subscribe to the hollowed out state of the regulation theorists and globalism advocates. Instead he sees a state that plays:

‘an indispensable role in the creation, governance, and conduct of markets...the state is always involved in the operation of markets, the salient debate should be about the nature, purpose, and consequences of the *form* of state action, rather than questions of magnitude of intervention’ (2004: 257)

In so doing he argues for a reintroduction, a new acknowledgement, of what he terms ‘the qualitative state’ back into Economic Geography. For O’Neill the qualitative state expresses the observable reality of the multi-layered, nuanced variety of state interventions and linkages with markets, and stands in contrast to a scenario wherein the state’s remit is divorced from, or emasculated by, markets. Whilst this study would concur with O’Neill’s (204) observation of a nuanced and influential qualitative state, it advocates the notion of taking this concept further. This extension of the existing literature to encompass the state as a nuanced financial actor forms a key constituent of the conceptual and theoretical contribution of this thesis.

So in summary, this thesis investigates the acceleration in the financialisation of essentiality (Thrower, 2014), exemplified globally by the hegemonic spread of contractual infrastructure constructs such as PPP at the encouragement of major multinational state based organisations such as the OECD, World Bank (and IFC), World Economic Forum, European Investment Bank, International Monetary Fund, G20, the Public-Private Information Advisory Facility (PPIAF) and private sector bodies such as the B20 (the business counterpart to the G20), Long Term Infrastructure Investors Association (LTIIA) and the mainstream accounting and consultancy community. This study observes that this is a process that has accelerated since the financial crash and through the Great Recession (Pike and O’Brien, 2015). Arising from this it could be argued that the systemic failure of contemporary neoliberalised capitalism during the financial crash resulted in a counter-intuitive *acceleration* in the neoliberalisation of state service delivery and asset ownership.

This thesis then, seeks to explore whether the resultant infrastructure investment markets that have formed, are using yields on these essential infrastructure services as a route for globalised capital to repair their own balance sheet, thereby developing finance; or are answering the genuine and evidenced social need for infrastructure to be ‘a vector of change in addressing some of the most systemic development challenges of today’s world’ (World Bank, 2011: iv) against a backdrop of sovereign capital constraints, thereby financing development. The political, social and economic tension of infrastructure markets being pulled between these potentially competing demands are the ongoing backdrop to this study.

1.3 Key conceptual and theoretical contributions

This thesis, which explores the spatial concentrations of institutional capital, their economic derivations and deployment, aims to contribute to a better understanding of processes of ongoing market (re)construction, specifically that of infrastructure markets, and thereby to address a number of gaps in the extant literature.

This researcher shares with French et al (2011: 809), Christophers (2012), and Strickland (2016) a frustration at the sometimes incoherent, inconsistent and spatially blind conceptualisation of financialisation in the literature. If financialisation is the pervasive entry of financial norms and practices into our everyday life (Allen and Pryke, 2013; Arrighi, 2010; Engelen, 2008; Pike and Pollard, 2010; Sheppard, 2017: 239), then it is manifestly spatially uneven in its application and impact (French, Leyshon and Thrift, 2009; Pike and Pollard, 2010). A key contribution of this thesis is to derive an institutionally and spatially informed understanding of financialisation that goes beyond the application of amorphous private capital generated from an abstracted elsewhere. Rather it represents a spatially contextualised view of investment capital as the aggregated sum of individual savings, annuities and pensions (the pension pool), state accrued fiscal surpluses (SWFs), pools of project or purpose specific capital (government agencies and MFIs). These capital sums in turn then being collected, mixed and reallocated within the mediating institutional constructs of funds and asset managers.

Such an unpacking of investment capital through original empirical, institutionally informed research is a response to a previous lack of attention to, or under-theorising of, ‘actually existing’ financialisation (Strickland, 2016; Weber, 2010). In its approach, this thesis builds upon more geographically informed readings of capital and money by the likes of Clark (1993, 2005), French *et al* (2011), Hall (2011), and Leyshon and Thrift (1997); and on the more institutionally contextualised analyses of capital such as the studies by Clark *et al* (2013), Clark and Monk (2009a), Della Croce (2012), Dixon and Monk (2012), Haberly (2011), Monk (2011), Strickland (2016), and Thrower (2014).

This thesis sees a real value in an institutional and spatial reading of investment capital and does, as has already been stated, take a consciously institutional approach to understanding

the pools of capital that together constitute global infrastructure markets. By understanding the institutional context of capital it is possible to examine in more depth, and with greater accuracy, its spatial derivation, and its institutional drivers, and the complex relational ties and considerations between market actors. Money does flow like mercury (Clark, 2005); and an institutional approach to investment capital permits a comprehension of why it pools and coalesces in some geographies and not others, and what macroeconomic, political, regulatory or social factors may impact on that capital's continued commitment to a given geography or sector.

Whilst the evidence of this thesis is that instances of financialisation are spatially and transactionally distinct, nevertheless there are certain factors that would seem to characterise contemporary financialisation in practice. These include the growth in size and proliferation of mediating institutions (funds and asset managers), the importance of the coupon or pension pool as a significant investor of patient capital, and an empowered state deploying a financialised form of statecraft through multiple actors and institutional constructs over which it exerts a variegated level of control; the mediated state.

It is in this area, in extending the notion, identity and characteristics of the qualitative state (O'Neill, 2004), particularly in its role as a financial and investment actor, where this thesis makes a significant contribution to the literature. O'Neill's qualitative state (2004), is in many senses an answer to and repudiation of the conceptualising of a hollowed out or denuded state (Clark, 1999; Froud, 2003; Halford, Goodwin and Duncan, 1993; Holliday, 2000; Rhodes, 1994; Skelcher, 2000) and represents an enmeshment or entangling of the state, finance and the real economy (Birch, and Siemiatycki, 2015; O'Neill, 2004) wherein the state is a pro-active, engaged, informed and powerful actor. This thesis then examines the state as a financial actor and charts an empirical manifestation of fiscal policy, financial capability, institutional capacity and transactional expertise both through the actions of government departments and agencies, but also through quasi-public entities such as SWFs and MFIs, and ultimately to entities such as public sector pension funds and infrastructure funds and PE firms in which the state is a material investor. The ability of the state to express its political will and infrastructure policy through these multiple channels constitutes, it is proposed, a new form of financialised statecraft enacted through and with other forms of institutional capital and other market actors. In aggregate this manifestation of the state as a super-actor or super-firm (Coase, 1991: 117) can be seen in this thesis as a

re-casting of the qualitative state, an addition of considerable financial influence layered on top of those roles and functions outlined in O’Neill’s (2004) qualitative state. In a sense the transmutation of sovereign budget surpluses into portfolios of financial investments represents an additional financialisation of the state. This broader influence of the re-cast qualitative state achieved in part out with direct state control and thus through partially controlled and arms-length institutions, co-investment partners and other entities benefitting from elements of public money (including fund managers), is reflected in the term the mediated state. These financial actions of state capital, accompanied by the politicisation of institutional capital create a hybrid form of enabling investment capital that, in the view of this study, challenges the old public-private binary.

This additional financial investment function of the state, and its extension to O’Neill’s conception of the qualitative state is shown at Fig 1.4. This also demonstrates the continuum of variegated levels of control that the state has over its investments and mediating institutions; presenting a more nuanced picture of the state’s relationship with institutional investment actors and the markets than the old public-private binary, and a useful framework through which to understand the extent of the state’s enmeshment with the wider economy.

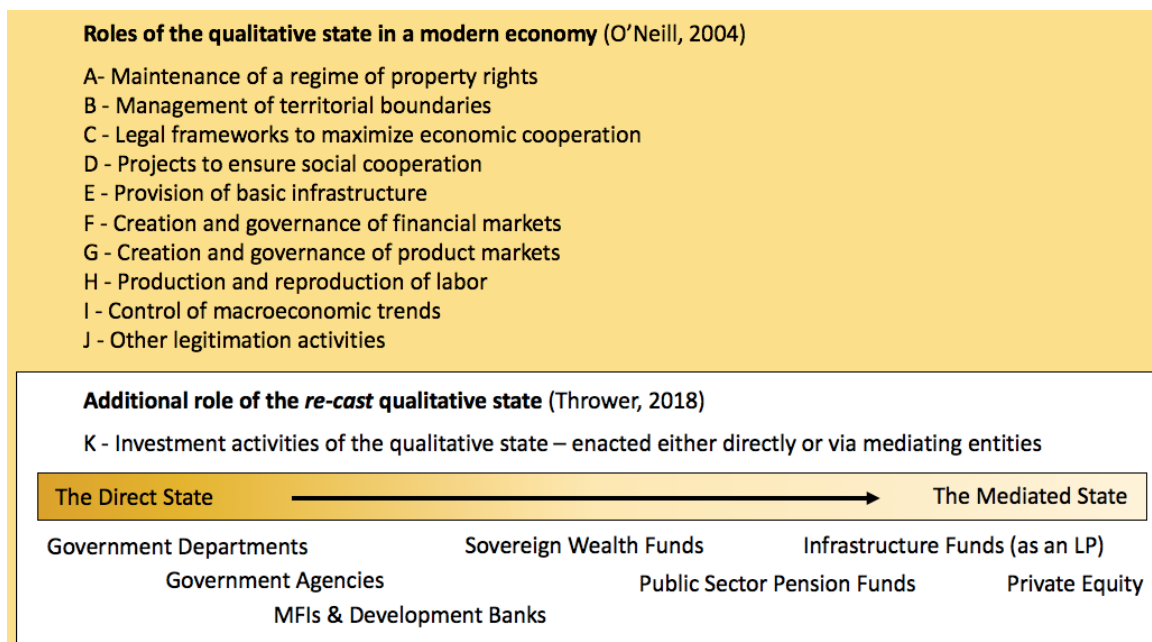


Fig 1.4: The additional role of the re-cast qualitative state

Source: Author’s own, 2018

By extending beyond O'Neill's conception of the qualitative state (2004) and theorising the capacity of this financialised, broader, enmeshed and mediated state, this thesis opens up a research space for further studies into a specifically financialised and mediated form of statecraft, and the deployment of state-linked capital as an extension of industrial policymaking.

It is argued that the theorising of the mediated state prefigures a more collegiate form of market based capitalism, and one where the economic diplomacy (Haberly, 2011) of the state executed through government agencies, MFIs and SWFs, and the actions of the public or *demos* manifested through the coupon pool (Froud, Johal and Williams, 2002) or pension fund capitalism (Clark, 1999), might offer alternatives to the more adversarial historic models that are the stock in trade of the political economy literature.

This thesis also brings these nuanced expressions of the mediated state and private institutional capital together to inform an institutional and spatial understanding of market (re)construction in the round. It examines the circumstances leading to the presence of key formative factors such as the importance of endogenous debt capital markets, evolutionary factors of pension or coupon pool capital (often preferring to invest in its own currency and geography), currency risk volatility as being out of step with the lower risk appetite that characterises a large sub-set of infrastructure investors, and the fossil fuel based SWFs largely looking to stable, larger markets denominated in major global currencies for their investments.

1.4 Structure of the thesis

This thesis is structured into six further Chapters. Chapter 2, outlines the way in which the literature has been organised to arrive at the key research focus and questions. It provides an overview of the emergent and relevant literature concerning both the state and institutional capital. It also considers how notions of the qualitative state and variegated capital might be used as a lens through which to arrive at a spatially and institutionally contextualised understanding of the complex set of inter-relationships between the state and

public actors on one hand and private institutional capital on the other. Section 2.2 justifies the selection of contemporary infrastructure markets as a means by which to analyse financialisation in action. Thereafter three major bodies of academic literature are examined for their insights into the contemporary infrastructure moment, and to institutional and market landscapes for infrastructure investment: Neo Classical Economics (in Section 2.3), Economic Sociology (Section 2.4), and Political Economy (Section 2.5). The value of institutional political economy and economic geography in the understanding of financialised infrastructure markets is outlined further at 2.6. This is then followed by an examination of how financialised infrastructure is reframing our conventional notions of the state and private capital. The Chapter closes with the way these readings of the literature inform both, a research agenda that will contribute an institutional and relational approach to institutional capital and market creation, and the three research questions on which this study is then founded.

Chapter 3 addresses the methodological challenge of building an institutional understanding of variegated global investment markets for infrastructure and constructs a robust methodological framework and research design for the study. The methodological approach (Table 3.1) examines market construction and re-construction in a spatially and institutionally sensitive manner. It builds an understanding of investor types through detailed empirical interview based data, supplemented with quantitative transactional information accessed through various industry sources, notably Prequin. This mixed methods approach explores institutional drivers, the spatial origins of institutional capital, the effects of these origins on the ultimate redeployment of that capital and relational issues between public, quasi-public and private investment actors. Throughout the study, these methods are informed by a theoretical framework that encompasses neoliberalisation, financialisation and, to a much lesser degree, marketisation.

Chapters 4, 5 and 6 contain the principal findings and conclusions from the original empirical research data. Chapter 4; *Exploring emergent institutional variegation and the role of public and private actors in the ongoing (re)construction of infrastructure markets*, answers the first Research Question and examines the nature of the modern state as an actor or super-actor (Coase, 1991: 117), wherein the state acts as a market maker (a role that ironically the market alone cannot perform (Thrower, 2014)), regulator, and provider of fiscal context; O'Neill's qualitative state (2004). Beyond this however it is argued that the

state now performs a range of financial and investment functions that, in aggregate (and as shown in Fig 1.4), result in an entity that can be seen as a more financialised re-casting of the qualitative state. Interacting with this public super-actor are a range of institutional investors ranging from the quasi-public or mediated state such as SWFs, and public pension funds, through to private actors such as private pension funds and other annuity providers, infrastructure funds and other asset managers, and PE firms. By pursuing a detailed spatial and institutional approach to these variegated actors this study then builds a picture of their investment drivers which, when taken into conjunction with a granular approach to the motivations of the state, results in some informed observations as to why and how infrastructure markets have grown in the manner and scale now seen, and with the spatially uneven characteristics that they display.

Chapter 5; *Variation everywhere: the relational links between financialised infrastructure, the state, and institutional capital*, answers the second Research Question and explores further the relational aspects of public, quasi-public and private institutional investment actors, and how these are all influenced by and in turn influence the heterogeneous nature of infrastructure itself. It begins by addressing infrastructure's stubborn spatiality (O'Neill, 2015), promiscuous interconnectivity, and multiple attractions to the investment community. The means by which investors achieve exposure to the infrastructure asset class are considered at 5.2, with the reflexive impacts of infrastructure markets on capital then addressed at 5.3.

It is widely accepted that processes of financialisation and an increasing prevalence of market based solutions on public services are having a profound effect on the role of the state, and the nature of public actors (Berndt, 2015; Birch and Siemiatycki, 2015; Christopherson, Martin and Pollard, 2013; Pike and Pollard, 2010; Theurillat, 2009; Weber, 2010). This thesis, using the research data, argues that, in turn, investment capital itself is being politicised by its investment into the uniquely political asset that is infrastructure, and by the extent of its co-investment and co-mingling with the capital deployed by the mediated state in all its institutional forms. These complex relational factors, and their constitutive and causal impacts on institutional actions, state policymaking and market dynamics, are then summarised at the end of the Chapter.

Chapter 6 considers *The role of geography in reconciling issues of infrastructure need and capital surplus* answers the third Research Question and brings together the extensive spatial analysis of the institutional investor types that constitute contemporary infrastructure markets in order to present a consolidated picture of the spatial derivations and investment geographies of global institutional capital. The resultant footprint is then compared to the geographies of infrastructure need, the purpose of which is to uncover the degree to which there is a spatial mismatch of capital and need. Where such a mismatch occurs, this thesis argues, it is suggestive of a market, and pool of capital, responding to its own exigencies rather than responding to an articulated, state-driven, policy programme of infrastructure development. The Chapter then builds on concepts, developed in this thesis, of *thick* and *thin* investment markets, to examine the outcomes that these surpluses or deficits of investment capital have on the nature of infrastructure development. This final findings Chapter also raises some potential scenarios for the inherent health or weaknesses of *thick* investment markets for infrastructure based on extrapolated trends for capital deployment and emergent valuation bubbles. These are then linked back into the literature (particularly that of political economy) on capitalism and the volatility of markets.

Chapter 7, the concluding Chapter, pulls together the key research strands, and summarises the findings and contributions of the research as a whole. It organises the main empirical findings into three coherent areas. The first of these considers institutional findings, particularly the unpacking of the qualitative state and its re-casting as an engaged and proactive source of finance and investment capital, both directly and via mediating entities. Secondly, relational aspects are considered; particularly the somewhat reflexive relationship between infrastructure and markets on state behaviour and institutional capital. Lastly, it focuses on market related findings; notable among which is the profound constitutive and causal role played by geography in terms of markets for the ongoing financialisation of infrastructure. In acknowledging this linkage between the spatial and institutional derivations of capital and its ultimate deployment, we can then see the origins and factors resulting in the spatial mismatch of investment capital and infrastructure need; and a concomitant spatially driven instability in infrastructure investment markets. These three key contributions, reflect and provide answers to the three research questions.

In answering the research questions, a number of key contributions of the thesis are enumerated, namely the notion of a re-cast qualitative state as an investment actor, and the

engagement of the state with a range of institutional actors which in sum result in the mediated state. The value of an institutional and spatial reading of investment capital is demonstrated, as is its ability to deliver an empirical and nuanced reading of the ongoing processes of financialisation in practice. Lastly, the research provides support for a conceptualisation of market construction and reconstruction as a constant process of institutional and transactional catalaxy

At its close, Chapter 7 reflects on the study, alternative methodological approaches that could have been followed, and ways in which the key theoretical and conceptual contributions of the thesis might be further developed in future studies.

Chapter 2. The geographies of variegated institutional capital and the (re)construction of infrastructure markets

Society is currently witnessing an unprecedented level of infrastructure new build announcements across developed and emerging markets, across the global north and south. Governments are vying for investor attention by announcing the latest major energy, transportation, water or communications investment programmes. These plans explicitly envisage a major role for private sector entities and investors in terms of design, delivery, maintenance and in many cases ownership of the resultant service delivery and underlying asset. The relations between state and the market, public and private institutional sources of funding, and the constitutive and causal role of geography in these, are the central conceptual, theoretical and empirical focus of this research study.

How infrastructure is to be financed and funded has become a key policy issue for governments across developed and developing economies:

‘the world’s insatiable demand for infrastructure will require the investment of trillions of dollars over the next four decades. While infrastructure poses many challenges for governments and developers, none are as urgent or as complex as the challenges of how to finance it’ (KPMG, 2012:2)

The weight of academic literature positions infrastructure as a public good, operating in an ‘environment of limited competition as a result of natural monopolies, government regulation or concessions’ (Della Croce, Kaminker and Stewart, 2011: 15-16), and ‘as a generator of urban [and national] economies (O’Neill, 2016:1). And it is the provision of these key utility services of transport, energy, communications, water, education, health and justice that have fallen, in some way, under the purview of government, as we can see from the OECD’s own definition of infrastructure being ‘the system of *public* works in a country, state or region’ (OECD, 2007; author’s own emphasis). Indeed, since the time of Adam Smith citing infrastructure as a key responsibility of the sovereign state; an opinion echoed by O’Neill (2016) as a political economy of infrastructure provision, there has been a view that it cannot be in the interests of the state for such essential infrastructures to be held in narrow private ownership.

This Chapter examines the concept of financialised infrastructure as expressed through differing economic perspectives and bodies of literature. By financialised infrastructure this study refers to those utility assets and services which have been opened up to financial markets and to investment by institutional finance. This echoes Krippner who writes that financialisation refers to a ‘pattern of accumulation in which profit making occurs increasingly through financial channels rather than through trade and commodity production’ (2005 3(2):173-208).

This financialisation has occurred as countries have shifted away from industrial capitalism. The extent of this paradigm shift can be seen in the example of the United States. The size of the financial sector as a percentage of GDP grew from 2.8% in 1950 to 7.9% in 2012. ‘Derivatives trading - mostly futures contracts on interest rates, foreign currencies, Treasury bonds, and the like - had reached a level of \$1,200 trillion, or \$1.2 quadrillion, a year’ (BIS, 2007). By comparison, US GDP in 2006 was \$12.456 trillion. The size of this derivative market implies in itself a tendency toward volatility magnifying, as it does, the underlying *real* economy by a factor of one hundred times. A similar story is seen in the UK. In the century prior to the 1970s UK bank assets were half of GDP, by the mid 2000s they were five times the value of GDP. In 1980 the equity value of the stock market was, at £30.8bn) 40% of government income (£76.6bn); by 2012 it was worth £1.76tn, nearly three times government income (£592bn) (Davis and Walsh, 2017: 34). These themes of the prevalence and primacy of financial markets over underlying industrial activity and physical assets are elaborated on further in the main body of this Chapter and throughout this thesis.

The involvement of these financial markets in the delivery of essential services raises ethical issues (Daianu and Vranceanu, 2005), threatens a value leakage from the public purse (Folkman, Froud, Johal and Williams, 2007), and represents a fragmenting of the moral obligation of the state to provide. This ‘shift in the pattern of ownership [of water infra] towards more consortia-leg, global infrastructure funds...has engineered benefits more towards investors than customers’ (Allen and Pryke, 2013: 419). In turn, this has societal implications; a rending apart of the social fabric, a social diremption (Thrower, 2014). It presents an image of utility provision based, not on need, but on access to capital or geographic location; the latter, as shall be demonstrated, often determining the former. Indeed, whilst many societies have become used to private ownership in the power,

transport, communication or water sectors (conventionally referred to as economic infrastructure) there is undeniable societal discomfort about the opening up of education, healthcare, justice, and social housing (social infrastructure) to the volatility of a market paradigm; the ‘selling off of the state’ (Martin, 1999); the so called financialisation of everything (Langley, 2008).

This Chapter reflects how, within these markets for financialised infrastructure, previously defined roles for public and private actors are being challenged and replaced with a more nuanced reality. Some commentators perceive an emasculated state, moving from the role of owner and provider of essential services to that of regulator and procurer. This, however, ignores the fact that the role of the state is evolving into that of an engaged and proactive multi-faceted actor in its own right (O’Neill, 2004); a critical market maker and a keystone investor.

As O’Neill observes:

‘the state is seen to play an indispensable role in the creation, governance and conduct of markets, including at the international scale...the salient debate should be about the nature, purpose and consequences of the form of state action, rather than about questions of magnitude of intervention’ (O’Neill, 2004:257)

And it is that question of the form of the state’s engagement with, and investment in, the wider institutional markets for infrastructure that is a key focus of this thesis. This can take the form of structural market making via market regulation and contractual instruments such as PFI and PPP, providing the ‘state structures [required] for accumulation to proceed without persistent chaos’ (O’Neill, 2004: 266) or, as we shall see, the direct or mediated investment of state derived capital into infrastructure assets and markets.

This blurring of conventional notions of the state, the sense of the state as an often mediated investment actor fits well with a central thesis of O’Neill’s work that ‘the state is not a homogenous unit but exists as a contested domain continuously interacting with society’ (O’Neill, 2004: 269).

This ‘market-based restructuring of the state’ (Birch and Siemiatycki, 2015: 1) sees:

‘governments... experimenting with ways to provide public goods by involving the private sector in the planning, financing, building and operating of a range of services, facilities, infrastructure...this entanglement of the state and markets has been loosely conceptualized as a process of marketization...the insertion of markets or market forces into the state and public sector’ (Birch and Siemiatycki, 2015: abstract)

and is part of a response to the fiscal crisis of the state first evident in the 1970s (O’Connor, 1973). This was a crisis exacerbated by public and political antipathy to public spending in the 1980s and 1990s, and in turn leading to subdued public investment (Kitson et al, 2011) and reduced gross capital formation (Bhattacharya, Oppenheim, and Stern, 2015).

Through examining these issues this Chapter aims to make sense of how the process of the construction and co-creation of infrastructure markets, and the transactional and relational behaviours of state actors and institutional investors, can be understood and explained by the prevailing academic literature. Specifically, it explores these relationships and institutional dynamics, and their spatial causes and consequences, through the lens of contemporary financialised infrastructure markets.

2.1. Understanding the landscape of twenty-first century capitalism; organising the literature

This Section outlines the way in which the literature has been organised to arrive at the key study research focus and questions. Section 2.1 provides an overview of the emergent and relevant literature concerning both the state and institutional capital. It also considers the ways in which notions of the qualitative state and variegated institutional capital represent a helpful way in which to view the contemporary nuanced reality of what is clearly a complex set of inter-relationships between the state and other public actors on one hand, and a variety of institutional investment capital on the other. Section 2.2 proposes that financialised infrastructure markets represent a compelling lens on to contemporary

relations between forms of state and private capital, encompassing as they do, and as this thesis will show, a variegated spectrum of enmeshed public, quasi-public and private institutional actors.

This Chapter then examines three major bodies of academic literature that are highly relevant and resonant to discussions of infrastructure provision, and differing approaches to questions of the relations between the state and private capital, and to the place and influence of markets in our economies and society. Neo-Classical Economics is discussed in Section 2.3, Economic Sociology in Section 2.4, and the breadth of institutional and Marxian Political Economy in Section 2.5. This last body of literature, concerned as it is with tensions between public and private, and ongoing themes of social good versus return on capital, is a particularly rich source of literature for this study. In aggregate these three bodies of literature provide rich, detailed and contesting viewpoints on the key themes of this thesis, and create the context from which the three research questions (outlined in Section 2.8) are derived.

Section 2.6 advances one of the key contributions of this thesis, namely the value of institutional political economy and economic geography, in understanding the institutional and spatial context of contemporary infrastructure markets; and in answering the gaps in our understanding that lie between conventional neo-classical or Marxian political economy, and economic sociology approaches. This is represented schematically at Fig 2.3. This is followed by Section 2.7, which proposes that it is precisely in the area of financialised infrastructure where we see the conjunction of the qualitative state and variegated capital, and the creation of new forms of the state as a dynamic financial actor and the mediating effects of institutional asset managers such as infrastructure funds. It is argued that it is in these institutional constructs that key aspects of infrastructure financialisation occur. This Chapter then closes, at Section 2.8, with the way these readings of the literature point toward a research agenda that contributes to our understanding of public and private actors in globalised infrastructure markets. It then proposes three research questions to answer the gaps in the literature and to develop these considerations going forward. The overall approach to organising the literature, as laid out above, is represented schematically at Fig 2.1:

The geographies of variegated institutional capital and infrastructure

2.1 Understanding the landscape of twenty-first century capitalism

2.2 Financialised infrastructure markets; a lens on to contemporary relations between variegated forms of state and private capital

Neo-Classical approaches	Economic Sociology	Political Economy
2.3 Blackboard economics and the negation of geography	2.4 Neoliberal markets and cultures of financialisation	2.5 Financialisation and contested market outcomes

2.6 Proposing the value of institutional political economy and economic geography to the understanding of financialised infrastructure markets

2.7 Financialised infrastructure; evolving beyond conventional notions of state and capital

2.8 Towards an institutionally and spatially contextualised understanding of financialised infrastructure markets: the Research Questions

RQ 1 - What are the roles and strategies of the state and private institutional capital in the construction, maintenance, and reconstruction of contemporary infrastructure markets?

RQ2 - What is the extent and nature of relations between the state and private capital as a consequence of their involvement in the co-creation of, and investment in, markets for the ongoing financialisation of infrastructure?

RQ3 - What is the constitutive and causal role of geography in creating markets that can reconcile issues of infrastructure need and capital surplus?

Fig 2.1: Organising the literature

Source: Author's own (2017)]

2.2. Financialised infrastructure markets; a lens on to contemporary relations between variegated forms of state and private capital

As stated in Chapter 1, it feels like we are at an inflexion point in the context of state vs non-state institutional provision of infrastructure. 60% of the UK's National Infrastructure and Construction Pipeline to be delivered by institutional private capital (IPA, 2016: 10, Institute for Government, 2017: 7), and the private sector now 'provides more than 40% of public goods' (Peters, 2012: 229). As this study will show the detailed institutional

breakdown of these categories of state and non-state are, in reality, more institutionally nuanced. This study proposes that markets for financialised infrastructure, emergent in recent years as a new asset class, and attracting a broad diversity of institutional interest, are an ideal lens through which to examine the contemporary enmeshment of variegated forms of state and private capital.

Nijkamp (2000: 88) speaks of infrastructure as material public capital, again referring to road, rail and airport assets. Bridges (1991: 202) also sees infrastructure as ‘publicly subsidised physical network[s]...such as highways, roads, bridges, public transit, airports, water supply, wastewater treatment, solid waste disposal, hazardous waste disposal, communications, power production, railroads, schools, public housing, hospitals, parks, and prisons’. Valila exposes the difficulty of a precise definition for infrastructure whilst siting it firmly within the public sphere:

‘[it] comprises tangible fixed assets in the built environment...that are either natural monopolies or that produce intermediate inputs subject to market failures [services the market would not naturally provide or what we may view as public goods]’ (2015: 26).

Neither Valila (2015) or other recent attempts to define infrastructure (Buhr, 2003; Fourie, 2006; and Baldwin & Dixon, 2008) have addressed the contentious issue of ownership, either by the state or the private sector. This despite the fact that, in many markets, a majority of key state infrastructure services have been privatised, or are intended to be outsourced to or delivered by private sector providers. We are seeing, in processes such as financialisation, a transition from a government by ownership to one of governance by regulation (Halford, Goodwin and Duncan, 1993). Monopolistic utility services (or concessions thereof) residing in private hands, are now controlled via regulated funding allocations from Government against availability or demand based metrics.

This question of ownership is important. In political economy terms it shapes what services are delivered; recalling that infrastructure is a service delivery asset. It also shapes who ultimately benefits from the delivery of those services. This is spatially relevant because infrastructure has a sensitivity deriving from being experientially proximate, often critical in nature, and is a ‘public good’ experienced on multiple occasions. ‘Public good’ does not

equate to public owned; indeed, the US President's Commission on Critical Infrastructure Protection (the PCCIP), reflecting the privatised nature of much of the USA's utility service delivery, defined infrastructure as 'a network of independent, mostly privately-owned man-made systems and processes that function collaboratively and synergistically to produce and distribute a continuous flow of essential goods and services' (1997: 3).

Leaving to one side the differing perspectives on ownership, this idea of networks of assets working synergistically to provide essential services, the basic physical structures and assets needed for the operation of our society and economy (HM Treasury Green Book, 2011), is common to most definitions of economic or social infrastructure. There are however, variations in public sensitivity toward infrastructure assets. Generally, there is less awareness and public debate around those assets with a primarily corporate customer base (backbone transmission networks, offshore repeaters and the like), whereas assets and services in the areas of healthcare, education, justice and housing (social infrastructure) continue to be highly politically charged, both in terms of their ownership but also the financial models upon which these services are provided. Weber (2002), Froud et al (2000), Loftus and March (2017), and Pryke and Allen (2018), among many, see infrastructure being mutated into an embedded monetisable revenue stream, and the deleterious economic impact of this alternative asset class (Inderst, 2010) on users, as fundamentally extractive, and regressive in terms of social policy.

So infrastructure systems enable the delivery of essential services, typically of a monopolistic or quasi-monopolistic nature. This *essentiality* (Thrower, 2014) is a key feature for policymakers and investors alike. In addition to their immediate functional purpose they also have a broader less tangible role as the 'basic building blocks of the nation's economy' (Pagano and Perry, 2008: 22). Infrastructure is regarded as a vehicle for job creation, an investment that brings long term dividends and as a proxy for the competitiveness of a national economy (Romp & De Haan, 2005; Bom & Ligthart, 2009; Kirkpatrick & Smith, 2011).

The debate over the critical properties of infrastructure has been joined by the likes of Aschauer (1989) and O'Neill (2009) who both question the effectiveness of public investment stimulus in infrastructure if profits accrue to private investors without an effective accompanying risk transfer. Gramlich (1994) goes further and examines (in a US

context) how public stimulus interventions should sit alongside other funding models to create an optimal result.

So when it is said that infrastructure is a contested term (Strickland, 2016), that tension reflects the debates about benefit, ownership, and the core purposes of infrastructure as an asset – utility value versus use value. What is clear is that different actors see what they want to see reflected within infrastructure, be they service providers, engineers, regulators, policymakers, financiers or users. And of course these perspectives are complicated in that we often enact more than one of these roles at any given time. This plurality of roles, this enrolling of citizens into finance (David and Walsh, 2017: 31; Leyshon and Thrift, 2007), and ‘the possessor of money become[ing] a capitalist’ (Marx, 1961), is an enduring theme of the coupon pool or pension pool capitalism literature discussed in this Chapter.

2.2.1 Infrastructure’s blurred entry into institutional investment markets

Neo-classical economics tends to regard public works and public goods as being items that markets (will) fail to deliver. This view however, was formulated in a time when it was harder to see the obvious investor return in the provision of such services. In a sense investor sentiment has now moved to the diametrically opposite perspective. It is precisely the everyday and critical nature of essential services, and the resultant lower volatility of public demand for them, that is of such attraction to SWFs and pension funds, the newer entrants into the institutional investment market.

Smith, referring to large scale infrastructure, stated that it ‘can never be in the interest of any individual or small number of individuals to erect and maintain’ (1776: 687-688). This can be read in two ways. Firstly, that there is no return to be made from such investments (as discussed above), but also that such narrow private ownership would bring not be in the interests of society or the users of these services. Such a reading would place Smith at the heart of contemporary debates as to the future of infrastructure ownership, re-nationalisation (Labour, 2017), and re-municipalisation (Cumbers, 2012). Even if a state can procure infrastructure from the market at demonstrably good value, and provide a regulatory regime to guard against market excesses, is it nevertheless appropriate for any economic benefits

arising from the delivery of essential services to accrue to the few rather than the many, the private, or institutional, investor rather than the taxpayer. Yet it is exactly this economic benefit accruing to a range of non-state actors (albeit some acting as mediating entities for public and quasi-public investment capital) that has become so prevalent in recent decades.

So it is that this financialised infrastructure that has been taken outside of the narrow system of public or state ownership, and has passed into a condition wherein the market will decide its fate; its ownership, the amount of debt or leverage which may be accumulated against its revenue model, and the operational characteristics which will determine its utility. Such a reading allows the combining aspects of the emergent literature of marketisation with that of financialisation to create a framework for understanding and explaining the role of markets within the economy. However, the precise nature of financialisation as a process, still requires more investigation.

As Pike (2014) observes, ‘little is known about how financial institutions analyse and interpret public infrastructure as an asset class within internationalized and varied investment portfolios’. Perhaps because, as Martin (2017) states: it is ‘very difficult for us as academics to penetrate the labyrinthine world of finance’. As with considerations of opaque finance, institutional variegations of capital, and the role of markets; it is also the case that the academic literature of infrastructure financialisation has had a “relatively short history” (French, Leyshon and Wainwright, 2011: 799), and remains ‘severely underdeveloped’ (Hall, 2011: 2) beyond the geography of finance approaches of Leyshon and Thrift (2007), Pryke and Allen (2000), and Torrance (2007, 2009) et al. Ultimately however, difficulty cannot be an excuse, it is necessary, as Peck & Theodore argue, to develop a more discriminating, variegated approach:

‘What is called for...is a nuanced analysis of the temporality *and spatiality* of capitalist development...This means moving beyond the routine pluralisation of capitalism, and the alternating proliferation and pruning of a reified set of ‘models,’ to probe the principles, sources and dimensions of *capitalist variegation*’ (2007: 760).

This study suggests that processes of financialisation, ‘quintessentially a process of geographically uneven development’ (Christopherson, Martin and Pollard, 2013: 352),

cannot be understood without due consideration of international financial institutions, and their spatial derivations and drivers. It is obvious, but nevertheless important, to state that there is wide diversity of private capital investing in infrastructure. Rather than capital existing in a homogenous state, it is exactly the heterogeneity of capital, differing risk appetite, return criteria, and sector and geographical focus that creates the liquidity of a diverse and robust market. Critical then to understanding infrastructure markets, is an appreciation of this heterogeneity of private capital. Clark agrees:

‘if we are to understand the economic landscape of twenty-first century capitalism, it should be understood through global financial institutions’ and their ‘investment practices’ (2005: 99).

This researcher concurs with Clark and Langley (2008) that, through understanding the complexity of institutional behaviours, we may arrive at a more informed view of markets and capital. Through this institutional led approach, which necessarily incorporates a spatial sensitivity, it is therefore possible to achieve a finer grained understanding of financialisation and the geographies of infrastructure investment capital.

2.2.2. Infrastructure and questions of value extraction

Infrastructure can be seen as a way into an understanding of this era of financialisation, the pervasive entry of financial norms and practices into our everyday life (Sheppard, 2017: 239; Arrighi, 2010; Engelen, 2008). The essential nature of the services it delivers is, quite literally, infrastructure’s utility value. However, it is precisely that quasi-monopolistic essential good that is driving infrastructure’s exchange value. The danger, as Harvey (2014) would say, is when decisions start to be driven by exchange value rather than utility value. The short term balance sheet and cashflow benefits to the public purse of a PPP, privatisation or granting of a utility concession, outweighing any longer term funding issues or the optimal whole life cycle management of that asset. Rather, there are profound governance implications, as well as engineering and fiscal objections, to the primacy accorded to exchange value in the context of infrastructure.

Political economy approaches are well suited to the examination of these issues. PPPs, though currently a major form of infrastructure financing globally, are intrinsically political instruments governing economic outcomes. Such structures specifically determine levels of service provision against a metric of financial payments. To the extent there are issues of extraction from the public purse by private actors; they are contained within the schedules of PPPs and other similar financialising instruments. For Hodge and Greve, PPPs may be ‘a language game’, but they are also ‘camouflaging the next frontier of conquering transaction merchants, legal advisers and merchant bankers each extracting large commissions’ (2010: s10). Such sentiments, characteristic of many political economy readings of institutional capital, are explicit in Augar’s *Greed Merchants* (2006), Shaoul, Stafford and Stapleton’s *Highway Robbery* (2006), French and Leyshon’s *F@*king Guys* (2010), and in the work of Marazzi (2011), Zizek (2008) and many others. This study would argue that such emotion is unhelpful to the objective, academic consideration of the growing manifestation of private capital in the construction, ownership, and operation of our key public services. What this research seeks to do is to consider the functional role of institutional investment capital, its spatial derivations and deployment, its motivations, and its interactions with the qualitative state and mediated entities (the mediated state), in the construction, maintenance and reconstruction of our infrastructure markets. It will also consider infrastructure markets and the rise of infrastructure as a diverse asset class.

PPP may be the ‘profit-making off projects that are...publicly owned...to serve public policy needs’ (Whiteside, 2015: 4). What it is not, however, is a mechanism of infrastructure funding. In an austerity context, PPP provides capital for upfront financing against a schedule of contractual payments extending out into the future, often against an implied sovereign covenant. PPP provides monies that have to be repaid in some way; they are in one sense, merely a ‘vehicle enabling the government to “rent the money”’ (Boardman and Vining, 2011: 355). A key early driver was that, after 1992, this *rental* obligation did not count as government debt and thus was ‘off-book’ (Whiteside, 2015: 6). It should be noted however that the weighting accorded to this accounting factor has shifted in recent years, with off balance sheet treatment no longer a given, and not now cited as a primary driver. It is now more about effective risk transfer and sustainable investment. Given that the ownership of the asset remains in public hands it might be asked, is such a model so bad? The debate is, in part, about the amount of the ‘rent’, since that figure (or at least the sum over and above a notional state cost of funds) could be said to represent a

fiscally endorsed value leakage from the taxpayer to institutional capital, Froud et al (2000), Weber (2002, 2010).

To this flow of capital should be added trading profits arising from private investors trading their stake in PFIs/ PPPs on secondary markets, and occurring largely outside public control. Whiteside (2015) cites Whitfield (2011) who estimates that 240 PFI equity trades have occurred between 1992 and 2009 totaling £10bn, and generating average capital profits of 50.6% for investors. This again highlights the difficulty in establishing robust upfront economic values for such long term asset concessions. Farmer's (2014) analysis of Chicago's 75 year \$1.15bn 2009 lease on parking meters after a mere 3 days of negotiation, the 99 year \$1.83bn 2005 Chicago Skyway toll road, and the 99 year \$563m 2006 lease of downtown parking garages, is explicitly critical of the public sector's record on due diligence in this area. The Chicago infrastructure transactions, and indeed the wider and late adoption of PPP in the US, have been seen by observers such as Peck (2013), O'Neill (2013), Di Napoli (2013), and Whiteside (2015), as a last roll of the infrastructure dice to stave off an impending public sector capital and cashflow crisis with its roots in the fiscal crises and subsequent under-investment of the 1970s (O'Connor, 1973; Choate and Walter, 1981). The Chicago experience, and its infrastructure transactions widely viewed to have been executed at a significant undervalue (Hoffman, 2009: 3), are suggestive of the 'lean American night-watchman state' shedding its 'role of public infrastructure provider', leaving a residue of social obligation, and a state of sleep-walking 'structural functionalism' (Whiteside, 2015: 10). Such negative outcomes can be seen replicated elsewhere; in the UK (Pryke and Allen, 2018; Whitfield; 2010, 2012), Canada (Whiteside, 2015), and Australia and beyond (Solomon, 2009).

If we subscribe to this view of the stripped down functionalist state, ought we to recognize the role that the state itself has played in this process? Not least in the enactment of primary legislation to empower private alternatives to areas previously the preserve of the public sector. 'Far from spontaneous, markets for public infrastructure assets have been intentionally constructed over the past two decades' (Birch and Siemiatycki, 2015: 1), with the key enabling methodology being changes to procurement processes, contract law and fiscal policy. Recent examples in the US for instance have included the 2013 federal Sustainable Water Act and Water Infrastructure Now Public Private Partnership Act, as well as 2005's Transportation Infrastructure Finance and Innovation Act (TIFIA), all

allowing tax exemption for private activity bonds as a mechanism for PPP to compete against the incumbent municipal bond alternative. This is again the state, through the passing of primary legislation, enacting its role as market maker. In such scenarios, Birch and Siemiatycki contend that PPP transforms the role of the state ‘from a provider of public services into a purchaser of private commodities’ (2015: p2). This study does not accept this interpretation unreservedly however, since the state retains a key role supplying enabling policy, acting institutionally to promulgate the very PPP model these new markets require and, as shall be demonstrated, investing publicly derived funds alongside private capital in domestic and overseas infrastructure markets.

2.2.3. Infrastructure’s transformation into a contested asset class

How did we get to today? Specifically, how did we arrive at situation whereby much of our previously public infrastructure has been, and is being, taken outside the supposed safe harbour of the public embrace (see Section 1.1) and being exposed to the storms and vagaries of the market? O’Connor (1973) sees the origins of this market based orthodoxy in the UK, in the fiscal crisis of the 1970s; though Braudel, Hayek and many others would doubtless look further back to the Industrial Revolution in Western Europe. In the USA the Chicago school and the Washington Consensus paved the way for the rise of the neoliberal orthodoxy that moved beyond North America, to the UK and Australia; the ‘path-breakers of financialization’ (Davis and Walsh, 2017: 28). From these roots came the ‘primitive’ and ‘amoral’ (Tickell and Peck, 2003) roll back (of regulations) phase of neoliberalisation and the promulgation of the idea of the small state; characterised by low public spending and low taxation (Kitson and Michie, 2000). In the UK, the early 1990s saw the creation, under the then Conservative Thatcher Government, of the Private Finance Initiative (PFI) (Whiteside, 2015) and state power, informed by a financial markets epistemology (Davis and Walsh, 2017: 28) mobilised behind private sector based solutions and deregulation (Peck and Tickell, 2002: 388). Since then PFI, PFI2, and PPP, have become part of a hegemonic financing paradigm, backed by neoliberal national governments, the OECD, EBRD, the World Bank, the IMF and many others (Whiteside, 2015). As both global capital markets and national governments adapt to post financial crisis austerity and constrained sovereign balance sheets, so market driven approaches have become ever more associated

with, and seen as a potential solution for, new forms of infrastructure development and public service delivery.

PPP can be seen as an instrument for infrastructure asset homogenization; that homogenization in turn allowing a depth of penetration and spatial breadth of global surplus capital in services of national essentiality that would otherwise be inconceivable. This homogenisation is itself part of broader processes of market construction; converting spatially and sectorally distinct infrastructure assets into financial instruments that can be systematically compared, traded and valued across time and space and, importantly, benchmarked against other globally liquid investment categories.

In global infrastructure markets there is a majority of institutional investors (be they SWFs, pension funds, infrastructure funds, or private equity) who are clearly comfortable with the dominant PPP template; and a global consensus of multinational state member organisations (such as the UN, OECD, EU, IMF, World Bank, and MFIs) who are promoting the PPP model across spatial geographies and sectoral boundaries. These actors, both state and private, do not seem to be promoting heterogeneity, rather they are market making via the enforcement of a system of narrow asset class parameters (Whiteside, 2015). As O'Neill (2004: 258) observes, 'the distinction between state and market is broken down and issues of accumulation and distribution become inseparable'. The nature of this promotion and the extent of the homogenisation of the resultant market or markets for infrastructure are another area of enquiry within this research study.

2.3. Blackboard economics and the negation of geography

Neo-classical economics presents us with some fundamental problems when considering the operation of markets, and the interactions between private actors and capital on the one hand, and the organs of the state and public actors on the other. As North (1995) observes, instrumental rationality renders neo-classical economics a largely institution free theoretical approach. What he, building on the work of Simon (1986) means by this is that:

‘If values are accepted as given and constant, if an objective description of the world as it is can really be postulated, and if it is assumed that the decision-makers’ computational powers are unlimited, then...institutions are unnecessary’ (Simon, 1986: 210)

Of course, perfect symmetries of information between actors do not exist. Transaction costs are real, and institutions are one way in which we seek to reduce or minimise them. When it is costly to transact, institutions matter (Coase, 1937). Accepting then this inherent problem at the heart of neo-classical economics, and taking note of an essentialist view of markets as fundamental, this study attempts to examine this most pervasive and powerful theoretical approach for insights into the state – private actor dynamic, the limited role of markets, and where markets sit in a binary (public-private) world view.

2.3.1 Blackboard economics and the true nature of markets

As Block observes; ‘Economists almost always discuss the market at a high level of abstraction; there is remarkably little discussion in the literature of the workings of actual markets’ (1990: 46), a sentiment echoed by Barber (1977). Neo-classical economists such as Lipsey and Friedman regard markets as having always been with us, a societal ever-present, an essential social manifestation. In this school of literature, markets are self-regulating efficient fora (be they physical or virtual) where supply and demand are not only in balance, but also naturally *tend* toward balance. This benign tendency is expressed in Salter (1921: 16-17, cited in Coase, 1991 [1937]: 34) ‘supply is adjusted to demand, and production to consumption, by a process that is automatic, elastic and responsive’. Resources are optimally deployed, the overall market ecosystem is able to, and does, respond to external factors and the mechanism of the market ensures a consistent impetus towards order. In such a worldview; markets and the economy exist in a state of elegant mathematical grace. ‘The normal economic system works itself’ or is an ‘unseen and largely automatic system’ (Bressler and King, 1970: vii). Within this self-correcting system, human behaviours are the result of rational egotists; *homo economicus*. Individuals maximize utility, firms maximize profits (hence the neo-classical theory of the firm). Rational atomised actors act independently and, more importantly, logically on the basis of full and

relevant information. In such a world of methodological individualism as envisaged by Becker and Stigler (1977) the function of these auto-balancing markets is clear. It is the collection of commodities from many producers, the balancing of supply and demand, and then the taking of goods from wholesale to retail markets, and to the end consumer; Bressler and King's concentration, equalization and dispersion (1970).

Even were the market to not be completely self-regulating, the existence of outside agents is largely confined to abstracted forces, such as Adam Smith's 'invisible hand' (1776), wherein individuals and traders, acting through self-interest, exhibit the optimal behaviours required by society. The elastic management of excesses of supply and demand wherein 'competition [does] all the coordination necessary' (Plant, 1932: 51). The flaw in this frictionless system, Coase realised, was that transaction costs (essentially the costs of doing business with others – rather than internal production or manufacturing costs) are not zero in a real world system. Indeed, in the case of complex, highly regulated, relatively illiquid infrastructure market transactions, costs can be substantial. Not all transactions eventually come to pass, deal pipelines can be somewhat opaque, and complex transactional timeframes are often numbered in years (Thrower, 2014) rather than in the negligible time periods that are a feature of the simple commodity based models used by neo-classical economists.

Coase (1991: 7) finds that 'in modern economic theory the market itself has an even more shadowy role than the firm'. His explanation as to why this may be the case is that 'in an economic theory which assumes that transaction costs are nonexistent, markets have no function to perform' since markets, in neo-classical theory are there to facilitate exchange or, to put it another way, 'to reduce the cost of carrying out exchange transactions' (1990:7). Coase expands further, when talking of (then) present day economic theory in his 1991 Nobel acceptance speech:

'what is studied is a system which lives in the minds of economists but not on earth. I have called the result "blackboard economics". The firm and the market appear by name but they lack any substance. The firm in mainstream economic theory has often been described as a "black box". And so it is.' (Coase, 1992: 714).

2.3.2. *The Public Goods State*

Block, writing from the perspective of economic sociology in Smelser and Swedberg (1994), critiques the neo-classical version of the state as one where it absorbs the ‘basic tasks of economic production’ in what is termed the ‘old state paradigm’ (1994: 263). In this view of the neo-classical world the ‘*macroeconomic stabilizing* form of the state *intervenes* to adjust market aggregates, especially consumer demand, in order to move equilibrium...positions of private markets closer to full employment’. The language is illuminating, seeing the state in a position of oversight or control. It is top down, the state acting in its own vision of the public interest and, importantly, not as a primary market actor. It *intervenes* to correct market excesses but does not play in the market as a material ongoing participant; it is apart from them.

These views and approaches are confirmative of the primacy of the state, and to its role as a counterweight to private interests. It being the role of government to provide common good ‘natural monopolies’ (O’Neill, 2009; Haughwoot, 2000). Adam Smith observed that:

‘the interests of the dealers...in any particular branch of trade or manufactures, is always in some respects different from, and even opposite to, that of the publick. To widen the market and to narrow the competition, is always in the interest of the dealers. To widen the market may frequently be agreeable enough to the interest of the publick; but to narrow the competition must always be against it’. ([1776] 1976, 2:267)

2.3.3. *Circuits of capital and notions of balance*

Capital in neo-classical economics has tended to be seen as one input in a broader closed circuit of capital goods and labour power. Clark (1965: 116) stated that ‘capital consists of instruments of production...and these are always concrete and material’. This quality of capital makes it, in Clark’s view, ‘one great tool in the hand of working humanity’. The nature of that tool though in much neo-classical discourse is related to serving methods of production. Production processes require time and labour. Workers receive value for their labour time in the form of wages, capitalists receive their value in the form of interest, but

this manifestation of capital always remains grounded in the physical and the real. It is perhaps this sense of capital as an enabling force for the production of physical goods, that political economy, and Augar (2006), Leyshon and Thrift (2007), and Marazzi (2011), see lacking in the intangible assets and synthetic financial structures, the merchant and interest-bearing capital (Marx, 1961; Hunt, 2002), of contemporary capitalism. Indeed, there is a hegemonic antipathy in the literature toward any type of capital accumulation without an underlying product or physical basis at its heart, a suspicion of alchemic wealth creation (Froud et al, 2001) that has found a voice in political economy's wariness about the motives of private capital in economic and social infrastructure.

In what is a notably modern spatial perspective, Clark (1965: 118) observes that 'capital is perfectly mobile: but capital-goods are far from being so'. This mobility is echoed in contemporary accounts such as (Gordon) Clark's (2005) *Money flows like mercury: The geography of global finance* and Cetina's (2005) *How are global markets global? The architecture of a flow world*. What needs to be overlaid on these accounts are the implications of that mobility of capital in terms of societal outcomes. The neo-liberal doctrines of the IMF and the World Bank, founded as they are on a belief in neo-classical economics, see capital as being, in its easily deployable form, a potential agent for development and societal enhancement. In a *flow world* however, capital can move away from markets, sectors and geographies as easily as it arrived. It is then private capital's promiscuous search for return (Pike, 2006) and the implicit competition that can be brought about between states, cities, and industrial sectors (Graham and Marvin, 2001) that gives observers cause for concern.

This economic competition of course also manifests between individuals, notably between those with excess capital and those without. Keynes identified and rationalised significant income disparities:

'for my own part, I believe that there is a social and psychological justification for significant inequalities of income and wealth, but not such large disparities as exist today. There are valuable human activities which require the motive of money-making and the environment of private wealth-ownership for their full fruition' (1936: 374)

When contemplating contemporary questions of the hegemony of capitalist accumulation of the financial ‘ruling classes’ (Lapavistas, 2010) over the austerity dampened growth of wages in the *real* economy, it is relevant to ask who defines Keynes’ ‘significant inequalities’, and how might they be moderated? Indeed it is clear that rewards in terms of wages have not kept pace with rewards to financial investors (Krugman, 2005). Clark’s assertion of a ‘natural law’ therefore must be called into question by observations of the reality of labour and investment markets; observations which would seem to challenge neo-classical beliefs such:

‘exchange benefits everyone, increases everyone’s utility, and ensures a just and equitable harmony of interests. No-one exploits anyone else. Each sells commodities and buys commodities at their equilibrium values. Each maximizes individual utility through the beneficence of the invisible hand of exchange.’ (Hunt, 2002: 57)

These concepts of utility, equitable harmony, lack of exploitation, equilibrium values and beneficence sounds more like a paean for a lost world of benign economics, rather than anything grounded in our reality. It represents the polar opposite to the literature of political economy. In Hunt’s world we are indeed a long way away from Peck and Theodore’s (2007) variegated capitalism and further still from Marazzi’s (2011) violence of financial capitalism.

This study then is about moving beyond the theoretical clarity of blackboard economics, and confronting the nuanced and complex interactions and enmeshment of the qualitative state and variegated capital through empirically grounded research into the actions and drivers of institutional investment capital. In this manner the study specifically seeks out the inherent opportunity for variegation throughout the global capitalist system that is a characteristic of the variegated capitalism approach (Brenner et al, 2010: 185; Keenan, 2017). In considering the financing and trading of complex infrastructure assets and systems, it distinguishes itself from the idealised markets upon which much of neo-classical economic theory is built. What is therefore necessary is to move beyond these broad theories of harmony and balance and enter into a more sociological consideration of economic factors and institutions and their effects on everyday lives as individuals (Langley, 2008), our neo-liberalizing spaces (Peck and Tickell, 2002) and the political economy of Harvey’s (2006) spaces of global capitalism.

2.4. Neoliberal markets and institutional geographies of financialisation

Neoliberalisation can be seen as a ‘variegated process of geographical transformation (Birch and Siemiatycki, 2015: 2) or as ‘the insertion of markets as the underlying institution or mechanism for organizing society (Harvey, 2007: 3). In this way the state, society and markets ‘become more thoroughly intermeshed’ (Hendrikse and Sidaway (2010: 2039).

In this context, and of particular relevance when considering the propagation of the neoliberalisation experiment and neoliberal policies, references to the state must also encompass state governance by state-like institutions at a supra-national level. These transnational or supranational actors and structures (such as NAFTA, GATT, and the EU) have relationships with domestic state governments and market actors that play out in spatially uneven ways across different geographies such as the global north and south (Block, 1994: 516), OECD and non OECD countries, what might be termed thick and thin markets. In this sense, thick and thin markets are used as a shorthand to denote the relative presence or absence of institutional investment capital in a given market geography. Thick markets denoting ones in which there is a high level of transactional and market sophistication, political capacity, investor interest and deal volume. Thin markets representing the obverse of this.

The imposition, by MFIs and market actors, of infrastructure constructs and transactional paradigms (such as PPP by PPIAF, World Bank, the IFC et al) can, particularly in thin markets that tend to have few investment or financing options, too easily become a spatially blind ‘institutional mono-cropping’ (Block, 1994: 521). And in their failure to incorporate local factors, can mitigate against any positive social and economic outcomes from the infrastructure developments that have themselves acted as Trojan horses (Miraftab, 2004) for the fiscal, legal and economic foot-soldiers of market capitalism.

2.4.1. Markets: Enmeshed with capital, financialising society

Berndt and Boeckler also see the heterodox economics literature making a conceptual separation of ‘an abstract perfect Market from concrete *imperfect* markets’ (2009: 535-6. original emphasis). Their study states that markets are ‘continually produced and constructed socially with the help of actors who are interlinked in dense and extensive webs of social relations’ (2009: 536). They also distinguish a cultural economy approach to consider, alongside the normal socio-economic (markets indivisible from their social context) and political economy (the market as an obfuscatory and destructive force) versions of market construction.

So economic sociology sees a nuanced and reflexive relationship between markets and society, the one constantly informing and influencing the other. This concern with the social cause and effect of market phenomena reflects a belief that actors, and indeed any entities with agency, have to create and (re)produce markets; unlike in neo-classical economics, they do not just exist. Its focus is the social causes and consequences of economic change wrought through the mechanism of the market (Slater and Tonkiss, 2013). It is concerned with behavioural changes both forced upon, and being actively adopted by states, regions, cities (Torrance, 2007; Graham and Marvin, 2001; and Weber, 2002), social units and individuals (Langley, 2008). It is about how we make change and how it makes us. It is also concerned with the spatial consequences of these market induced societal shifts (Cetina, 2005; French, Leyshon and Wainwright, 2011).

Biggart observes that ‘Market societies are built on complex sets of social relations and institutions’ (2002: xiii); and additionally that free markets are not free but exist thanks to an enabling architecture of inter-related ‘institutional structures and ideologies’ (2008: xiii). Amy (2007) agrees, stating that ‘capitalism requires government’. The free market, here a shorthand for an economic order that gives primacy to capitalism rather than any specific market, is neither a naturally occurring order (a view in conflict with neo-classical approaches) nor can it be held to be separate from government. Amy, like O’Neill (2004), rehearses numerous institutional factors: limited liability laws, property rights, bankruptcy

protections, patents and copyright, regulation, corporate charters, and a track record of enforcement of these, as roles for the state, and essential enablers for a free market to exist. Block concurs: ‘the successes of capitalist development are a product of limitations on market freedom. The vitality of capitalism has always rested on a particular mix of markets and limitations on markets’ (1990: 46-47). The nature of how the state plays this role are examined by Offe’s (1975, 1976, 1984) work summed up by O’Neill:

‘state involvement is more than the actions of public institutions *on* various social groupings. Rather the state participates directly *in* the domains of other institutions and associations such as political parties, trade unions, and corporations, and in the processes by which social and economic interests are represented to government...Offe’s point is that the state is neither an arbiter nor a regulator nor an uncritical supporter of capitalism, but is *enmeshed* in its contradictions.’ (2004: 263-264, *author’s emphasis*)

The complex package of fiscal, legal, regulatory, contractual, and procurement interventions extant in contemporary infrastructure markets are a tangible manifestation of this enmeshment between capital and the soft institutions of the state. There is a caveat here; O’Neill (2004) sees studies of the state either promoting financial flows or being more passive, as inherently problematic, since the variegated nature of states means one can always find empirical support for any given view. As this thesis argues for a nuanced view of variegated capital, it also acknowledges the variegated nature of states and therefore the need to understand the drivers and motivations of these pools of public and quasi-public capital that are spatially distinct, both in their derivation but also in the nature of their control or oversight.

French, Leyshon and Wainwright are less concerned with the construction of markets and their salient constituents, and instead focus on the impacts that they, particularly through the process of financialisation, have in ‘shaping contemporary economic, social and cultural life’ (2011: 79). The impacts here range from societal transformation through the primacy of finance and markets over the real economy, to the resultant effects on individuals and households. These impacts are not simply downstream, namely the increased exposures of individuals to the capital fluctuations and risks inherent in global and globalised markets. There is also an upstream context whereby individuals, when aggregated with others,

through their appointed agents and combined capital, constitute actors within these same globalised markets. This concept is addressed in Erturk's (2008) 'massification' of household savings, a paper in the same aggregation of *homo economicus* vein as Froud, Johal and Williams' 'coupon pool' (2002) and Clark's 'pension fund capitalism' (1999).

In contrast to the benign order and balance of the neo-classical school; economic sociology, because of its focus upon actor interests and inter-relations, admits the possibility that markets can be arenas of conflict, but ones which can produce 'a harmonious result out of the clash of competing interests' (Block, 1990: 46). Waldenberger too, states that 'markets imply a certain way of conflict resolution' (2002:126 in Dore, 2002). Far from the neo-classical view of harmonious reconciliation, he views this process as the offsetting of balancing trading positions; seeing it as 'ruthless' since 'it is the future profit that matters, not the pleasures and bonds of the past'. In this conflict filled process of reconciliation Waldenberger echoes Offe's (1985) writings on the state mediating tensions between aggressive post-war capitalism and the demands of wider society for better infrastructure provision.

Coase (1991: 10) also cites the crucial role of the underpinning power of the state and its ability to influence market provision and the operation of institutions. It is a *super-actor* or, as Coase would have it, 'a *super-firm* since it is able to influence the use of factors of productions by administrative decision' (1990: 117, *author's emphasis*). This is echoed by O'Neill (2013) who notes that the 'role of government in commissioning and regulating infrastructure grows in importance'. This 'infrastructure turn' (Dodson, 2017) in the public sector's focus on infrastructure is reflected globally in the G20 Global Infrastructure Hub's stated goal 'to increase the flow and quality of private *and* public infrastructure investment opportunities' (2017: 88, *author's emphasis*). Peck and Tickell (1992) see the state as market regulator setting the 'rules of the game' for both the public and private sectors. More specifically that multi-faceted role includes one that, ironically, the market cannot fulfill; namely that of market maker (O'Neill, 2013, Thrower, 2014).

So the economic sociology view of 'socialising markets', sees markets as networks of actors, with exchanges made possible by 'socially agreed institutions' (Berndt and Boeckler, 2009: 537) or a range of socialised constructs of varying scales of institutional formality; from primary legislation, to regulatory regimes, to cultural constructs and social

norms. Looking at PPP markets there is a question as to whether these institutional frameworks are being internally or externally imposed. In such a scenario it seems likely that it is the financing parties - the institutional investment community – that are the ones dictating the agenda (Hickey and Mohan, 2004; Power, Mohan and Mercer, 2006).

2.4.2. The coupon pool and the financialisation of daily life

There is a sense that financialisation, this outcome and manifestation of capitalism and markets, has extended beyond large-scale institutions and international stock exchanges. Its influence can now be observed in the financialisation of infrastructure (Thrower, 2014), and has become a part of our daily lives (Dore (2008), French, Leyshon and Wainwright (2011), Langley (2008), and Harvey (2006, 2011)).

Until the last decades of the twentieth century, the realm of the family unit or household could be viewed as little affected, by the machinations of capital and the volatility of global markets. There was a protective state construction, a Polanyian shield (Polanyi, 1944), between markets and consumers. This concept of there being different spheres of activity or layers in society is not new. As Harvey observes (2006), Braudel sought to examine these strata of society, and to unpick their spheres of influence. For him the lowest layer, ‘material life’, referred specifically to the ‘non-economy, the soil into which capitalism thrusts its roots but which it can never really penetrate’. In the middle was ‘the favoured terrain of the market economy, with its many horizontal communications between different markets’. Lastly was the anti-market ‘where the great predators roam and the law of the jungle operates’ (Braudel, 1973). Harvey then disputes this clean demarcation as artificial and not applicable to contemporary life: ‘it is impossible...to sustain the view that capitalism has only a shadowy relation to daily life or that the adjustments and adaptations that occur in daily life are irrelevant for understanding how capital accumulation is working on the global stage’ (2006: 80). Indeed, if Langley’s ‘financialisation of daily life’ (2008) and Lazzarato’s ‘making of indebted man’ (2012) hold true, then we must concede that Braudel’s tiers have as Harvey suggests, become confused and, as suggested by O’Neill (2004), enmeshed.

Harvey (2011) sees this process of financialisation as the upper tier of the wild and uncontrollable excesses of the anti-market reaching down into the hitherto protected and tranquil lowest tier; but this too is not a sustainable view. Rather, the accounts of pension-pool (Clark, 1999) or coupon-pool (Froud, Johal and Williams, 2002) capitalism (both referring to the power and scale of aggregated individuals' savings) suggest that what is being seen are also the effects of the tier of daily life reaching up into the broader capital economy. This has a corollary in the actions of the state as a co-investor with private capital in many infrastructure projects. Hildyard (2012), citing Prequin (2010), observes that 'public funders now account for more than one-third of the institutional investors in infrastructure'.

What is then required in order to better understand this enmeshment of capital and society, the market and the state, is an analysis of the respective inter-relationships between, and drivers of, public and private forms of institutional capital. It is only through such an approach that the societal consequences of this financialisation driven enmeshment of the state and private capital can be fully understood.

Harvey also cites Polanyian institutionalism when he sees a cultural 'disembedding' of the market from the broader social system (2006: 80). In Polanyi's *Great Transformation* (the ascendance of market economics) the 'logic of commodification...and of capital accumulation had been imposed upon social life as a set of fictions and abstractions' (2006: 80-81). Harvey argues, it is not that capital is outside social life but rather 'that the abstractions that drive it are separated from the broader logic that would derive from social...processes taken as a whole' (2006: 81) with negative implications for the environment and for labour. Importantly Harvey, does not see capital or capitalists as a homogenous entity. This acknowledgment of variegation in the institutions of capital allows a more measured assessment of the market actors in the context of infrastructure and will be used in this study when reading across from the literature to the operations of infrastructure markets and the behaviours and drivers of institutional actors such as pension funds, infrastructure funds, SWFs and the broader ecosystem of investment capital.

2.4.3. *Social behaviours, economic consequences*

It can be seen that much of the economic sociology literature is concerned with the societal and sociological implications of private capital and market ideology reaching down into areas of society and our everyday lives in ways previously not envisaged. Whether such areas of our daily existence are defined by the proximate physical infrastructure with which we interact: space; houses, schools, hospitals, workplaces and city centres; there is undeniably societal unease at the pervasive and intrusive nature of contemporary capitalism. The privatisation and liberalisation of our infrastructure has provided an entry point for global investment capital into the day-to-day consumption patterns of modern society. In so doing it has afforded financial investors a stake in societal behaviours and, more importantly, created an embedded financial interest in how critical utility services are consumed by society. Debates such as those between renewable and, fossil energies; and road, rail and air transport; are no longer purely issues of public policy and state decision making. These choices, enacted on our behalf, impact materially on the investment portfolios of institutional capital, and in a less documented return loop, on the returns to public and quasi-public investment actors who are enmeshed in those same markets.

2.5. Financialisation and contested market outcomes

Since a core focus of this research is the institutional capital driving the financialisation of previously publicly held assets, and the replacement of the state (as utility owner and operator) by private actors, there is a compelling need to analyse the motivations of private capital versus those of the state. Political Economy as an academic discipline relates strongly to this dynamic shift from public to private. It addresses themes of value extraction, market ownership and market failure, the shareholder motive, and exchange value versus use value (Harvey, 2014). Of the bodies of literature examined in this Chapter, it has the most to say on this tension between public and private, societal value and economic value, market failure and market ownership.

2.5.1. Market dynamics and the financialisation of everything

There are clear links between economic sociology and political economy approaches to markets and private capital. These can be seen in the Critical Social Accountancy (CSA) school of Froud, Williams et al at the University of Manchester. They (the CSA school) are interested in exploring the social inequalities of a marketised, financialised system whereby 40% of society are economically empowered (they have a meaningful capital stake in the market via property, pensions and aggregated savings) whilst 60% are economically disempowered and disenfranchised (Froud, Johal and Williams, 2002). In a market world, the CSA school see clear evidence of a growing schism between empowered and disempowered segments of society.

In political economy terms too, the market is a contested and complex arena wherein political institutions, the political environment, and the economic system influence each other. It is concerned with the reflexive relationship of political systems driving economic structures, and economic imperatives driving policymaking. This is resulting in a pressing need to consider the influence of finance and private capital on policymaking (Davis and Walsh, 2017: 28). Another consideration is the spatially and socially uneven outcomes of this reflexive relationship of state and capital. Private gain needs to be weighed against societal loss. In such readings there is tension between market actors, rather than neo-classical balance; struggle, competition and conflict, rather than benign co-existence.

The importance of the role that neoliberalisation has played and continues to play in our financial (and infrastructure) markets has been the topic of much research (Brenner, Peck and Theodore (2005); Crouch (2011); and England and Ward (2011)). Even though what is meant by neoliberalism is ‘a wide-ranging concept with multiple interpretations’ (Davis and Walsh, 2017:29), Harvey (2007), Peck (2010), Davies (2014) et al. It is however, the consequences of those neoliberal policies that perhaps has been the focus, rather than the market mechanics themselves. Policies such as ‘low taxes and less regulation, monetarist policy levers over fiscal ones, programmes of privatization and state withdrawal from industry, the marketization of state functions, weakening employee rights and welfare state provision, market deregulation, open trading borders, low inflation and price stability’ (Davis and Walsh, 2017: 29-30). A list that demonstrates the irony at the heart of

neoliberalism; that it requires the very state it denudes to adopt and promote it (Davis and Walsh, 2017: 30).

French, Leyshon and Wainwright (2011) see a pervasive influence that runs throughout the entire societal system; painting a picture of government in thrall to private capital, corporations pressured by the expectations of capital markets, and a trickle down impact on households and individuals. Langley (2008) and Langley and Leyshon (2009) also focus on the impacts of markets and financialisation at the level of the individual and make the point that, in being exposed to the volatility of capital markets, the risk volatility element in all our lives has increased. As O'Neill states 'financialisation is driving a shift in the character of infrastructure provision from public utility to financial product, bringing about a change from a relatively stable and cohesive operational world to one that has risk management and financial innovation at its core' (2017: 33). Financial markets use the term delta to express risk in terms of volatility relative to a norm. Using that terminology, Langley's work can be seen as a means of examining the increased exposure we bear by virtue of our exposure to the risks inherent in this financial innovation, the increase in the delta of our existence (Thrower, 2014).

In Marxian Political Economy the capital markets (as opposed to capital itself), simpler in construction and commodity based in nature, are often under-theorised. Christophers (2015) believes this to be because Marx sees the creation of surplus value in production and not in exchange (the latter being the preserve of the market). '[N]o value is produced in the process of circulation...if a surplus-value is realised in the sale of produced commodities, then this is only because it already existed in them' (Marx 1894, vol. III c3, cited in Christophers, 2015:14). Agnew (1979: 115) also states that, in Marx, market relations 'have taken on the status of givens in his analysis...Labor time, not the market place, becomes the pre-emptive frame of reference'. This can either be interpreted as an exclusionary approach to markets (discounting their value) or an unlikely acceptance of a Smith-ian orthodoxy of efficient market mechanisms. Christophers also cites Agnew (1979: 107) in his analysis that Marx sees the 'market as a mode of mystification' since 'the rise of capitalist production is inseparable from the forms of mystification by which its characteristic system of surplus-extraction is concealed'.

Taking a more nuanced view, Birch & Siemiatycki (2015: 8) suggest that ‘the market economy is multiple, involving a variety of instituted market processes, that is, there is not just one form of market economy’. They see markets from the perspective of new models of service provision; distinguishing between outsourcing (price competition between competing providers), PPP (bidding for long term concessions – which actually, though not acknowledged by Birch and Siemiatycki, is pricing embedded within a broader financial model), and privatisation (regulated pricing). Even here however, it is the hegemonic public sector perspective, so prevalent in the literature, that frames their thinking. What is absent here however is the perspective of the institutional investor.

Berndt and Boeckler (2009) talk of ‘destructive markets’ as the anti-capitalism end of Political Economy wearing ‘its more radical Marxist clothes’ (2009: 539). Indeed, even the current governor of the Bank of England stated that markets ‘left unattended...are prone to instability, excess and abuse’ (Carney, 2015). These sentiments (with antecedents in Marx, Froud, Weber et al) see the market as ‘a powerful and all-encompassing force’, and the market mechanism as ‘destructive, doing away with tradition, community, solidarity or cultural particularities’ (2009: 539). That last phrase, concerned with the homogenising effect of the market, is echoed strongly in the rise of PPP as a global template for the emergent infrastructure asset class, not just as a financing methodology, but also because of the implicit demands it makes of nation states in terms of fiscal policy, contract and procurement law, and market access. Not only is that homogenising force noticeably active in transactional terms, but also as a calibrator of societal value. ‘It is “the market” that appears to decide what should be done, what counts socially and what has no value’ (Berndt and Boeckler, 2009: 540). This valuing process, Political Economy would contend, is observable at the level of the individual (Wallerstein, 2004), and in contemporary debate, is manifested in the market having a greater voice in the provision of healthcare, education, justice services; and the linguistic sleight of hand re-characterising social housing to its more politically malleable cousin; affordable housing.

2.5.2. The qualitative state: shield, market maker and co-investor

This review of the literature has highlighted an ongoing debate as to the role of the state, the extent of its power and influence, and the degree to which this should be leveraged to constrain or enable the private sector. This Section examines why such a debate is problematic and proposes an alternative view of how the inter-relationships of state and non-state actors may be re-considered.

Firstly, there are no ready-made boundaries to circumscribe what we mean by the state, and indeed the empirical findings in Chapters 4 to 6 elaborate at some length on this question. Institutionally where the state or its manifestations as the mediated state ends and the realm of purely private capital begins is unclear, contested and subjective.

The second problem is the traditional view of the binary relationship, or duality, between the state and the market. Such a clear demarcation mitigates against considerations of more complex linkages, and omits the possibility of reflexive effects and feedback loops between the actions and drivers of both public and private actors. O'Neill (2004) expressed the idea of the qualitative state as a nuanced public actor engaged at numerous levels, and on an ongoing basis, with the full multiplicity of variegated capital. He saw:

‘a domain where a complex and heterogeneous state apparatus is engaged in constant interplay with non-state institutions and agents, including those from other nations, in an irresolvable contest over accumulation and distributional goals’ (2004: 257).

O'Neill's ‘qualitative state’ (2004) presents us with a picture of an engaged and empowered state enmeshed within a complex and dynamic world of fast moving capital markets. The aspect of an ongoing ‘irresolvable contest’ with private capital and markets, and indeed other states, encapsulates the idea of markets as realms of conflict requiring resolution. It raises issues of inequalities of power and disparities of wealth, and also the geo-political and economic variegation of states. Importantly it does not place the state as the central reference point (as many others have done) rather ‘by decentering the way in which we portray the state and by concentrating on the interactions between the state’s apparatus and capitalist processes, the distinction between the state and market is broken down and issues

of accumulation and distribution become inseparable' (2004: 258). The key point in O'Neill is that 'there is a difference between a loss of state role contained in the globalism story and a shift in the state role which a qualitative view of the state would assert' (2004: 260).

Hendrikse & Sidaway (2010: 2039) also describe financialisation as reconfiguring the relationship between the state and the market 'so that they become more thoroughly inter-meshed'. Weller & O'Neill (2014: 105-130) argue that these forces 'bind multiple levels of government into the maintenance of public service provision', but that the state 'remains in control and accountable' (Springer, 2014). Pike and O'Brien (2015: 9) see the state as 'the critical actor in convening financial institutions and orchestrating the funding, financing and governance of such infrastructure'. These views accord with evidence from the empirical research presented later in this thesis. But it is important to see this intermeshing of state and market, this *binding in* of the state, as part of an ongoing process that has multiple facets. Such a perspective would echo Foucault's thinking on neo-liberal governmentality; envisaging the production of freedom through 'the establishment of limitations, controls, forms of coercion and obligations' (2008: 64). Graham and Marvin (2001) also note the presence of a multi-faceted process where, under a neo-liberal paradigm, the state retains a key role as creator of markets through public contract tendering, concessions and price regulation; prefiguring in turn Clifton, Comin and Fuentes' (2006) citing the emergence of the regulatory state. Among these voices arguing for the enmeshment of state and capital and an ongoing critical role for the state in both capitalism and markets, it is useful to cite O'Neill's concluding perspective on this matter:

'Because capitalism is incapable of an existence outside the reality of state action and because capitalist processes involve distributive processes *per se*, then the state is always involved in redistribution activities.' (O'Neill, 2004: 268)

Such a super-actor, market maker role seems far divorced from the hollowing out of the state and its public services as depicted (albeit in a UK context) by Rhodes (1994), Holliday (2000) and Peters (1994).

There is of course debate as to how such engagement between public and private actors should be balanced; to what extent, and how, state actions should become blurred within the

free market. Indeed, O'Neill goes to the lengths of listing out forty-five 'Roles of the qualitative state in a modern economy' (2004: 264-5). It is interesting to note however that even he does not include any role for the state as an economic actor, pump-priming a market or co-investing alongside private actors.

A more commonly acknowledged role for the modern state is that of regulatory oversight. As Waldenberger (2002: 126 in Dore, 2002) states:

'Markets...need some kind of regulation. Investors in specialized assets [infrastructure as an asset class being one] must be forward looking. It is not necessarily personal trust on which they rely in their forecasts, but confidence in future demand and legal rules...Markets can only function to the extent that, together with the regulatory environment, they foster and confirm the beliefs of participating parties'.

These mechanisms of hard and soft institutions are espoused by the likes of Rhodes (1994) and Skelcher (2000); and both of these relate back to the institutional approaches of Polanyi. Such institutions act as Polanyian mediators between the interests of global markets and that of national society (Haberly, 2011).

Block's 'new paradigm' rejects the concept of intervention, instead offering the observation that 'the state and the economy should be seen as mutually constituting spheres of activity' (Block, 1994), and that the state and the economy or the market are always intertwined (Migdal, 2001). Since state action is inevitable, our focus should be on the qualitative nature of those actions. This enmeshment and qualitative action leads once more to notions of the qualitative state. The innovation made by Block is the term he uses for this synergistic co-existence of state and the economy: 'market reconstruction' (1994: 697). This phrase, influenced by Marxian political economy, institutional economics and Polanyian institutionalism, reflects the possibility that markets can be constructed or reconstructed 'to achieve greater efficiency, greater equality, or other ends'. This echoes Harvey (1973) and Christophers, who suggests that:

'One answer to the effective demand problem...has been to create new markets entirely, either through the penetration of capital into previously non-capitalist

spheres...or through intensification of capital investment in the built environment which crystallizes as new rounds of urbanization' (2014: 16)

Christophers' conjecture (informed by Harvey) makes reference to factors that are certainly present in contemporary infrastructure markets. It is that process of structuring and restructuring such markets, and the role of variegated capital and the qualitative state in that process, which is at the heart of this thesis.

Berndt and Boeckler (2009) see a variegation of capitalism across the spectrum from the North American, less planned and intermediated 'perfect market model' (2009: 540) to the socially and politically coordinated German version, Rhineland capitalism. This is a view shared by Peck and Theodore (2007) and O'Neill (2004). This spatial variegation of market and transactional structures and outcomes is clear in comparisons between emerging and developed economies (Ankrah, Mante, and Ndekugri, 2015; and Power, Mohan and mercer, 2006), in analyses of the global rollout of the Australia derived Macquarie model (Solomon, 2009), in UK and US comparisons (Strickland, 2016), in Anglo-Saxon and Rhineland capitalism comparisons (Keenan, 2017), as well as in the growing body of transactional literature on PPP such as Delmon (2009) and Miraftab (2004). These are of course neo-liberal variances of degree as well as geography and, as the German treasury today turns to a major program of PPP financed road building, it is clear that these poles of capitalism may be experiencing a lessening of cultural and cognitive distance. Consideration of these spatial differences; a key consideration of this thesis and of economic geography, are addressed extensively in Sections 4.2, 6.2, 6.3 and 6.4.

How economic ideas and constructs are spread across spatial markets, and the 'embeddedness of economic activities in institutions' (Berndt and Boeckler, 2009: 541), are relevant for us to consider in light of the role being played by national governments and multinational institutions in the dissemination of infrastructure financing methodologies such as PPP. An example of this is the (PPIAF), a global technical assistance facility managed by the World Bank 'dedicated to strengthening the policy, regulatory and institutional underpinnings of private sector investment in infrastructure in emerging markets and developing countries (PPIAF, 2017).

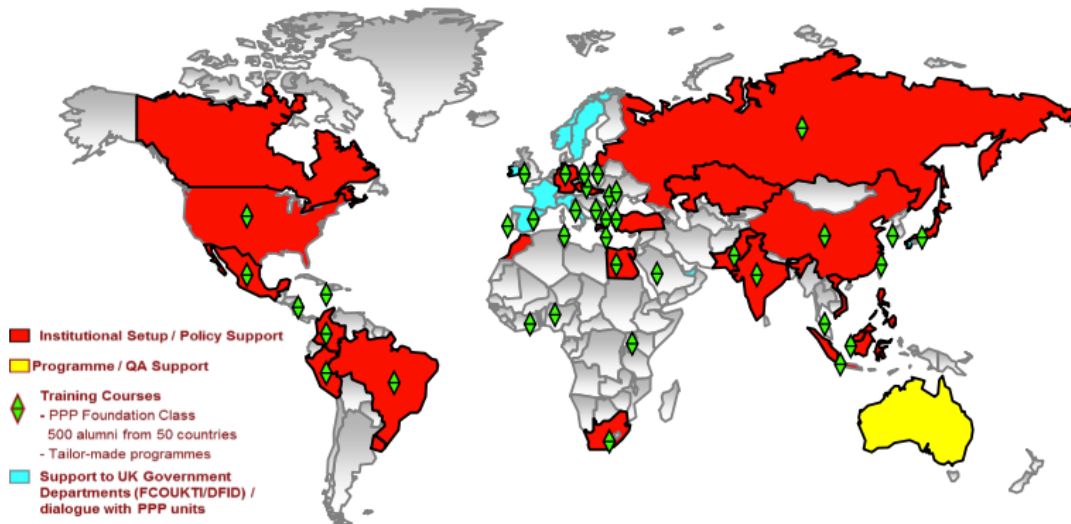


Fig 2.2: PPIAF ‘Where we work’

Source: PPIAF (2017)

These processes, so carefully documented by Delmon (2009), Hearne (2006), Weber and Alfen (2010), Whiteside (2015) and others, are about more than providing an entrée for private institutional capitalism. They are surely about the homogenisation of political institutional structures, a ‘singular world of market unification and institutional convergence’ (Peck and Theodore, 2007: 731). Far from hollowing out (Holliday, 2000), states are exporting their own hegemonic neoliberal worldview on the back of the global demand for new and upgraded infrastructure. Whether these processes, manifesting as an enmeshment of the markets and the qualitative state (O’Neill, 2004), or a market driven realignment of the state’ (Whittam and Birch, 2011), have aided beneficiary governments in the global south and other more economically challenged geographies remains, at best, moot (Miraftab, 2015).

2.5.3. *Financing development or developing finance?*

The successful accumulation of capital, according to Harvey (1985: 146), requires a ‘structured coherence’ wherein production and consumption, supply and demand, production and realisation, class struggle and accumulation, and culture and lifestyle ‘hang together’. This captures the dynamic tension at the heart of capital and of markets. We can clearly see that each input (supply and demand) varies over time. There is no stasis in this

model. The energy of capitalism's competing inputs must therefore be absorbed. The elastic medium of this 'enduring capitalist dance' (O'Neill, 2012 in Barnes, Peck and Sheppard (eds), 2012: 79) is the market, and the poles to which the market membrane stretches are defined by policy, regulation, laws and customs. This refers back to the market as a means of conflict resolution (Waldenberger, 2002). But if we can see that these inputs in themselves contain dynamic factors of change, the question to ask is perhaps the degree to which the market merely manifests the tensions of its inputs and the degree to which it creates these tensions, or allows them to amplify to unsustainable levels. Witness the global financial crash of 2007, capitalism containing within itself, as Marx and Braudel would contend, the seeds of its own downfall.

Underlying much of the contemporary political economy perspectives on private capital is an unspoken assumption of Pareto efficiency (Pareto, 1909), meaning a state where one actor cannot be advantaged without the disadvantage of another. On the one hand this assumes, as would be expected from one such as Pareto writing in the neo-classical economics tradition, a perfect efficiency of markets with little thought for externalities, and yet it also incorporates ideas that run through Smith, Marx and Hayek right up to contemporary observers such as Erturk, Froud, Weber, Peck and Theodore; and to the heart of political economy. Namely that capital, particularly private capital, only prospers through the extraction of value; to the detriment of society and individuals. So capital is seen as an exploitative and de-stabilising actor which, in its present dominant iteration, has adverse and spatially uneven consequences: for infrastructure service provision, society, and our way of life.

These negative connotations of capital and capitalism are reflected in the literature in the characterisation of corporations; their actions and motivations being seen as suspicious, opaque and unknowable; a black box (Pollard, 2003), a shadowy figure (Coase, 1991), or 'a domain of delusion and chicanery' (Blackburn, 2006: 66). Clark goes further; suggesting many social scientists identify global finance as 'the devil's handiwork, or worse' (2005: 108). Similarly, we are told that 'corporate managers are increasingly oriented toward securing financial value for shareholders, value that can only be achieved through financial engineering and 'alchemic transformation' '(Froud et al. 2001, cited by French et al, 2007: 5). The language here is telling. The use of *alchemic* implies a magic, a subterfuge, turning base metal into gold, an essentially Marxist reading of capital: of 'All that is solid melts into

air' (Marx and Engels, 1848). This impermanent, elusive and intangible aspect of finance and financial derivatives (Pryke and Allen, 2000) seen as separate, without substance and apart from the permanence of tangible reality is remarked upon by Leyshon (2007). He observes that it is precisely the physicality of *real* assets such as infrastructure, and the revenue streams flowing therefrom, that makes them so attractive and foundational to investors, since the leveraging of these real assets allows more speculative financial positions to be overlaid upon them.

For Polanyi at least this extractive nature of the market requires a strong state as a counterweight against the assault of market forces. The state does more than just set the rules of the game, it is a shield protecting the citizenry, society as a whole, and the environment from these forces of rampant market fundamentalism:

‘to allow the market mechanism to be sole director of the fate of human beings and their natural environment...would result in the demolition of society...Robbed of the protective covering of cultural institutions, human beings would perish...neighbourhoods and landscapes defiled’ (1944: 76)

It is instructive to note however, that the rationales of public or quasi-public actors can also be opaque, as this study will show. In contemporary infrastructure markets, public actors are also often an investing party, either directly or indirectly. Any contemporary reading of the role of the state therefore must reflect the role of PSPFs, state backed MFIs, and SWFs as significant economic actors. It must also acknowledge that these quasi-national, quasi-governmental investment arms are often investing for reasons beyond pure economic yield (Haberly, 2011). In the case of SWFs, the influence that these economic investments can give their domestic (investor) government in investee territories has profound implications for spatial sovereignty and for the tensions between economic and political actors.

This conjunction of the state and the economic, is characterised in terms such as alliance capitalism and economic diplomacy (Gerlach, 1992; Rozanov, 2005; Monk, 2011; Haberly, 2011; Dixon & Monk, 2012). Haberly defines alliance capitalism as ‘an institutional manifestation of the synthesis of the twin political dynamics of defensive state adaptation and changing state territoriality under conditions of globalization and financialization’ (2011: 1834). Breaking this down into its essential parts we can perceive that SWFs invest for economic benefit *and* to further the political objectives of their sponsor state. Why should

this be necessary? The answer lies within the changing and fluid geo-political nature of the modern qualitative state in which ‘the political foundation of the state may be partially decoupled from the territorially defined national constituency’ (Haberly, 2011: 1834); Glassman’s internationalised state (1999). We may also be witnessing the start of a regional form of alliance capitalism here in the UK as councils, combined authorities and local pension funds take economic stakes in UK based infrastructure assets outside their own geography. A recent example of this is the grouping of ten Manchester metropolitan borough pension funds buying a portfolio of airports including Bournemouth, East Midlands and Stansted, all of which lie outside the area of their administrative jurisdiction.

These interpretations of institutional capital (primarily private but also hybrid public-private) still, however, present a two-dimensional view. There has been little consideration of issues around supply and demand. In neo-classical economics Say’s Law (Say, 1803) asserts that supply creates its own demand. More specifically, he expressed his belief in the balance of a market economy, by stating in an exchange with Malthus that ‘a supply creates a demand of the same magnitude’ (Say, 1936).

Conventionally we might assume that infrastructure projects are the demand and that capital, be that public or private, is the supply. But if Say is correct then it is the multiple actors representing global capital, requiring attractive yielding, long dated assets in which to invest, who are creating the demand. Harvey (1975: 9) too states that the progress of capitalist accumulation depends on ‘the existence of a market to absorb the increasing quantities of commodities produced’. In light of the alleged *wall of capital* looking for a home, Ben Bernanke’s ‘global finance glut’ (Sheppard, 2017: 240), we can agree with Harvey and assert that capitalist accumulation relies on the existence of a market to productively deploy (invest) the increasing quantities of excess capital being produced. As Marx (1863) observed it ‘is in the nature of capitalist production, to produce without regard to the limits of the market’. This statement pre-dates the time in which we see the emergence of enabling private capital as a good or commodity on the market. Indeed, we can say that the commodity of which there is the greatest surplus on international markets at present, is capital itself. It was that very fact, in terms of huge Australian pension surpluses and a relatively small domestic stock market in the 1990s, that contributed to the growth of the Macquarie infrastructure investment model which has perhaps been the most significant structural market event of recent decades.

2.6 Proposing the value of institutional political economy and economic geography to the understanding of financialised infrastructure markets

This study asserts that political economy approaches, influenced by Marxian perspectives that privilege abstraction and generalisation, and sociological ‘techno-cultural approaches’ focused on ‘local, historically-specific instances of market construction’ (Christophers, 2014:12) have left, under-theorised, a critical space in the middle. It is this gap between these approaches (Fig 2.3 below) that is addressed in this thesis, and that Christophers (2015) suggests can yield new insights into the ‘performativity’, or construction, of markets by actors pursuing their own institutional drivers and interests.

Heterodox neo-classical economics, like Marxian political economy, foregrounds the differences between the roles and actions of the state as opposed to, and distinct from, private capital. There is little bleeding of the one into the other. It is the tension between the distinct societal positions of the public-private binary, that provides a balance within systems of neo-classical thought, and that assumption of balance is core to what Christophers terms as ‘*classical* political economy’ (2014: 14, original emphasis). As Harvey states (2012: 23); Marx ‘accepts the Smithian version of a “hidden hand” of a perfectly functioning competitive market’.

Economic sociology attempts to chart the influence of cultures and societal structures on the market, and vice versa. It is concerned with both the hard institutions of government and governance but also with the soft institutions of culture, values, societal norms and expectations. These sociological approaches are concerned with markets but they

‘tend to focus on local, historically-specific instances of market construction and configuration, shying away from theorization of capitalism as a coherent social system and of the place of market exchange within it’ (Christophers, 2014: 12).

What is under-explored then in these literatures, are the reflexive relations between a fine-grained understanding of state and quasi-public actors and markets, the one influencing and

in turn influenced by the other. The state as market maker, regulator, investor and actor of last resort, whilst also experiencing and exploiting the increased influence of private capital, and market based methodologies. States are, in part, mechanisms of governance, concerned with making the optimal decisions for citizens and society. Part of that context is societal value, and the way that value is determined in a marketised economy is one that market participants would readily recognise. It is about captured economic value, tested by procurement processes that are embedded in market thinking, utilising government endorsed structures (PPP and the like) which are fundamentally market based and market shaping (MacKenzie, 2006) instruments. These devices of contemporary infrastructure finance, design, commission and deployment are constructed by markets and market actors, delivered by markets, procured through markets, and ultimately traded on markets.

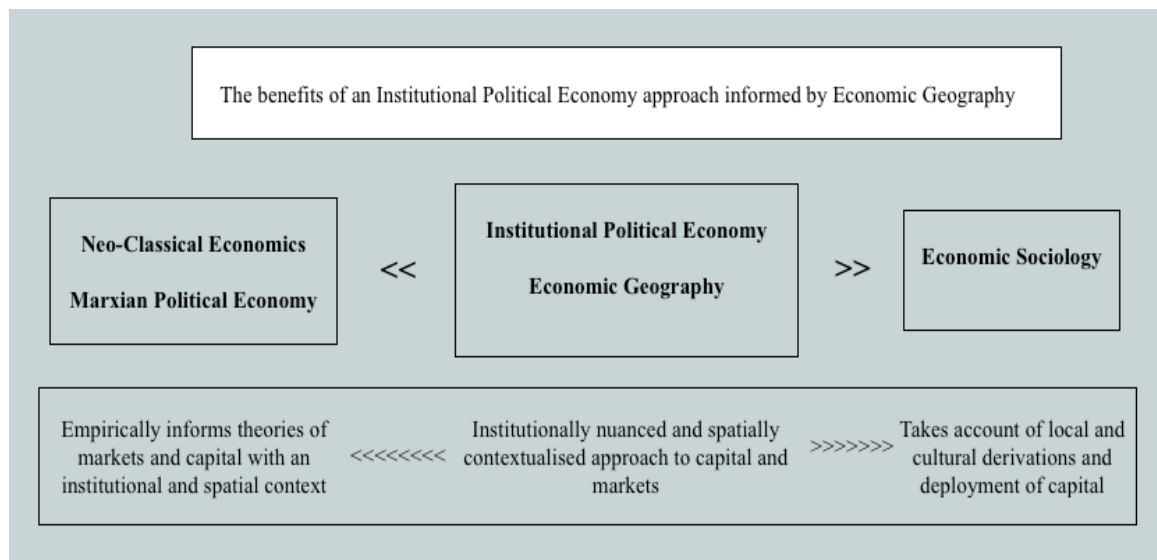


Fig 2.3: The benefits of an Institutional Political Economy approach informed by Economy Geography

Source: Author's own (2017)

Institutional political economy, informed by the spatial sensitivities of economic geography, addresses many of these issues, and examines the political consequences of economic models, and the economic consequences of political choice. Here again is a consideration of themes of extraction, and of public trust. It is the extraction from one purse (the public purse) by another (the private). It is a debate over the extent to which returns on capital can be held to be *reasonable*, both societally and in terms of value for money. What this research approach offers, building on Jamie Peck's (2012) notion of comparative

economy, is methodologically ‘deeply empirical’ (Christophers, 2014), and reconciles the problem of Marxian political economy and economic sociology seeing ‘theories of uneven development and concepts of local institutional specificity [as]...different sides of the same phenomenon’ (Peck, 2012: 158). That is to say that, if we take an institutionally driven and spatially contextualised approach (as outlined in Fig 2.3), utilising an institutionally oriented and driven political economy approach *and* the spatial context offered by economic geography, then it is possible to arrive at a better understanding of the contemporary financialised infrastructure markets that are formed through the enmeshment of the qualitative state with variegated institutional capital.

Despite the considerable growth and reach of financial markets and the neo-liberal consensus over recent decades, the literature would suggest that the construction, nature and effect of markets has been poorly theorised in the seventy years since the publication of Polanyi’s *The Great Transformation* (Dale, 2010). The same has been said of financialisation where there has been a ‘dearth of empirical work’ (Pike and Pollard, 2010: 29). Pike and Pollard highlight the influence of markets, intermediaries and processes as key factors in financialisation (2010); whilst Epstein (2005: 3) highlights the role of ‘financial markets’. The argument to be made here is that the considerations of financialisation and the involvement of investment markets are highly complex, and closely linked, in terms of the principal actors involved, the financial processes enacted through the medium of the market, and the ultimate impacts on society across different levels of space and scale.

This version of financialisation describes the increasing importance of financial markets, financial motives, financial institutions, and financial elites in the operation of the economy and its governing institutions, both at the national and international levels (Epstein, 2001). This scalar conception of financialisation leaves unanswered the question as to when financial markets and drivers should be regarded as *too* important and dominant in the real economy. Indeed, it makes the implicit assumption that finance is somehow apart from the broader economy.

This study is interested in the enmeshment (O’Neill, 2004) of finance, the state and the economy; and a critical locus through which this occurs is the market. In the context of state or state linked institutions operating in a market-oriented manner, this process is sometimes described as ‘competitive federalism’ (Greve, 2012). Looking through the lens of

infrastructure markets, this thesis sees the relationship between financialisation and marketisation, as one wherein market driven solutions of previously state run and owned infrastructure are a manifestation of an equity or market culture in the public sector. This in turn is the end result of a prevailing hegemonic perspective of financialisation that accords greater weight to financial firms, investors, markets and methodologies, rather than to industrial economics or industrial capitalism. This is thus a process and outcome of financialisation that is a tectonic shift to the rentier class, from industrial capitalism to financial capitalism, from manufacturing returns to investment returns, from social equity to equity return. Within this there has been a dominant, almost unquestioned, primacy accorded to private capital often viewed as accompanying or resulting in a hollowed-out state (Jessop, 1994). Whilst Jessop's view is based on shifts in the scalar activities and responsibilities of the state; the wider literature has come to present this notion of hollowing-out as 'a universal condition of state depowerment...an extreme paralysis of the nation-state' (O'Neill, 2004: 261). Allen and Pryke go further, and equate privatisations to 'a *withdrawal* of the state from the routines of urban life' (2013: 421, *author's emphasis*). These views of withdrawal or reduced capacity to act, will be challenged in this study. Rather it is proposed that the qualitative state (O'Neill, 2004) as an engaged, proactive actor is intrinsically and increasingly *enmeshed* with variegated capital (Peck and Theodore, 2007; Cerny, 1990: 230) in the co-creation of enabling legislation, asset classes and investment markets. Additionally, it is state and quasi-state actors who are providing much of the significant investment capital (both directly and via intermediaries), stimulus packages, and enabling primary legislation, that contribute to the health, size and liquidity of emergent infrastructure markets.

This study develops the concept of a more financially active qualitative state actor, that executes its infrastructure strategy via a variegated portfolio of direct investments by government agencies, through to pools of state and quasi-state capital (SWFs, MFIs and public pension funds) being deployed through a range of financial intermediaries such as infrastructure funds and private equity firms. This is a scenario of state capital invested in, and manifested through, para-public and private sector institutional constructs, and referred to hereafter as the mediated state.

2.7. Financialised infrastructure: Evolving beyond conventional notions of state and capital

The marketised nature of infrastructure and the emergence of the qualitative state (O'Neill, 2004) are symptomatic of what can be seen as the blurring of the lines between public and private actors. This demands an academic approach to infrastructure that reflects the variegated reality of the contemporary institutional, financial and societal frameworks that surround it, finance it and consume its services. This Chapter has considered the approaches of neo-classical economics, economic sociology and political economy through the lens of financialised infrastructure markets and has started to draw some conclusions about the way the study of institutional investors in infrastructure markets might inform academic discourse and provide a way to uncover gaps in the literature as it struggles to keep pace with the blurring of established concepts of public and private, state and markets, mobile capital and fixed sovereign geographies.

As Schumpeter states 'public finances are one of the best starting points for an investigation of society' (1918: 101) particularly at the transitional interface of fiscal epochs. This provides a public sector equivalent to Clark's (2005) desire for a more fine-grained approach to 'global financial institutions and their investment practices'. These are both exhortations to a more nuanced, spatially sensitive, and detailed consideration of the practices of market actors. Again, following the money, Whiteside (2015: 3) draws attention to Cutt's view that 'regardless of economic climate or government ideology, budgetary instruments allocate and (re)distribute social wealth' (1989: 151). It is then reasonable to ask that, in the context of austerity driven cuts in public service provision, regressive fiscal policies, and increases in user fees; who, what and where is being left behind? What part of society, in Marxian terminology, is being exploited for the enrichment of whom? This 'neoliberal risk shift' (Hacker, 2008) sees some groups in society benefit, while 'most are left worse off' (Whiteside, 2015: 3), their needs unmet, victims of capitalism's tendency to be 'hostile to the poor' (Bresser-Pereira, 2010: 3). Consequently:

'the question is whether the logic of maximizing rates of return on investment, as pursued by undoubtedly well-informed (and well-resourced) institutional investors

and market makers, builds the infrastructure that society needs?’ (Sheppard, 2017: 241).

Since the early days of a few private institutional investors allocating capital to illiquid infrastructure assets, infrastructure markets have come a long way. It is now the state and the market working *together* that is enlarging and evolving the market for global infrastructure investment (Whiteside, 2015), itself an acknowledgement of the blurring of old public private binaries in the context of infrastructure provision and the broader economy. To ascertain how this is occurring and why, and the implications for infrastructure and for economic geography, there is a pressing need to move beyond the generic characterisations of the benign hollowed out state on the one hand, and exploitative, violent capitalism on the other. It is time to consider the true nature of today’s infrastructure markets, the globally amorphous nature of money and the inter-related, globalised and competitive world in which sovereign states exist and through which money, and those institutions that aggregate and invest it, operate.

As we have seen, the qualitative state (O’Neill, 2004) evolved notions of the state beyond the monolithic, paternalistic entity of neo-classical economic theory, providing public goods in multiple areas of market failure. The idea of the state as a shield for its citizens, as an essential counterbalance to over-reaching capitalism has given way to a perception of a hollowed out public sector actor, as the end result of decades of neo-liberal thinking from the late 1970s eroding the authority, capability and democratic mandate of government. Regulation theorists saw the state as having tools in its arsenal, but these were always variants on policy and the regulatory constraint of ‘free trade’ rather than a true engagement with capital on equal terms. Whilst O’Neill’s qualitative state (2004: 264-5) presents a suite of roles for government around legal frameworks, infrastructure provision, the creation and governance of markets, and social legitimisation activities (public health, elimination of poverty etc.); even here we do not see the state as a co-investor, or as a primary financial actor. So even in this most nuanced reading of the modern state the enmeshment does not incorporate a vision of the state as financial *super actor*.

As has been seen, neo-classical economics has tended to take markets as a given, a natural mechanism that is part of the balance of the natural economy. For Marx markets remained peripheral since they neither were the site of the generation of value (which resided in labour

production) nor had a core function to perform in a world where transaction costs were deemed to be at or close to zero. Whilst more modern studies have looked at the roles of actors (Caliskan and Callon; 2009, 2010), public choice theory, market regulation, cultural aspects of markets, globalisation, and causes of market failure; what is lacking is a version of markets that reflects them as a post spatial, post-statal arena wherein the qualitative state engages with, and acts alongside, and through, variegated capital.

This study argues that nowhere is this modern reading of the market, as agnostic to old public-private binaries, more evident than in the evolution of investment markets for financialised infrastructure. It is through the lens of these markets that we may start to discern new ecologies of state behaviour, new variegations of capital and the complex feedback loops that reside within such geographically indifferent institutional constructs as SWFs, pension funds and infrastructure funds, and the infrastructure assets in which they invest.

2.8. Towards an institutionally and spatially contextualised understanding of financialised infrastructure markets: the Research Questions

The aim of this Chapter has been to critically analyse and engage with the literature that informs our understanding of contemporary financialised infrastructure markets, and the institutional and spatial context in which they are situated. This Section reprises the core arguments arising from the literature review, and utilises the identified gaps to guide the research questions of the thesis and its analytical framework.

The provision of economic and social infrastructure is an area of political contention, profound social interest and growing academic debate. Huge investment programmes are planned across energy, transport, water, communications, housing, education and health. Associations are drawn between infrastructure investment, economic growth, job creation and international competitiveness. Alongside these claims, and in a time of austerity, there are polarised views as to the role that private capital and the free market should play in these essential services.

The specific focus of this research is the institutional and spatial factors driving the construction, operation and reconstruction of investment markets for financialised infrastructure. And, of particular interest, is that point where the qualitative state meets, and is enmeshed with, a wide variegation of institutional capital. The nuanced, spatially sensitive, institutional aspects of this, we may say with some certainty, remains under-theorised. This is firstly, because the growing societal and economic primacy of privately driven markets challenges the mainstream neo-classical economic paradigm that has considered capital and the state in the abstract and apart. Secondly, analyses of the financialisation of infrastructure have, thus far, eschewed a more nuanced reading of the drivers of private sector actors (Clark, 2005; Pike, 2014). The conjunction therefore of these two factors has resulted in an academic field that remains largely under-researched.

The identified gaps in the literature clearly illustrate a need for an institutionally and spatially sensitive analysis of the dynamics of infrastructure markets, of the ways in which they are constructed, maintained and reconstructed; and of the role of geography in this. In particular there is a need to consider the increasing co-mingling of capital by public and private sector actors in the financing, construction, ownership and operation of critical economic and social infrastructure.

This research then explores whether financialisation; encapsulating as it does financial processes, actors, institutions and motives occurring across the medium of the market, represents a situation wherein finance is ‘now inherently attached to all forms of material or “real” economic activity’ (Marazzi, 2011). It then examines empirical evidence of the supply and demand characteristics of infrastructure markets, and the roles played by institutional actors. It considers the functional aspects of markets as a medium for efficient trade and conflict resolution; or as a mechanism that permits the inappropriate hegemony of financial imperatives with adverse societal implications. Lastly, it considers the question of whether who owns our infrastructure is important in terms of future infrastructure provision, spatial consequences, societal outcomes and the long run delivery of value for the public purse.

In debating the above issues this research takes into account differing views on market construction by contrasting neo-classical, economic sociological, institutionalist and

political economy perspectives of markets, and relates them to the peculiar category of infrastructure and its particular economic characteristics.

As with Pike and Pollard's (2010) call for an integrationist approach to finance, what is required, this thesis argues, is an accompanying and comparable integrationist approach to markets. They are ever present (in the neo-classical view) yet always evolving and taking on new forms. They are often termed to be free markets, yet this freedom is only sustained by a complex network of national and multinational governmental rules, structures and institutions. They are culturally embedded in spatial geographies and yet often seen as geographically indifferent (Pike and Pollard, 2010; French, Leyshon & Wainwright, 2011). Are we enriched by privately funded infrastructure provision or endangered by exposure to the "crisis-prone" dimensions of capitalism (Harvey, 1985:131); the 'crises...endemic to capitalist financial markets in the wild' (Mackenzie, 2004)? Is the financialisation of key services merely surplus capital seeking new and inappropriate homes, echoing Braudel's (1984) "signs of autumn"; and Froud et al's (2007) homogenising forces of global finance. Are the global financial markets acting logically in answering and meeting a societal need, funding where others will not? This paper seeks to examine that schism between a market driven cycle of crisis and endangerment (Marazzi, 2011; Davidson and Ward, 2014), and a financialisation of societal enrichment (Strickland, 2016).

It is anticipated that, in holding a lens to the structures and institutional and spatial constituents of infrastructure markets that we may (after Clark, 2005) derive a more informed understanding of the financialised infrastructure investment landscape. By examining public and private actors we glimpse the operations of the market. By understanding the market, we amass the tools to assess its efficiencies (and inefficiencies), its congruence to societal needs, and the impact (if any) of ourselves as investment actors through the coupon pool (Froud, Johal and Williams, 2002). In so doing we may decode the geographies of infrastructure, the links between ourselves and international markets, and between local money and global finance (after Clark, 2005). In order to achieve these aims, to explore the relationships between state and institutional capital, between financialisation and marketisation, and to examine the construction, maintenance and reproduction of markets, the following research questions are proposed:

RQ1 - What are the roles and strategies of the state and private institutional capital in the construction, maintenance, and reconstruction of contemporary infrastructure markets?

This considers the role of what we may term public and private institutional actors in how markets are constructed; and the nature and characteristics of infrastructure markets that are emerging to meet the twin demands of aspirational infrastructure build and excess global capital. This is, in part, a consideration of the *infrastructure* of the infrastructure market. It considers the mechanics of market construction to examine the evidence for an organic process, a *catallaxy*, utilising the characteristics of money flowing like mercury (Clark, 2005); a state driven process of policy and regulatory interventions, or an institutional process of capital influencing an ever widening agenda of neoliberalisation and market based infrastructure delivery.

RQ2 - What is the extent and nature of relations between the state and private capital as a consequence of their involvement in the co-creation of, and investment in, markets for the ongoing financialisation of infrastructure?

The main focus here is on the variegated nature of both statal and quasi-statal actors and the range of highly specialised private sector investment institutions active in infrastructure investment. The literature suggests that a deeper and more nuanced understanding of their role and motivations is largely absent from contemporary academic perspectives. This addresses how public and private institutions, active in financialised infrastructure, both shape and are shaped by both the market and the heterogeneous nature of infrastructure itself.

RQ3 - What is the role of geography in creating markets that are able to reconcile issues of infrastructure need and capital surplus?

This question seeks to address the inter-relationships and interdependencies of the forces of supply and demand within globalised infrastructure markets. It examines the spatial characteristics of institutional investors as a route into challenging the notion of whom infrastructure markets are constructed for and how efficiently capital is being allocated across and into variegated geographies. In understanding the distorted and asymmetric geographies of capital availability and infrastructure need it interrogates infrastructure markets for areas of stress and structural vulnerability.

These research questions seek to better understand the drivers, characteristics and spatial dynamics of a breadth of institutional investment actors across the spectrum from public to private. The second question specifically, aims to explore the relational aspects of these actors, the way in which one influences the other, and how the aggregate impact of their combined presence shapes the markets in which they operate.

This approach has been adopted since this study has, as one of its major concerns, a more integrated and holistic understanding of how investment markets are created, maintained and reinvented. It is acknowledged however that other viable approaches would have been to, over a period of separate research programs, examine in much greater depth the actions and drivers of individual institutional types, for instance to focus on pension funds in isolation. Such an approach, perhaps informed by specific institutional case studies would undoubtedly yield a greater empirical depth and richness in the context of that singular focus. It is however, the opinion of this researcher that there is an iterative and evolving relational dynamic between institutions, between public and private actors, that is critical to deriving a more nuanced understanding of how and why infrastructure markets have developed in the way they have. Such a breadth of relational insights would simply not be practicable within the context of singular institutional case studies or interview programs.

Chapter 3. A methodology for studying the intersection and inter-relationships of public and private capital through the lens of infrastructure markets

This thesis has, as its core concern, an analysis of the evolving behaviours of investment institutions across a spectrum of identities that might simplistically in the past have been characterised along a line from public to private. The lens for this examination is the significant and growing market for investing in financialised infrastructure, an area that as Section 2 demonstrated, was previously largely the preserve of government. Since old binary definitions of state or private imply a variety or range of identities and characteristics and imply a difference, this research is, in nature at least, partly comparative. It is however the hypothesis suggested by the research questions that these binary positions are evolving into a more textured, nuanced and complicated modern reality; that a blurring of what constitutes public and private, in the context of institutional investment in financialised infrastructure, is taking place.

3.1. Introduction: Translating the theory and literature into a methodology

To address the gaps in the literature identified in the Chapter 2, and to work towards an institutional and spatial consideration of global infrastructure investment markets, it is necessary to examine their cultural, economic and institutional machinery. This holistic approach enables a nuanced exploration of how the process of market construction is enacted, and the transactional outcomes and traces that these processes leave. Specifically, this study considers the role played by geography in the construction and ongoing functioning of these markets.

These aims, are achieved by examining the nature and behaviours of specific kinds of research subjects, investment actors with transactionally evidenced market agency; firstly, the institutional actors (both buyers and sellers) that make up this market. This study has, as its focus, an institutional approach to understanding the process of financialisation (defined in Chapter 2) as manifested in and through infrastructure markets. As such the

institutions engaged and interviewed for this study include the principal infrastructure investors as identified through a quantitative analysis of some 3000 entities that hold capital for investment purposes: government agencies, multilateral financial institutions and development banks, sovereign wealth funds, pension funds (from public and private sector schemes) and annuity providers, infrastructure funds and private equity firms. This analysis and selection process is discussed further at 3.4.1.

Secondly, this study is interested in the characteristics of the items for sale, in this case the unusually heterogeneous asset class (though this study will challenge the term asset class) of infrastructure. The impact of this diverse asset on markets, market actors and investment behaviours is discussed in Chapter 5, where the iterative and reflexive nature of the relations between infrastructure and the institutional capital deployed into it are also examined. There is an additional, though secondary, focus on the constructs within which the market operates, the market parameters. These include advisors and consultants, regulatory and policy related entities, and the spatially uneven capacity of states and public institutions to coordinate, direct and influence these market-related bodies.

The methodological approach of this research has been to gather empirical interview and transactional data on the variegated institutional investors in global infrastructure markets, treating each institutional investor as a mini-case through which to illuminate the whole, the whole being contemporary infrastructure investment markets. These actors hail from thirteen countries across three continents, reflecting the geographic spread of institutional pools of significant capital but also the global nature of this study. This aspect of the study, examined further at 3.3 and 3.4, exhibits an institutional turn in economic geography; providing an empirical response to Coase's (1992) concerns about the abstract pursuit of grand theory that he termed 'blackboard economics'. It also answers Clark's (2005) suggestion that if we are to understand 21st century capitalism then it is necessary to develop a research method that focuses on financial and investment institutions. This approach, which addresses the deficit implied in Pike's (2014) observation that much of the academic literature has eschewed a more nuanced reading of the drivers of private sector actors, can also be seen as a move to a more institutionally focused reading of political economy and economic geography. It addresses the three research questions (previously enumerated in Section 2, and repeated at 3.2) and, in aggregate, extends our understanding of

contemporary financialised infrastructure markets and the interplay of the investment institutions active within them.

It is by virtue of such an institutional political economy approach that this research seeks to explain spatial and scalar factors of investment capital as inherently constitutive to the complex behaviours demonstrated within global infrastructure markets. In so doing, this analysis seeks to demonstrate that markets are forever incomplete, partial and contradictory; and that there is no such thing as a perfect market. Differing infrastructure markets may be seen as being at variant points along a curve from developed to undeveloped (in size and complexity), from *thick* to *thin* (in terms of investor density and appetite), from efficient to inefficient (in terms of realising value to taxpayers and government); and it is the institutional and spatial factors affecting where on these curves these markets reside, that is the focus of this research.

For the purposes of this study, infrastructure firms such as engineering and construction companies and their associated supply chains have not been included. It is undeniable however that such firms have, to a degree, become financialised as part of an increasingly competitive market for their services and to further stimulate pipelines of greenfield and new-build projects for future work. This behavioural change, while of interest and a potentially fruitful subject of a future research agenda as part of the secondary consequences of the processes of marketisation and financialisation in developed and developing economies, is not of principal importance in the context of how public and private institutional actors are becoming entwined in the area of financialised infrastructure. Neither is conventional bank debt finance considered in this study. For decades, banks have offered debt facilities to either state or privately run infrastructure entities, and provided a degree of project finance type lending to greenfield developments. Whilst the quantum of this may have changed over time (notably post the Global Financial Crisis and in response to evolving capital adequacy regulations), the nature of that involvement has not fundamentally changed. This study is concerned with what has changed in the context of the interplay of public and private institutional actors in financialised infrastructure; to permit this focus therefore, *steady state* elements such as bank debt have been omitted.

This research then can be seen both as a response to the above notions of market traces, and to what Christophers sees as ‘a Polanyi-inspired “comparative economy” approach to

the study of markets' (Christophers, 2014: 17). Comparative in the sense that it is the spatial derivations and behavioural drivers of differing institutional investor types that is being compared. This approach, Christophers (2014) and Peck (2012) would see as empirical (grounded in factual research of market actors), and from these singular observations deriving 'more sustained and systematic claims concerning the geographical form and constitution of this uniquely foundational economic category' (Peck, 2012: 125).

3.2 Research aims and questions: the needs of the methodology

This research is concerned with the ways in which sources of public or quasi-public capital interact, co-invest with and are deployed through private institutional capital. An improved understanding of this process, it is argued, yields insights into the way in which infrastructure investment markets are constructed, maintained and reconstructed. This interplay between public and private actors and infrastructure assets and systems is explored to ascertain how the financialisation of infrastructure is being conducted and its societal and service delivery implications. As Pike (2014) observes, 'little is known about how financial institutions analyse and interpret public infrastructure as an asset class within internationalized and varied investment portfolios'.

This research then addresses contemporary understandings of financialisation, the growing societal and economic primacy of privately driven financial market orthodoxy, and challenges the mainstream neo-classical economic paradigm that has considered capital and the state as largely separate actors. It builds on and questions the extant approaches to the financialisation of infrastructure which have thus far, with the notable exception of the work of Clark's (1999, 2000, 2005) work on Pension Fund capitalism; Clark, Dixon, and Monk (2013), and Haberly's (2011) works on Sovereign Wealth Funds, and the market construction research of Whiteside (2012, 2013), Birch and Siemiatycki (2015), Christophers (2012) and others, eschewed a more nuanced reading of the drivers of private sector actors, and their interplay with the qualitative state in the context of the formation and evolution of infrastructure markets. It is positioned therefore to answer a need for a finer grained, spatially informed, and institutionally based study of the processes of market construction and renewal.

Financialisation here refers to the increasing importance of financial markets, financial motives, financial institutions, and financial elites in the operation of the economy and its governing institutions, both at the national and international levels (Epstein, 2001). This has occurred as countries have shifted away from industrial capitalism. In the United States, the size of the financial sector as a percentage of gross domestic product has grown from 2.8% in 1950 to 7.9% in 2012 (Bank for International Settlements, 2014: 24), reflecting a ‘pattern of accumulation in which profit making occurs increasingly through financial channels rather than through trade and commodity production’ (Krippner, 2005).

In the context of infrastructure, ‘financialisation is the process of instilling a productive asset with qualities that make it attractive as a tradeable financial investment’ (O’Neill, 2017: 33), whilst marketisation is manifested then as the imposition or intensification of price-based competition in the context of that asset, *transformed* by the financial structuring (Pryke and Allen, 2018) enacted upon it. These process have included a wide range of phenomena, such as outsourcing, privatisation, active labour market policies, and the internal integration of markets for goods, services, capital and labour (Greer and Doellgast, 2013).

So, as we have seen, the financialisation of previously state owned and run infrastructure can be viewed as just one manifestation of an equity or market dominated influence in the public sector policy debate. This view, of the primacy of a private sector driven market orthodoxy, needs some unpicking and should be questioned. Rather, this study is equally interested in O’Neill’s (2004) qualitative state as an engaged, proactive actor that is intrinsically enmeshed with Peck and Theodore’s (2007) variegated capital in the co-creation of enabling legislation, asset classes and investment markets. Additionally, it is state and quasi-public actors who are providing investment capital (both directly and, importantly, *through* private sector funds and private equity), pump-priming instruments (UK Government guarantees, EU project bonds), and enabling primary legislation (TTT, Northern Line extension etc..) that contribute to the health, size and liquidity of these emergent markets.

There is strong emphasis throughout this Chapter on the relationship between the methodological framework employed and the theory and literature that is driving the research. Consequently, whilst being an explanation of the methodology for the research, this Chapter frequently makes reference to the concepts explored in Chapter 2 and, specifically, to the research questions laid out in Section 2.8. and repeated here:

RQ1 - What are the roles and strategies of the state and private institutional capital in the process of the construction, maintenance and reconstruction of contemporary infrastructure markets?

Theme – Institutional roles and variegation

Proposition – There are different roles and behaviours performed by public and private actors in the context of, and disclosed through, financialised infrastructure markets, and that an institutionally and spatially focused approach will yield new perspectives on market construction.

RQ2 - What is the extent and nature of relations between the state and private capital as a consequence of their involvement in the co-creation of, and investment in, markets for the ongoing financialisation of infrastructure?

Theme – The consequences of financialisation

Proposition – That processes of financialisation enacted through infrastructure markets are having profound impacts on institutional investors, the role of the state, and the nature of infrastructure itself.

RQ3 - What is the role of geography in creating markets that are able to reconcile issues of infrastructure need and capital surplus?

Theme – Geographies of finance

Proposition – That the spatial aspects of institutional investors, both in the derivations and deployment of their investment capital, shape the spatially uneven nature of infrastructure markets. And that these factors in turn have a role to play in the ability of those markets to meet the need infrastructure demand and to efficiently and sustainably allocate capital.

The above propositions were formulated as a response to the review of the academic literature outlined in Chapter 2, and the initial trawl of quantitative, transactional data in

the Preqin database, coupled with a review of the grey literature and policy materials, prior to the empirical research phase of the study. These propositions assisted in the formulation of the research questions, helped to structure the empirical data gathering, and reflected the eventual organisation of the findings into institutional, relational and market related themes as can be seen in Chapters 4 to 6 and then, in summary form, in Chapter 7.

3.3 Specifics of the research methodology

This research seeks to inform our understanding of the ways in which public and private actors and international investment capital act in the context of globalised infrastructure markets, and to examine the implications of this for the future provision of infrastructure services and perceptions of binary behavioural differences between public and private realms.

The research questions focus on a broad global spread of international institutional investment actors deploying significant volumes of capital derived from both public and private sources and from specific and variegated spatial contexts, and enacting their investment strategies both directly into infrastructure projects and indirectly via third party financial intermediaries. The Preqin database was used as a principal source of quantitative market, institutional, sectoral, spatial and transactional information. From an analysis of this data it was possible to isolate the principal institutional investor types (regardless of geographic derivation or focus) and, within each grouping, to see those investment actors with the largest commitment (of capital or allocation) to financialised infrastructure. The use of Preqin as a research tool, and the selection of institutional interview candidates, is dealt with more fully in Section 3.4 and Tables 3.2 and 3.4.

Much of the primary empirical research is qualitative in nature; in that a series of semi-structured interviews have been conducted with a wide range of actors, domiciled across five continents and representing the global north and south, and who are globally active in the infrastructure space. These are drawn from government agencies, MFIs, sovereign wealth funds, public and private sector pension funds and annuity providers, through to infrastructure funds; private equity firms and other asset managers. This approach has been

selected precisely to inform a more integrated perspective on infrastructure markets, and because a significant *gap* in current understanding is in the detailed perspectives of the investment capital institutional population as a variegated, and spatially diverse, economic market actor. It also answers Leyshon and Wainwright's (2011) and Clark's (2005) call for a more reflective consideration of finance, financialisation, and financial actors. A set of interview pro-forma questions is attached at Appendix 1.

A comprehensive literature review has provided a perspective grounded in current theory. Additional desk based sources and grey literature have included conference papers, UK Government and international consultation and policy papers, industry publications, corporate filings, blog posts and general media articles. This secondary material provides additional policy, transactional and market context for the empirical findings themselves.

This mixed methods approach (analysis of extensive quantitative transactional and institutional data, semi-structured qualitative interviews, institutional behaviours, illustrative examples, literature review, and desk based research) follows Tashakkori and Creswell's (2007:4) model whereby 'the investigator collects and analyses data, integrates the findings, and draws inferences using both qualitative and quantitative approaches or methods in a single study or program of inquiry.'

The different aspects of the methodological framework are in Table 3.1 below:

Methodology Component	Methodological Approach		
Academic Approaches	Neo-Classical Economics	Economic Sociology	Political Economy
Theoretical Framework	Financialisation, Marketisation and Neoliberalisation		
Case Study	Financialised Infrastructure Markets		
Units of Analysis	Institutional Investment Actors		
Geography	Global		
Sub Category	Public Actors	Quasi-Public Actors	Private Actors
Study Entities	Government Departments Government Agencies	Multilateral Financial Institutions Sovereign Wealth Funds Public Pension Funds	Private Pension Funds & Annuity Providers Infrastructure Funds Private Equity Firms
Method of Research	STEP 1 Database Analysis >> & Secondary Data	STEP 2 Semi-Structured Interviews >>	STEP 3 Transactional Data
Method of Analysis	Quantitative Analysis Database Analysis	Qualitative Analysis Thematic Framework	Quantitative Analysis Qualitative Analysis

Table 3.1: Methodological Framework

Source: Author's own, 2017

3.4. Research design and phases of research activity

This research study examined an extensive amount of quantitative data, notably derived from the industry leading Preqin database, ‘a major provider of data on alternative investments’ (Inderst, 2010) and ‘a unique source of financial infrastructure data focussed on deals conducted worldwide’ (Pryke and Allen, 2018). The Preqin database was selected because it is itself built from the detailed contributions of individual institutional actors and offers a granularity of information that is unmatched in other industry or publicly available sources. As Pryke and Allen note:

‘it offers a comprehensive, reliable and continually updated source, used by the industry itself, and also a significantly advantageous means to develop a data rich picture of key actors, from general partners to secondary investors’ (2018: 4).

Additionally, the study made use of public, policy and industry documentary secondary sources and grey literature, an extensive programme of qualitative semi-structured interviews, and the close consideration of transactional examples providing, in aggregate, an in-depth and nuanced understanding of the global institutional investment actor market population. This is an inherently comparative exercise, with each institution and institutional type of actor being analysed and compared so as to better understand the spatial derivation of their capital, and their cultural, political and institutional drivers. From these it is possible to contextualise the actions and capital deployment of any given institution and, through a process of aggregation, to draw some conclusions around that investor type. As Ragin (1987: 1) notes ‘virtually all empirical social research involves comparison of some sort’. Utilising a comparative approach that has been increasingly prevalent in urban studies (Di Gaetano and Klemanski, 1993; Ward, 1996; Wood, 1996) and applying it to infrastructure investment actors allows for an informed perspective of institutional difference and the contextualising of those variegations in background and approach within the broader market. This echoes Brenner’s comparative method where he ‘relate[s] contextually specific institutional dynamics and outcomes to broader, meso-level transformations’ (2004: 21). In this respect the use of multiple mini-cases, as in the focus on institutional investment actors in financialised infrastructure, to illuminate a meta study of broader institutional investment markets for infrastructure, as in this study, can be

context rich, permit informed insights, and enables each institution to be considered as more than just an example (Yin, 2014; Flyvbjerg, 2006). In this regard the individual institutional investors and actors can be viewed as sub (case study) units and, in addition to the consideration of their constitutive role in the meta study, can also be considered in relation to each other, in a form of cross-case analysis (Yin, 2003). Indeed, it can be compellingly argued that the global infrastructure investment market approached in this way is an inherently comparative exercise. This financialised, competitive environment, and the transactional behaviours occurring within its parameters, are governed by precedent, evolving deal templates, established and available price points, competition for returns and differing costs of capital. It is therefore the institutional array proposed by this research that provides the comparative element within the broader framework of the wider market.

It is the position of this study that this broader market, for financialised infrastructure invested in by both public and private institutional actors alike, can be seen as the meta case study, or collective case (Stake, 1995), of this research endeavour. A multi-faceted approach to such an approach enables ‘fine-grain detail of the social processes in their appropriate context’ (Cassell and Symon, 1994, p.208). The selection of the global infrastructure investment market then defines the investor arena, encompasses a spatially diverse set of institutional investors, and defines the underlying asset in which the institutional capital is ultimately deployed. By examining both public and private investment actors across a range of geographies, sectors and assets, it is possible to construct the global infrastructure market as a content-rich, geographically constituted, contextualised meta-study. In so far as it is an example that is sufficiently defined and deep that extensive learning may derive therefrom, it can be seen to meet a number of Flyvbjerg’s (2006) criteria to also be a critical case. It encompasses the evolving role of the state, public, quasi-public actors, and private institutions, the inter-connectedness of global capital and markets, and the consequences of processes of financialisation on geographies of infrastructure. In that it is bounded by the criteria for the selection of institutions to be interviewed, supported by a quantitatively based rationale as to their investor type and the quantum of their commitment to infrastructure, rendering the research manageable due to the clear delineation of what is to be studied (Stake, 1994).

Furthermore, this strategy enables the in depth description and analysis of the focal phenomenon - the institutional construction of the infrastructure market – by taking a holistic view of the market, the market actors and the market goods. This perspective is ultimately enriched by the qualitative data yielded up by the actor interviews; the 'how' and 'why' questions (Yin, 2014; Bloomberg and Volpe, 2012). The illustrative transactional information that emerges from the interview phase allows the opportunity for further intensive quantitative and qualitative research that enables meaningful conclusions as to the cause and effect of infrastructure supply and demand and the interplay of public and private institutional capital that lies at the heart of the research questions.

Phase 1 - Secondary data collection and analysis

Of the various institutional investment industry sources, it is the Preqin database (www.preqin.com) that has been extensively used to establish a baseline institutional and transactional context for an industry (one of global infrastructure procurement, investment, construction and acquisition) that is in a constant state of vigorous flux. Preqin is widely regarded as the industry's leading source of information for over 47,000 infrastructure professionals in nearly 100 countries. Preqin's infrastructure data coverage extends to Fund managers, Institutional investors, transactional data, capital raising and fund performance; and is derived from industry relationships, corporate public filings, government documents, regulatory filings, freedom of information requests and tracked news reports. This is aggregated in such a way that it may be interrogated by individual actors, institution type, geography, sector or individual asset. Access to this paid for database was granted via an Australian Research Council project with an academic link into the UK based iBUILD research entity.

The above notwithstanding, it should be noted that 'secondary data is a cultural artifact, produced for [those] with priorities and ways of seeing the world that may be very different' from ourselves as individual researchers (Clark, 2013: 57). It is also the case that 'secondary data [is] not static. New sources are being created' (Clark, 2005: 59). This statement is particularly apposite in the high volume news flow world of infrastructure policy, transactions and investment, and in the *reportage* of the specialist trade press.

Phase 2 – Preparing for qualitative interviews and the gathering of primary research data

This research takes as a singular case the contemporary globalised and financialised infrastructure market. In order to understand the construction, operation and ongoing renewal and reconstruction of this market it is essential to examine the motivations and actions of investment actors across the spectrum of public to private capital. It is a strength of the methodological approach that this research seeks to do just this, however this also poses certain challenges, not the least of which is accommodating the breadth of institutional variegation of the interviewee subjects.

Given the above, it is perhaps more accurate to consider each type of institutional class of actor as its own case study illuminated by the interviews conducted with the various firms within that grouping; for instance, that of infrastructure funds. This example goes to the heart of the study. As shall be shown in 4.2.3 and 6.2.3, infrastructure funds cannot be regarded as merely a private sector actor. In so far as they are also managing capital for state and quasi-public actors they are an enabling entity of the mediated state, a critical actor in the re-spatialisation of investment capital, and through their role in the structuring, transformation and translation (Pryke and Allen, 2018) of infrastructure assets to match investor needs they are a key institutional space wherein financialisation occurs. It is only by taking a nuanced institutionally led approach to the analysis of market actors that this role of infrastructure funds becomes apparent, and through which typological inferences of institutional groups, such as infrastructure funds, can be made.

As Figure 3.1 below shows there is a perception in the literature as to the spectrum from public to private actors within the investment community. In the context of infrastructure, we might expect those entities at the public end of the scale (shades of blue) to have considerations beyond pure economic return; such as political, social, environmental, developmental or other ‘public good’ drivers. By contrast we might expect, and indeed the majority of the academic literature (particularly in Political Economy approaches) would hold, that those private sector entities such as fund managers and private equity would be almost entirely motivated by financial returns.

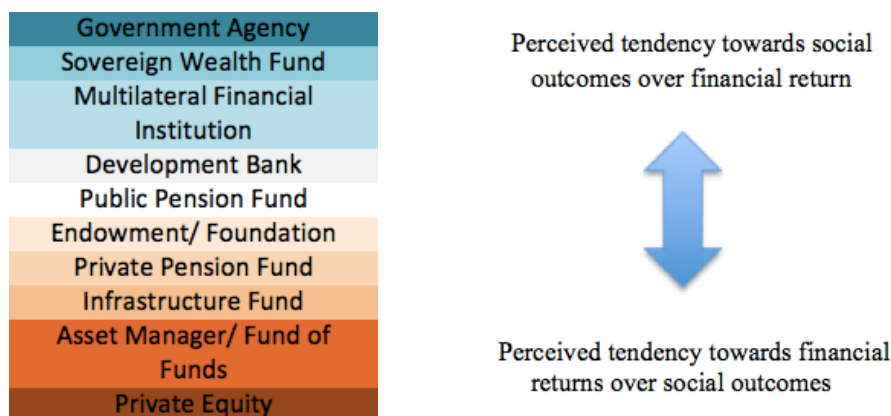


Figure 3.1: Perceived investment spectrum: Public to Private

Source: Author's own, 2016

This research aims to test and challenge these preconceived notions since the Preqin data has yielded highly granular detail to demonstrate the profound inter-connectedness and co-investment of public and private actors, and of publicly and privately derived institutional capital. This quantitative data examined from over 12,700 infrastructure transactions and information on over 2,400 institutional investors (between 1994 and 2015, source: Preqin, 2016; Author's own analysis) would suggest that public and private actors across this spectrum are actively co-investing in infrastructure assets and, in the case of public and quasi-public actors, actually investing directly in pools of private institutional capital which are then deployed into other funds or assets. This research seeks to understand these investment methodologies, and investor priorities around scale, access, influence, economic governance via the deployment of capital, as well as more obvious issues of achieving financial return.

Relating back to the literature we may surmise that aspects of public actor investment correlate closely with O'Neill's 'qualitative state'. The actions of SWFs and MFIs internationally, and the economic (as well as policy) interventions of governments in domestic infrastructure financings (such as Thames Tideway Tunnel, Hinkley Point-C Nuclear financing, UK Government guarantee programme, and EU project bonds) would seem to bear this out. The research questions however require us to look beyond these headline interventions and achieve a more nuanced picture of the inter-relationship of public and private investment in infrastructure markets. This is achieved through a

qualitative dialogue with investment institutions during the gathering of primary empirical data.

During 2016 three phases of semi-structured interviews with forty-five key institutional investment actors were undertaken. The breakdown of these interviews by investment actor and the rationale for these numbers is outlined in Tables 3.2 and 3.3 below. These opportunities for a ‘conversation with a purpose’ Eyles and Smith (1988), Lewis (1970), Patton (2002) allowed for the gathering of context rich information ‘in a manner that is a mixture of conversation and embedded questions’ (Erlandson Harris, Skipper and Allen, 1993: 86). This approach accords with Bryman’s (2012) inductivist, constructionist and interpretivist methodologies since the gap identified in the current literature is in the detailed perspectives and views of both public and private institutional investors. In this context the interview aim is not to be representative, but rather to understand how people experience and make sense of their own lives (Valentine, 2005; Flowerdew and Martin, 2005), and by extension their working lives and institutional activities. Whilst there is structure in these guided conversations, the qualitative interview approach ‘allows respondents to raise issues that the interviewer may not have anticipated’ (Silverman, 1993). So the semi-structured interview approach is ‘used to verify, analyze, interpret and understand human behavior of all types’ (Winchester and Rofe, 2010: 21), and to throw light on the institutional context of their working lives, thereby ‘elucidating human environments’ (Winchester and Rofe, 2010: 5).

The Preqin data was interrogated to arrive at an empirically driven shortlist of institutional sectors with significant investment positions in infrastructure assets and services. These for instance notably included SWFs, pension funds and other annuity providers, and infrastructure funds; though government agencies, MFIs, conventional asset managers and private equity firms also featured in material amounts. Within these sectors, the institutions of scale and prominent market position were identified by virtue of their capital size and commitment to infrastructure assets. This exercise was entirely agnostic as to geography; there was no spatial bias towards actors from OECD or the global north for example. These were additionally filtered to select for institutions with a diversity of approaches and routes to market. These include direct and indirect investments, and the deployment of public and privately derived capital investment resources. These institutions cover a broad geographic,

sectoral, asset and structural breadth representative of the global financialised infrastructure market as a whole.

This process resulted in an initial interviewee target lists separated into each sector of the institutional investment market as outlined in Table 3.2. These were thereafter supplemented by the use of purposive and snowball sampling arising from contacts and suggestions derived from the interviewees themselves. In the main the interviewees were at a senior level (Chief Executives, Founders, equity partners and Managing Directors), so as to yield in depth, insightful and informative data; and a richness of context and quality (Erlandson et al, 1993). The numbers of interviewees by institutional class were as follows:

Institution Type	Selection Criteria	Sector AuM £bn	Interviews
<i>Investment Institutions</i>			
Government Agencies	Global top 10 by fund size, European top 10 or UK based	963	4
MFIs and Development Banks	Top 15 globally	803	4
Sovereign Wealth Funds	Global top 15 by fund size, >\$1bn invested in infrastructure	4,846	6
Public Sector Pension Fund	Global top 20 by fund size, >\$1bn invested in infrastructure, or are in top 10 for infrastructure allocation in UK	18,231	5
Private Sector Pension Fund	Global top 20 by fund size, >\$1bn invested in infrastructure, or are in top 10 for infrastructure allocation in UK	11,154	3
Annuity Asset Manager	Global top 20 by fund size, >\$1bn invested in infrastructure, or are in top 10 for infrastructure allocation in UK	13,230	4
Fund Managers and Infrastructure Funds	Debt or equity, listed or unlisted. Top 10 by funds invested globally	12,535	8
Investment Advisors	Global top 10 or UK based, assets under advisory >£50bn		3
Private Equity firms	Global top 20	566	3
<i>Contextual Interviews</i>			
Various	Government departments, consultants, regulators etc..		5
	<i>Total Interviews</i>		45

Table 3.2: List of interviews by institutional type

Source: Author's own records and derived from Preqin (2016), OECD (2016, 2017), Willis Towers Watson (2016), 2017

3.5 Empirical interview data collection and contextualisation

The final interviewee list (Table 3.3) provides a strategic level insight into and global snapshot of the current institutional investment market for infrastructure.

Organisation Type / #	Continent of Origin	Title of Interviewee	Date
Government Agency / #1	Europe	Head of Profession	25/02/2016
Government Agency / #2	Europe	Head of Projects & Finance	03/03/2016
Government Agency / #3	Europe	Commercial Finance Specialist	04/07/2016
Government Agency / #4	Europe	Sector Lead for Transport	04/07/2016
Government Agency / #5	Europe	Research Fellow	25/02/2016
Infrastructure Regulator / #1	Europe	Director of Corporate Finance	08/08/2016
Multilateral Financial Institution / #1	North America	Infrastructure Head	23/02/2016
Multilateral Financial Institution / #2	Europe	Senior Banker - Equity Funds	01/03/2016
Multilateral Financial Institution / #3	Asia-Pacific	Director - Private Sector and Private Equity	15/06/2016
Multilateral Financial Institution / #4	Europe	Head of [Country] Office	22/06/2016
Sovereign Wealth Fund / #1	Asia-Pacific	Head & Managing Director - European Infra	24/02/2016
Sovereign Wealth Fund / #2	Europe	Global Head of Investment Policy	26/05/2016
Sovereign Wealth Fund / #3	Asia-Pacific	Director of Infrastructure Program	30/05/2016
Sovereign Wealth Fund / #4	Asia-Pacific	Head of Infrastructure	15/06/2016
Sovereign Wealth Fund / #5	Asia-Pacific	Head of International Direct Investment	20/06/2016
Sovereign Wealth Fund / #6	Asia-Pacific	Director of Investments - Alternatives	20/06/2016
Public Pension Fund / #1	North America	Portfolio Manager - Infrastructure	01/04/2016
Public Pension Fund / #2	Europe	Chief Executive	28/04/2016
Public Pension Fund / #3	Europe	Head of Investment Strategy	15/06/2016
Public Pension Fund / #4	Asia-Pacific	Executive Managing Director	21/06/2016
Public Pension Fund / #5	North America	Regional Director	29/06/2016
Consultancy Firm / #1	Europe	Partner	29/04/2016
Consultancy Firm / #2	Asia-Pacific	Global Lead, Infrastructure Finance	14/06/2017
Consultancy Firm / #3	North America	Global Managing Director	26/02/2016
Consultancy Firm / #4	Europe	Managing Director	26/02/2016
Investment Advisor / #1	Europe	Founder & Co-Chief Executive	24/02/2016
Investment Advisor / #2	Europe	Head of Alternatives	20/06/2016
Investment Advisor / #3	North America	Partner & Global Head of Infrastructure	29/06/2016
Private Pension Fund / #1	Europe	Senior Investment Manager - Direct Infrastructure	13/04/2016
Private Pension Fund / #2	North America	Managing Director - Energy & Infrastructure	07/07/2016
{Annuity} Asset Management Firm / #1	Europe	Co-Founder	03/03/2016
{Annuity} Asset Management Firm / #2	Europe	Head of Infrastructure Funds	25/04/2016
{Annuity} Asset Management Firm / #3	Europe	Director, Alternative & Real Assets	29/04/2016
{Annuity} Asset Management Firm / #4	Europe	Managing Director	29/04/2016
Infrastructure Fund / #1	Europe	Senior Partner	26/02/2016
Infrastructure Fund / #2	Europe	Co-Managing Partner	26/02/2016
Infrastructure Fund / #3	Europe	Chief Executive	01/03/2016
Infrastructure Fund / #4	Europe	Chief Executive	28/04/2016
Infrastructure Fund / #5	Asia-Pacific	Executive Managing Director & Partner	28/04/2016
Infrastructure Fund / #6	Europe	Partner and CFO	03/05/2016
Infrastructure Fund / #7	Europe	Chief Strategy Officer	04/07/2016
Infrastructure Fund / #8	North America	Managing Director & Head	07/07/2016
Private Equity Firm / #1	North America	(1) Founder & Managing Partner & (2) Partner	31/03/2016
Private Equity Firm / #2	North America	Director	20/05/2016
Private Equity Firm / #3	Europe	Partner & Co-Head - Private Infrastructure	17/08/2016
Total Assets under Management or Advisory Mandate			* £10,371 bn
Total Assets Committed to Infrastructure			* £787bn
* where applicable non sterling amounts were converted into sterling as at date of interview			

Table 3.3: Final list of interviewees

Source: Author's own, 2017

As Figure 3.2 demonstrates, there was a wide geographical spread of institutions interviewed in the context of this empirical research. The majority of these interviews were conducted face to face, however logistical considerations meant that this was not always possible. In those cases interviews were conducted via skype.

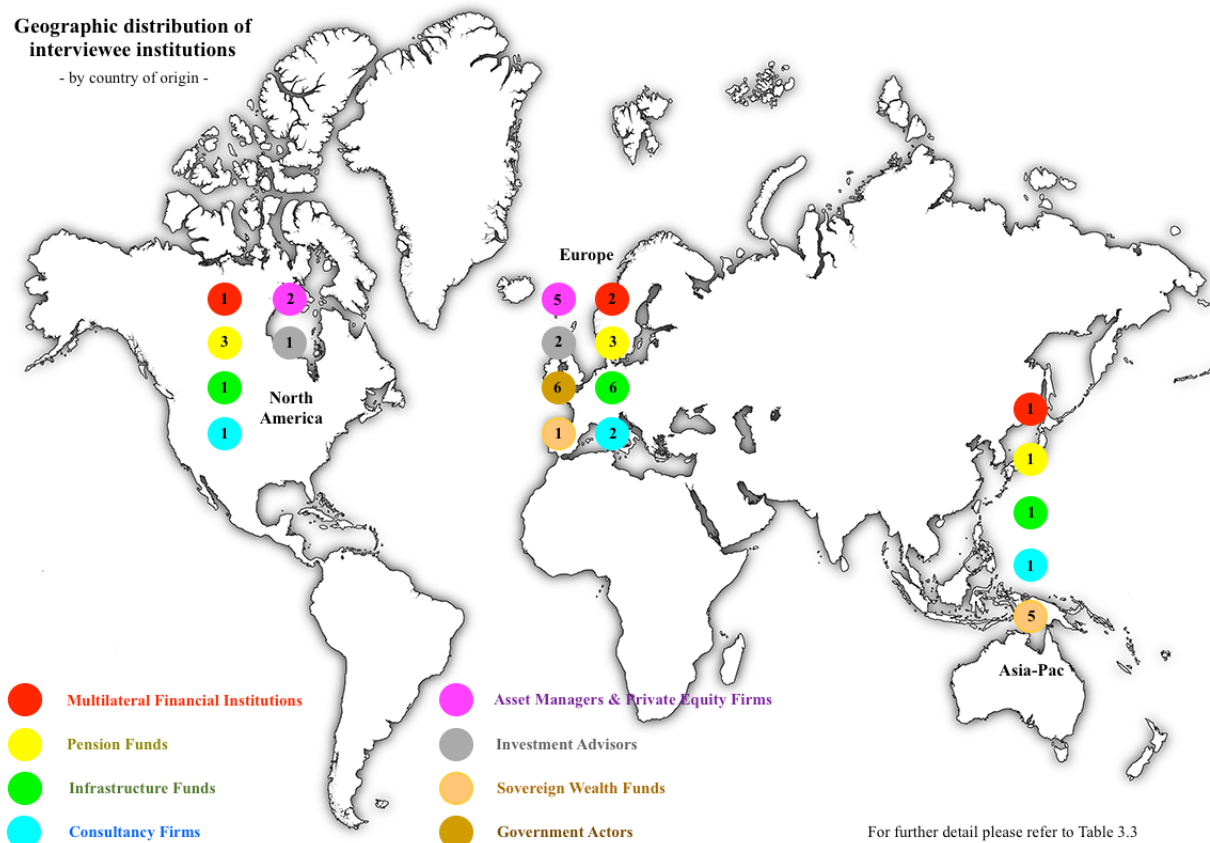


Figure 3.2: Geographic distribution of interviewee institutions

Source: Author's own, 2018

Importantly themes generated in one interview were explored, interrogated, expanded upon and further contextualised as the process evolved: “lines of thought identified by earlier interviewees [being] taken up and presented to later interviewees” (Beardsworth and Keil, 1992: 261-2). The phased approach to these interviews over a period of eight months allowed for this process of reflection as an in-built part of the interview data gathering process.

These interviewees represent the most significant actors among institutional investors in infrastructure, and encompass investing entities of government and quasi-public

institutions (the qualitative state) as well as the variegated forms and firms of private investment capital. In total they invest, manage or provide advice relating to more than £10.3tn of AuM or advisory mandate, of which £787bn is deployed in infrastructure globally (see Table 3.4). They are present in all sectors of the infrastructure market, all geographies, and across debt, equity and fixed income (bonds), and in transactions at all scales.

Institution Type	Institutional Sector AuM £bn	Interviewee Group AuM £bn	Interviewee Group %age of Market AuM	Infrastructure Investment £bn
<i>Investment Institutions</i>				
Government Agencies	963	not calculated	n/a	n/a
MFIs and Development Banks	803 *	588	73%	110
Sovereign Wealth Funds	4,846	1,384	29%	210
Public Sector Pension Fund	18,231	1,211	7%	91
Private Sector Pension Fund	11,154	724	6%	10
Annuity Asset Manager	13,230	1,374	11%	40
Fund Managers and Infrastructure Funds	12,535	292	2%**	292
Investment Advisors	not calculated	4,688 ***	n/a	27
Private Equity firms	566	110	19%	7
Total Market	62,328	10,371		787

Table 3.4: Interviewees related to overall institutional investment market

Source: Author's own records and derived from Preqin (2016), OECD (2016, 2017), Willis Towers Watson (2016), 2017

* MFI and Development Bank data in terms of AuM is partial as it is often not recognised until invested. Until that time it is part of the institutional balance sheet and not separately identified or sectorally allocated.

** Some funds identify as Infrastructure Funds in Preqin, whilst others identify as Fund Managers or other forms of Asset Managers. Extensive efforts have been made to identify those funds with an active investment interest in the infrastructure sector (both listed and unlisted assets). The Preqin data for these funds suggests that around £1tn (of the total

£12.5tn) of capital is actually deployed in or allocated to infrastructure, meaning that this study engaged with around 30% of the infrastructure element of the fund market by AuM. *** Investment advisors do not normally, as a category of institution, actually manage (in the sense of holding and investing) capital. Rather they have a mandate to advise the institutions that do deploy capital, often pension funds and other annuity providers. No accurate numbers are available for the total quantum of funds over which exist some type of advisory mandate. This figure therefore relates only to the advisory mandates held by institutions interviewed for this study.

The list of interview questions (following a semi-structured interview method) and the approach taken was reviewed after each interview; not only to reassess emerging themes but also to analyse the effectiveness of the questions and interviewing technique in terms of generating meaningful data; a dialogic approach, after Bakhtin (1981). This practice of emergent design is referenced by Erlandson et al (1993: 86): “As the researcher gets deeper and deeper into the context...first sources of data reveal others that the researcher could not have imagined”. This approach of reflexive evolving refinement enables a gradual tightening of focus on core themes and key issues.

The use of snowball sampling (Bakhtin, 1981), and emergent design all implicitly encompass a constant referencing to other sources and previous data. As further interviews were undertaken, infrastructure transactions examined, and secondary data sources gathered; a read across of the research materials (after Clifford et al, 2012) enabled an ongoing thematic analysis to be undertaken. Through repetition and prominence, topics and factors key to the investment community were identified. This naturalistic version of content analysis is uniquely well suited to the comprehension of the diverse range of qualitative source information and the context rich nature of the primary interview data itself. Emergent themes being continually referred back to the research questions (Clifford et al, 2012) to check for relevance and to ensure continuous refinement of the research focus.

The positionality, ‘the historically generated circumstances that create the “position” of the researcher’ (Hoggart, Lee and Davies, 2002: 310), of the author, as a former infrastructure financier for a number of major global investment institutions, was disclosed in advance. This assisted in establishing trust between academic interviewer and investor interviewee,

and in understanding the more complex and technical elements of the interviews, reflecting a degree of cognitive proximity (Boschma, 2005) between interviewer and interviewee. This positionality however, meant a need to guard against methodological myopia (Hart, 2005) when collating the results of the qualitative data interview phase, and in the interpretation of its findings. In this regard the mixed methods approach of transcribed interview data, institutional studies, desk based literature and transactional and market data analysis, was specifically designed to provide a robust, triangulated and replicable evidence base to ensure the objectivity of the research, and to enable a methodological and theoretical triangulation of the critical elements of the research questions (after Flowerdew and Martin, 2005; Teddlie and Yu, 2007).

All interviews were undertaken face to face or via skype, were recorded and backed up digitally, and subsequently transcribed. This was done firstly, for enhanced accuracy, secondly, to avoid the researcher's own perspectives and positionality being overlaid onto any responses, and thirdly, so that during interviews concentration was focused only on the interviewee and the discourse. Interview subjects and industry sources were assured of anonymity (in terms of their identity and that of their organisation) in advance correspondence, after Hart (2005).

Whilst the views, sentiments and intentions of the private sector investment actors provide the cornerstone for this research, it is clear that their views require a context. Global infrastructure investment markets are highly sophisticated, differentiated, spatially contextualised and complex. The investor community is large and diverse in terms of its home markets, derivation of funds, scope of operations, sector specialisms, sophistication, governmental access, transactional history, and investment resources. This complex variegation is consciously reflected and acknowledged in the interviewee subjects. Despite these breadths of perspective in the primary data however, the triangulation of the empirical interview findings by cross referencing to transactional evidence, public filings, government policy and review documents (white papers, green papers, consultations, NIPs, NAO reports), regulatory pronouncements, industry data aggregators (Preqin, IJ Global, InfraPPP), industry presentations, and magazine and newspaper articles undoubtedly provides a 'wider context' (Silverman, 2013: 210) and enhances the overall findings (Kitchin and Tate, 2000: 40) of this study.

3.6. Analytical Framework

This research method is at all stages grounded in the empirical, observable (and recorded) actions of the institutions that make up the investor population of contemporary financialised infrastructure markets. Quantitative transactional and market data, notably derived from the Preqin database, showed clearly those institutional actors that are a growing presence in global infrastructure markets, and those markets wherein the financialisation of infrastructure is particularly prevalent. This data, together with qualitatively rich policy documentation and extensive grey literature from industry and market observers, enabled a refining of focus onto the key institutional types of actors as outlined in this study: Government Agencies, MFIs, SWFs, Pension Funds and annuity providers, Infrastructure Funds and Private Equity firms. The largest and most active of each of these institutional types, regardless of geography, were then selected for interview. The resultant empirical interview qualitative data, generated in a deductive manner via questioning, was recorded and then transcribed.

These transcripts, or field materials (Crang, 2005), permitted the inductive process of identifying themes or issues for further investigation from the qualitative data. Principal themes (of geographies of derived and deployed capital, investment methodologies, return aspirations and duration appetite, for instance) were subdivided further in what Crang (2005) referred to as ‘axial coding [where] aspects and properties of each theme are teased out’ (Strauss, 1987: 32). This process is not an end in itself, but rather a tool to ‘making sense of the material’ (Crang, 2005: 224). This is a creative, subjective process (Bailey, White and Pain, 1999) reflecting the positionality of the individual researcher as well as views and perceptions informed by the pre-interview research of secondary materials.

It was expected that an analysis of the core research aims and research question would be possible for each class or type of institutional investor; and so it proved. This analytical framework, which occurred over three principal stages, is illustrated below, and remained reflexive to the nature of the actual data arising from the interview phase of the study.

Phase 1 – Interrogating the interview transcripts

Interview transcripts were interrogated qualitatively to allow for the thematic ordering of interview data content (sifting, sorting, and arranging into thematic strands) and a level of textual analysis. This drawing out of textual content follows Ryan & Barnard's (2000) methods in Myers (2013: 167-168) and entails 'sampling, identifying themes...marking texts, constructing models, and testing these models against empirical data'. This qualitative approach was important in view of the fact that, for some interviewees, English was not their first language, and due to the fact that differing terminologies for the same investment and market phenomena exist in various geographies.

Phase 2 – Identification and consideration of emergent themes

The interview and case study content was, after Phase 1, in a form where it had been grouped around certain themes and examined for differing institutional approaches. This then allowed a better examination of institutional custom and practice against the research questions.

Phase 3 – Contextualising and situating empirical results with secondary materials

The strength of the mixed methods approach, an increasingly powerful conceptual route to contextualise and enrich qualitative primary data (Longhurst, 2003; Nolan, 2003; Hay, 2010) in this instance was the opportunity to correlate reported behaviours and actions from the empirical interview data against transactional records and quantitative databases of actual capital deployed into infrastructure sectors and geographical markets. This enabled the sense checking of the interview material against reported industry data such as IRR trends, fund raising statistics, transactional volumes, market margins, and spatial and sectoral investment differences. On occasion, the empirical findings are further illustrated by reference to specific transactions or infrastructure assets. The citing of specific real examples is intended to substantiate and clarify the empirical findings, and in a few instances (such as CDPQ Infra's REM project and the city of Rialto's water transaction) they provide a further granularity of information about the transactional structure from which lessons can be learned. In those latter cases, it is about the importance of public and private actors problem solving together in a transparent and collegiate manner, with the

ultimate infrastructure delivery solution being independently benchmarked against a ‘pure public’ alternative.

These mixed methods make more robust the identification of sectoral and spatial themes from which the core study findings then flow and which are examined in greater detail in Chapters 4, 5 and 6 of this study.

3.7 Concluding Remarks

The objective of this Chapter has been to explain and justify the construction of the methodology used in this research, and to illuminate the process by which it has been derived. It is a direct consequence of, the gaps identified in the literature developed in Chapter 2, which in turn are a function of the extant body of literature on issues such as the relations between the state and private capital in the context of markets and infrastructure, coupled with observations on transactional and policy activity being enacted globally in the ongoing process of infrastructure financialisation.

The Methodological Framework (Table 3.1) makes clear that the meta-case is the study of financialised infrastructure investment markets. It is also clear however, that the route to the understanding of those markets, can only be achieved through a deeper and more nuanced appreciation of and engagement with, the key institutional investment actors. That is the clear direction and guidance of the contemporary literature, and that was the absolute focus of this study. The focus on individual investment entities, of necessity incorporates their respective spatial context and institutional circumstances, creating a rich and deep matrix of investor rationale and sentiment around the ongoing process of infrastructure financialisation and asset class development based on the delivery of essential services.

The findings generated by the empirical data arising from this extensive and deep engagement with institutional actors, and having been further contextualised and situated by multiple secondary quantitative and qualitative sources, is now rationalised, analysed and presented in the following three Chapters. Mirroring the structure and focus of the Research Questions, Chapter 4 concentrates on institutional factors and the variegation of

investment actors. Chapter 5 examines the relational aspects between the state and institutional capital in the context of the ongoing financialisation of infrastructure. Chapter 6 then considers the profound spatial impacts on global infrastructure markets, and therefore the role played by geography in the ability of these markets to reconcile issues of infrastructure need and the deployment of surplus sums of investment capital.

Chapter 4. Exploring emergent institutional variegation and the role of public and private actors in the ongoing (re)construction of infrastructure markets

This Chapter specifically identifies and examines the differing institutional investment actors across the spectrum from public to private, and active within global infrastructure markets. It also questions the usefulness of such binary distinctions, and the distortions that such terminology may present. Section 4.1. addresses a major finding from the empirical research, namely that, contrary to the contention of the denuded or hollowed out state; the state can be seen as a multi-faceted actor present on multiple, or indeed, all sides of the deal. The extent to which this is the case is, however, highly spatially uneven.

Section 4.2. then considers the nature and role of the actors that constitute the broader ecosystem of investors that, in aggregate, constitute contemporary evolving infrastructure markets. In the context of this research they are addressed in three distinct blocks:

- (i) The direct and mediated state (see definition in Chapter 1.4) – Government agencies, Multilateral Financial Institutions (MFIs), and SWFs. These are entities driven by a combination of direct and indirect state policy, multi-state policy (in the case of some MFIs), political influence, and the need to produce economic return (in the case of SWFs). Whilst SWFs are a more recent institutional manifestation of state derived economic surplus, it is the case that Government agencies and MFIs have long been interested in the financing of infrastructure assets within the context of broader economic development goals. What will be argued in this Chapter is that new institutional actors such as infrastructure funds, have provided a fresh methodological impetus and opportunity for the execution of that investment role.
- (ii) The coupon pool (Froud, Johal and Williams, 2002) – Public and private sector pension funds, insurers, superannuation funds and other annuity providers. These are the institutional manifestation of aggregated individual savings; an agglomeration of the ongoing contributions of individuals and their employers. This ‘massification’ of household savings (Erturk, 2008), represents an outcome of pension fund capitalism (Clark, 1999). They are a transformation of individual

surplus savings (normally for retirement) into pools of patient capital that have made extensive use of the mediating advisory and structuring expertise of infrastructure funds and other asset managers, to gain access to assets of long duration. The increasing allocation to infrastructure made by this investor class, the largest single class of aggregated capital in terms of global investment (Preqin, 2017), is a key factor in the growth of the infrastructure asset class and represents a distinct investment shift within the last two decades.

- (iii) The mediating institutional advisors and investors – Infrastructure funds, asset managers, funds of funds and Private Equity (PE). Whilst some of the investors in (i) and (ii) have the scale and expertise to make direct investments into unlisted infrastructure assets, many do not. For those investors, mediating institutional actors provide access to deal flow, transactional expertise, and risk mitigation via the diversity of geographic, sectoral and project investments which make up their fund vehicles. The rise of infrastructure specific funds, born out of traditional PE, has mirrored the growth in and public awareness of infrastructure as an asset class. It will also be argued that these fund vehicles provide a critical institutional space wherein the financialisation of infrastructure assets and services can occur.

Lastly, Section 4.3. examines the motivations for each of the above investment institutions to become involved in the market for financialised infrastructure, and how the rise of this asset class answers their institutional needs. By understanding the drivers and resultant behaviours of each of these market and investment actor types at an institutional level this study seeks to understand how the aggregated actions, of buying *and* selling, have constructed and continue to construct and re-shape the infrastructure markets seen today.

It is the thesis of this research that the evolution, health, sophistication and efficiency of markets in general, and infrastructure markets in particular, are a product of the diversity, capabilities and spatial density of these various investment actors, and the selling and concession granting entities with whom they interact. The presence of these actors in volume is, it is argued, highly reliant on the continuity and capacity of a market's institutional frameworks such as laws, regulation, and customs. Not only can we say that these markets have been neglected by cultural economy approaches within Economic Geography (Hall, 2011) but, more pertinently to this research, the institutional landscape

underlying contemporary infrastructure markets, and the nature and drivers of these institutions, have also rarely been the subject of academic research (Clark, 2005; Pike 2014; Pike and Pollard, 2010).

4.1 The narrative of the financialised state

In the UK, it could be argued that the era of the financialised state began around 1983, during the second term of the Conservative Thatcher government, with a programme of privatisations of economic infrastructure owning utility companies in areas such as energy, water and communications. It was driven by a neoliberal ideological belief that markets and competition (overseen by a state directed regulatory regime) could and would deliver better management, service delivery, and value, a fiscal imperative to generate windfall capital returns to HM Treasury and, as a useful byproduct, would broaden public (as in wider societal and individual) investment in the economy in general and critical UK stocks in particular.

As some of these initial assets passed out of direct state control, there was also a consideration of potential alternative models for market delivery of other essential services, and in the early 1990s, the start of the post-privatisation era (O'Neill, 2016), the Private Finance Initiative or PFI was born. Here concessions could be granted to encourage private sector construction, financing and delivery of public services, but with the underlying asset ultimately returning to state ownership at the end of the concession period. Many of these contracts were in 'safe' social infrastructure assets such as hospitals and schools; regarded as safe by investors as ensuring the provision of such services continued to be viewed as one of 'the underpinning roles of the sovereign state' (Author's interview, Head of Infrastructure funds, Asset Management firm #2, 2016), and therefore relatively immune to the vicissitudes of political deal-making. Since the financial model was primarily based on 'availability of service' payments, and the asset operations were regarded as of low volatility and low risk, little equity was required. This 'pinpoint' equity (Author's interview, Senior Partner, Infrastructure fund #1, 2016), as it is termed, meant that the appeal here was to private sector debt capital seeking low (quasi sovereign) risk and low yield. Unsurprisingly banks (either in infrastructure teams or project finance/ structured

finance units) continued to play a sizeable role in such transactions, critically in getting up the learning curve on the financial models pertaining to regulated infrastructure delivery.

What has really changed since the birth of PFI in the UK in the 1990s is the quantum of institutional capital investment, the variegation of forms of infrastructure financing and delivery business models, and the gradual shift (from the early days of PFI) to the private sector not only taking on debt positions in these structures but, increasingly, the role of equity holders, as capital with a voice. As institutional capital has been invited to take on these positions (against a background of fiscal austerity at a state, regional and local level, and continued political ideology supportive of the role of neoliberal markets) this market for infrastructure investment has grown substantially, such that, writing in 2009 it was observed (citing OECD statistics) that ‘estimates for privatized assets run over US\$1tn for the OECD countries’ (Inderst, 2009).

This trend has continued and prominent in this growing market has been Europe (driven by the UK), North America and Australia:

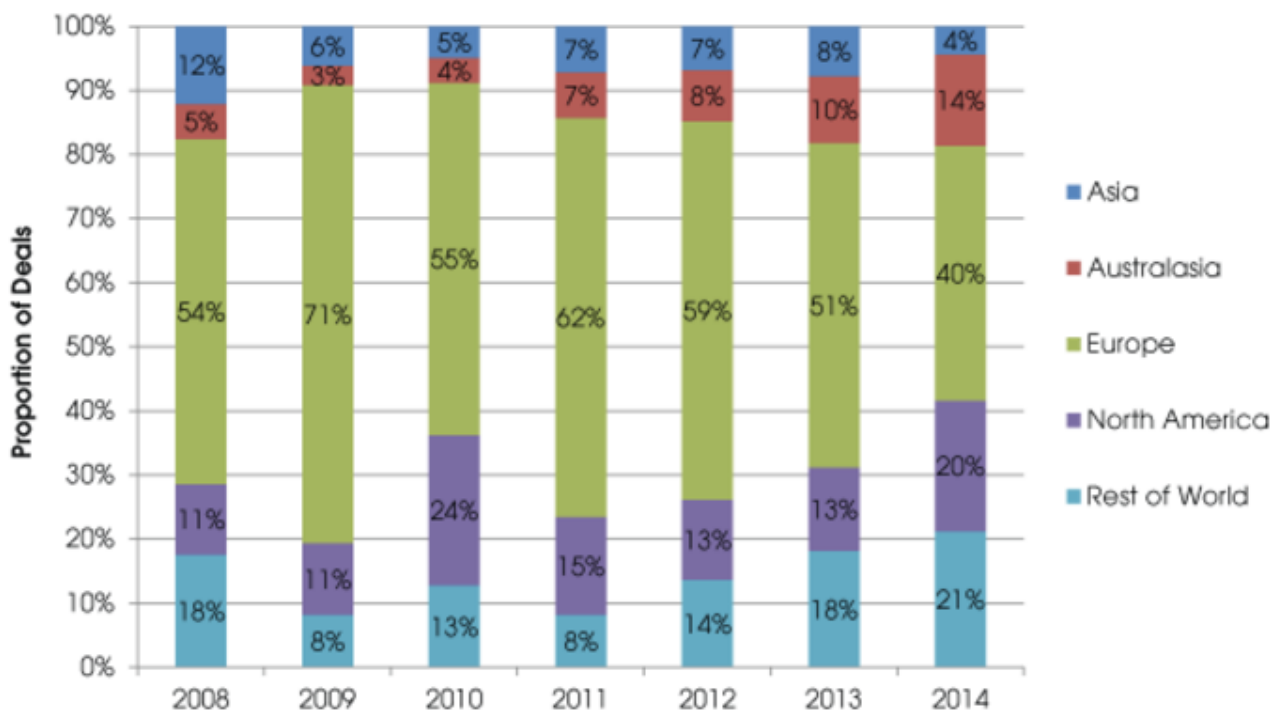


Fig 4.1: Number of Infrastructure PPP deals by region 2008-14

Source: Preqin, 2015a

The scale of the UK's financialised infrastructure market in comparison to the rest of continental Europe can be clearly seen by the relative volumes of completed infrastructure transactions in Fig 4.2 below:



Fig 4.2: Number of completed European infrastructure deals by country, 2010-2015

Source: Prequin, 2016

The data in Fig 4.2 clearly reflects the neoliberal policies adopted in the UK during this period and the volume of UK based transactions highlights the presence of institutional investment markets of scale and increasing complexity centered on London as Europe's financial centre. At the same time, throughout the period of privatisation and then PFI, governments (across OECD markets and further afield) led by the UK and Australia, were moving from an ownership and control model of infrastructure provision to one that was market driven; regulating the participants and contractually dimensioning the services to be delivered. 'Competition is a factor and it's what creates value for the public sector' (Author's interview, Head of Infrastructure, Asset Management firm #2, 2016). This policy of asset privatisation and public sector reform has accompanied a growing fiscal austerity across most of the OECD member states (Peters, 2012) and a concomitant reduction in expenditure on public service infrastructure as part of those budgetary decisions.

The impetus that has taken infrastructure markets from early PFI to where they are today, can be seen as driven by fiscal austerity and the balance sheet treatment of the finance or debt related asset, both from the perspective of government but also that of major banks. The demand for new and improved infrastructure has only grown, driven by factors such as population growth, urbanisation, technological progress, climate change and the need to catch up on decades of comparative under-investment. It is also itself a driver of growth. Infrastructure is both a cause and a consequence of economic growth (Goldman Sachs, 2008) and so there is a market narrative of a positive feedback loop inherent merely in the commissioning and building of new infrastructure. At the same time, governments across the world have been financially constrained (and seen their sovereign credit ratings under pressure) as a result of the global financial crisis and widespread state bailouts of the financial services sector. Similarly banks themselves have faced increasingly rigorous capital hurdles via the Basel accords (II in 2004 and, as a response to the global financial crisis in 2007-08, III in 2011) whilst having to rebuild their capital structures post the crisis. High levels of indebtedness compared to GDP have therefore been undesirable for government, whilst the taking on of low yielding long term debt has been unattractive for banks in return on capital terms. At the same time however, Basel II recognised infrastructure equity as not being highly speculative and this treatment has contributed to PFs increasing their allocation to the sector and to the equity part of the capital structure. In these ways the market demonstrates a clear sensitivity to these transnational regulatory regimes (Author's interview, Senior Banker, MFI #2, 2016).

What has been seen since around 2006 therefore, are infrastructure debt units spun out of major banks and into independent or separately listed entities; HICL being a prime case in point. It was formerly a part of HSBC's real estate and project finance group (as HSBC Infrastructure Company Ltd) and was taken independent and listed in 2006 becoming the UK's first listed, and therefore perpetual, infrastructure fund. HICL's growth since inception is a good corollary of the broader infrastructure market; AuM up from £250m of mainly UK based, availability payment model, PFI2 assets in 2006, to £1.5bn of diverse asset based international investments in 2016. That this has been achieved through the period of the global financial crisis reflects, in part, the low volatility of infrastructure investments (HICL has a beta of 0.1 meaning it is 90% less volatile than the broader stock market); and the attraction of these tangible essential assets to investment managers across the public to private institutional landscape.

Government has also realised that the huge sums required to be invested in infrastructure could result in a material and adverse effect on sovereign credit ratings and have been looking for genuinely off-balance sheet solutions to this problem. Domestic and EU driven pressures (via Eurostat) to keep PPP commitments on balance sheet (Cohen, cited in Nabarro, 2015) have resulted in a marked reduction in UK, and indeed European, domiciled PPPs – down from €27bn in 2006 to €15bn in 2014 (InfraPPP, 2016). There has however, been considerable growth in this type of structure (PPP/ P3) elsewhere globally, where policy imperatives, the need for capital investment, and balance sheet considerations (and treatments) differ.

The result in the UK and globally, has been to substantially broaden the infrastructure sectors wherein equity positions have been opened to private institutional capital, to increase the role of non-state institutional equity (not least to, at least notionally, achieve effective risk transfer), to assess market involvement by economic metrics such as those developed by the National Audit Office's (NAO) Value for Money (VfM) formulae (NAO, 2011), and to employ market regulation as a principal policy tool for governing the delivery of essential services:

‘Greater collaboration between local state actors and private interests has been evident in the material appearance and evolution of “urban entrepreneurialism” (Harvey, 1989). This new era has resulted in the boundaries between the public and private sectors being recast across service provision, infrastructure finance, delivery and operation’ (Whitfield, 2010).

The growth of opportunities to invest in infrastructure accompanied and tracked a growing interest among conventional (PE type) funds in infrastructure, an emergence of infrastructure specific debt and equity funds, and other pools of institutional capital looking for attractively priced risk; this they found in infrastructure's implied sovereign risk profile, priced at yields substantially in excess of sovereign bonds (gilts etc..) and the rest of their fixed income portfolio:

‘historically a lot of this money would have been put to work in government bonds on a 20year basis. And right now institutions simply cannot achieve the returns they

need to meet the expectations of their policy holders by investing in that. So they are looking to move up the risk curve so that they can meet those expectations...and infrastructure is one of those stops as they march up that ladder' (Author's interview, Co-Managing Partner, Infrastructure Fund #2, 2016).

Such pools of capital notably included SWFs and pension funds (both public and private). This interest in Australasia and the OECD countries of the global north was also stimulated by organisations like Infrastructure Fund #5 who, in the early 2000s, imported their own Australian model of infrastructure financing by pension or coupon pool investors into, initially, the UK:

'we, I would say, originally created demand for infrastructure as an investment. I was involved in setting up our first private fund here in Europe [in early 2000s] and in those days, apart from the UK PPP/ PFI (there was a handful of those), the concept of investing in infra didn't exist here. So I literally went out to talk to all the big institutions who today are massive investors in this space. In those days they literally didn't know what I was talking about' (Author's interview, Executive MD & Partner, Infrastructure Fund #5, 2016).

What is explored over the rest of this Chapter is the extent to which government involvement has, in reality, exceeded the confines of its already significant roles as asset seller or concession granter, market maker and regulator. The empirical research would suggest that, the narrative of the emasculated state (Holliday, 2000) notwithstanding, the state has in fact evolved into a considerable and important financial actor, both directly and in a mediated sense. It would also suggest that *pure* private institutional capital is, in terms of the wider institutional investment ecosystem, somewhat of a misnomer. It can also be argued that these investment actions of the state (both directly and through mediating actors) represent, themselves, a continuum of degrees of financialisation. This ongoing financialising of state activities can be seen in the ever more complex relations between financial investment interests of the state, regulatory and policy actions, and the underlying ultimate responsibility of the state for the long-run provision of critical infrastructure. As with the ongoing process of the financialisation of infrastructure assets and services, and the continual construction, reconstruction and evolution of infrastructure markets, so the financialisation of the state represents contemporary statecraft in flux, such that this thesis

would suggest no state can truly be termed to be either financialised or non-financialised. Instead what we can observe is that different states, and markets are further or lesser along a continuum or curve of financialisation. For example, the UK as a vanguard neoliberal state, with substantial proportions of its key infrastructure under the ownership or management of private or hybrid public-private actors, with very high volumes of financial transactions based on underlying infrastructure assets; can be seen as relatively highly financialised across most key infrastructure sectors; energy, water, telecoms and rail and air transport for instance.

What is in fact seen in today's infrastructure markets is the emergence of a financially engaged and active form of O'Neill's (2004) qualitative state. The state as inextricably intertwined with the market, the state as another institution in the larger institutional capital landscape (not apart from). The state as an actor whose investment capacity is material in quantum, flexible and mobile in deployment both at home and abroad. An entity that, by its extensive and multifaceted use of its investment activity, represents a re-casting of the nature of the qualitative state.

What the findings will demonstrate is that the state is not a passive actor; it is not the 'done to' party, the supplier of profitable opportunities, the entity being exploited, whilst the private sector is the supply of yield-seeking capital. Contemporary infrastructure markets are not that simple or binary. The state is integral to the operation of these global markets, and either directly, or via mediating institutions, is the dominant actor in these processes of financialisation. This is not the state as societal leveller, as equitable democratising force. This is the state as vested capital interest, as financial actor, as market maker; Coase's 'super-firm' (1988). The state is a considerable and pervasive driving force here, and its actions are inextricably bound in with and facilitated by global capital markets.

4.1.1 The re-cast qualitative state on all sides of the deal

This research weighs the evidence in support of the thesis of the exploited or denuded state against that of O'Neill's qualitative state;

‘the state as a domain where a complex and heterogeneous state apparatus is engaged in constant interplay with non-state institutions and agents, including those from other nations, in an irresolvable contest over accumulation and distributional goals’ (O’Neill, 2008: 257).

It argues that what we are seeing in contemporary financialised infrastructure markets is an extension of O’Neill’s ‘roles of the qualitative state in a modern economy’ (2008: 264); positioning the state as a potent, indeed an essential, financial actor. It is the diverse manifestations of state derived capital alongside and within institutional investors that supports Waldenberger’s (2002) view of markets as a forum for conflict resolution and, at least in more developed (or thick) markets, for the ‘irresolvable contest’ (O’Neill, 2008: 257) thesis of an antagonistic ‘locus of contradiction and tension’ (Harvey, 1975) between binary public and private actors over asset control and capital to be re-examined.

The thesis of the empowered, proactive, multifaceted state is, according to much of the conventional Political Economy literature (Lapavistas, 2010; Leyshon and Thrift, 2007; Weber, 2002), ostensibly undermined by a history of adverse economic outcomes experienced by government at all spatial levels (national, regional and local) arising from its interactions with institutional capital. This would cite the numerous examples of state disposals at an undervalue (whether due to information asymmetries, financial *naïveté*, or the state succumbing to the exigencies of short term cash need in order to achieve near term political goals and re-election). Often cited examples include Chicago’s infrastructure sales and leases (the Skyway Toll Road, parking meters, and inner city garages) (Farmer, 2014); Australian ports and toll roads (O’Neill, 2016), and the UK’s sale of its energy network and water companies (Allen and Pryke, 2013)

This process of institutional devolution (the paradigmatic shift of assets and services from public to private ownership and operation) can be seen as representing a transfer by the state of what would previously have been regarded as areas of key government responsibility. Characterised as the hollowing out of the state (Rhodes, 1994) or the movement towards a lean night-watchman state (Whiteside, 2015); what we are really talking about here is the opening up to the markets of the wholesale provision of essential utility services and the financialisation of the assets and systems through which those services are delivered (Birch and Siemiatycki, 2015). This is a movement of services and

assets from a model of ownership control to one of arms-length regulation; a shift to a mediated delivery of public services. The size of the infrastructure investment market in Europe is now larger than the European bond market and close in size to the European real estate market (Preqin, 2017; author's analysis), and is testament to the fact that this is neither a recent or minor phenomenon. It is, however, noticeable that institutional investors are themselves surprised at the nature of some of the infrastructure assets that are now passing into private ownership:

‘we recently invested into London Gateway Port... a passing on of what would have been seen as government responsibility in terms of core infrastructure to the private sector... so it's a privately owned port close to the centre of London... most other countries would not hand that into private ownership’ (Author's interview, MD, Asset Management firm #4, 2016).

In the context of fixed life concessions, and regardless of the underlying operational model, there is an ongoing debate over value for money (VfM) (Birch and Siemiatycki, 2015). The institutional investor view is that, unlike outright sales or privatisations, ‘you are getting a fully maintained asset that gets handed back to you in 25 years in a condition, and you are taking away the risk of building this on time and maintaining it, and you get less project creep’ (Author's interview, MD, Asset Management firm #4, 2016). That said, there is the traditional Political Economy concern about the extraction of value from the public purse, an issue manifested by the payment of excess dividends to investors at the expense of a diminished service to users (Allen and Pryke, 2013; Froud, 2002; Weber, 2002). Before this concern, there is the wider philosophical debate about the appropriateness of a market driven financialised model that factors in a profit element (even one supported by a VfM calculation) from activities regarded by many as inappropriate for such treatment: education, healthcare, justice and social housing being such example sectors. There is an unsurprising tension here between the outlook of institutional investors and that of Government as exercised, in the UK for example, through the NAO, part of whose remit is the assessment of VfM for the public purse. If the state really perceives value being delivered by institutional investment and the market model, then there is a feeling that this view is not being evidenced to the wider public either by the investor community: ‘the industry has not presented itself well’ (Author's interview, Co-Founder, Asset Management firm #1, 2016) or by the state: ‘Government generally in the UK has done a pretty poor job

in engaging with the public about the cost of infrastructure’ (Author’s interview, Partner, Consultancy firm, 2016). One asset manager expressed this more bluntly:

‘In history we pillaged India and other colonies, went to war and took over other people’s property, we also had North Sea Oil, in order to pay for things. People really need to understand the true cost of things.’ (Author’s interview, Head of Infrastructure, Asset Management firm #2, 2016)

We can speculate that there are multiple reasons for this, but surely the principal driver is the inherently political nature of infrastructure as an experiential manifestation of government policy and the always highly charged debate over the cost (whether direct or via taxation) of these essential services. The political sensitivity around cost is at its height when infrastructure systems fail and state under-investment is identified as a contributory factor. Again this can be seen in many examples worldwide. The Flint, Michigan water contamination threw a spotlight on the constrained nature of municipal water services in the US, just as the 2017 Grenfell tower fire in London raised questions over the UK’s provision of council and social housing and the prioritising of economic over social returns.

By contrast to readings of the exploited, passive state; O’Neill (2008) espoused the idea of the qualitative state, as an engaged, proactive and informed entity. This in turn built on Block’s (1994) quantitative state by focussing on the ‘nature, purpose, and consequences of the *form* of state action’ and by envisaging ‘the state as a domain where a complex and heterogeneous state apparatus is engaged in constant interplay with non-state institutions and agents’ (Block, 1994: 257). The empirical institutional data derived from interview and from extensive scrutiny of patterns of infrastructure investing from Preqin’s infrastructure investment industry database and industry records, suggest that we need to go further than O’Neill’s conception of the qualitative state in two respects. Firstly, we need to acknowledge that the binary view of state and non-state no longer reflects the variegation of institutional pools of blended public and private capital. Secondly and crucially, O’Neill’s perspective does not address the state’s role as a diverse and pervasive financial actor. These two aspects of state or public capital, answer and rebut the hollowed out state theories of Rhodes, Holliday, Jessop, Skelcher et al, and are reflected in the behaviours of the UK Government’s Regeneration Investment Organisation, HM Treasury and most notably in the examples of SWFs and PSPFs. This entangling of the state and markets

(Birch and Siemiatycki, 2015) can be demonstrated via a quantitative analysis of infrastructure investors, which suggests that pools of capital that are either explicitly public in nature or that have a public derivation might account for as much as 35-40% of the total US\$70tn pool of investable capital globally (Preqin data 2006-17, Preqin, 2017, author's analysis). Hildyard (2012) made similar observations of 'public' entities importance to institutional infrastructure investors:

‘such public funders now account for more than one-third of the institutional investors in infrastructure, with public pension funds leading the pack (20 per cent of all investors) and government agencies or funds accounting for a further 13 per cent’ (Hildyard, 2012: 23)

This blurring of the boundaries (Hildyard, 2012) between what we might term as the state and private capital represents, this thesis contends, an intertwining or enmeshment of capital and society, of the market and the state. As one fund manager remarked: ‘the state is everywhere’ (Author's interview, Senior Partner, Infrastructure fund #1, 2016). So we may say that the spectrum of state involvement is manifested both directly and indirectly. Its influence on certain infrastructures is on all sides of the deal; behaving in aggregate as Coase's super-firm (1991).

In policy terms the state determines and prioritises infrastructure projects by advertising to the market the infrastructure opportunities that exist and that will exist in the future. There is an advocacy and evangelising role here:

‘The initial role for government is providing some visibility and transparency of opportunities, and to giving some thought as to how private capital might participate in those opportunities’ (Author's interview, Country Head, MFI #4, 2016).

But this needs to be married with a structural investment environment that directs investors towards the priority policy areas determined by government:

‘Why is this [institutional] capital not chasing greenfield projects. I won't say that it isn't but there is an example of what you need to do to harness this capital; the example of Thames Tideway Tunnel (TTT). If you want to harness the capital you

have to create the opportunity to invest. if there is a frustration with gov't, it is that you need to manage the project and cashflows to attract investors, the market cannot do that...The voice in the UK wanting the market to invest has sung loud. But I do wonder where is the political will to galvanise this'' (Author's interview, Senior Partner, Infrastructure fund #1, 2016).

When this role of promoting the opportunities for investment either does not occur, or is unclear (the governance dilemma cited below), then the numbers of investment actors in the market declines:

'political inaction at the time of the coalition was very negative. As a result, we have seen some investors go to North America and Australia where there is better visibility on the pipeline' (Author's interview, CEO, Infrastructure fund #3, 2016).

'prevarication is a disaster...here [the UK] there is too much prevarication' (Author's interview, CEO, Public Pension fund #2, 2016).

'There's more infra trapped in the governance dilemma in the US than there is [Global Infrastructure Partner's] GIP's funds, we are talking by a factor of a hundred. We are talking about every water and wastewater plant in the US, and Europe' (Author's interview, Founder, PE firm #1, 2016).

Once the programme of opportunities has been decided upon and communicated, then the state develops and promotes various pump-priming or stimulus programmes. Examples of this include EU Project Bonds, the UK Government guarantee scheme, the US Federal investment tax credit scheme for solar, and production tax credits for Wind: 'in the US it's easier to legislate through the tax code' (Author's interview, MD, Infrastructure fund #8, 2016). Such stimuli, designed to crowd-in certain investors, can also be felt to operate at the expense of others. In that sense, critics maintain, these initiatives are more about the government selecting for the yield, and thus type of investor, it wishes to see in a given transaction or sector. It is about replacing or transplanting capacity rather than being truly additive (Author's interview, Senior Infrastructure specialist, Government agency #3, 2016). Of course, such government support has the effect of reducing the headline cost of capital. A clear example of this being the TTT, where the Weighted Average Cost of Capital

(WACC) was fixed out until 2030 at a full 1% lower than OFWAT's (the UK water regulator) draft models. The issue then to consider is the degree to which the reduced capital costs represent value for money in the context of the residual risks retained by the state and taxpayer.

Thereafter, the underpinning legal system of the state (Coase, 1991) makes it a crucial market maker; ironically the one role the market cannot perform (Thrower, 2014). It grants concessions and ultimately owns the returned assets at the end of that period. It dimensions and oversees the regulatory systems. In many instances it is the ultimate backstop credit covenant, acting implicitly or as an explicit guarantor. It is underwriter, financier, and mediated investor (via government agencies, MFIs, SWFs and the public sector pension pool). It is the ultimate planning authority under a methodology imposed by central or regional government and enacted at a local level (Author's interview, Head of Alternatives, Investment consultant #2, 2016). Its monetary policies and influence determine currency and interest rates. Government departments at national, state or municipal levels decide the size of the fiscal envelope for service delivery and also how government wishes to see such services delivered (for instance by the public or private sector); a key aspect of the structuring and funding piece of the infrastructure puzzle, a role enacted in the UK at the national level for example by HM Treasury and the Infrastructure and Projects Authority (IPA). Two insights into these market considerations and choices between public and private solutions are provided below:

‘Look at the UK - transport, energy and water. The 5year regulatory settlement has the water companies putting in £20bn every 5 years into the water sector. Equally if you look at gas and electricity...it never ceases to amaze me that 20 years ago energy generation was pretty much a private sector business with private capital earning sensible returns and today its pretty much impossible to do anything on the energy generation side without some kind of government subsidy. In the Transport space, airports are pretty much privately owned, planning is the big issue there. Which leaves the thorny issue of roads; the political hot potato that nobody wants to touch. At some point they'll have to. At some point electric cars will become a significant user of roads and in that world revenues from fuel duties will disappear and there will be an enormous funding deficit and someone is going to have to

figure out what to do about it.’ (Author’s interview, Co-Managing Partner, Infrastructure fund #2, 2016)

As one consultancy firm, close to the UK government, observed:

‘The government is spending more on its own balance sheet on projects than historically and we’re doing some very big projects. Look at the road network, Crossrail, HS2; all being done out of public money. We are kind of using the capital in the wrong way aren’t we? Shouldn’t we be using private sector capital to build our roads...and public sector money to build nuclear which has a very different risk profile?’ (Author’s interview, Partner, Consultancy firm #1, 2016)

These multiple roles of the state are both a function of neoliberalisation and the consequent financialisation of infrastructure; but are also driving that process further along. The existence of an ever larger, deeper and broader market for infrastructure assets, concessions and services permit a fiscal deferral of obligation on the part of the state, but also allows the state and its mediated investment institutions (such as SWFs) the opportunity to match long term investment goals with commensurate assets. All this accords with, and arguably goes beyond even O’Brien and Pike’s (2015) view of the state as ‘the critical actor in convening financial institutions and orchestrating the funding, financing and governance of such infrastructure’. As one consultant to the UK government commented: ‘you can’t move far in infrastructure without government intervention in some form’ (Author’s interview, Partner, Consultancy firm #1, 2016).

So, from the experience of the major markets for financialised infrastructure such as Western Europe, North America and Australasia, it can be seen that state actors and statecraft is manifested within institutional investment markets in multiple forms. Organs of the state (from government departments to arms-length state related entities) are investing (in both a mediated and direct manner) in infrastructure transactions for reasons that vary from market capacity building to providing capital stimulus for emergent financial infrastructures in areas of low endogenous financing capacity, notably through development banks. They are investing for reasons of gaining industry expertise, proxy economic diplomacy, and economic arbitrage; notably through SWFs. And they are investing to generate financial returns via the activities of PSPFs and SWFs, investing both

as a Limited Partner (LP) in infrastructure and private equity funds, and directly into infrastructure assets.

There are also examples of state linked entities such as public sector pension funds being used as proxy or back channels for policy through the ways in which they deploy their pools of investment capital within supposedly open financialised markets:

‘last year we looked at acquiring a minority interest in a utility here in the mid-west that was being sold by a utility conglomerate. Much of the generation in that utility was coal fired and that had to be brought forward for discussion. Feedback was that if in fact we are going to acquire this asset then we need a seat at the table as to how we are going to effect change at the utility; ie: let’s convert coal to gas’ (Author’s interview, Head of Alternatives, Public Pension fund #1, 2016)

These roles played by the state, and manifested via public and quasi-public, or *parapublic* as the French neatly term it, entities are all consistent with a Polanyian view of markets: ‘The road to the free market was opened and *kept open* by an enormous increase in continuous, centrally organized and controlled interventionism’ (Polanyi 2001 [1944], 144).

4.2. The variegation of institutional capital

In recent decades four principal factors have been at work to bring us to the point where large scale institutional investors have become intrinsically involved in the ownership and operation of a wide range of key economic and social infrastructure assets.

Firstly, the market opportunity to invest driven by factors such as fiscal austerity and sovereign indebtedness which we have seen in 4.1., has driven states to look for off balance sheet structures and more financially innovative methods to bring additional sources of capital into the delivery of essential services.

Secondly, infrastructure has been developed by market actors, despite its relative heterogeneity, into something akin to an asset class, and one with investment propositions at all points on the risk curve from quasi-sovereign credit profile to those more akin to conventional private equity, with a commensurate spread of returns; and with a long term duration attractive to institutions such as SWFs and pension funds:

‘Institutional investors have traditionally invested in infrastructure through listed companies and fixed income instruments. Only in the last two decades have investors started to recognise infrastructure as a distinct asset class. Since listed infrastructure tends to move in line with broader market trends, it is a commonly held view that investing in unlisted infrastructure, although illiquid, can be beneficial to ensure proper diversification. In principle, the long-term investment horizon of pension funds and other institutional investors should make them natural investors in less liquid, long-term assets such as infrastructure’ (Della Croce; 2012: 7)

Thirdly, these pools of capital driven by state, corporate or individual surpluses, and looking for long term assets either for direct or mediated investment, have grown considerably in scale and range of investment appetite or variegation, in recent decades:

‘The combination of pension fund capitalism in the West, neo-mercantilism in the East, and commodity price booms at the periphery of the global economy have produced a map of global financial stocks profoundly different to that of fifty years ago’ (Clark, Dixon and Monk, 2013: xii)

And lastly, there has been a diversification of potential institutional mechanisms and structures for the aggregation and deployment of that capital, with PFI, PFI 2 and PPP evolving into an array of contractual structures to accommodate varieties of state – private sector hybrids and to capture a range of economic factors and outputs; examples being the land value capture schemes such as those used on the London Northern Line extension and Crossrail projects and in the tax increment financing (TIF) industry originally based in the US (Strickland, 2016).

It is the third of these factors that has created two of the largest classes of institutional investment actors in the world today, namely Pension Funds and Sovereign Wealth Funds. These enormous and growing pools of capital: \$36.4tn across public and private sector pension funds, and \$6.3tn in the case of SWFs have, in recent years, seen shifts in allocations away from the more volatile equity markets (the cause of much portfolio impairment in the global financial crisis of 2008) and the low (or even negative) yielding sovereign and investment grade bond markets, towards an increased position in ‘alternatives’, amongst which definition can be found infrastructure. When we factor into consideration that much of the capital managed and deployed by fund managers, asset managers and private equity is ultimately derived from these two sources (pension funds and SWFs) then their importance to global financial markets and to meeting the considerable capital demands of global infrastructure projects becomes clear.

Fig 4.3 (below) shows the importance of these institutional pools of capital in terms of the pure financial investors into infrastructure. Corporate (on the right of the pie chart) represents professional infrastructure firms and the supply chain. The Infrastructure Fund section contains a significant degree of, particularly, pension fund investment (but also that of SWFs), whereas the distinct sections for pension funds and SWFs represent direct investment into the infrastructure sector.

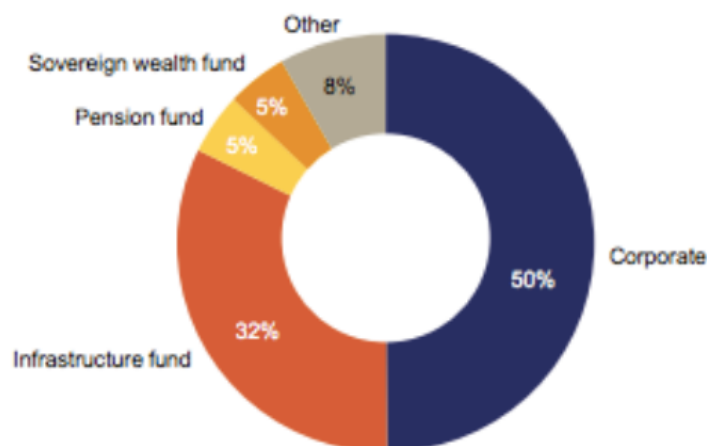


Fig 4.3: Global infrastructure investment – Equity and PPP by type of owner

Source: InfraDeals, cited in PWC (2017)

As the market has evolved, so the number and variegation of institutional actors has grown. How and why this has occurred is explained further in 4.2.1, 4.2.2 and 4.2.3. For such a

political asset as infrastructure however, it is relevant for governments to consider how these various actors are viewed both from the perspective of economic value as determined by organs of the state, but also by the broader public. In that context the spectrum of investors from public to private are arguably also viewed in terms of perceived cultural alignment with state aims and taxpayer value. This is demonstrated by the way in which the involvement of pension funds is often viewed positively: witness the UK government's (2011) exhortations to pension funds to support the National Infrastructure Plan and again Chancellor Osborne's plan for aggregated public sector funds to invest in UK infrastructure announced at the Conservative Party Conference in 2015. To this rhetoric must be added the more concrete actions of the Canadian public sector pension fund CDPQ's infrastructure firm subsidiary (CDPQ Infra) citing the 'virtuous circle' of Montreal residents riding the CDPQ Infra built and operated mass transit rail system, contributing to economic development whilst *also* contributing to their pensions:

'Today we are proposing an innovative public transit solution that will improve the quality of life in Montréal and deliver important economic, social and environmental benefits. It will improve the metropolitan region's overall competitiveness. The new transit system will also deliver long-term, stable investment returns very well aligned with the needs of our depositors, the people of Québec. Every time passengers use their new transit system, they will be helping to secure their future retirement. This virtuous circle serves as a good illustration of the principle underlying the public-public partnership model.' (President and CEO of La Caisse/ CDPQ; CDPQ, 2016).

Contrast this to the often adverse public sentiment around the loss of national control of key assets (Chinese and French state owned entities investing in Hinckley Point nuclear power station), or debates on the violent nature of financial capitalism (Marazzi, 2011) and the extractive nature of private capital that accompanied the purchase by Macquarie of Thames Water (Allen and Pryke, 2013).

These culturally based sentiments distinguish between return driven SWFs and relatively altruistic SWFs such as the Alaska Permanent Fund; between pension funds investing in their own geography directly and those engaged in mediated investing in speculative assets further afield; between the more socially aligned infrastructure funds such as the longer

duration Meridiam funds (further reinforced by their leading role in the long Term Infrastructure investors Association or LTIIA) and EU central bank backed Marguerite fund, compared to the higher yield seeking world of more conventional private equity. One of the key questions to then contemplate is the degree to which these investment behaviours, represent the processes of financialisation working *for* the state, as opposed to being merely the latest manifestation and example of financialisation being an undesirable and extractive process both in terms of state finances and societal impact.

It is important to note that, in their role as investment actors, these institutions do not appear to be viewed as either public or private, but identify each other by geographical, sectoral, duration (or maturity), return and risk factors. The fact that a large number of such apparently different institutional types can find common ground in the aims of various funds in which they are co-invested (such as the examples in Table 4.1), would seem to suggest that differences in outlook and economic priorities can be accommodated in the common ground provided by new institutional constructs; namely infrastructure funds. The examples at Table 4.1 could have been drawn from numerous funds examined on the Preqin database but have been selected to show a typical spread of institutional type. The important thing to note is that the fund construct, as well as being the institutional space wherein the financialisation of an infrastructure asset is manifested, is also the place where the drivers and goals of a wide variegation of public, quasi-public and private institutional capital are reconciled:

‘The expectation of all the investors in the fund is the same; also because we tell everyone a consistent story. Everyone gets the same return whether it is good or bad. They are all invested in the same deals, the same stories and the same team.’
(Author’s interview, Principal, PE firm #2, 2016)

Major UK based fund manager - Country specific fund

3i Infrastructure	Infrastructure Firm
Alberta Investment Management Corporation	Asset Manager
APG - All Pensions Group	Asset Manager
Cavendish Ltd	Government Agency
CDC Group	Government Agency
First Gulf Bank	Bank
George Kaiser Family Foundation	Foundation
GIC	Sovereign Wealth Fund
Hermes GPE	Infrastructure Fund of Funds Manager
Lord Baltimore Capital Corporation	Foundation
Lothian Pension Fund	Public Pension Fund
Nationwide Insurance	Insurance Company
Partners Group	Infrastructure Fund of Funds Manager
Princess Private Equity Holding	Listed Fund of funds Manager

Major US based fund manager - Global fund

AEVWL	Public Pension Fund
Alaska Permanent Fund Corporation	Sovereign Wealth Fund
Athene Annuity & Life Insurance of NY	Insurance Company
Boeing Company Pension Fund	Private Sector Pension Fund
Bush Foundation	Foundation
City of Montreal Retirement System	Public Pension Fund
Coca Cola Pension Plan	Private Sector Pension Fund
Compagnie Benjamin de Rothschild	Asset Manager
Dow Chemical Pension Fund (US & Europe)	Private Sector Pension Fund
Federal Way Asset Management	Asset Manager
Future Fund	Sovereign Wealth Fund
GE Asset Management	Asset Manager
Industrial Bank of Kuwait	Bank
König & Cie	Infrastructure Fund of Funds Manager
Massachusetts Laborers Pension Fund	Public Pension Fund
Mitsubishi Corporation	Private Equity Firm
Nobel Foundation	Foundation
Opplysningsvesenets Fond	Government Agency
Regents of the University of California	Public Pension Fund
Sentry Insurance	Insurance Company
University of Toronto Asset Management Corp	Endowment Plan

Table 4.1: Institutional variegation citing actual example investors in two representative sample infrastructure funds

source: Prequin, 2016; Author's own analysis

As previously stated, the three principal areas of institutional focus in this Chapter are (i) the mediated state and its agent entities, (ii) Pension Funds, Insurers, Superannuation Funds and other annuity providers, and (iii) Infrastructure Funds, Funds of funds, Infrastructure focussed PE and other asset managers. The rationale for this is twofold. Firstly, the focus is on how new markets for infrastructure investing have been created, are being developed, and are evolving. Part of this analysis is then to screen out those actors who have had an ongoing involvement in this space and whose role has remained broadly unchanged, such as banks and infrastructure firms (construction companies and their attendant supply chains). Secondly, this research is interested in how institutional capital is shaping not just infrastructure markets but also the dimensioning of infrastructure assets, service delivery, and models of governance. In this context the capital being invested needs to be able to demonstrate a level of influence that goes beyond traditional debt provision, and so the findings have concentrated primarily on those investor classes where equity investment or control of infrastructure outcomes, forms a material part of their operation and return.

In the context of these two factors, Government agencies and MFIs are included in the study, but greater focus is on the new state institutional investment represented by SWFs. Government agencies and MFIs, in the main, are driven by desires to stimulate investment in certain geographies and sectors or to invest in the financial infrastructure of a geography by, for instance, contributing to the seed capital of a new fund in that region: ‘investing in funds gives you scale, access and local understanding’ (Author’s interview, Infrastructure Head, MFI #1, 2016). The policy, social, and environmental outcomes of these operations often have an importance weighting at least equal to any economic Internal Rate of Return (IRR) (MFI #3, SWF #3, MFI #1CIC) and represent the mediated political consensus of multiple state governments and bodies. Government Agencies and MFIs such as the World Bank, MFI #2, MFI #3, IADB and others do illustrate transnational manifestations of the qualitative state but their *raison d’être* in the context of infrastructure investment is as a precursor to, and building block of, economic development. Similarly, their investing in the financial and institutional infrastructure and seeding or pump priming of local currency derived endogenous market equity investment vehicles, seeks to facilitate infrastructure development by encouraging the major fund managers and *crowding in* funding:

‘They have this principle, additionality? The EBRD [European Bank of Reconstruction and Development] in particular. They want their equity to make a

difference. If I was setting up a new fund in one of their target countries, I would say your commitment to that fund will make it happen, and they would do that' (Author's interview, Partner, Infrastructure Fund #5, 2016).

In an institutional context Government Agencies and MFIs are engaged globally in capacity building, the dissemination of governance models, investment structures (PPP/ P3), and advice around regulatory frameworks and the like. All of these activities however, have profound economic and political implications (MFI #1).

Whilst we can observe that the more recent phenomena of geography and sector specific infrastructure funds permit a more targeted use of MFI investment capital and a real alternative to being mediated through local state infrastructure related departments; it remains the case that the deployment of MFI managed capital for policy ends is not a recent phenomenon. The role of Government Agencies and MFIs making investment allocations to Infrastructure Funds is, however, a clear usage of new institutional constructs by long standing actors in the market.

4.2.1. Sovereign Wealth Funds: the mediated state and the deployment of economic surplus

The late 20th century saw a geographic shift in global trade, with a significant shift in production towards the East, and to Asia specifically. One feature of this globalisation was a change in the balance of payments between nations; most notably huge trade surpluses and the accumulation of financial assets in the major producing countries of Asia, the largest of which could be observed in China. At the same time the oil producing nations of the Middle East and a disparate group of others, including Norway, were accruing significant financial resources from the exploitation and sale of fossil fuel based reserves. Clark, Dixon and Monk (2013: xii) refer to these two factors as the 'neo-mercantilism in the East and commodity price booms at the periphery of the global economy' and suggest that, when taken in conjunction with the rise of pension fund capitalism (examined in some detail in Section 4.2.2.), represent a fundamental re-drawing of the global economy. Some of the nation states benefitting from this accumulation of financial asset either through

trading surpluses or the sale of hydrocarbon based commodities, decided to pool these assets into an institutional form to then be deployed into a range of other investments; ‘to be “hoarded” in a new form of institutional investor, the Sovereign Wealth Fund’ (Clark, Dixon and Monk, 2013: xii).

So SWFs represent the combined effects of the ‘accumulating financial stocks of the East and of commodity-producing countries’ (Clark, Dixon and Monk, 2013: xii) and, by virtue of the extent of their deployable investment capital, can be seen as a ‘major reassertion and restructuring of the state’s economic role’ (Haberly, 2011:1833).

SWFs are a substantial and growing pool of (ultimately) state controlled institutional capital. Institutionally these are focussed on capital maximisation, stabilisation or reserve activities, and economic development, as shown in Table 4.2 (below):

Economic Objectives	Specific Objectives	Description	Examples
Capital maximisation Building a risk-adjusted capital base for the growth and preservation of national wealth	Balancing intergenerational wealth	Investing to create intergenerational equity e.g. transforming non-renewable assets into diversified financial assets for future generations	NBIM, Kuwait Investment Authority
	Funding future liabilities	Growing and preserving the real value of capital to meet future liabilities, such as contingent liabilities like pensions	Australia Future Fund, New Zealand Super Fund
	Investing reserves	Investing excess reserves in potentially higher-yielding assets via financial strategies aiming at higher long-term returns, and reducing the negative carry costs of holding reserves	China Investment Corporation, Korea Investment Corporation
Stabilisation Macroeconomic management and economic smoothing	Facilitating fiscal stability	Using counter-cyclical fiscal tools to insulate the economy from internal and /or external shocks, e.g. changes in commodity prices to smooth consumption	Chile Economic and Social Stabilisation Fund
	Stabilising the exchange rate	Using the fund’s resources to balance large capital inflows and outflows in the short term (which may be caused by commodity price volatility) to prevent asset price bubbles and reduce price volatility	Russia Reserve Fund
		Using the fund to manage the amount of capital entering the domestic economy over the long run to ensure the exchange rate is maintained at a level that allows for other export activities, e.g. to prevent Dutch Disease	Mexico Oil Income Stabilisation Fund
Economic development Investment to boost a country’s long-term productivity	Investing in hard infrastructure	Domestic development in capital assets, including but not limited to transport, energy, water management and communications	Nigeria Infrastructure Fund
	Investing in social infrastructure	Domestic development in soft infrastructure: human capital and the institutions that cultivate it. This includes socio-economic projects such as education and health	Mubadala Development Company
	Pursuing industrial policy	Creating a diversified economy in order to reduce dependency on one resource or source of funding. Official, strategic efforts by governments to boost productivity in specific sectors	Temasek, BPI (France)

Table 4.2: Economic rationales for the institutional role of an SWF

Source: PWC (2016: 8)

There have been substantial capital inflows into this relatively new institutional construct (the term SWF was first used by Rozanov in 2005) on the back of high prices for fossil fuels in much of the last two decades, and significant budget surpluses in a number of major Asian economies – most notably China: ‘A hell of a lot of money is being generated economically, mainly in the far east’ (Author’s interview, Senior Partner, Infrastructure fund #1, 2016). Since 2005, more than 40 SWFs have been created with AuM more than doubling from \$3tn in 2008 to \$6.3tn in 2015 (SWF Institute):

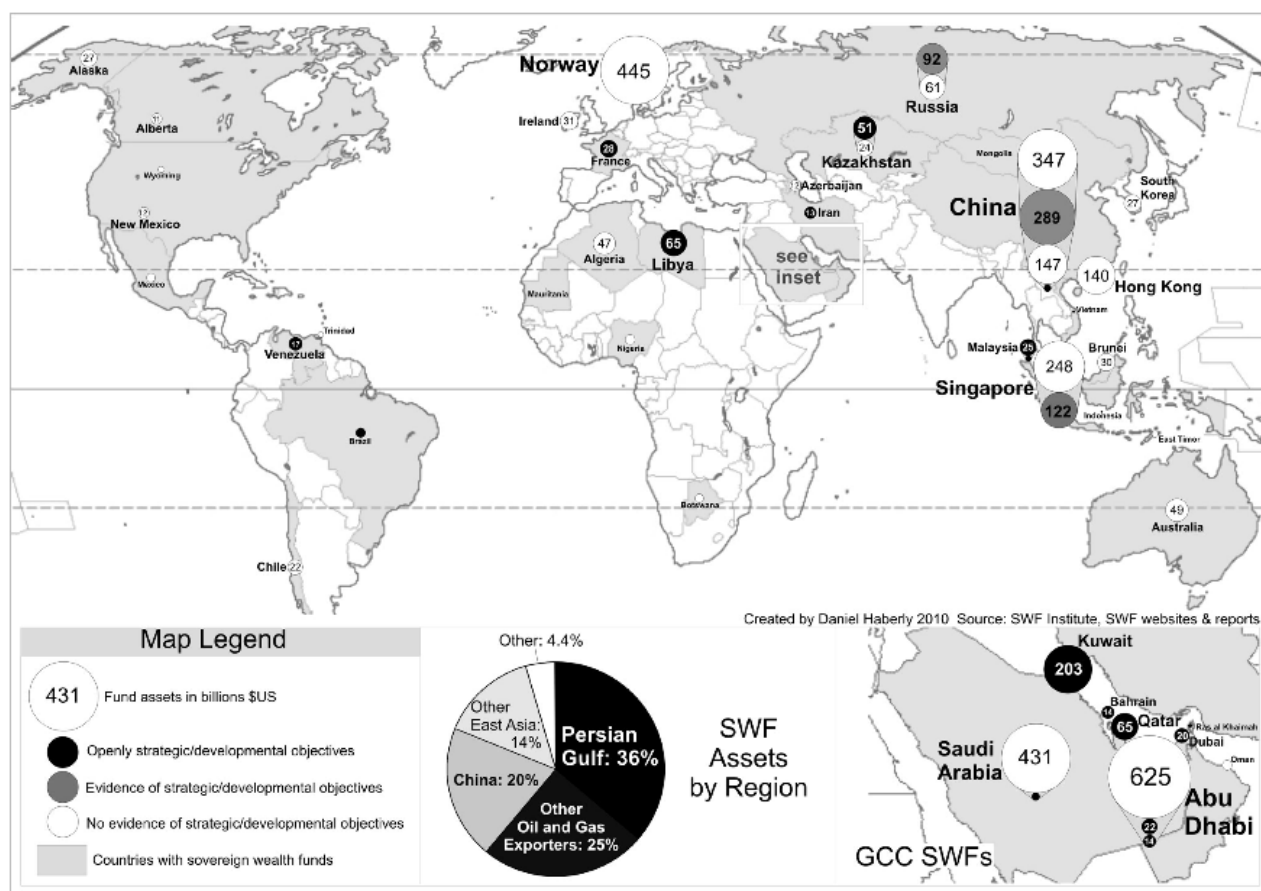


Fig 4.4: Geographical spread of Sovereign Wealth Funds

source: Haberly, 2011 & SWF Institute (SWFI)

The extent to which these pools of capital have (in the main) expanded in recent years, and the spatial context of that change, can be seen when comparing the assets reported in Table 4.3 (below) as of June 2017, against those in Haberly’s analysis based on SWFI (the same reporting entity) data from 2010 (in Fig 4.4. above). The increase is particularly marked in those countries where additional funds from ongoing hydrocarbon exploitation have been

added to the SWF pool, and where that pool of capital has not been depleted due to budgetary shortfalls arising from either the financial crisis or the more recent fall in fossil fuel commodity prices. Norway, largely benefitting from the rise in value of listed equity stocks, is a paragon example of this exceptional growth in AuM.

Country	Sovereign Wealth Fund Name	Assets USD-Bil	Inception	Origin
Norway	Government Pension Fund – Global	922.11	1990	Oil
UAE – Abu Dhabi	Abu Dhabi Investment Authority	828	1976	Oil
China	China Investment Corporation	813.8	2007	Non-Commodity
Kuwait	Kuwait Investment Authority	524	1953	Oil
Saudi Arabia	SAMA Foreign Holdings	514	1952	Oil
China – Hong Kong	Hong Kong Monetary Authority Investment Portfolio	456.6	1993	Non-Commodity
China	SAFE Investment Company	441**	1997	Non-Commodity
Singapore	Government of Singapore Investment Corporation	350	1981	Non-Commodity
Qatar	Qatar Investment Authority	320	2005	Oil & Gas
China	National Social Security Fund	295	2000	Non-Commodity
UAE – Dubai	Investment Corporation of Dubai	200.5	2006	Non-Commodity

Table 4.3: Largest SWFs over \$200bn in AuM as at 2017

Source: SWFI, 2017

4.2.1.1. Towards a typology of Sovereign Wealth Funds

Geographically concentrated in the derivation of their funding, SWFs are, as national economic hedging mechanisms, almost specifically constituted to spatially spread, reallocate or hedge risk. Investments in the assets of other nation states constitute an economic hedge against economic factors that may affect the fund’s domestic economy. They also act as an arbitrage into the economic performance of the economy in which sits the invested asset; infrastructure assets are a compelling example of this. Importantly any

likely volatility in the performance of these infrastructure assets (which usually are selected for their low risk, predictable return, quasi sovereign credit characteristics) has a very low correlation with factors that may impact on the source economy; for instance, the extraction and sale of hydrocarbon based products subject to commodity cycle risks. In the context of hedging against adverse factors in their home economy, SWFs unsurprisingly are very selective about the jurisdictions in which they will place their hedging capital. As we shall also see later in the context of pension funds; SWFs have indices against which to benchmark or manage, and these factors as well as market familiarity, drive much of their allocation strategy:

‘we also had a shorter term target which was an infra stock index and that index is 65% US, and we were something like 70% Europe, 20% US, 10% other. And I don’t really have a focus on getting more Asia or Australia, I don’t have any better reason than its far away and I’ve heard that Australia is a really expensive market right now, and China I don’t really understand. So the US has been the market we’ve focused on...a little home country bias.’ (Author’s interview, Director of Alternatives, SWF #6, 2016).

How they manage against such indices, and the degree of either state or popular oversight of their operations, varies markedly between those SWFs in states that have a concentrated authority (the gulf states), as opposed to those with a popular mandate and an element of ‘distributive justice’ such as Alaska Permanent Fund (Dixon, 2015). APF distribute an annual dividend (in the form of a cheque) to each qualifying Alaskan citizen and interestingly it seems that this dividend protects the funds broader legitimacy in the face of any ongoing debate about Alaska’s ongoing budgetary pressures and what role, if any, the APF should play in them.

Fig 4.5 and Table 4.3 provide an overview of the heterogeneity of the SWF investor population. There is clear variance by source of funding, age, objective and mandate. Determining all of these issues however, is the spatially fixed aspect of the underlying sovereign or state. It is the domestic spatial, economic and political features of the SWF host state that prescribe the institutional culture and characteristic of individual funds in terms of their endogenous economic risks, their exposure to meta factors such as climate change, demographic shifts, and urbanisation; and more profoundly provide a set backdrop

in terms of political, economic, industrial and social history. All these factors manifest in a set of investment parameters or mandates for the respective SWFs, and through their investments into other nation states, these endogenous factors come to influence the infrastructure assets on a global scale.

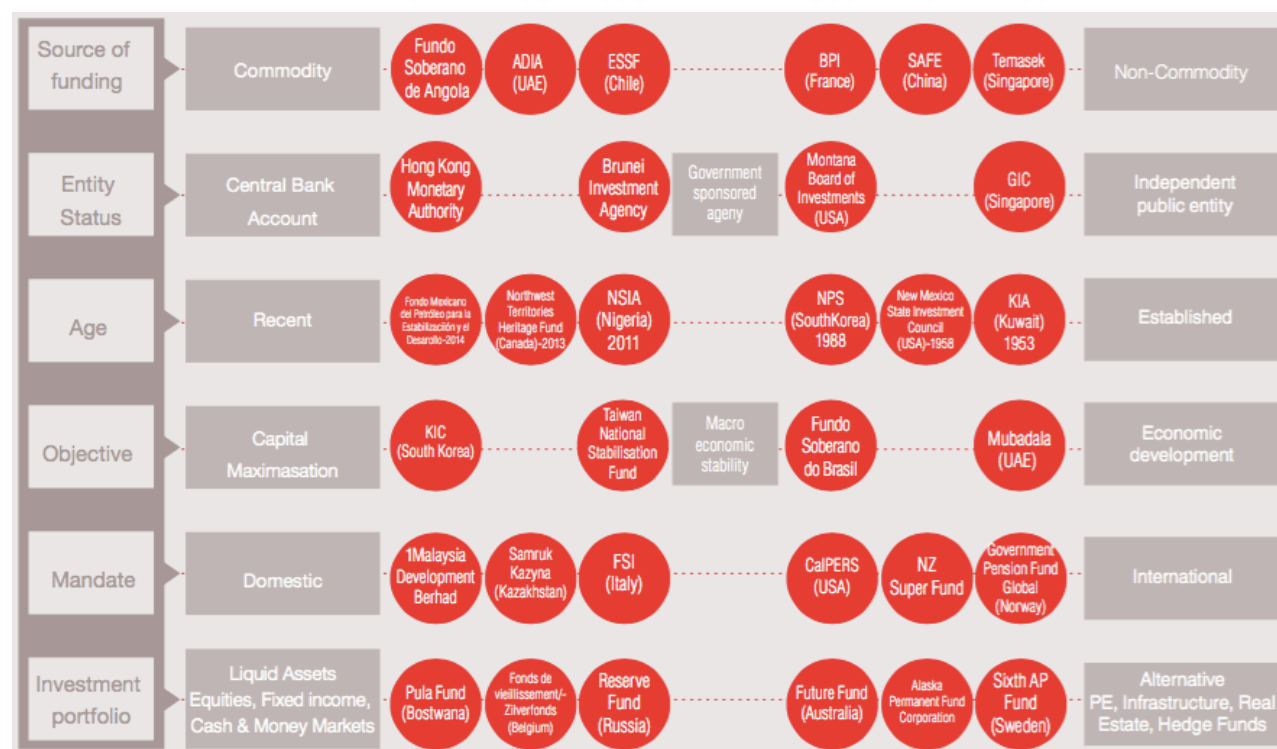


Fig 4.5: A typology of SWFs, superannuation funds and state directed capital

Source: PWC and PWC Market Research Centre (2016: 5)

‘There are pools of capital that are seeking lower rates of return than they did previously. For lower risk operational assets that becomes a very attractive opportunity for the money in the sovereign space looking for bigger cheques to write’ (Author’s interview, Senior Partner, Infrastructure fund #1, 2016). Not only this but, unlike pension funds, SWFs generally have no ongoing liabilities or budgetary obligations in the near term. This allows them a measure of flexibility and means that, unlike PFs looking for yield (see Section 4.2.2.), SWFs can take a much longer view:

‘We are not that yield driven because of the nature of our capital source...we are a wealth fund right? Capital is allocated by central government. What we are trying to achieve is total returns, yield is important but we certainly can wait longer. As

long as our return is risk justifiable we are happy about that.’ (Author’s interview, Principal, SWF #3, 2016)

These economic factors, derived from the source of an SWF’s capital, need to be considered within the context of the broader global markets. As such, movements in economic indices (stock and commodity markets) and economic impacts can work both ways, both positively as a source of capital and, potentially, when negative, as a call on capital. So as high commodity prices for hydrocarbon based products create the surpluses that allow for the financialised policy decisions of one state to impact on the infrastructure assets of another; so a fall in the same prices might also, some fear, result in a call on those investments and the need to divest (see Fig 4.6). So when we talk of correlation it is not only with regard to asset performance. Given the scale of infrastructure in most SWF portfolios (5-10%) and the relative illiquidity of the underlying asset, the investor consensus seems to be that short term effects would be minimal: ‘you worry...I guess...people talk about what’s going to happen if the oil price falls to \$10 to all the oil based SWFs. They may stop investing, they may sell assets, but they are going to do that from their liquid portfolio not their private portfolio’ (Author’s interview, MD, SWF #1, 2016). However, a protracted depressed or low hydrocarbon market such as that we are in at present, does seem to have restricted the abilities of the newer hydrocarbon based SWFs to grow; examples being the likes of Kazakhstan, Nigeria, Ghana, and Gabon.

An example of this call on capital phenomenon is Saudi Arabia. As Fig 4.6 shows, there is a very high correlation between oil price and fiscal self-sufficiency. From their peak in 2014, the Saudi reserves (mainly held as government deposits with the Saudi Arabia Monetary Authority or SAMA) have reduced by \$150bn. In 2015 alone, the Kingdom spent \$115 bn of its capital reserves, at a time when the crude oil prices averaged \$48.67 per barrel.

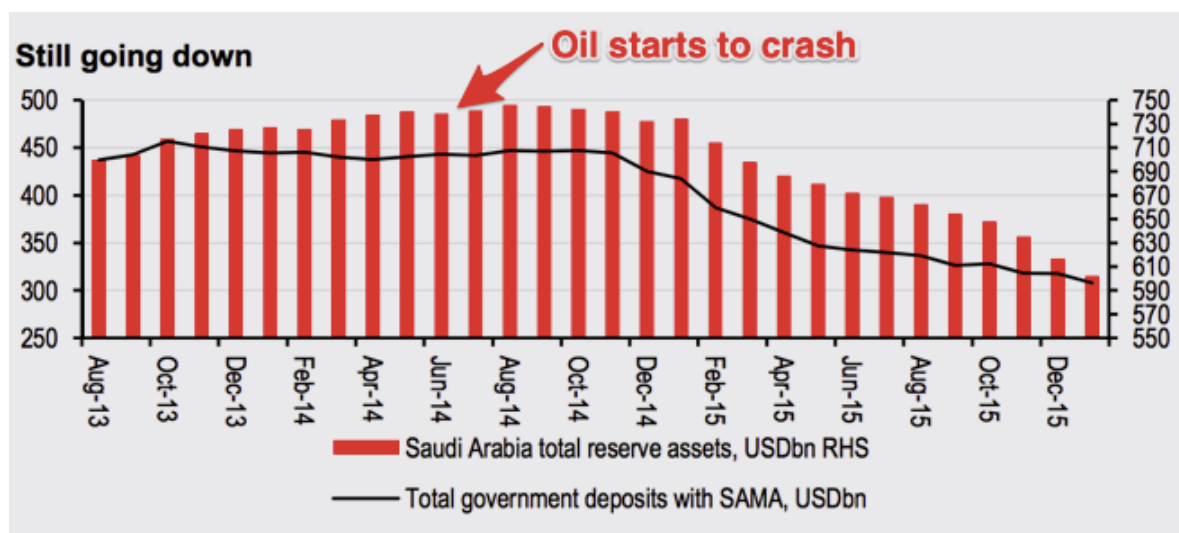


Fig 4.6: The link between commodity prices and reserve assets in Saudi Arabia

Source: HSBC and SAMA, 2016

4.2.1.2. *The state manifested in, and mediated through, Sovereign Wealth Funds*

‘A sovereign wealth fund is just a big pension fund but without any liabilities’
(Author’s interview, MD, SWF #1, 2016)

This absence of a need (in most cases) to generate near or short term cash returns has undoubtedly made SWFs a powerful force in an infrastructure class that, by its nature, best suits those with longer term investment horizons. If we also accept the thesis that ‘part of the problem in terms of economic development is getting new infrastructure built’ (Author’s interview, Partner, PE firm #1, 2016), then, having an investor class that is content to wait for dividends or service related cashflows, can only be seen as useful. Chapters 5 and 6 will examine the degree to which this solving of the infrastructure problem is occurring and in which areas of the infrastructure investment landscape this patient capital is most heavily invested.

SWFs exhibit widely diverging degrees of state control from direct to double arms-length. The latter being for instance ‘where government appoints a panel of experts and then the panel selects the board members’ (Author’s interview, Head of international Direct Investment, SWF #5, 2016). As has been seen they exhibit a variegation in investment mandates from purely financial returns (against a wide range of benchmarks and time

horizons) through to stimulating new endogenous industry sectors; a form of alliance capitalism (Haberly, 2011), and policy influence or economic diplomacy (Yeung, 2011); as the ‘strategic instruments of nation-states, conceived, in part, to underwrite their sponsors’ geopolitical interests’ (Clark, Dixon and Monk: 2013, xiii); and as providing a hedge against domestic economic turbulence. Infrastructure assets are seen as an attractive piece in a wider portfolio strategy pursued by SWFs due to their features of essentiality (and therefore lower correlation with economic turbulence), the ‘read-through’ (explicit via regulation or implicit) to a sovereign credit covenant (it is one state dealing with another), long maturity, and the scope for significant scale (a practical functional consideration when trying to invest hundreds of billions of dollars per annum).

SWFs, as an institutional grouping, invest substantially, as do many pension funds, in listed infrastructure (shares of public companies traded on the major public markets), but this is not part of their infrastructure allocation (it is managed within an equities allocation) and will in fact be part of their tracking of, and investment in, the major market indices. These investments are by their nature extremely liquid and exhibit different characteristics from unlisted infrastructure. It is the latter asset class that is the focus of this research. In the context of unlisted infrastructure, it is the larger SWFs that are primarily direct investors (not least due to the scale of the overall funds) and typically assets can be taken out of the market with a view to very long term holds. This reduction in liquidity of available prime market prime sector assets is only now beginning to be realised by market actors. With rising pension fund pools, SWF inflows and an arguably overheated and spatially uneven market for infrastructure funds and investment, we are seeing ever greater pools of long term capital chasing a scarce and diminishing number of core assets in the most desired (mainly OECD) markets. This wave of rises in capital values and a growing ease of secondary market trading has seen asset holders, particularly the PE end of the infrastructure fund market, make exceptional windfall gains. The financial performance of such actors attracts further capital based on reputation and expectation. This is occurring at present with Global Infrastructure Partners (GIP) closing their third fund at US\$15.8bn, Brookfield Asset Management closing their third fund at US\$14bn, and most notably Blackstone Group in the market with a US\$40bn fund, their first that is specific to infrastructure. The effect of these infrastructure mega funds (Prequin, 2017e) is the concentration of investment capital (from across the institutional landscape on a specific economic investment model (close to conventional PE), and primarily on large scale,

brownfield, operational assets. The Blackstone fund has for example already stated that *minimum* investment amounts would be \$1bn. This neither solves the problem of how new greenfield infrastructure gets built, or how to attract capital to those less invested geographies. Over time, if continued, this has the effect of adding further fuel to rising asset values in core geographies; a welcome feature to some, indicative of the crisis prone nature of capitalism (Harvey, 2011) and a source of increasing concern to others. These themes are examined further in Section 6.4.

If the above sentiment suggests a principle driver for SWFs of the maximisation of return on capital to meet some future specific or abstracted economic need; then it should also be acknowledged that there are other, less transparent, drivers with which some SWFs have been associated. These activities, briefly mentioned above as economic diplomacy (Yeung, 2011), aim to influence foreign governments and industrial sectors via the deployment of capital sums into overseas investments and territories. There exists a code of conduct for SWFs, the Santiago Principles, which are designed to ensure transparency and investment for reasons of direct financial return. Despite these however, there is a sentiment among institutional investors that matters of national policy interest are a factor in some investments:

‘They [state] SWFs will again for the larger ticket go direct. They bid, in Germany recently, infrastructure related. It was a technology play, waste to energy, brownfield, put on the market by a German developer. Two [state] buyers came in and bid a price 30% higher than the rest of the pack. They made it clear their strategic objective was “how does this work”? There is a phenomenal amount of energy efficiency opportunity back in [state], so the biggest factor was the know-how...their expertise base is not nearly enough to do all they need to do and they see a real skill gap’ (Author’s interview, Senior Partner, Infrastructure Fund #1, 2016).

The above is not an isolated sentiment or there would have been no need for the Santiago Principles. In a sense this reflects the fact that while SWFs may be seen as amorphous pools of capital that invest across all geographies; in fact, the investments made would seem to point more towards a targeted approach in terms of the exogenous economies in which SWFs invest and, where appropriate, a focus on those sectors that have either a relevance

to their endogenous economy or have characteristics to which the SWF's home state aspires. This theme will be explored further in Section 6.3.

4.2.2. Public and private pension funds, superannuation schemes, insurers, annuity providers and the coupon pool

If SWFs represent the accumulated financial stocks of sovereign nations, then pension funds can be viewed as the accumulated financial stocks of individuals. These aggregated pools of capital are the sum of contributions from both the individual as ultimate beneficiary, but also their employer or fund sponsor. They are a huge (\$36.4tn) and growing (4.3% in the year to January 2017 - Willis Towers Watson, 2017) source of capital. Not only are they a major investor in infrastructure already, but they are also regarded by governments as having a long term, patient capital, outlook (driven by their liability profile), and thus a preference for investing in new and existing infrastructure: 'there has been increasing support for pension funds investing in infrastructure, as a win-win situation for pension funds and macroeconomic stability' (Escriva, Fuentes and Herrero; 2010).

In a sense the quantum of capital held within pension funds is representative of the core thesis of financialisation; namely the growing size of the financial economy relative to the 'real' economy. Overall, in the largest 22 pension market states (the P22), pension assets under management equate to 62% of GDP (Willis Towers Watson, 2017); a figure reduced from 2016's 80% by the recent inclusion of China, where pensions equate to only 1.2% of GDP. Indeed, in The Netherlands (168%), Australia (126%), Switzerland (123%), the USA (121%) and the UK (108%) pension assets easily surpass GDP (Willis Towers Watson, 2017).

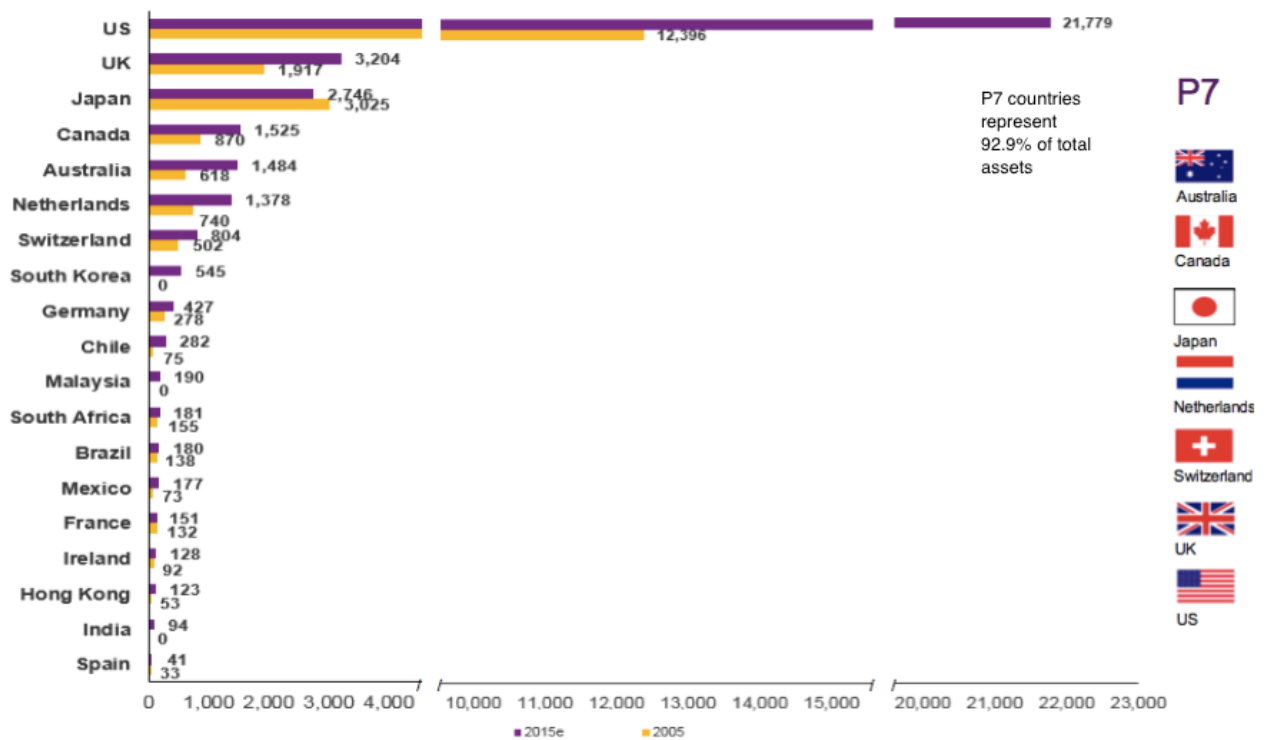


Fig 4.7: Global pension assets - evolution 2005 – 2015 (US\$ bn)

source: Willis Towers Watson, 2016

This is not a recent phenomenon. Clark, citing Langbein (1997: 168) in *Pension Fund Capitalism* (2000), noted that ‘since the early 1980s, Anglo-American private pension assets have “attained stupendous size and importance”, eclipsing all other forms of private savings and *transforming the nature and structure of global financial markets*’ (Clark, 2000: 17; author’s own emphasis).

This idea that large scale pools of capital and their investment preferences, in this case those of PFs, can shape an investment market, in their own image, is of critical importance to the understanding of how markets are created and evolve. The significant rise, over recent decades, of patient capital in the form of both pension funds and SWFs (the latter sometimes being characterised as PFs without liabilities), has created a demand for low volatility, low risk, moderately yielding assets with long duration. In short, the type of asset represented by core economic and social infrastructure (Weber and Alfen, 2010).

For such assets to fully meet investor demand however, it is also key that the institutional mechanisms through which they are held are structured to meet the longer term nature of Pension Funds’ investment horizons and the characteristics of infrastructure’s economic

lifespan, and thus to endure for periods longer than that of traditional Private Equity (7-9 years). Re-investment risk is also a real risk. Therefore, having a short term PE style vehicle sitting between a long term asset and a long duration appetite again makes no sense, it adds to transaction costs and makes the market less efficient. These factors have in turn driven the rise of infrastructure funds of longer (12-15 year) duration, Meridiam's 25+ year fund, listed fund 'perpetual' vehicles such as HICL, specific allocations constructed by fund managers and dimensioned to the commissioning investor's needs, and a higher degree of direct investment. These issues of institutional drivers, asset characteristics, and the impacts of both on the nature of the infrastructure investment market are examined further in Chapter 5.

4.2.2.1. *The heterogeneity of pension funds*

The institutional universe of pension funds is highly heterogeneous, with multiple factors materially impacting on institutional capacity to invest, investment appetite, risk appetite, ongoing cashflow requirements and institutional independence (Author's interview, CEO, Investment Consultant #1, 2016). These factors include:

Whether the scheme is public or private

The former tending to be larger and better funded, yet arguably more prone to state pressure to invest in assets that promote economic development (Author's interview, Investment Director, Public Pension fund #3, 2016). The larger funds tending towards greater institutional capacity to invest directly; whereas smaller funds lack that expertise and can often only achieve portfolio diversity (in infrastructure) via investing in funds or funds of funds. Other than that scalar factor, there was reported to be 'no systemic difference [in approach] between corporate and public pension funds' (Author's interview, Co-Founder, Asset Management firm #1, 2016). 'The mind-set (of a public pension fund) is no different to the person managing the corporate pension fund. They are facing exactly the same issues, a set of long term liabilities. They both see that infra is a tantalising opportunity particularly when the prospect of getting acceptable low risk returns from other markets (fixed income etc..) is uncertain at best' (Author's interview, Senior Partner, Infrastructure Fund #1, 2016).

It was acknowledged that the Local Government Pension Fund (LGPF) in the UK and certain public sector pension funds in North America have in the past, and continue to be, pressured to invest in their own jurisdiction by Local Authorities (in the UK) and states or municipal authorities in North America. The observations of the investment community can be summed up by one fund manager: ‘you need to question ‘why are you doing it? For return or to see what is going on...don’t confuse the two’ (Author’s interview, Senior Partner, Infrastructure Fund #1, 2016). LGPF schemes were acutely aware of the dangers of local concentration of risk: ‘We are commercially driven and *not* by issues of regional economic development. The pension fund is shielded from local councils by our property investment committee’ (Author’s interview, Investment Director, Public Pension fund #3, 2016). It was deemed important to come back to what is the principal objective of a pension fund; namely prudent asset liability management.

Defined benefit or defined contribution scheme

Defined contribution schemes entail no real risk to employers or schemes as the ultimate pension payments are subject to market performance. Defined benefit (DB or final salary) schemes however, require the scheme to provide a specific sum on retirement and the trustees of such schemes will be acutely aware of how well funded they are as compared to projected future liabilities. In the main these DB schemes are now closed to new entrants (Author’s interview, CEO, Public Pension Fund #2, 2016) and closed to future accrual, they therefore can calculate their future liabilities (which may still reflect an unfunded position) subject only to longevity risk. For these entities (where already fully funded) additional risk is not needed or desirable; for them it is about maintaining the return they have or need whilst minimising the risk profile of the investment instrument by which that is achieved. Where DB schemes are not fully funded (particularly true of some private sector schemes in the UK and USA) then there becomes an onus on the pension fund trustees to look for higher yielding assets, as can be seen in Fig 4.8.

Quality and type of scheme sponsor

A scheme sponsor (normally the employer) is the ultimate guarantor of a fund and the credit quality of that sponsor may affect investment behaviours in the fund itself. A strong public sector sponsor was cited in numerous interviews as resulting in an increased appetite for

risk and return. The presence of an implied funder of last resort, in turn creating a degree of moral hazard in such funds.

Mature or closed versus open or active

A closed fund has a precise view on its ongoing obligations but no ongoing cashflow from members’ contributions. By contrast an open scheme has uncertain future obligations but does benefit from a level of ongoing cashflow from contributions of active members. This availability of cashflow can result in a greater preference or need (within closed funds) for ongoing equity dividends, bond coupons or returns from infrastructure assets.

These factors all influence where a given pension scheme sits on a scale that ranges from being truly fully funded against all future liabilities, through being funded on a technical (projected or actuarial basis) to being unfunded. They also materially impact on the confidence of a scheme’s trustees as to the likelihood of future liabilities being able to be met. A scheme’s place in this spectrum (of fund health) will determine its ongoing yield requirements across its overall portfolio. This in turn drives the likely asset allocation mix and by implication its risk appetite, as is demonstrated in Fig 4.8 below:

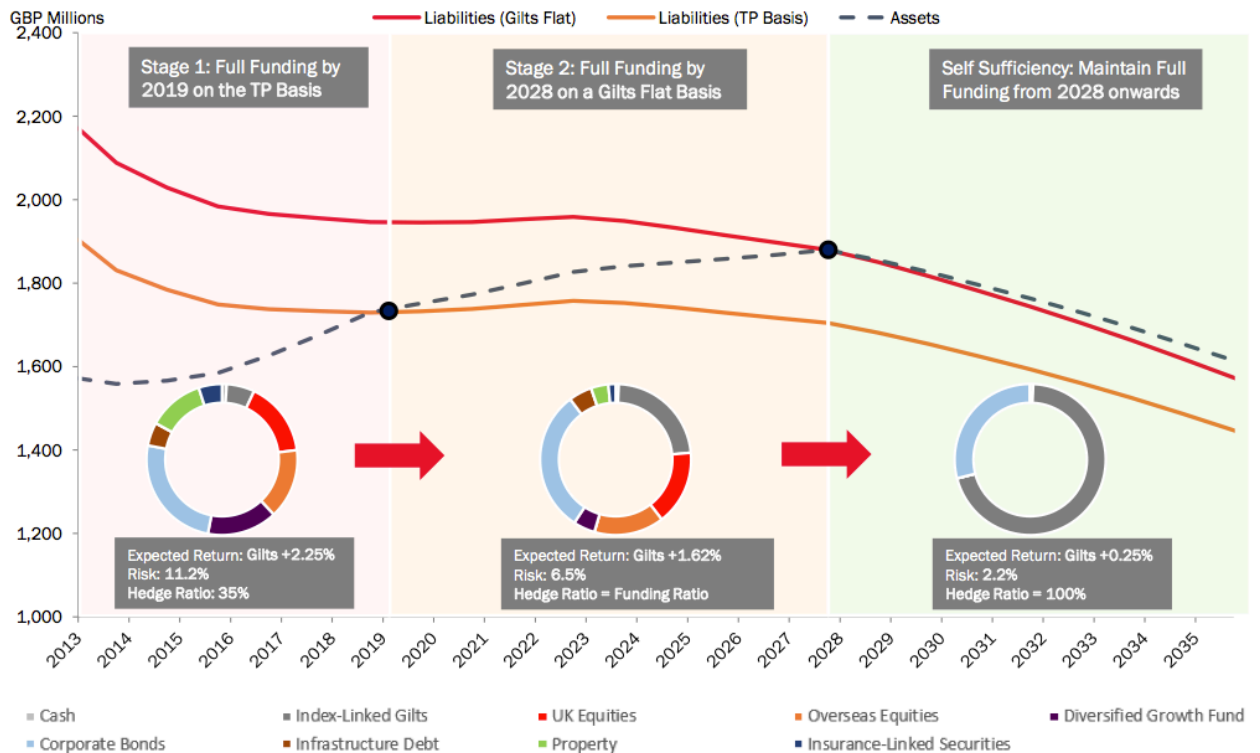


Fig 4.8: Pension fund portfolio evolution over time

Source: Redington (2014)

In their simplest form these positions, of either seeking capital appreciation, ongoing cashflow or just a low risk home to protect an existing fully funded position, are manifested in the ways in which some advisers now present the infrastructure market opportunities to PFs (both public and private) as being ‘growth, income or protection...we very much put infrastructure into the income bracket but there is an element of growth in it’ (Author’s interview, Head of Alternatives, Investment Consultant #2, 2016).

It is the public pension funds to which this study returns in Section 5.3.2, to consider the ways in which this source of long duration, low yield requiring (and hence highly useful to the state) pools of capital are being shaped by the market for financialised infrastructure as well as in turn shaping it themselves. It also considers how these funds are becoming increasingly contested as pools of capital, and subjected to state pressure at both national and regional levels, and state direction if not (yet) control. As one North American public pension fund stated:

‘[we are] an entity that is wholly owned by government but has an independent set of directors...like all US public pensions, we are a government managed pool of capital. What that means is that the ultimate fiduciaries that occupy the board seats here come from a variety of different political affiliations and constituencies and those forces come to bear at time on the decisions that are put forward to staff. From time to time there have been efforts that have been thwarted in the legislature here to proscribe even more capital to earmark for our home state. At one time there was a proposal to have the entire infrastructure capital focussed on [that state]’ (Author’s interview, Head of Alternatives, Public Pension fund #1, 2016)

The same pressures are evident in a UK context:

‘I think there probably is an element of Local Government Pension Funds thinking about infrastructure as a social good and so as something that is worth investing in for that reason, rather than financial reasons. It’s something that we try and guard against, particularly when it comes to local infrastructure, because we feel there shouldn’t be a conflict between trying to perform a social good in your local community and getting the best financial returns for your pension scheme members.

But you will find pensions fund committees that do have that thought in mind; we would argue that they really shouldn't' (Author's interview, Head of Alternatives, Investment Consultant #2, 2016).

These pressures either explicit or implicit, mandated or cultural, to invest disproportionately in their own geography, are contrasted with the relative independence of the large Canadian schemes; established as 'Crown Corporations with independent governance and the remit to act commercially' (Author's interview, Head of Alternatives, Public Pension fund #1, 2016).

Many public pension funds (such as the large schemes in North America and the Local Government Pension Scheme in the UK) are open defined benefit schemes with a very long term investment horizon; whereas most private sector schemes are now closed and have a shorter investment horizon and are therefore less likely to consider an infrastructure investment because of the illiquidity (Author's interview, Head of Alternatives, Investment Consultant #2, 2016). Both have had to recalibrate their return expectations in the light of current (and post financial crisis) market realities: 'When pension funds made the 'promises' they did, they had an expectation of fairly easy 7+% pa growth. That world has gone...mind-sets need to change' (Author's interview, Head of Infrastructure, Asset Management firm #2, 2016).

4.2.2.2. *Spatial derivations of the coupon pool*

The pension sector, an aggregated coupon pool (Froud, Johal and Williams, 2002), represents the financial accumulations (re-invested over time) derived from a set of evolutionary economic factors such as the expansion of remunerative employment and employer participation in private pensions (Clark, 2000: 17) in certain countries. These countries were, in the main, those where generous defined benefit (DB) schemes existed, and where there were significant state or large corporate sponsors for these schemes which had, by law, to be fully funded. In addition to these we can add those schemes where significant employee contributions were or are compulsory:

‘those parts of the world with fully funded pension schemes or mandatory contributions tend to be the source of some of the larger pension funds. I’m thinking about places such as Australia where mandatory contributions of 12-15% which gives rise to an enormous amount of pension savings managed by institutions there, and the domestic market is not big enough there so they have to look overseas. Ditto NPS in Korea; mandatory contributions, massive surplus, they own whatever percentage it is they own of the domestic market and it’s not sensible to continue to deploy in that market, they need diversification. Obviously the Canadians...have some very large funds...for sure it’s a little to do with the consolidation but its more to do with that for many of public sector employees, they all have fully funded pensions...you add that up and it’s a huge pool of money looking for investment returns’ (Author’s interview, Co-Managing Partner, Infrastructure Fund #2, 2016)

Added to these factors we might add the co-existence of institutional investment actors in the shape of asset managers, such that these growing pools of capital could be optimally invested over time. The resultant pools of pension capital are, as a result, spatially highly uneven. Globally the top 7 pension markets (the P7) represent around 93% of global pension assets (Fig 4.7). There is therefore a high degree of concentration of global pension capital in just these seven major markets where these critical accumulation factors occurred: Australia, Canada, Japan, Netherlands, Switzerland, UK and US.

Public pension funds, private sector pension funds, and superannuation schemes make up a significant 40% of the active global infrastructure investor universe...with public pension funds the most prevalent (18% of the total). Private sector pension funds follow closely, accounting for a further 17%...39% of all active pension plans in the infrastructure space are based in Europe, with 18% located in the UK alone. North America is also a significant base for pension plans making investments in infrastructure. Canada represents 9% of the total universe and is home to some of the largest and most experienced infrastructure investors in the world. The US is home to 27% of the total universe... Australian institutions, most of which are structured as superannuation schemes, were among the pioneers of private sector investment in infrastructure assets in the 1990s and now account for a significant 13% of the universe. (Prequin, 2012)

These geographical characteristics of the coupon pool are important to the spatial construction of infrastructure markets since they drive the geographies of asset allocation within these major institutional investors. Pension funds typically prefer lower risk investments. Infrastructure assets in their own national geography and (importantly) currency, or geographies with similar cultural, economic, political or institutional features, are thus preferred.

‘there is no firm restriction where we invest, but in fact we don’t look outside OECD, that’s the first sift. We can do exceptions; Finland is not in the OECD but is European. The familiarity with a country informs that view. Areas within Europe that we are more comfortable with are the UK, France, and Netherlands...The political and regulatory environment is the starting point because you are going to live with that for the duration’ (Author’s interview, Senior Partner, Infrastructure Fund #1, 2016).

Similarly pension funds prefer to minimise currency risk, and seek to do this either via investing in domestic assets or in currencies where liquid hedging options are available.

‘It is an economic issue. A UK PF has UK sterling liabilities and wants to see UK returns. In Europe you see the same thing with euros. There are regulatory restrictions for example in Germany and France to investing outside the euro zone. The problem with hedged returns is cost, and can you keep the hedge sufficiently perfect. For an equity instrument it is incredibly difficult’ (Author’s interview, Senior Partner, Infrastructure Fund #1, 2016).

In turn these large populations of pension funds and their attendant trillions of dollars of capital have attracted an investment ecosystem or supply chain co-located in their own geographies, notable among which are the infrastructure funds, asset managers and private equity. These are discussed further in Section 4.2.3. Through their investment actions, either manifested directly or through financial intermediaries, pension funds and other annuity providers allocate patient capital from the jurisdiction of the fund sponsor or individual pension contributor, to financial instruments and entities exhibiting a high degree of spatial diversity. In some instances, we may observe pension funds from one geography taking significant stakes in economic assets of another geography; Greater

Lancashire's Pension Fund stake in Stansted Airport in the UK for example. Whether this constitutes an arbitrage action, as has been seen driving, at least in part, the investment rationales of SWFs, is debatable. What is undeniable however is that the effects of this spatial mixing or reallocating of significant pools of capital profoundly affects and drives infrastructure markets globally and provides a further demonstration of the impacts of financialisation on infrastructure assets and provision in already globalised economies. The methodology of this spatial reallocation of capital is explored further in Chapter 6.

4.2.2.3. *Scale and allocation strategies*

The scale (in terms of AuM), experience and institutional capacities of funds drives widely differing investment methodologies; from being a passive participant (Limited Partner or LP) to co-investing with the General Partners (GPs) in funds, through to genuine direct investment; and ultimately, in isolated cases, an evolution to independent infrastructure firm (CDPQ Infra). This variegation of market access is analysed further in Chapter 5, but it has enabled the widest possible range of institutional actors (in terms of scale of AuM and institutional capacity) to gain exposure to this asset class, and in so doing contributed to the size and range of the investor population, which in turn has resulted in a dynamic and variegated market environment where evolutionary institutional and economic geographies allow.

There is therefore a spatial characteristic of the largest pension fund investors in infrastructure that is a function of factors such as overall national market pension savings (those pension funds in major P7 markets), early employer engagement with pension savings, and those states where a measure of aggregation of public sector funds has already occurred (Canada, Netherlands, USA and Australia) as shown by Table 4.4 below:

Investor	Currently Committed to Infrastructure (\$bn)	Investor Type	Investor Location
OMERS	14.3	Public Pension Fund	Canada
CPP Investment Board	9.2	Public Pension Fund	Canada
Ontario Teachers' Pension Plan	7.8	Public Pension Fund	Canada
TIAA-CREF	6.5	Private Sector Pension Fund	US
ABP	6.0	Public Pension Fund	Netherlands
AustralianSuper	5.1	Superannuation Scheme	Australia
ATP Lifelong Pension	2.6	Public Pension Fund	Denmark
Public Sector Pension Investment Board	2.3	Public Pension Fund	Canada
Construction and Building Industries Superannuation Fund	2.2	Superannuation Scheme	Australia
California Public Employees' Retirement System (CalPERS)	1.7	Public Pension Fund	US

Table 4.4: Top 10 pension funds investing in infrastructure by commitment size

Source: Preqin Infrastructure online, 2012

Beyond these ten pension funds (which also reflect the scale dominance of the public pension funds) a similar pattern emerges across different regional pension fund populations, with North American and European public pension funds by far the largest principal investors in this asset (see Fig 4.9):

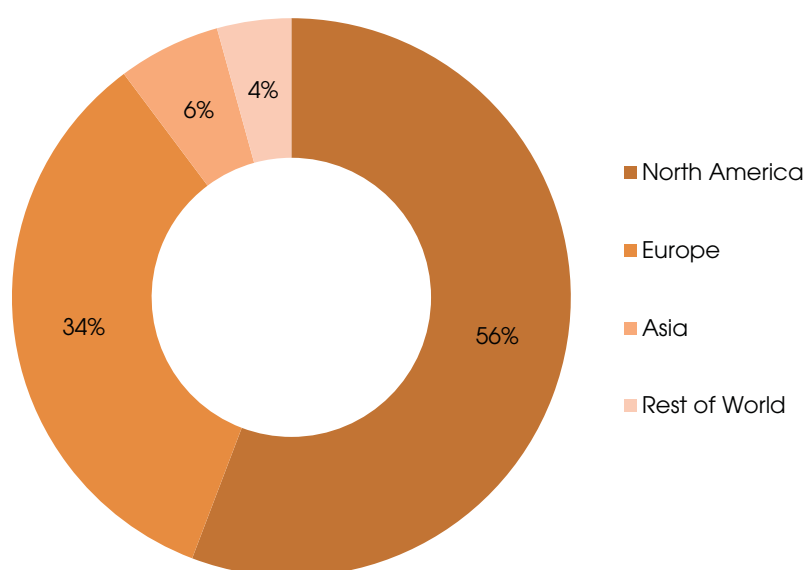


Fig 4.9: Breakdown of public pension funds investing in infrastructure, by location

Source: Preqin Infrastructure Spotlight, February 2014

As Fig 4.11 shows, at the aggregate level of the various pension funds, the allocation approach of all P7 funds has shifted substantially in the last two decades. The section marked other includes 'alternatives', which comprises real estate, infrastructure and hedge

funds. This had grown to 24% of the total capital pool as of 2015 and, reflects that ‘between 2010 and 2013, the world’s largest 10 pension funds boosted their allocation to alternative assets from 17.6% to 19.5%’ (Alonso, Arellano and Tuesta; 2015: 2)

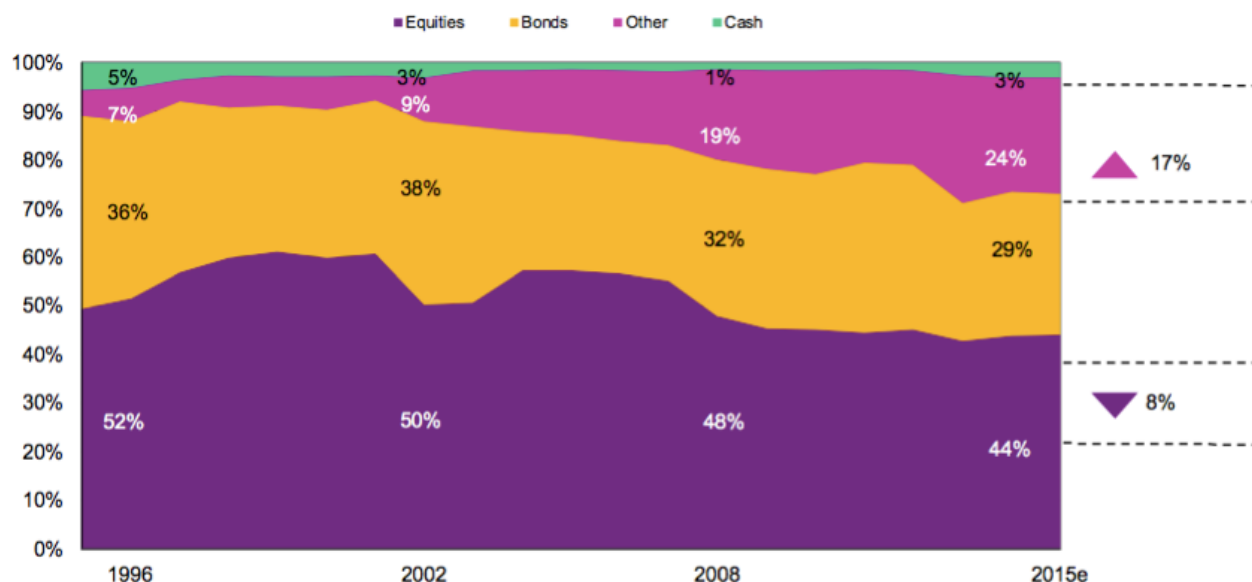


Fig 4.10: Aggregate P7 pension asset allocation from 1996 to 2015

Source: Willis Towers Watson, 2016

In aggregate these public and private pension funds (regardless of funding model and liability position) represent an enormous pool of capital that, pre 2000s, were largely not invested in infrastructure. On that basis a shift in portfolio allocations from 0-2% to 2-5% (in some cases up to 15%) on a total sector size of \$36.4tn over the last 20 years to infrastructure and alternatives represents a considerable movement of long term ‘patient’ capital, in many cases (particularly those in a fully funded position) with IRR expectations below conventional and early market infrastructure funds and PE, into the infrastructure market. It is this source of long term, modest yield seeking, patient capital that is of such interest to fiscally constrained state entities looking to finance their extensive infrastructure plans. In many cases however, they need some kind of mediating institution to help them find opportunities, understand the asset class, and provide the transactional expertise. It is here that infrastructure funds have found a major area of market need.

4.2.3 Infrastructure funds and asset managers: mediating the market

Infrastructure funds can be seen as enabling actors, where the delivery of essential services and the control of infrastructure assets are converted into financial instruments tailored to a series of duration, risk, capital growth, and coupon stream characteristics to match the portfolio expectations of a variegated group of institutional investors. In this sense their role of mediation and deal making (rain making in financial parlance) represents the institutional space where financialisation occurs. By virtue of the size of AuM held in infrastructure funds, the range of public to private institutional investors committed as LPs to fund structures, and the diverse asset, sector and geographical focus of these institutional actors; we can surmise that these infrastructure funds are not only a principal institutional product of the financialisation of infrastructure, but also one of its underlying and ongoing architects.

As Inderst observes:

Dedicated infrastructure funds were first set up in the mid-1990s in Australia, and the local Superannuation plans in the USA were early investors in them. Some bigger Canadian plans also pioneered this field. Australian financial institutions started to promote such funds more widely to pension funds and other investors earlier this decade [2000s]' (Inderst, 2009: 4).

Since those days of Australian funds evangelising about the benefits of infrastructure investment to pension schemes and superannuation funds, the sector has, in parallel with broader infrastructure markets, witnessed significant growth. Driving this growth, as well as a growing supply pipeline (in UK and abroad and across many transactional vehicles/ structures [PPP, PFI2 and others]), was the fact that investors' traditional portfolios were simply not yielding what they once did (particularly in real estate, fixed income and gilts) or showed higher degrees of volatility than historically seen (equities and real estate). When managing a portfolio weighing the price of risk, both these inputs are negative considerations. Infrastructure, to an extent, was and is the answer to this problem; a theme to which this thesis returns in Section 6.1.

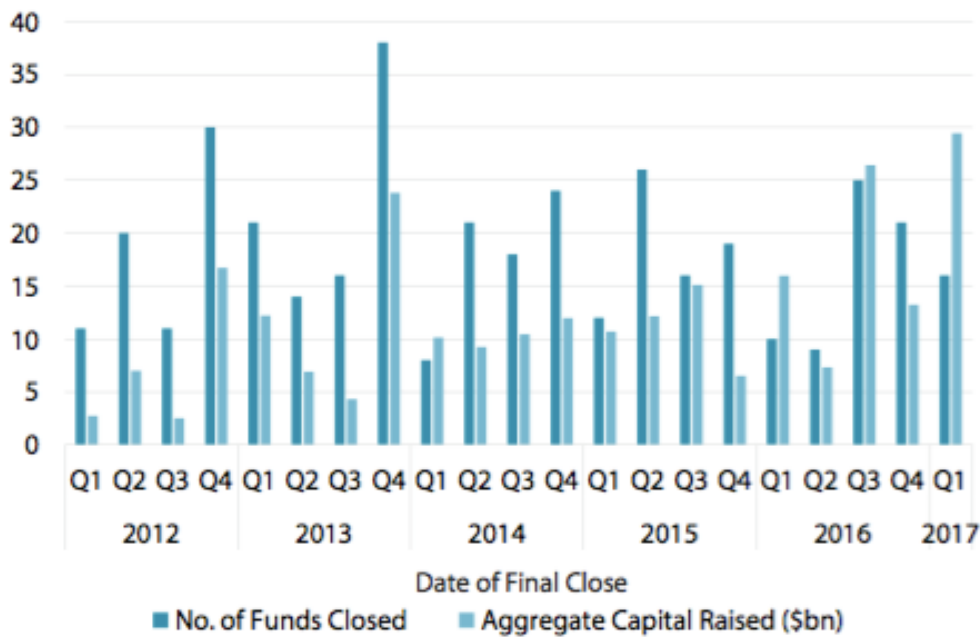


Fig 4.11: Unlisted infrastructure fundraising globally Q1 2012 – Q1 2017

Source: Preqin (2017a)

What Figs 4.12 and 4.13 (below) demonstrate is that there is significant geographic concentration in both the domicile and the regions of primary investment focus of the major infrastructure funds; though these two features are not spatially contiguous. This pattern of the concentration of institutional capital in a few key *thick* investment markets (by which is meant a high density of investment actors and deployable capital) has continued, with 55% of funds closed between Q1 2016 and Q1 2017 having a North American focus, and 38% having a European focus (Preqin, 2017c). This is due in large part to the fact that these funds derive much of their capital from mediated state institutions (SWFs and government agencies) and the coupon pool institutions and, as we have seen, such investors are driven in part by the reallocation or arbitraging of risk. The spatial transfer and mixing of domestic economic risk within a portfolio context is, for both mediated state institutions and annuity providers, a key attraction of the fund management ecosystem and its diversity of geographical market access.

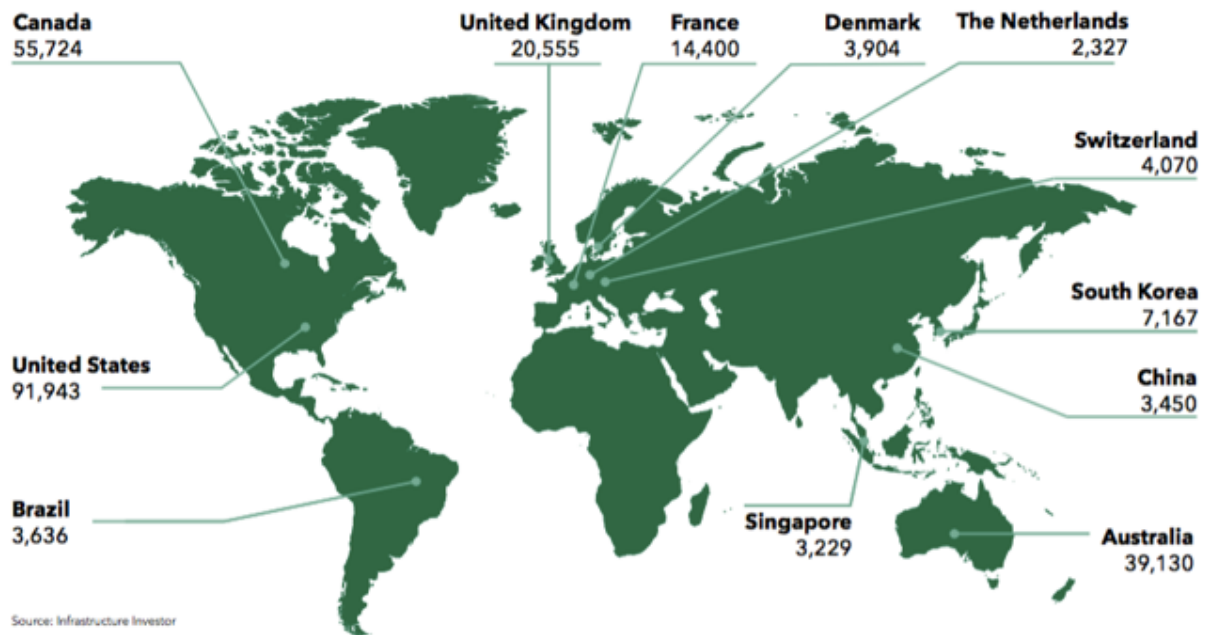


Fig 4.12: Spatial characteristics of top 50 funds by headquarters location

Source: Infrastructure Investor (2016: 8)

In addition to the above highly concentrated geography of capital fundraising, it is also an extremely concentrated sector in terms of the dominance exercised by certain key firms. For example, the top five fund managers raised \$117bn of the \$283bn raised globally in 2016 (Infrastructure Investor, 2016).

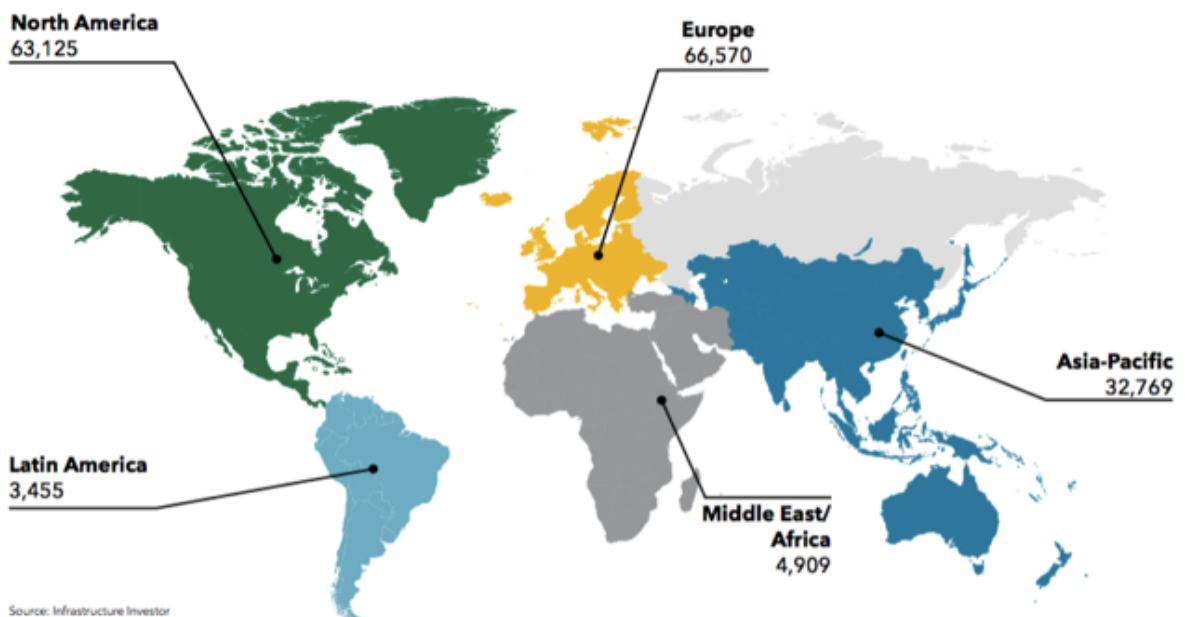


Fig 4.13: Spatial characteristics of top 50 funds by main geographic investment focus

Source: Infrastructure Investor (2016: 7)

The infrastructure fund universe is geographically diverse in nature, though still concentrated in certain key markets such as North America, Western Europe and Australia. The sources of capital contained within those funds, however, are considerably more variegated, both in institutional, scalar and geographic terms. The investment appetite and geographic focus of these funds (see Fig 4.13 above) is largely OECD focussed at present although Asia is an increasing destination. Duration preference is medium term with a lower end near conventional private equity funds (8-12 years) and a very few starting to reflect target asset characteristics and some SWF/ pension fund preferences and therefore a term of 25 years+ (such as Meridiam). Many investors, however, have sought to achieve greater duration either by having GPs manage bespoke pots of cash (at their desired duration), acting as advisers on co-sourced, co-led transactions of longer duration (as joint leads) or by investing outside of the FM universe and going directly.

‘As to fund type vehicles we still raise, 10 + 2 or 3 year extensions. Specific allocation vehicles tend to be buy and hold...and another on the way could be 20+ years’ (Author’s interview, MD, Infrastructure fund #8, 2016).

For the funds themselves, return requirements are tied to risk appetite and are highly variegated from 3.5-4.5% for PFI/PPP debt funds to 15%+ for more PE style equity funds with significant geographical/ regulatory or technology risk.

Conventionally and historically, funds were either low rate debt seeking constructs spun out of bank project and utility finance departments (like HICL), or equity focused PE type entities looking for returns over 10%, in some cases over 15% or 20%. Conventional infrastructure doesn’t yield that sort of return: ‘when you are at that level of yield you are no longer dealing with infrastructure’ (Author’s interview, Senior Investment Manager, Private Pension Fund #1, 2016), so there was no easy fit. The complex duration mismatch; between asset life, concession maturity, investor preference and fund structure, was also an issue. So as opportunities to invest in infrastructure grew there was a lack of vehicles to match investor demand with deal flow. Infrastructure specific funds are an instance of market evolution matching supply and demand. As further evidence of evolution and specialisation those early funds themselves became more variegated; by duration, technology, geography, sector, and place in the capital structure. The nature of that

variegation has been driven in large part by the characteristics of the pools of capital that the funds are constructed to serve. What is clear is that the large volumes of investment by pension funds and insurers has created demand for longer maturity and lower risk assets, and that fund structures have evolved to meet that need:

‘the investment community for low risk assets is being dominated by PFs who have a long term view, looking for a hold to maturity strategy and low volatility with index linked characteristics...we’ve got just over £3bn under management; the vast majority comes from PFs, with a minority from insurance companies. In terms of geographies a lot comes from the UK, we also get a lot from Germany who like our strategy because they are not seeking high returns, in general (unlike UK PFs) they tend not to be in deficit, so they want a nice safe strategy where they get index linked L/T returns’ (Author’s interview, CEO, Infrastructure fund #4, 2016).

There is a great diversity of investment appetite and approach within both the mediated state institutions (including SWFs) and the spectrum of public and private pension funds, and other annuity providers. For the fund community to be able to successfully engage with these variegated pools of capital, and to be trusted with the deployment of the capital of such a range of institutional actors, it is unsurprising that the fund sector itself has had to evolve into a heterogeneous population of investment vehicles. These may be oriented towards the longer duration characteristics of infrastructure (such as Meridiam), towards specific PPP opportunities, exploiting a tight geographic focus (such as 3i’s India funds, and Macquarie’s suite of country based funds) or focussed on a sector such as renewable energy (such as Capital Dynamics in the USA). It is perhaps instructive however, that large scale, operational, brownfield assets with the scope for a PE type approach, have been the core focus of one of the most successful (in capital returns) and largest (in terms of AuM and investment vehicles closed) Infrastructure funds, that of Global Infrastructure Partners.

‘What is Global Infrastructure Partner’s strategy? It’s an M&A style brownfield infra player, large facility acquisition and divestiture, brownfield, buy sell. It’s M&A period, and yes they try and improve performance, but they don’t work with cities; they are not in the city business...those funds are very successful’ (Author’s interview, Founder, PE firm #1, 2016).

4.2.3.1. *Private Equity firms*

Private Equity fund models formed the early template for institutional infrastructure equity investment in terms of fee structures, capital return time horizons, and IRR expectations. As this research will show, Private Equity, is still present in some assets open to full market competition (such as airports, ports and some aspects of power generation):

‘I think that our portfolio is a function of where largely global funds have been deploying: 40% energy, 40% transportation, 20% other. It seems to me that most deal flow people have seen has been in energy and transportation which is regarded as economic. For some reason our portfolio does look like private equity within infrastructure’ (Author’s interview, Director of Investment, SWF #6, 2016).

PE has also retained a distinct role in infrastructure markets where its higher risk appetite is suited to emerging infrastructure sectors, challenging geographies, areas of significant market risk, and nascent technologies. At the lower risk end of the spectrum, as we have seen, many of the large names in PE have developed tailored forms of institutional investment vehicles more sensitive to the characteristics of infrastructure and the politicised nature of utility services; bringing them closer to conventional infrastructure funds.

At the earlier stages of infrastructure market development, the PE firms were significant actors. This reflected a less mature, more illiquid market, that was less efficient and transparent. In such an environment, asset prices reflected wider margins for a still new and unproven asset class. In addition to those early high cashflow yields, there were also considerable capital returns derived from secondary activities such as the on-selling of infrastructure concessions and assets, and the floating on public markets (by PE firms) of those assets deemed ready for such a step. Often these were accompanied by the loading up of greater, and in some cases unsustainable, leverage to drive share price growth and pay for enlarged dividends, such as the case of the Macquarie managed Thames Water investment (Allen and Pryke, 2013).

These capital exit events enabled the realising of exceptional profits, seen by some as evidence of the negative and extractive nature of private capital; particularly when accompanied by perceived reductions in the quality of essential service delivery. As the market has matured however, and as more tailored infrastructure funds have entered the market, so conventional PE has had to work harder to find opportunities in the core attractive markets. In that scenario there has emerged an economically perverse situation whereby earlier PE funds, by virtue of current greater cash inflows into this space, have a higher cost of capital and thus a structural disadvantage. Though, in many cases, these PE firms have a rolling portfolio of investments and funds across which these costs of capital can be somewhat ameliorated.

PE firms are geographically domiciled in, derived from and investing in North America and Western Europe in the main, and performing within a conventional view of neoliberalised markets. In their behavioural characteristics and IRR expectations, PE houses are perhaps closest to the conventional political economy literature narrative of private institutional capital. Duration preference is short to medium term, reflecting a part of the financial sector that tends to be at sub 10 years. Returns are targeted at 10%+ with some higher risk funds even seeking 20%+. The empirical data suggests that infrastructure assets or companies yielding returns at these levels are regarded by many as having too much risk to be accurately characterised as infrastructure. This raises an interesting conceptual disconnect between the usage property of infrastructure as an asset for the delivery of essential utility services, and the exchange concept of infrastructure as an asset class generating a return which, at least in the eyes of many investors, is limited by the asset's ability to continue to demonstrate its own core investment characteristics of low volatility, low risk, high barriers to entry and quasi monopoly.

4.3 Public and private sector drivers: but why a market?

Sections 5.1 and 5.2 address how the heterogeneous properties of infrastructure and the diverse investment methodologies of the variegated institutional actors have constructed and continue to reconstruct global infrastructure markets. This Chapter has focussed on the range of institutional actors present in these markets and the differing factors that act as

ongoing drivers for their investment in, and engagement with, both this asset class and with each other. It can be seen however, that within these markets for institutional investment exists a myriad of risk-return appetite. Previously the state acted as equity holder or owner, with debt raised via bonds, gilts, T-bills and via municipal (muni) bonds and banks. In that model equity control resided largely with the state, the organ of policymaking, and one (supposedly) without a profit motive. An interim phase occurred wherein infrastructure funds were focussed on equity and debt opportunities in operational PPP/PFI (Author's interview, CEO, Infrastructure fund #4, 2016), and were sourcing transactions for previously debt focussed institutions such as commercial and investment banks and the debt oriented private wealth market. Theirs was, primarily, a short term horizon with a view to selling on assets after 5 to 6 years for a capital gain; so it was in part a capital growth (rather than ongoing cash yield) strategy. Now the main investors are PFs and to a lesser extent insurance companies, both with a much longer term horizon and less inclination to indulge in or rely on speculative trading or churning (entering and leaving) of investment positions.

Not only is the equity now held much more widely (more institutions but also a much more fragmented shareholder list after two decades of considerable secondary trading), but matters are further complicated by the growing influence of coupon pools (of individuals and nation states) institutionally manifested in SWFs (Clarke, Dixon and Monk, 2013; Haberly, 2011), interconnected institutional holdings (Haberly, 2011), pension funds (Langley, 2008; Inderst, 2009), infrastructure funds, PE and so on. Overall it can be said that financial institutions and institutional investors are now more prevalent in equity roles, a fact consistent with the prevailing thesis of financialisation (Epstein, 2005) and examined further in the section on assertive capital in Section 5.3.1.

Throughout any analysis of a market and its variegated institutional actors, it is critical to consider what it is that is driving institutions to invest beyond their traditional asset classes (fixed income, listed equities and real estate), and to move into these wider markets and opportunities, and operate in concert with, or through, other institutions. It is also worth remembering that being able to invest in some aspects of infrastructure is, in a sense, not a new phenomenon:

‘Is it an asset class? Some years ago it wouldn’t have been one, and in some ways I think its creation and its proliferation has been a function of good marketing on Wall Street, because you can like tomorrow get access to publicly traded infrastructure such as Union-Pacific Railroad, that has been a stock in the US for a 100 years. It’s been a big company and a good company and it owns rail infrastructure, but 50 years ago people didn’t say oh that’s infra it was just a company that owned physical assets and did things with it. So in some ways I am resistant to it being called an asset class’ (Author’s interview, Director of Investment, SWF #6, 2016).

One driver, as we have seen, is that the size of the capital pools accumulated by institutional actors such as SWFs and pension funds can no longer, efficiently or safely (in concentration terms), be deployed within their domestic market. This is a notable driver in the case of Japanese, Australian, Canadian, Korean, and Dutch large scale public pension funds, as well as the SWFs of the Gulf states and Norway; as confirmed in interviews with Public Pension fund #4, SWF #1 and others. There is also, in the case of some SWFs, the desire to arbitrage away from their domestic, host economy, and to invest in assets and sectors that have a low correlation with the economic drivers pertaining at home; ‘we are looking to diversify away from [our home state] and it [a non-domestic mandate] stops people trying to curry favour or support their pet projects’ (Author’s interview, MD, SWF #1, 2016). This is a sentiment consistent with the findings of Clark, Dixon and Monk (2013). Interestingly this last point offers a contrary view to the previous UK government’s assertions that a fracking driven shale oil and gas energy driven fiscal windfall could or should constitute a new SWF for the UK to be invested in UK infrastructure projects: ‘an everlasting pension fund for UK plc’ (Lord Hodgson, 2014).

It can be debated whether, what has resulted from the last 25 years of financialised infrastructure, constitutes an asset class. What is clear however is that, within infrastructure investing, it is now possible to configure risk appetite to distinct geographies, sectors, operational models, points in the capital structure, and types of underlying assets.

The analysis of the empirical evidence of the forty-five research interviews and the transactional data suggests that it is the conjunction of a heterogeneous asset, along with a heterogeneous and growing investor population that makes a dynamic, deep and broad

market possible. It is the potential for the reconciliation, assisted by an increasing population of mediating actors, of wildly divergent appetites for risk and return. Secondly, there is the conjunction of availability drivers: availability of assets for the reasons of fiscal austerity, market based political ideologies, constrained sovereign balance sheets, and infrastructure spend catch up on the one side (see Fig 4.14). On the other side it has been accompanied by the huge growth in the sovereign receipt pool (SWFs) and the coupon pool (pension funds and annuity providers) who, not only have large volumes of capital to deploy, but whose conventional portfolios are exhibiting lower capital returns, lower cash yields and greater volatility. As the final factor these pools of capital have a natural preference for longer term assets to match longer term liabilities, to minimise re-investment risk and as a non-correlating asset in the context of their historic and ongoing portfolio constructions.

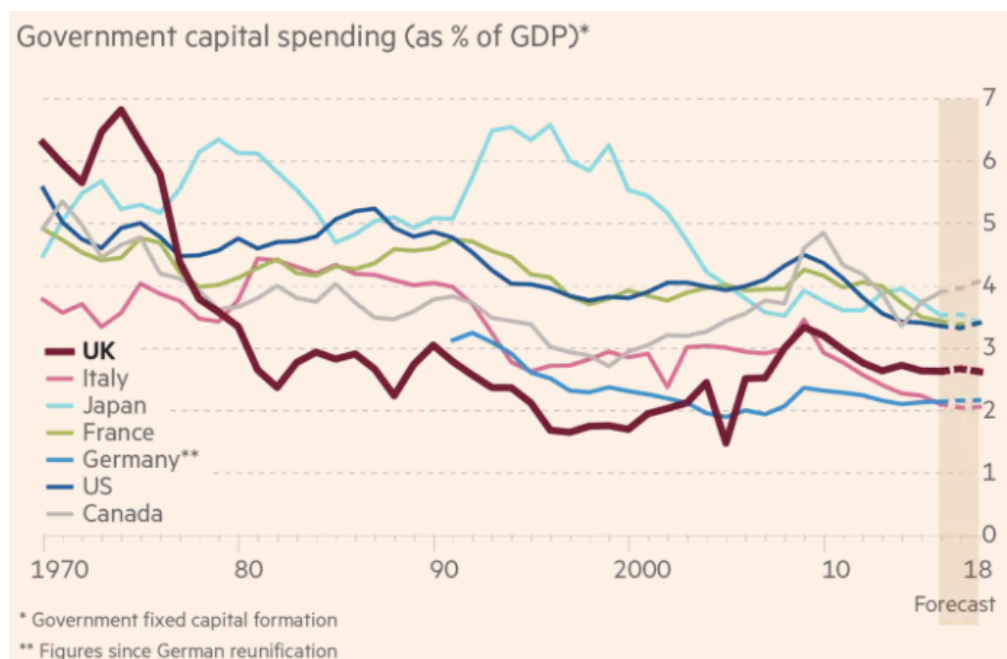


Fig 4.14: UK lags behind G7 peers on infrastructure investment

Source: OECD, cited in Plimmer and Tetlow (2017)

So how do these disparate actors come together or become aggregated, so as to transform isolated pools of capital, infrastructure assets and bounded institutions into a market? Some of these institutions have the capacity and inclination to deal bilaterally with each other, facilitated in no small part by movements of staff between public and private actors thereby reducing cultural and cognitive distance (Author's interview, Partner, Consultancy firm #1,

2016). The driving phenomenon in recent years however has been the wholesale adaptation of conventional asset management and PE models to the needs of infrastructure asset owners, concession granters, regulators and lower risk lower yield debt; and to the exigencies of patient equity capital. This role has, for the smaller and less sophisticated institutional investors, been played by infrastructure funds; mediating actors providing a functional place for the reconciliation of supply and demand, risk and return, assets and capital. This mediating and rainmaking role (discussed in more theoretical terms in Chapters 6 and 7) took time to take hold during the late 1990s and early 2000s but has now become a dominant factor in the financialisation of utility services and their attendant monetary flows.

More broadly, institutions have played multiple roles in this market, as advisers to both investors and the state, as constructors of infrastructure portfolios, but also as advisers to those constructing new templates for public-private co-investment in infrastructure assets: ‘We advised the government on PPP’ (Infrastructure fund #3). This multiplicity of roles played by institutions, coupled with the movement of key individuals across the market, have combined to ensure a flow of information and practice that has complemented the economic factors driving this market development, and seems to be contributing to the ongoing dominance of the key geographic markets for infrastructure investment, and the spatially uneven nature of both infrastructure development and infrastructure markets. This is a topic that is addressed further in Chapter 6.

This chapter has, in answer to Research Question 1, examined the respective roles and strategies of the various state, quasi-public and private institutional actors active within contemporary infrastructure investment markets. It has in particular unpacked the extensive influence of the state as a financial actor, not only directly through the action of government agencies and departments, but also through an array of institutional forms over which it has a variegated level of control or influence. These include the often state mandated investment strategies of SWFs, the public sector pension funds that can be liable to state pressures and the needs of public policy, through to those infrastructure funds in which state entities hold investments, often as a Limited Partner.

A wider analysis of how these diverse institutional actors participate in the market, how they interact with each other, and how infrastructure's heterogeneity is driving both models of infrastructure provision and institutional behaviour is considered further in Chapter 5.

Chapter 5. Variiegation everywhere: the relational links between financialised infrastructure, the state, and institutional capital

This Chapter addresses how public and private institutions, active in infrastructure investment, shape and are shaped by both infrastructure markets and the nature of infrastructure itself. Section 5.1 examines the inherently heterogeneous nature of infrastructure; in terms of its physical characteristics, its underlying business model, the *promiscuous* nature of its interconnectivity, and its problematic geography. These latter aspects reflecting the fact that any spatial analysis of infrastructure immediately reveals how it can transcend municipal, regional or (in some instances) national boundaries. Think of the obvious interconnectedness of a road or rail network, or the less apparent but more fragmented communications and power networks, and the political sensitivity of water catchment areas. This heterogeneity is magnified by the fact that infrastructure ranges from being a delivery mechanism for critical services against a regulated state backed settlement, through to a system or asset fully exposed to the vagaries of market and demand risks. Additionally, infrastructure, by virtue of regulatory regimes and perceived sovereign support, can either benefit from, or be impacted by, an explicit or implicit link to its state of domicile. A factor that brings policy uncertainty and political risk into play as significant considerations for infrastructure investors.

Section 5.2 explores the myriad investment methodologies utilised by institutional investors in infrastructure. From the direct investment strategies of the largest and most sophisticated institutions, to the aggregating and risk diversifying mechanisms offered by infrastructure funds and other asset managers, structured to appeal to those entities unable to achieve portfolio diversity and balance from their own *sub-scale* allocation to the asset class. Indeed, the empirical data questions whether infrastructure is an asset class, or is merely a diverse basket of utility based investment opportunities, an investment strategy founded on low risk and low volatility and based on non-correlating (with other investments), inflation hedged assets. Alternatively, is it the investment class *de jour* enjoying a sovereign linked credit covenant, and benefitting from a post financial crisis institutional desire to embed investment in a physical and necessary asset?

Section 5.3 addresses a major finding of the empirical research, namely the impacts of financialised infrastructure markets on capital itself. It specifically argues that the recent focus of orthodox political economy on the effects of processes of neo-liberalisation, and financialisation on the state, and on critical social assets such as infrastructure, has allowed the flip side of this coin, the *politicisation* of investment capital, to go largely undocumented. This process of politicisation has arisen through institutional capital being increasingly invested into infrastructure assets, which are an inherently political asset class, associated as they are with the delivery of essential services that many feel, are the preserve of governments to provide. These are services in which the competing demands of social good and shareholder return sit uneasily in many people's minds. These assets and services in which investment capital is taking an economic interest are also, at least in part, circumscribed by state determined fiscal envelopes and state overseen regulatory regimes. Lastly, the infrastructure investment market is one in which, as has been seen in Section 4.2, variegated sources of state, public and quasi-public capital, ultimately answerable to state actors, are being deployed alongside and co-invested with private institutional capital.

The impact of these flows of institutional capital into previously state run utility services is profound, and Section 5.4 examines the way in which the expectations of financialised markets, and their constitutive actors, are shaping infrastructure assets themselves. It explains how the contractual terms upon which these concessions, sales and regulatory frameworks are founded, remove service provision from political cycles and constrain governance flexibility at state and sub-state levels. Indeed, as Chapter 5 concludes, the institutional equity (ultimately derived from public, *para-public* and private sources) now operating and controlling these infrastructure assets is considerably more assertive in the promotion of its own agenda than the previous financing mechanisms, prevalent in the 1980s and earlier, such as global fixed income (namely bond) markets and bank debt. The increasing hegemony of this assertive capital has profound implications for governance and infrastructure service provision.

Chapter 5 ends with an overview of how state policymaking and institutional investment dynamics shape and are shaped by the evolving characteristics of infrastructure markets, before looking ahead to the consequences of financialised policymaking, marketised models of infrastructure provision and politicised investment capital on wider society and in spatial terms; topics that will represent the core themes of Chapter 6.

5.1. The constitutive effect of infrastructure's inherent heterogeneity on global investment markets

Since the great financial crisis (GFC) (Foster and Magdoff, 2009), infrastructure has become associated, some would say burdened, with many matters of great policy import. It has long been viewed as a key 'building block of the economy' (Author's interview, Partner and Co-Head, PE firm #3, 2016), as an essential asset (Thrower, 2014; PWC, 2017), and as a series of systems and services with which we all interact daily. In the last decade however it has become (for some) the vanguard poster child for the neo-liberalisation of everything (Leyshon and Thrift, 2007; Birch and Siemiatycki, 2015), a tool for fast track job creation (Romer and Bernstein, 2009), an apparently compelling investment multiplier for government funding, a physical manifestation of state responses to the challenges of the age (climate change, fossil fuel alternatives, migration, urbanisation, and technological shifts) (Bhattacharya, Oppenheim, and Stern, 2015; World Bank, 2011), and an indicator of relative economic strength (witness the multiplicity of global infrastructure indices and comparators). As a result of all of these factors infrastructure has been and remains a major issue of active policy debate.

The above aspects of infrastructure reflect the differing viewpoints that are taken by engineers, politicians, regulators, users and investors. It is the way in which this latter group, investors across the public to private spectrum, view infrastructure that will now be examined. For infrastructure has undeniably witnessed enormous growth in investment from non-domestic state sources in the last 25 years. A global infrastructure investment market has emerged, and the ownership and operation of many of our key infrastructure services now resides in the hands of institutions or investment vehicles that are profoundly different from those pertaining for much of the last century.

In investment terms the infrastructure asset class displays considerable variegation, as the analysis from HICL in Fig 5.1 (below) demonstrates:

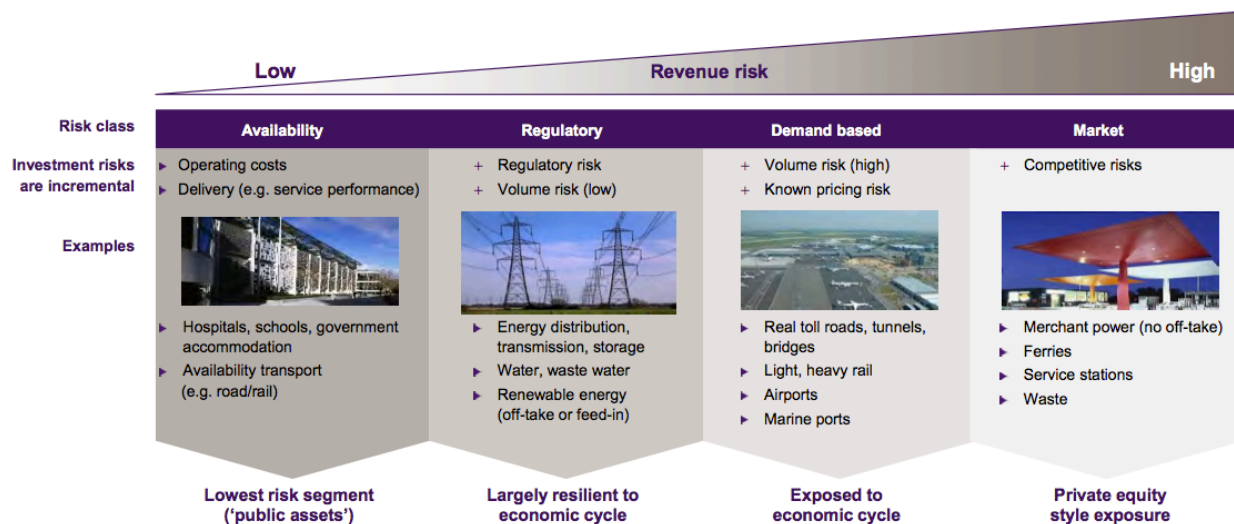


Figure 5.1: Infrastructure categories by revenue risk type

Source: HICL (2014)

The above illustrates how investors see risk as a composite product of revenue model, exposure to economic cycles and competition. These factors alone offer significant choice to any would be investors: ‘Even within Core defensive assets there is a wide degree of heterogeneity’ (Author’s interview, Head of Infrastructure, Public Pension Fund #1, 2016).

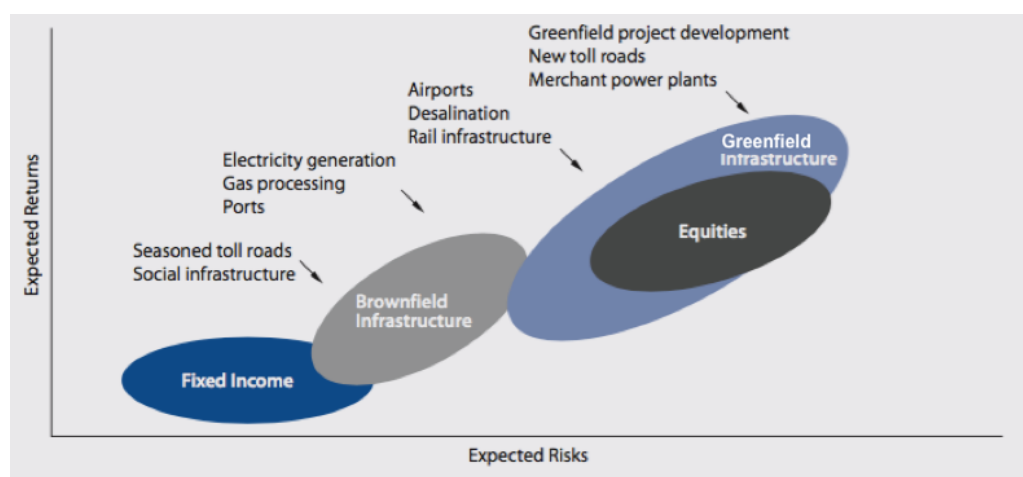


Fig 5.2: The range of risk-return profiles in infrastructure assets

Source: Credit Suisse Asset Management, 2010

To these, however, we should add two more critical factors:

- (i) Phase of development – mature or operational assets are strongly preferred since they are past the higher risk stage of development, exhibit known cashflow

characteristics and therefore reflect better the expectations of low volatility stable returns which most investors in infrastructure seek. Greenfield (or pre-operational) assets still have the execution risk of construction. A period in which regulatory arrangements may change and one in which normally (with the notable exception of TTT) no cashflow flows from the asset.

- (ii) Geography – The classes of infrastructure based on Availability payments or tariffs derived from Regulatory settlement (also referred to as Core by investors) in Fig 5.1 imply a strong read through to the state as ultimate credit covenant. In the former, as long as services are provided as scheduled (eg: hospital theatres are open and active) then payments from government will flow to the owners of that asset. In the case of the Regulatory assets the derivation of those payments will be from customers in accordance with service charges, user tariffs or feed-in tariffs agreed with an arms-length (from government) regulator. Both of these, by virtue of the close ties to the state, are in part the aggregated result of institutional, regulatory, currency and political considerations.

What the neoliberalisation of infrastructure policy, and the attendant financialisation of infrastructure assets and services into a global investment market, has done is to introduce further variegation into this already highly heterogeneous asset. Investor perspectives will examine build quality, technology risk, credit covenant, business models, ongoing capital expenditure requirements, the capacity of the asset to service dividends, return timescales, governance risk, political sensitivities, and ultimate investment exit (sale) strategies. On the capacity for infrastructure assets to pay out reliable and high levels of dividends for example one major investment consultant stated:

‘Most of our clients would see it as a relatively well defined asset class, but we...think of pension funds in terms of growth, income and protection...we very much put infrastructure into the income bracket but there is an element of growth in there’ (Author’s interview, Head of Alternatives, Investment Consultant #2, 2016)

That sentiment from the investment industry is supported by the empirical research:

‘infrastructure firms exhibit a unique business model in terms of revenues and profits dynamics compared to a large control group of public and private firms. Infrastructure firms have significantly lower volatility of revenues and profits and pay a much higher proportion of their revenues much more frequently to their owners, independent of the business cycle’ (Blanc-Brude, Hasan, and Whittaker, March 2016).

Given these financial and portfolio factors, we might therefore consider that in fact it has been the inherent heterogeneity within the nature of infrastructure *multiplied* by its attendant financialisation and the development of infrastructure investment mechanisms (from PFI/ PFI2/ PPP to fund vehicles), as well as ‘good marketing on Wall St’ (Author’s interview, Director of Investment, SWF #6, 2016) by the investment industry, that has really led to the rise of this ‘asset class’. Though even this idea of infrastructure as an asset class is one that is contested:

‘from my personal view it is a strategy...what makes it a strategy and not an asset class is the heterogeneity of it’ (Author’s interview, Head of Infrastructure, Public Pension Fund #1, 2016).

For others the debate around asset class or not is academic; their focus is on a market where the risk return equation is favourable:

‘We just view infrastructure as a diverse field, and one that is well rewarded’ (Author’s interview, Principal, SWF #4, 2016), and

‘we buy risk. When risk is cheap we want to buy lots of it, and when it is expensive we sell it’ (Author’s interview, Head of Direct Investment, SWF #5, 2016)

To that end investors will seek out the area of the market, or specific targeted market, that aligns with their return metrics and hurdles:

‘The infrastructure market is not one market...its lots of tiny markets. The one we look at is low risk, long term, contractual, inflation linked cashflows’ (Author’s interview, CEO, Public Pension Fund #2, 2016).

On both the buy (investor) and sell (state) side of the market, infrastructure is being sold as an answer to a problem which, ironically, was a result of the emblematic crisis of modern capitalism. An outcome of the extremes of financialisation applied to an essential item – housing - the GFC of 2007-8 and its still ongoing ramifications. As O’Neill states ‘the GFC has been responsible for refining and consolidating the infrastructure sector’s private finance options rather than exposing them as unsustainable, as some had predicted’ (2017).

Among other impacts of the GFC were significant falls in global stock indices (particularly blue chip stocks such as the banks), and impairments to the values of real estate portfolios (both of commercial and housing stock). These resulted in a concomitant increase in volatility across stock markets, in turn having an adverse technical effect on the value of institutional portfolios, since the perceived risk of more volatile stocks and indices is greater. As a consequence, there were widespread and significant impairments to fund valuations and asset ratios for pension funds globally. In addition, these institutions were also suffering from the ongoing low interest rate environment which made the holding of bonds and fixed income products less attractive, and cash less attractive still. Add to this the huge increase in the levels of sovereign indebtedness (from bailing out banks and reduced fiscal receipts) and the result is the fiscal austerity that has driven governments to consider non state solutions for the financing of infrastructure. At the same time those institutions with impaired portfolios have seen a need to increase the returns from their investments as a whole in order to repair the damage caused by the GFC.

This *perfect storm* of macro factors provides many of the push and pull factors driving the growth of this sector, whilst also (conveniently) creating an industry that requires a highly mediated investment approach for the bulk of would be investors; a structural feature of infrastructure markets that is explored further in Sections 5.2. and 6.1.

5.1.1. The heterogeneity of institutional return expectations and risk appetite

The investment opportunities offered by the heterogeneous nature of infrastructure, manifest in a range of returns across the risk spectrum. For infrastructure markets to have

grown and flourished as they have is highly suggestive that this variegation of investment opportunity has been accompanied by an equally heterogeneous investor demand.

As Fig 4.9 in Chapter 4 demonstrates, pension funds can operate at a range of targeted Internal Rate of Return (IRR) as low as 0.25% to 2.25% over the risk free, or sovereign (eg: UK gilts or US T-bills) rate. So fully funded PFs consider inflation adjusted returns as low as Public Pension Fund #2’s 0-2% return sleeve. Well-funded PFs and less aggressive SWFs are happy to look at inflation + 4-6% on equity, and less on debt. Examples would include SWF #6 at +5.5%, Public Pension Fund #1 at +4%; and Public Pension Fund #2’s 2-5% sleeve. One UK fund manager stated that ‘RPI plus 3 to 4% is still acceptable for most of our investors’ (Author’s interview, CEO, Infrastructure Fund #4, 2016); whilst a US based counterpart reported ‘a lot of guys who are realistic about where the market is are in that 5-6% hurdle’ (Author’s interview, MD, Infrastructure Fund #8, 2016). Others such as a major European based private sector fund confessed that:

‘we are happy to forego some upside for downside protection. We are not a scheme that needs 10% return, we’re happy with low single digit growth’ (Author’s interview, Senior Investment Manager, Private Pension Fund #1, 2016)

These statements broadly accord with the 2016 Deloitte infrastructure investors survey:

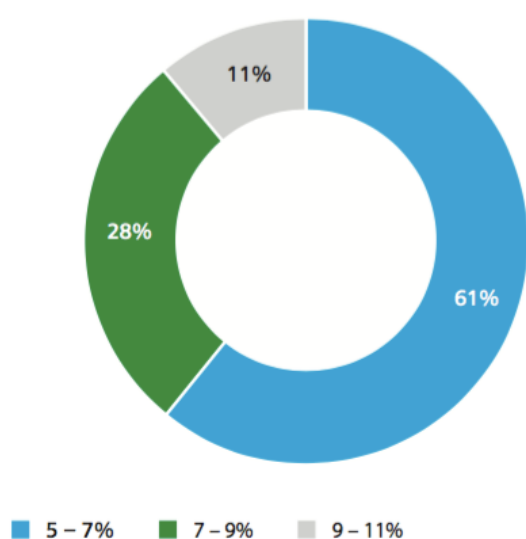


Fig 5.3: Target fund cash yield to date

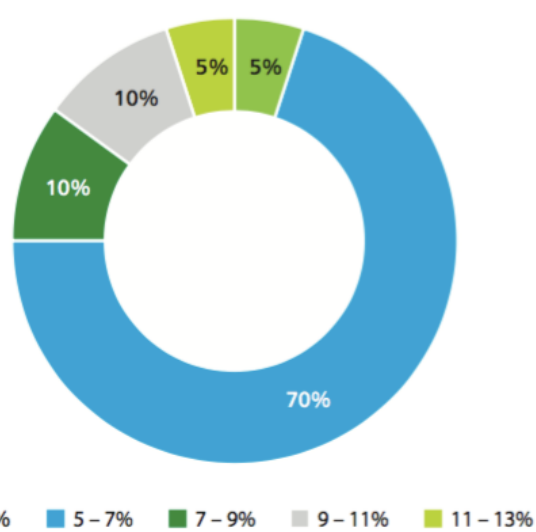


Fig 5.4: Actual fund cash yield to date

Source: *European Infrastructure Investors Survey, Deloitte UK, 2016*

A number of pension funds find themselves (post GFC) moderately impaired but with a ‘recovery strategy’ in place. For instance; Public Pension Fund #3, a major UK institution, are 75-80% funded (a better position than most) and so looking to their infrastructure investment to yield around 8%. This is not traditional PE levels of return but does entail some extra risk and is where most renewable assets globally tend to pitch their IRR (Author’s interview, Investment Director, Public Pension Fund #3, 2016). Since their needs are specific they work with a fund manager (Infrastructure Fund #8) to design a specific allocation via a Limited Partner (LP) Agreement; this allows a tight investment focus, customised execution, and a very long term buy and hold approach as desired by that pension fund’s investment committee.

Within the context of PFs there are also some structural shifts which have had profound consequences:

‘as Defined Benefit schemes are closed to new entrants, and virtually all are now, and closed to future accrual, you know what your liabilities are as a scheme... essentially you know what your cash inflows and outflows are so you can calculate what investment return you need... after that you don’t need any more. Previously schemes were looking to maximise return within a risk ceiling, now they are looking to match liabilities at minimum risk... so their objectives have changed completely’ (Author’s interview, CEO, Public Pension Fund #2, 2016)

At the higher end; some of the larger funds such as Macquarie, Brookfield and Meridiam, and managers such as Mercer are looking at returning the risk free rate + 10% or more (Prequin, 2016; Author’s own calculations). Those funds structured as more traditional PE seek mid-teens IRR and above; a level at which some interviewees (Head of Infrastructure, Public Pension Fund #1) would suggest they are no longer really talking about infrastructure, due to the implicit elevated risk profile. This view is echoed by a major global fund manager: ‘if you are looking for an investment within your infrastructure bucket [in OECD] I’d be arguing it is probably today in the mid-single digit and lower returns’ (Author’s interview, Executive MD & Partner, Infrastructure Fund #5, 2016).

Those investment institutions seeking double digit returns may still claim a focus on infrastructure (however they individually define it) but will be taking on, or *constructing*, additional technology, political, greenfield, regulatory, market or leverage risks that in aggregate enable them to request and receive the IRR they are targeting within the investment parameters of their portfolios.

One example of this *risk construction* is the Carlsbad reverse osmosis desalination plant in California, USA (Allen, O'Neill and Pryke, 2015). Allen et al note the desirability (from the investors' standpoint) of a see through to a proxy state risk (in this case San Diego County Water Authority rated at AA+) but also the need to *create* additional risk so as to generate yield: 'the municipal market is so safe and secure that there's no yield... This has risk – the delivery of water – and thus yield' (Project Finance, 2013: 48). That infrastructure delivery 'risk' generated an IRR of 9.38-9.45% at closing. This exceptional return for what in essence remained an AA+ credit proposition led Partners Group (as lead investors) to state that 'pension funds will be well advised to include such projects in their asset allocation to avoid falling into the long-term return gap' (Partners Group, 2012: 18).

As one interviewee said:

'what we do is private equity investment, we just happen to make money from businesses that provide essential services...we are hesitant to describe it by its physical characteristics...we talk always about essential services under conditions of monopoly or limited competition' (Author's interview, Executive MD & Partner, Infrastructure Fund #5, 2016)

However, this thinking continues to demonstrate the inextricable nature of the state in the infrastructure markets:

'My focus is...primary market development, which heads you directly into government. You can't move far in infrastructure without government intervention in some form...government involvement is vast' (Author's interview, Partner, Consultancy Firm #1, 2016).

The state is there, as we have seen, as market maker, regulator and underlying credit covenant. The presence of the state and the asset's feature of essentiality (Thrower, 2014), are together critical in investor perception of that asset class:

‘if an asset is essential and monopolistic, no government would allow it to run unchecked [echoes of Smith (1776) here], therefore it would be regulated, so to me if an asset is regulated then it ticks the box on those two things...if it is regulated it is definitely infrastructure’ (Author's interview, Executive MD & Partner, Infrastructure Fund #5, 2016)

While most would agree with this fund manager's view (shared by many other interviewees including SWFs, asset managers and pension funds), the asset class argument also encompasses many services which are neither monopolistic nor regulated; and here one enters into a subjective debate around the *relative essentiality*, or at least high barriers to entry, of a given service. In this context airports and ports (by virtue of scarcity and planning), clinics and labs (by virtue of limited government licences) and even funeral services (again due to government licence) have been characterised by some funds and investors as infrastructure within their asset portfolios.

Coming full circle, that analysis of regulated, essential services then has direct linkages back into return. As has been seen elsewhere there is a strong market sentiment that high returns suggest a concomitant high level of risk, the taking of more market risk, even an unregulated market and one wherein there are lower barriers to entry. All of these would imply that such an asset belongs to a PE rather than an infrastructure portfolio.

Asset Management Firm #2 also make the distinction between long term concessions with sovereign underpinning vs regulated utilities (political risk) vs the unregulated space (some power markets, airports, some ports etc..) which are more like PE (Author's interview, Head of Infrastructure Funds, 2016). The same point is true of certain Emerging Market (EM) geographies where high risk free rates (based on a country's poor credit profile) mean that even core infrastructure investments take on the risk characteristics of PE (Author's interview, Head of Infrastructure, Public Pension Fund #1, 2016). This blurring of infrastructure and PE based on risk profile and return can be confusing when considering allocations and focus. For instance, Public Pension Fund #1 have \$3bn+ in energy assets

held within their PE allocation, even though the people managing those assets would not regard themselves as infrastructure managers. Similarly, funds such as Apollo, Energy Cap Partners, Arclight, and Blackstone might refer to a number of their funds as infrastructure funds but, in risk profile terms, these are closer to and importantly, *managed as*, PE vehicles.

As can be observed, the heterogeneity of infrastructure itself is at least matched by the variegated nature of the way it is viewed by investment institutions. The empirical data gathered through the interview process, as to how the investment industry *defines* infrastructure, is cited throughout this research, but these findings are neatly encapsulated (and supported) by this graphic based on a 2016 survey conducted by Deloitte:

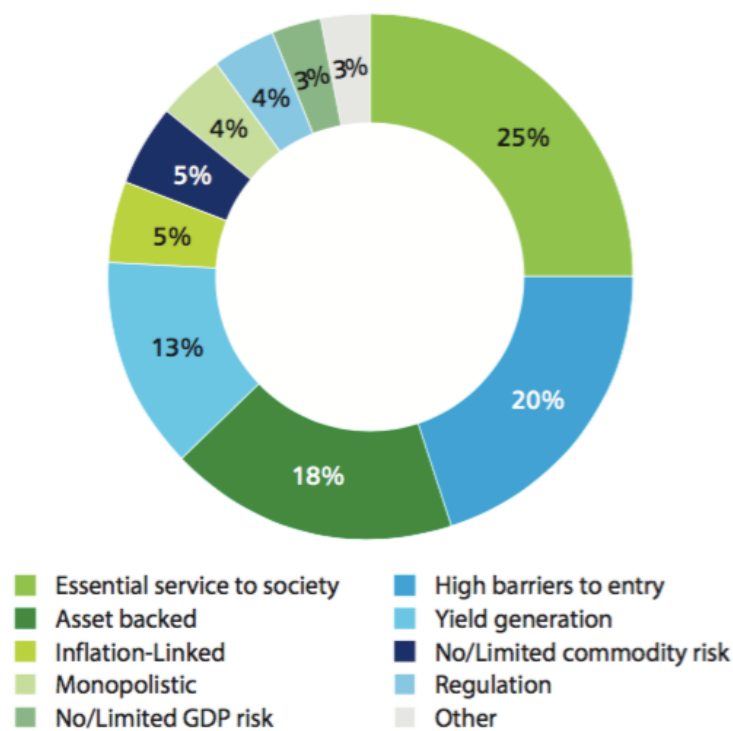


Fig 5.5: Factors defining infrastructure assets

Source: European Infrastructure Investors Survey, Deloitte UK, 2016

What is revealing about these responses, and this study’s own empirical data, is how infrastructure; in a volatile, low interest, post financial crisis world seems to tick so many boxes for institutional investors. For a financial services and global investment industry which was the target of so much negative public sentiment and governmental pressure; institutional investors can now claim to be investing in assets that are socially useful, an ‘essential service to society’.

After the synthetic and (almost) illusory nature of the Collateralised Debt Obligations (CDOs) that fueled the financial crisis; the infrastructure investment industry is now focussed on physical, tangible, asset backed entities and services. In a volatile post financial crisis world, and after a period of market volatility unseen for a generation, infrastructure offers a protection against inflation, and presents high barriers to entry. Indeed, it even presents as monopolistic for some assets. In a global economy where GDP growth rates remain stubbornly low, infrastructure has limited direct exposure to GDP risk. As if all of these factors were not enough, infrastructure exhibits a very low correlation in terms of economic performance with other assets in investors' portfolios, and generates returns that are attractive when compared to many of the other investable alternatives.

This notion of institutional investment producing positive social gains, improving infrastructure stock and contributing to GDP, is referred to as 'the virtuous circle' by CDPQ Infra in their discussion of their REM project (CDPQ Infra, 2017), and outlined by Banco Bilbao Vizcaya Argentaria (BBVA) in Fig 5.6 (below). Whilst the beneficial outcomes of institutional investment in infrastructure are commonly cited on the websites of fund managers and in the reports of major pension funds; that idea of beneficent capitalism still runs counter to prevailing public perceptions of the institutional investment industry and the role of *private* capital in the ownership and delivery of essential services. It is not that the public questions the desirability of new infrastructure and job creation, or that well-funded pension plans aren't generally a good thing. The public and policy debate, and focus of much of the political economy literature, is at what *cost* these benefits are delivered. It is this issue of the value leakage inherent in the apparently frictionless symbiosis of institutional money, infrastructure and jobs that occupies the thoughts of the NAO (in the UK) and those organisations and individuals that query the desirability of the marketised delivery of utility services. These issues are explored further in Section 6.1.

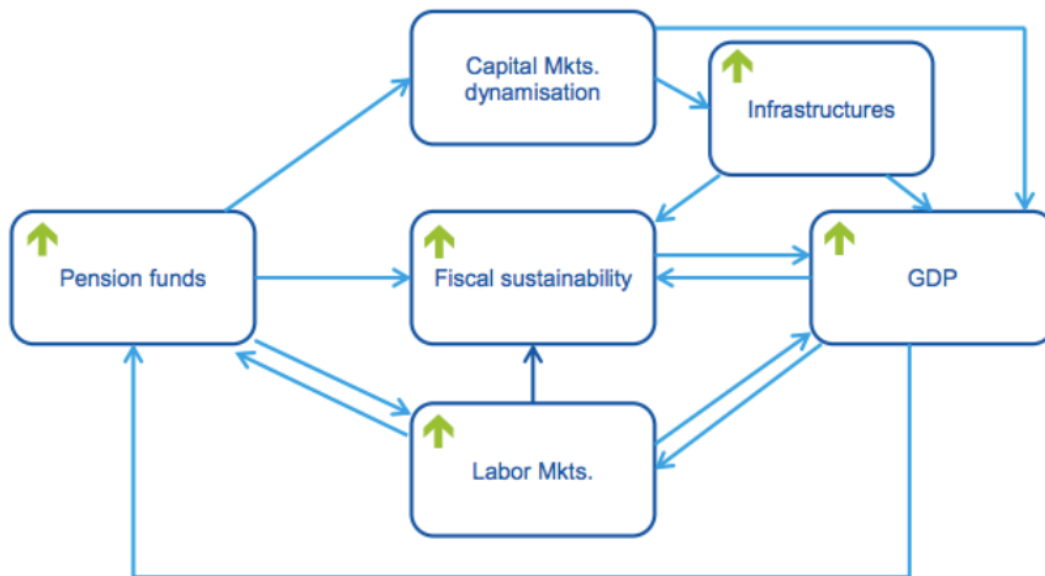


Fig 5.6: PFI and infrastructure: the theoretical virtuous circle

Source: BBVA Research, 2015

There are additional factors at play for some investors, where the virtuous circle effects more directly relate to their own specific business risks and exposures. Because infrastructure in one form or another touches all aspects of life and society, there exists in theory the opportunity to hedge your own risk exposures via the infrastructure in which you invest. Since PFs are, in aggregate, such a large pool of investment capital, are an increasingly significant investor in infrastructure, *and* have an ongoing set of liabilities based on the longevity of their pension holders, they are an obvious place to start. For this investor segment there is a strong and obvious rationale, for instance, in investing in the healthcare sector.

‘healthcare is poised to be the most significant growth industry of the century, one of the new asset classes that can generate consistently high returns according to Yun (2012). A declining, ageing population is a demographic headwind for most investment assets, but for healthcare it is a tailwind. Thus investing in healthcare infrastructure could allow pension funds to isolate longevity risk. The variable that most imbalances their revenues and obligations. Investing in the healthcare sector may be a natural hedge for pension funds.’ (Alonso, Arella and Tuesta, 2015: 6)

So it is infrastructure's heterogeneity and the above unique set of characteristics that makes it such an attractive space in which to invest, wherever one sits on the yield curve. It is this confirmation bias or *mirror of suitability* (investors seeing what they want to see) that infrastructure holds up to such a wide swathe of investors, that has seen the evolution into financialised assets of energy utilities, transport and water companies, as well as areas of social infrastructure and more yield marginal systems hitherto regarded as preserves of market failure...in short the 'capitalisation of almost everything' (Leyshon and Thrift, 2007). A process in which, to varying degrees, individual states have been complicit.

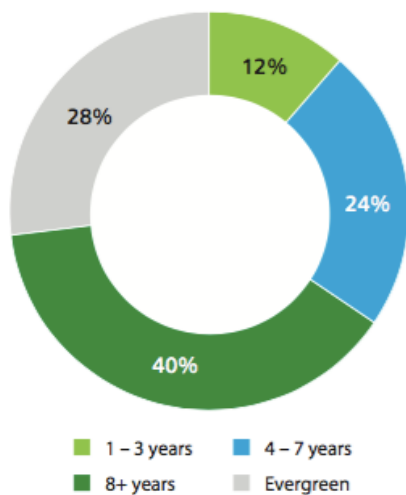
5.2 Investment methodologies and models of market participation and construction

Research interviews and industry literature reveal that early stage institutional experience of institutional investing of equity into infrastructure assets, developed from the likes of Macquarie and Star Capital in Australia in the 1980s. These entities were purely financial actors investing where previously only the supply chain finance of corporations such as Bechtel and other construction and equipment firms had been present (Author's interview, Director, Asset Management Firm #3, 2016).

As the industry and market grew in the early 1990s, facilitated by structural innovations such as PFI in the UK, early infrastructure funds emerged from either the project finance departments of major banks who had debt experience of infrastructure (for example HICL from HSBC), or from the existing equity investment expertise of PE houses such as Deutsche, 3i, Macquarie, and Meridiam. As the market has, over the last 25 years, grown in size and the range of investment opportunities broadened, so investor appetite has become more diverse, and in turn driven a variegation in the following fund characteristics:

- (i) Duration - From traditional closed end PE type typically 7-9 years through to 25+ years with the likes of Meridiam. The spread of fund duration and investor hold appetite is outlined below in Figs 5.6 and 5.7:

How many years does your current fund have until maturity?



When are you expecting to exit your current assets under management?

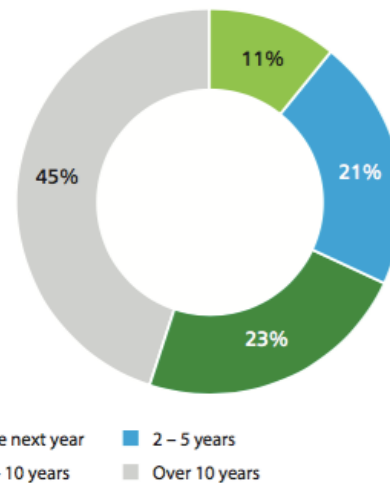


Fig 5.7: Remaining durations of funds **Fig 5.8: Investor hold expectations**

Source: European Infrastructure Investors Survey, Deloitte UK, 2016

Fund or asset duration is critical as the number of times a fund or investor has to re-invest capital contributes to execution risk and impacts on returns (Author’s interview, Head of Infrastructure, Public Pension Fund #1, 2016). This pertains particularly to capital invested in time limited (7-10 years) traditional style infrastructure PE funds and therefore requiring multiple cycles of re-investment over its ‘life’. ‘Most investors don’t want their money back...it just means they have to re-deploy...they are under pressure to keep money deployed’ (Author’s interview, Partner & Co-Head, PE Firm #3, 2016).

Accordingly, there is a market shift away from shorter term PE type funds to longer term funds or perpetuals. ‘We view it as a whole of life concept...this matches well with concession cycles’ (Author’s interview, Chief Strategy Officer, Infrastructure Fund #7, 2016). Direct investment, as utilised by some of the Canadian funds and larger SWFs, tends toward very long term holds. Such institutions have huge sums to deploy and cannot afford un-invested or underinvested pools of capital. Accordingly, the market is seeing core assets, particularly those that have been privatised or been the subject of very long term (79-99 year) concessions being locked away: ‘We have no appetite for exit’ (Author’s interview, MD Energy & Infrastructure, Private Pension

Fund #2, 2016). This is creating a scarcity in prime assets and a concern among the larger investors and asset managers as to where the flow of core investable assets will come from in future years. These concerns are in turn fueling a growing bubble in asset valuations that is discussed further in Section 6.4.

The positive aspect of this trend to a longer term hold is the potential for a better alignment between the outlook of investors, government, and the needs of users. Citing the alignment argument around long term holds, one fund manager commented:

‘it drives different types of behaviours. We have exited, over the last 11 years, very few transactions. We think it is extremely important that public and private sit together’ (Author’s interview, Chief Strategy Officer, Infrastructure Fund #7, 2016).

It is perhaps telling that this fund plays a leading role in the LTIIA, Long Term Infrastructure Investors Association.

- (ii) Sector – The bulk of pure infrastructure funds pursuing a sector based approach have, in recent years, focussed on renewable energy in one form or another. However, in the main, such funds are relatively small in size as very large renewables deals are uncommon and the greenfield aspect of most can cause issues in terms of lack of cashflow in the early years. That said, renewables were a consistent area in which research interviewees, particularly pension funds, expressed interest; and they align well with broader social and political priorities around climate change mitigation. Any such fund that wishes to pursue the scarce large scale renewables transactions will need a strong risk appetite as the technology and greenfield risks are often compounded by challenging geopolitical elements, as can be seen in the top three transactions in Table 5.1 below:

Asset	Location	Industry	Investor(s)	Deal Size (mn)	Stake (%)	Date
Diga di Rogun Dam Project	Tajikistan	Hydropower	Impregilo	3,900 USD	100	Jul-16
Baltic Srodkowy III Offshore Wind Farm	Poland	Wind Power	Kulczyk Investments	2,576 USD	100	Aug-16
Isagen	Colombia	Hydropower	Brookfield Renewable Energy Partners, Unidentified Investor(s)	2,200 USD	58	Jan-16
Merkur Wind Project	Germany	Wind Power	ADEME, Deme Group, General Electric, InfraRed Capital Partners, Partners Group	1,600 EUR	100	Aug-16
Tees Renewable Energy Plant	UK	Biomass/Biofuel Facility	Macquarie Bank, PKA AIP	900 GBP	100	Aug-16

Table 5.1 Five notable renewable energy deals completed in 2016

Source: Preqin, 2017

Larger scale sector based funds (such as the Goldman Sachs water fund, and GIP's brownfield energy) are managed more as conventional PE funds and aimed at a buyout, leverage and re-sale model of capital growth.

- (iii) Geography – Such funds are relatively widespread. By definition these funds are narrowing the geography in which infrastructure opportunities will be considered. There needs to be a reason why a fund manager would place such a constraint on their ability to invest managed capital. That rationale is to suggest a tightness of focus or to offer a specific set of spatial exposures to investors who seek such specificity as part of a wider portfolio balance. A number of the larger such funds have a continental focus. Examples include Meridiam's Africa, Europe and North American funds, Brookfield's Americas fund, and Macquarie's European funds amongst many.

Country specific funds are also numerous, particularly outside the OECD, and are often constructed to leverage the investment of a major domestic institutional actor (such as Macquarie's funds in Abu Dhabi, Brazil, China, India, South Korea, Mexico, Russia/CIS, and South Africa) or the host government who is looking to build their endogenous financial infrastructure and capital market depth to facilitate broader economic development. Of these, many are unsurprisingly focussed on the larger economies with a greater depth of opportunity. As of early 2016, seven of twenty Asian related funds in the market were India specific. The challenge of such non OECD funds however, can be seen in that of those twenty, 60% had been fundraising (seeking investor capital) for over 2 years (Preqin, 2016: 4).

Country specific funds in challenging geographies based within smaller markets do exist but normally require the presence of host government support and the involvement of development banks or MFIs. EBRD for example works with fund managers and governments based in Czech Republic, Jordan, the Baltic States and Bosnia-Herzegovina, and ‘looks to support first-time fund managers...as part of its mandate to support the development of market economies and democracies’ (Author’s own research, Preqin; 2016)

(iv)Phase of development; for example, greenfield or brownfield. Transactional liquidity globally is not really being driven by new greenfield opportunities, of which there is generally deemed to be an insufficient amount (OECD, 2015; World Economic Forum, 2014), and those are structured in a way that present numerous logistical and financial issues for many investors (construction risk, planning delays, negative carrying cost, poor cashflow profiles etc..). Instead much of the market is being driven by secondary selling, trading of active, operational infrastructure assets among global investors: ‘most of the market is trading secondary existing assets...so a lot of it is corporate selling. So at the moment all the oil majors are under pressure so they are looking in their portfolios for some hidden assets – pipelines, midstream assets – that they can sell, because we will buy them at a lower return [on equity] than shareholders of BP [for example] would accept’ (Author’s interview, MD & Head, SWF #1, 2016).

For the larger funds the investment logistics of greenfield are problematic, and mitigate against investment in such early stage or construction stage transactions. For the likes of the larger SWFs anything less than \$100m makes no sense as a direct investment. Greenfields also require lengthy lead times. Again this does not work for those with vast levels of capital to deploy (Author’s interview, Senior Partner, Infrastructure Fund #1, 2016). Social infrastructure is also highly problematic in terms of direct investment or for those with large funds to deploy. It is characterised by small amounts of pinpoint equity (low risk PFI and PPP can see equity representing as little as 1% of the overall capital structure) which attracts very low returns:

‘there are people who are happy to take very small target returns for it...so that’s not where we are...the deals are too small. So the way we have addressed it is we have invested in a fund manager who invests in social

infrastructure...its way too small for us' (Author's interview, MD & Head, SWF #1, 2016).

(v) Capital type - Equity, mezzanine (or convertible debt), and conventional and project debt. This structural variegation in funds has relevance for the complex variations in investing methodologies. This analysis should also be prefaced by stating that, for many of these institutions and institutional approaches, infrastructure means *privately held* infrastructure, hence the linkages with PE at the higher risk/ return end of the scale. Publicly quoted infrastructure holdings and assets may also often be held by SWFs, pension funds, many infrastructure funds (though not all) and the like, but are normally regarded as being part of a public equities portfolio which, in liquidity, control and return terms has quite different characteristics: 'we would only do something that is listed if we expected to take it private' (Author's interview, MD & Head, SWF #1, 2016). For example, Government Pension Fund Global (GPF), effectively the Norwegian SWF and the world's largest, has extensive holdings in publicly listed infrastructure companies as part of its programme of tracking the major global stock indices. It holds 1.5% of all globally quoted stocks, and 2.5% of all European listed equities. Despite this however, it has eschewed the opportunities to invest in unlisted infrastructure (it was most recently reviewed and declined by the Norwegian state in 2015) citing, among other reasons, the potential for policy and regulatory driven volatility, and political sensitivity:

'Such investments are exposed to high regulatory or political risk. Conflicts with the authorities of other countries regarding the regulation of transport, energy supply and other important public goods will generally be difficult to handle and entail reputational risk for the fund...The government considers that a transparent, politically endorsed state fund like the GPF is less suited to bear this type of risk than other investors. Following an overall assessment, the Ministry is not prepared to permit the GPF to invest in unlisted infrastructure at this stage' (Jensen, 2016).

This variegation in the structure and focus of infrastructure funds reflects their role as mediating institutions that sit between sources of capital and the asset opportunities in which that capital can be deployed. Whilst much institutional capital seeks to achieve, through their use of funds, a degree of portfolio diversity; there are other pools of capital

that desire a more specific focus for their investment. The variegation of funds, sectors, maturities (or duration), phases of development, and types of debt or capital instrument, permit the widest accommodation of investment capital, and the greatest diversity of investment opportunities. In thick markets we can see that these processes of variegation and specialisation are more evident, as befits the volume of investment opportunities and the widespread availability of investment capital. Such segmentation is considerably less prevalent in developing or frontier markets wherein, the data would suggest, only already specialist institutions look to invest.

5.2.1 A typology of different investment approaches

Infrastructure funds are an important aspect of the broader institutional engagement with, and investment in, infrastructure assets. For example, they allow for the smallest of institutional investors to achieve an exposure to the sector. At the other end of the market there are huge investors in the SWF and pension fund space with many hundreds of billions of dollars to invest (though not all in infrastructure) for whom economies of scale permit them to assemble considerable in house investment expertise and to pursue a more direct investment approach.

A diversity of access routes to market is important. It enables the breaking down of very large asset opportunities into manageable amounts, and the aggregation of smaller ones into a package that has scale. It allows the aggregation of smaller investor sums into meaningful investment amounts. It facilitates portfolio diversity or focus, by sector, geography or phase of development. Funds can connect investors to opportunity, can leverage industry or investment expertise across a wider investor population, can provide resolution between IRR expectations and asset returns, and can provide the means to invest at all levels of the corporate or asset structure. It is this existence of a diversity of routes to market, and the presence of mediating entities that indicate the existence of a true market, as opposed to a series of bilateral trades or bargains. As has been explained earlier however, it is important to see the growth of routes to market, the increase in infrastructure transactional opportunities, and the increased presence of investor interest and investment capital as litmus indicators of an ongoing process of market growth, reconstruction and

regeneration. As more areas of infrastructure delivery are opened up to market competition, these allow for the possibility of financialised delivery solutions to replace state or relatively non-financialised models of ownership and control. These in turn enter a primary and secondary market and so contribute to the diversity of supply and demand critical to market health and dynamism.

The following represent the principal investment methodologies by which investors gain access to these global infrastructure opportunities and markets. They are helpful in avoiding a descent into particularism amidst the complexity of investment actions in infrastructure markets, and demonstrate the degree to which market actors create a variegation of institutional accommodations so as to permit the broadest access to the market. The categories used are terms devised by the author as there is no market consensus or definition to describe such approaches:

Wholly mediated

Those who only invest through funds as Limited Partners (LPs), taking a financial participation in a fund but without any control or strategic input. Control resides in the founders, fund owners or General Partners (GPs). Such investors are the largest by number but not by assets under management, and consist of small PFs, Foundations, and family offices. Sometimes there can be a regulatory driven need for mediation (eg Swiss and German family offices who legally cannot invest in unlisted sterling assets) with fund managers constructing indirect access to the UK market via Luxembourg and other ‘offshore’ type domiciled vehicles. It is sometimes attested that a mediated approach helps smaller investors get up the learning curve, though others (Author’s interview, Head of Infrastructure, Public Pension Fund #1, 2016) suggest that such a passive role yields very little insight into sectors or geographies.

‘Smaller pension funds have to be passive and to be LPs, they have no capacity. This includes most US and UK public pensions small funds. Whereas when you sit across from an Australian or Canadian PF, you are dealing with someone who stepped out of a Morgan Stanley asset allocation and investment program. Some smaller funds tend to be very conservative, they prefer big name managers like Goldman and KKR, it is about longer term keeping their job, having contracted

revenues, and using an established brand [of asset manager]' (Author's interview, MD & Head, Infrastructure Fund #8, 2016).

These smaller institutions, in aggregate, represent a substantial pool of spatially and institutionally variegated capital, and additionally exhibit a wide range of risk, duration, geography and return appetite. It is for this reason that so many of these pools of capital find themselves co-invested with each other in a range of infrastructure funds.

The mediated investment approach via infrastructure funds does have negative implications for returns, due to value leakage from ongoing management fees. However, the funds provide access (to markets, sectors and deals), transactional expertise, portfolio risk mitigation, scale (via their aggregated pools of capital) and an ongoing management capacity. Funds of funds (funds that invest in a portfolio of other funds) result in further fee related return erosion but provide an even greater spread of risk which continues to be attractive to those smaller institutional investors who lack the scale to achieve sectoral and geographic diversity themselves.

Fig 5.9 (below) demonstrates the extent of the role played by funds for most institutional investors (notably pension funds); whereas SWFs, by virtue of their typical large scale and desire for very long term hold positions, are more likely to pursue a direct approach.

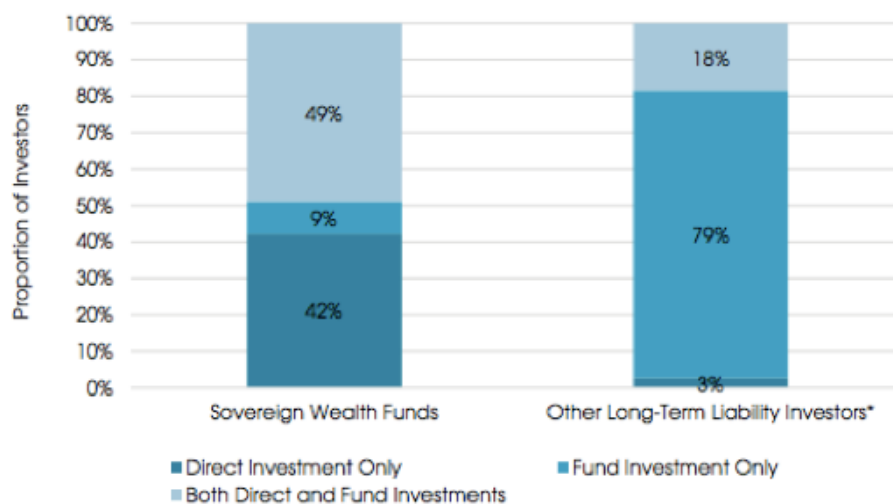


Fig 5.9: Preferred method of exposure to infrastructure: SWFs vs all other long term liability investors

Source: Preqin Infrastructure Online, 2016

Mediated and Co-Invested

A combined funds and co-investment approach pursued by smaller SWFs and many mid to large size pension funds. Even those institutions with larger AuM often need managerial, advisory or GP services:

‘in a \$100bn portfolio with a 10% allocation, and an infra team of 5 guys out of Toronto you are going to struggle to do anything that isn’t a high profile, broadly auctioned, cost of capital driven opportunity. If you want to do anything smaller, that isn’t shopped around by a bank, that’s not a multi-billion dollar deal, any space that is a little bit different...you need a manager to help do that, to execute strategy’
(Author’s interview, MD & Head, Infrastructure Fund #8, 2016)

It is a question of access and management time. It is important to realise that all fund investors are not the same. Firstly, the extent of their overall pool of capital allocated to funds or infrastructure will vary. Secondly there is substantial variegation within funds, so investors may ‘have a PPP fund which is high yield and low return, a core infra fund which is maybe a bit more risky, and a fund like ourselves which is more about buying companies...and others along the risk curve’ (Author’s interview, Director - Energy & Infrastructure, PE firm #2, 2016). Fund characteristics can be infrastructure focussed, niche (for examples renewables or tech specific) or conventional PE type (Author’s interview, Investment Director, Public Pension Fund #3, 2016).

When considering joint venturing or co-investing with other institutions, there is also the factor of cultural alignment to consider. Corporate investors (often construction companies or equipment suppliers), also referred to sometimes as infrastructure firms, often have their own agendas that may feature fees for managing the initial construction project or the ongoing resultant business; building an expertise in service provision that they can they sell elsewhere (Author’s interview, MD & Head, SWF #1, 2016), or achieving nearer term exists or sell down of their investment position. PE firms may require higher levels of leverage or the execution of material strategic change as part of their investment rationale. One investor said of co-investing with PE: ‘yeah, but their return targets are high though. If you are partnering with PE, then you are probably not buying an infrastructure asset!’

(Author's interview, MD & Head, SWF #1, 2016). Evidence again of this notion that the essential character of infrastructure in some way precludes higher levels of leverage, risk or return.

Quasi or Facilitated Direct

This segment consists of large scale pension funds and SWFs, as well as aggregated groupings of PFs coming together to achieve some scale to enable them to consider direct opportunities in addition to investing in funds and secondary sales. The Joint Venture (JV) between London PFA and Greater Manchester and Lancashire pension funds would be a UK example of this approach. In 2015 CalPERS (a US based public sector pension fund) announced a \$1bn partnership with Queensland Investment Corp (QIC), an Australian pension fund, to facilitate direct investment in Australasian and Asia Pac infrastructure assets. Similar institutional aggregations are occurring in other geographies:

‘I sit on the investment committee of a group of Swiss PFs who have also come together to form an investment foundation, they are looking at direct investments and also secondary ones, it's a similar model – let's pool our resource and use our collective expertise to start to make infra investments’ (Author's interview, CEO, infrastructure Fund #4, 2016).

This same strategy of facilitated direct investment is, according to some research interviewees, pursued by those that claim to be ‘Direct’ investors but are normally introduced by a ‘lead’ investor; often a previous co-investment partner or GP of an earlier fund investment. The potential return kicker for a Direct or Lead position drives a degree of pragmatism, as to approach, for most investors; ‘in some ways the argument is less about investing direct or not, it's more can you get the right assets or the most cost effective structure’ whilst maximising returns (Author's interview, CEO, infrastructure Fund #4, 2016). Within this investor segment exist Separate Accounts, which are tailored to an investor's preference in terms of geography, duration, and sector, but which benefit from the expertise and access of the fund manager overseeing and deploying the allocation (see Table 5.2 below).

Separate Account	Firm	Investor	Initial Equity Size (mn)	Strategy	Geographic Focus
CNP Assurances-Natixis Infrastructure Debt Account	Mirova	CNP Assurances	2,000 EUR	Debt/Mezzanine	Europe
Cubico Sustainable Investments Separate Account	Cubico Sustainable Investments	Ontario Teachers' Pension Plan	2,000 USD	Primary	Europe, Rest of World
Gulf Pacific Power	Harbert Management Corporation	CalPERS	900 USD	Primary	North America
QIC-CalPERS Separate Infrastructure Account	QIC Global Infrastructure	CalPERS	1,000 AUD	Primary	Asia-Pacific
HUK Coburg/Golding Capital Partners Separate Account	Golding Capital Partners	HUK Coburg	600 EUR	Primary	Global
Arcus Tivana Investment Vehicle II	Arcus Infrastructure Partners	Tivana Investments	500 EUR	Primary	Europe
Golden State Matterhorn	UBS Global Asset Management	CalPERS	500 USD	Primary	North America, Global
WSIB/GIP Separate Account	Global Infrastructure Partners	Washington State Investment Board	500 USD	Primary	Global

Table 5.2: Notable infrastructure separate accounts formed, 2013-16

Source: Preqin Infrastructure Online, 2017

Direct

This approach requires significant scale, reach and institutional capacity. It demands a real understanding of a market and sufficient depth and breadth of contacts to have an early awareness of upcoming opportunities. Prospective bids or investments will require local level negotiation and analysis throughout the tender or bid process. Having made the investment there is the need to achieve suitable governance arrangements involving board representation and (most likely) frequent involvement with company strategy. There is also a need to resource the means for an ongoing dialogue with the host government, regulators and other stakeholder bodies; as well as keeping a constant watching brief on the domestic economy and any emergent risks. Due to these factors, such a strategy is only accessible to well-resourced institutional investors with considerable levels of experienced senior staff and high volumes of AuM; such as CPPIP, Borealis (OMERS), TIAA-CREF, some of the other larger Canadian pension schemes, and a few select SWFs.

‘Due to single digit returns on true ‘core’ infrastructure, returns net of fees become hard to justify. That equation drives some investors down the direct path’ (Author’s interview, MD Energy & Infrastructure, Private Pension Fund #2, 2016).

It is important to stress that whilst some organisations stay in the same strata of investor; others look to migrate through or upwards from being an LP in a fund to eventually co-investment and direct equity positions.

‘Our starting point is simple...by investing in fund managers, big names in the sector, as LPs. Then work with big GPs together to co-invest. To build up portfolio and industry network. And gradually we build up our own team and move into direct investment, built upon the relationship with fund managers’ (Author’s interview, Principal, SWF #3, 2016)

In emerging markets this strategy often requires working through additional networks due to the paucity of General Partners (GPs) specialising in such markets: ‘So we try to build relationships with industrial companies and multinational organisations like the world bank and development banks, and work with them to build a pipeline and to build consortia’ (Author’s interview, Principal, SWF #3, 2016).

Sector Shifted Firms

There is an additional, and much rarer, strata of institutional approach to infrastructure; where pools of capital become themselves fully constituted infrastructure firms with vertical integration across design, construction, and operations as well as financial investment. These are characterised by a necessary proactive engagement with policy-makers to address and answer infrastructure needs. CDPQ, and the formation of CDPQ Infra, founded in 2015, being a notable recent example. Their announcement of the Réseau électrique métropolitain (REM), an integrated transport project that will link downtown Montréal, the South Shore, the West Island (Sainte-Anne-de-Bellevue), the North Shore (Deux-Montagnes) and the airport in a unified, fully automated, 67-km light rail transit (LRT) system, is of particular note in that it is described by CDPQ Infra as Quebec’s first ‘*public-public*’ partnership project (author’s emphasis). The alignment of the needs of institutional capital, broader public policy, and societal good are made explicit by CDPQ in their statement that ‘such economic benefits clearly show that la Caisse’s return objectives go hand in hand with Quebec’s economic development’ (CDPQ Infra, 2016). The core project values of partnership working, political and public consultation, enhancement of surrounding agricultural land via the establishment of a Land Trust,

environmental protections and carbon emission offsetting and, ultimately, an enhanced mass transit service are heavily reinforced in all CDPQ Infra communications materials; Figs 5.10 (below) being an example:

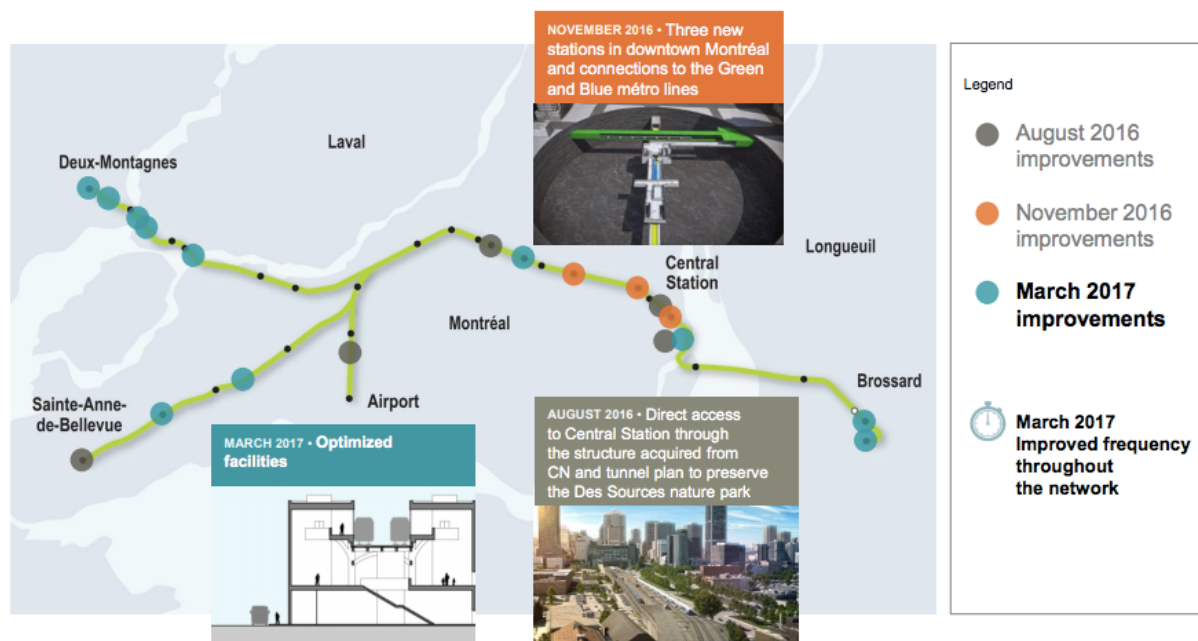


Fig 5.10: REM - Summary of Improvements

Source: CDPQ Infra, 2017

5.3 The effects of infrastructure financialisation on capital

The financialisation of infrastructure is a profoundly new form of state provision and a marked policy shift away from government providing common good ‘natural monopolies’ (O’Neill, 2009) and toward ‘the interests of the dealers’ (Smith, 1776). For the investing institutions too, these new infrastructure markets represent a paradigm shift. Their investment activity is no longer the abstracted, amorphous purchasing of government bonds and securities in liquid, global markets where the physical, geographical and political dimension to the investment is diminished within a larger index or portfolio. Infrastructure investments are physical, political and touch the daily lives of millions of citizens of a nation state. The performance of these infrastructure assets, indeed the very idea that these assets are not owned and operated by government, are matters of public and political debate (Cumbers, 2012).

The notion of the politicisation of investment capital is a relatively unexplored outcome of the financialisation of essentiality (Thrower, 2014) or our daily lives (Langley, 2008) concentrating as it does, not on the asset being financialised, but rather the change in properties of the mechanism or instrument by which the financialisation occurs. The state may continue to be everywhere (Infrastructure Funds #1 and #4), but arguably the nature of the Polanyian shield (Fraser, 2011) that the state provides is fundamentally changed. That defence is now provided, not through ownership and control, but rather through mediating authorities, regulatory frameworks and commercial contract. Ironically that Polanyian protection may also result from the state's actions as a financial investor; even where that role is via a financial markets based intermediary such as a fund manager.

There are two aspects to this politicisation. Firstly, investment capital is invested in infrastructure which is a highly politicised asset class (Author's interview, Global Head of Investment Policy, SWF #2, 2016); providing, as it does, the essential services previously the preserve of the state to supply (see 5.3.1). Secondly, much of this capital, particularly that derived from SWFs and PSPFs is not only owned by the state (in the case of SWFs), but also subject to an element of influence or control (albeit contested) by the state in some way (see 5.3.2).

5.3.1 Infrastructure investment: assertive capital and fiscal envelopes as inherently political acts

The state using external capital to fund previously public sector provided services can be viewed as an inherently political act. It has long been accepted that the role of government includes the legal, fiscal and regulatory underpinnings, under which any market participants operate. The use of external debt represents a complication of this status quo and brings with it fears of excessive return to the private sector or investor, as well as value leakage away from core service delivery. Significantly greater complexities arise however, when the invested capital, manifests as equity, and assumes more active agency, as shareholder, manager and controlling voice.

The increased instance of institutional equity positions in infrastructure assets and companies, this assertive form of investment capital with a boardroom voice, presents a challenge to the idea of utility assets being operated to prioritise user experience and public value for money. It is a transition from the institutional debt provision of sovereign bonds, banks, and the Public Works Loan Board (PWLB); to equity and board roles (held by SWFs, pension funds, Infrastructure Funds & PE) requiring ‘managerial bandwidth’ (Author’s interview, Partner & Co-Head, PE firm #3, 2016).

From the acts of assertive capital making demands of future tariffs and regulatory support, such as the case of Franco-Chinese state backed equity investment in the Hinkley Point-C nuclear project, there are clear ethical implications that link into the literature on the primacy of shareholder returns resulting in leakage from the public purse (Folkman, Froud et al, 2007) and issues of value for money. Over time these become material for questions of social cohesion and social diremption and the delta (volatility and exposure to risk) of our existence (Thrower, 2014) as a consequence of the financialisation of everything (Langley, 2008). So these state driven decisions to participate in a marketised solution to infrastructure delivery are inherently political and result in the re-configuration and re-purposing of infrastructure assets and systems in manner that prioritise their financial characteristics (O’Neill, 2013); a notion that provides an infrastructure corollary to Harvey’s (2014) discussion of exchange value over utility value in *Seventeen Contradictions*.

An example of the assertiveness of institutional capital can be seen in early PFI transactions involving prisons. The UK government initially wanted equity investors to take market risk on the future size of the prison population. This idea was, not unreasonably, deemed ludicrous by the market. As a result, ‘the likes of Societe Generale...said we [the market] are not doing this and so you better change it. So the original prisons ended up being some of the lowest risk assets in the sector because the government was on the run and the banks forced them to change the contract’ (Author’s interview, CEO, Infrastructure Fund #4, 2016). This degree of involvement in the running of infrastructure businesses and the policy environment in which they operate, is a noticeable feature of the infrastructure investment market, and can be seen in Fig 5.11:

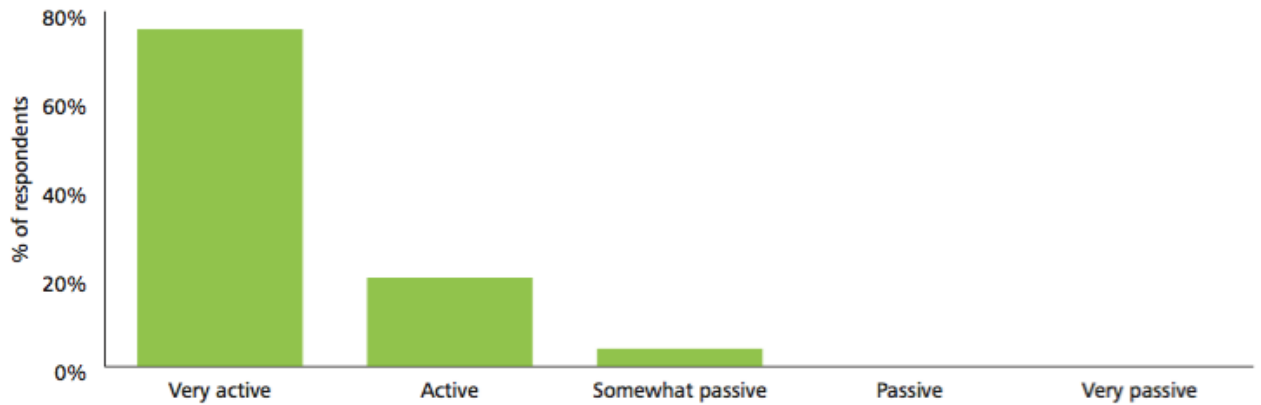


Fig 5.11: How infrastructure fund investors categorise their involvement in investee companies

Source: Deloitte Infrastructure Investors survey, 2016

Assertive capital is, however, sometimes more than offset by assertive policy. An example relates to the energy generation sector in the UK:

‘it never ceases to amaze me that 20 years ago energy generation was pretty much a private sector business with private capital earning sensible returns and today its pretty much impossible to do anything on the energy generation side without some kind of government subsidy...the principal cause of that is the government’s decision to decarbonise the economy’ (Author’s interview, Co-Managing Partner, Infrastructure Fund #2, 2016)

The same fund manager cited a similar challenge in the near future, that of road transport funding. In an environment of electric cars, fuel duties will disappear and there may be a significant fiscal funding deficit. Do we move to a user pays model? For now, other than the A14, parts of the M25 and M6, and some small stretches in Scotland, the government has largely avoided this issue. Although even the maintenance of the status quo represents an inherently political decision as to where to encourage institutional capital, and where to fund directly from government:

‘from our point of view its rationing [of capital], we’d say this is best illustrated by the government announcing [in 2016] £16bn investment in roads. 10 years ago it would have been unbelievable to think we would spend that amount of money on roads and not a penny of that would come from the private sector’ and why has that

decision been made? ‘we said its almost as if you don’t believe in whole life cost management by the private sector, and they said we believe in it but it’s too expensive. That seems to be the conclusion, though not drawn out of any evidence I’ve seen’ (Author’s interview, Partner, Consultancy firm #1, 2016).

Assertive capital with political access has the potential to result in opportunities for private capital deployment having primacy over the evidence based infrastructure need. This is an ongoing tension between government and the wider institutional investor and financial community:

‘I was on the NIC consultation discussions and there was an investment banker there who said, what the government needs to do is focus on making these things financeable...and even me...I said whoah!.. you are in the wrong part of the equation. This is not about only things that are financeable...this is about what does the country need...and only then is it about how do you fund them, how do you finance them. Actually how do you prioritise them...because you are not going to be able to afford everything. But his view was it should solely focus on financing (Author’s interview, Partner, Consultancy firm #1, 2016)

That said, there is a view that, having decided its infrastructure priorities, government then needs to decide *who* (institutionally) it wants to finance them, and where along the return curve government wants to use its agency to position UK infrastructure. This will essentially decide the institutional characteristic of UK infrastructure investors (from PE though to public pension funds and SWFs). This political rationing (balance sheet or off balance sheet; state or private) reflects ideological positions around certain industries and is not necessarily aligned with, or reflective of, investor appetite, as these two quotes demonstrate:

‘Look at today. The government is spending more on its own balance sheet on projects than historically. Look at the road network, we’re spending more there, Crossrail, HS2, all being done out of public money...OK if we are going to spend £16bn on roads, but we must have nuclear power and that’s only going to be delivered through private sector financing, well we are kind of using the capital in the wrong way aren’t we? Shouldn’t we be using private sector capital to build our

roads and rail in theory, and public sector money to build nuclear? They say no, no...they're not joined up. Government still lives in a quasi-liberalised market in energy and it believes that the private sector should deliver on that basis' (Author's interview, Partner, Consultancy firm #1, 2016).

Compare this to the UK Government's approach to Thames Tideway Tunnel (TTT):

'It's quite ironic that we have government running around trying to sell TTT to big PFs, anyone who will listen to them, and we have nuclear where generically they are not a million miles away, large, complex construction projects that no-one wants to finance, low risk profile once they perform. TTT though with a much lower risk profile once its operational, TTT is unbelievably benign once its operational...it's just a tunnel...yet the government has two financing models poles apart...one where the private sector takes all the construction risk and all the financing in, and here [TTT] the private sector brings finance in but the risk is shaped in order to make it accessible [and why is that] it's part of the silo, departmental, policy point of view' (Author's interview, Partner, Consultancy firm #1, 2016)

In the view of that firm, future nuclear investors 'are definitely not going to do a Hinkley'; so government are in a position of constantly creating customised solutions, with a consequential upwards impact on transaction costs; an adverse factor in market efficiency almost entirely discounted in traditional Marxian approaches.

5.3.2. The contested nature of public and para-public money

In addition to the notion of external investment in infrastructure being a key decision of government and a political act; it must be acknowledged that a facet of this politicisation is due to the fact that control of the mediated public money invested through funds, SWFs and PSPFs is, itself, highly contested. The derivation of these public and *para-public* pots of capital has already been discussed in Chapter 4; but the entry of SWFs (\$6.3tn AuM) and pension funds, 60%+ of which (in excess of \$20tn) have a public sector derivation (Author's own calculation, Preqin; 2016), into this space has undeniably created a more

nanced and politically complex investment landscape. It is also the case that it is not merely about who owns these monies, but the degree to which they can said to be directed or controlled by the state. Given their size in terms of AuM and their increasing prominence in global infrastructure markets, this has become a material consideration in any study of the role and scope of state power in the 21st Century.

In the UK, the Pension infrastructure Platform (PiP), the Government's proposals on LGPS aggregation and infrastructure allocation, and the Greater Lancashire Pension Fund (UK) JV with LPFA, are all evidence of the state contesting the right to a voice in how quasi-public monies should be invested in support of politically desired outcomes. The allocation guidance of HM Treasury for the proposed LGPS aggregated funds drew particular scorn from industry observers and investors:

‘I would agree that 25% (HM Treasury guideline infra allocation by LGPF schemes) is a step too far’ (Author's interview, CEO, Infrastructure Fund #4, 2016);

‘I think that would be terrible...a 25% allocation to infrastructure...urgh...if I was one of the pension fund trustees I'd be really worried about it’ (Author's interview, MD & Head, SWF #1, 2016).

‘Osborne talked about £20bn, which would be more than 10% across the LGPS, I don't think we are going to get to that. The cross pooling document mentioned an aspiration to get to the same level as international norms, which is about 5%...but actually in a meeting I had with Treasury a few weeks ago their feeling was why should the LGPS aim to be average...they should aim to be more ambitious than that...so I don't think it's going to mean compulsion but they hope or expect the LGPS to be investing more than 5% in infrastructure’ (Author's interview, Head of Alternatives, Investment Consultant #2, 2016).

In the US a major public pension fund commented on their soft commitment to allocate \$800m to assets in their home state. In part this was a response to:

‘efforts...in the legislature here to prescribe even more capital to earmark for [home state]. At one time there was a proposal to have the entire infrastructure capital

focussed on [home state]. A reason for this is the fiduciaries on the board who have their own political affiliations, reflecting that this is a government managed pool of capital' (Author's interview, Head of Infrastructure, Public Pension Fund #1, 2016).

This can be contrasted to the governance arrangements of the large Canadian schemes, who, as Crown Corporations, are arms-length from the state, with independent governance, and acting commercially:

'to achieve what they've [the Canadians] have done, you have to take all this capital and manage it outside of government, and that's what the Canadians have done' (Author's interview, Head of Infrastructure, Public Pension Fund #1, 2016)

Also SWF #5 describe themselves as operating at 'double arms-length from government'. They additionally steer clear of domestic politics by not competing in internal competitive auctions in their home country. In this manner they cannot be accused of market distortion, and the government cannot be accused of a bias toward its own SWF.

5.4 The relationship between financialisation, policymaking and governance

A principal of Aberdeen Asset Management (AAM) talked of the need for an *aligned* mindset (Cohen, 2016), and of the need for a long term value outlook and a transparent accountable behaviour, on the part of investing institutions. This theme has been echoed by the likes of Meridiam in their leadership of the LTIIA. This has relevance for modal institutional behavioural norms for investing parties. Part of the alignment question relates to duration, both in terms of institutional appetite (where there is a good fit with state objectives of long term investment and commitment) and vehicle structure, where many funds still carry the legacy of older PE models. We are though, as Section 5.2 demonstrates, starting to see some longer PE/ infrastructure hybrid funds of 10 years +2 or 3 year extensions, longer term pure infrastructure vehicles (such as Meridiam's funds) and numerous perpetual or buy and hold Specific Allocation Vehicles (SAVs) dimensioned to targeted duration aims of investors (such as that of CapD's specific allocation for Lancashire PF (Jensen and Moreolo, 2015). Despite this:

‘there is a disconnect between the life of a typical close-ended fund and the life of the underlying asset, and possibly the investment horizon of some of the investors...so some of those very long term investors invest directly these days, and part of the rationale is they want to be in charge of the duration’ (Author’s interview, Executive MD & Partner, Infrastructure Fund #5, 2016).

The process of financialisation does require of state and local governments, a cognisance of investor parameters and appetite:

‘The process is demand or investor driven. Its less about what I’ve got in my portfolio, that took a while for people around here to understand. It’s about getting close enough to the investors decision making logic to align yourself with them, so that they deploy capital where they wish, not diverting into it something you think they should invest into’ (Author’s interview, Head of Projects & Finance, Government Agency #2, 2016).

These are issues influenced by financially driven constraints on administration and policy flexibility; an investment driven path-dependency (Birch and Siemiatycki, 2015), which keys into the political economy literature and themes of extraction and profit motives (Weber, 2002 et al). Most investors state that ‘relationship with stakeholders are key...and the relationship with government is even more important, is crucial I would say’ (Author’s interview, Director, PE firm #2, 2016). But the relationship between the state and concession holder or investor is a complex, and potentially symbiotic, one:

‘So in Spain where we have a car park company. The municipality come to me and say you have 3 underground floors...you need to build 5 more. If the municipality says actually I understand that this is not in the original contract so I will extend the concession from 25 to 28 years, or I will increase the allowed carriage by 4 cents...at the end of the day we are a financial animal, we want to provide a service, but we also of course have a fiduciary duty to the investors in the fund which in a lot of countries are also users of that infrastructure right? So that relationship is key and governments understand that these infrastructures need new capital and that capital

needs to be remunerated in an adequate way'. (Author's interview, Director, PE firm #2, 2016)

That is not to say that tensions do not exist, particularly as a result of electoral cycles and the shifting policy priorities that are a feature of the democratic process, however, institutional investors maintain that the long term relationship model inherent in PFI to PPP contains scope for both parties to achieve their stakeholder priorities:

'We hear of parties on the election campaign who say we will offer free parking. But when they get elected they realise that... this is a marriage...a balanced relationship and if you hurt that trust, then whenever you want to build the 3rd school in a different county then probably no-one will attend to that tender. Also it works the other way right. If we do not deliver on the service that we have signed up for...it is in the right of the authorities to terminate those contracts. This is not a one-way street where we are the capital saying we want our returns and if not we will not move...it's a completely balanced relationship where both parties need to deliver...what is important is that over the long term that relationship remains balanced'. (Author's interview, Director, PE firm #2, 2016)

The above example may suggest a balanced relationship indicative of the enmeshment of public and private capital. But however the relationship between the state and institutional capital is framed, and however aligned we may wish those actors to be, it appears that it is infrastructure's essentiality, importance and all-pervasive nature that ultimately binds the parties together:

'in the context of PPP type arrangements, if you go into that thinking you're pushing every problem across the table, then the very nature of infra means everyone will lose...you pass the risk and in a disastrous situation the private sector loses its shirt and there's a lot of pain all round, but the public sector can't think its devolved its overall responsibility so...what that should do is make you think...being able to demonstrate there is real value in that relationship...recognising that both sides have a [*pause*] there is a partnership here.

Nuclear is a good example. If I've got a windfarm that doesn't work the government can say that's not my problem. Nuclear is different, on Hinkley we spend ages speaking about what happens if there is a problem ...the reality is if you've got a reactor risking a core meltdown it's pretty clear the government going to say actually we are going to take over this...we are not going to sit here and hope the private sector is incentivised to do the right thing.' (Author's interview, Partner, Consultancy firm #1, 2016)

This has clear implications for the government's ability to achieve true risk transfer and, on the other hand as institutional investors have grasped, it creates a potential line of sight in credit covenant terms through to government regardless of nominal counterparty risk.

5.4.1 Rendering the political; contractual

The UK Conservative government have been enacting significant budgetary cuts to a range of public services under the auspices of post financial crisis era fiscal austerity. In areas like education and health, who were heavy users of PFI1 and PFI2 structures outsourcing construction and management contracts to the private sector, the consequences are profound:

'there is a lot of political risk in terms of flexibility [with PPP] because "I have signed up to make these payments, to deliver this service I wanted in the first place, and now I'm not sure I can afford it...it's like buying a big house and then realising you can't pay the mortgage" ' (Author's interview, Partner, Consultancy firm #1, 2016), and

'If you talk to hospital trust directors many of them love PPPs or PFIs, many of them have been working in the NHS for 15, 25 years and the hospitals they had before they had leaks, no money for maintenance, because when money was tight that's the first thing that goes...everything gets left until you have to build a new hospital because everything has gone beyond repair...A lot of them were quite cute about it, they couldn't afford it but know "well if we can't pay it the government is

going to balk at making a termination payment so I may as well take the money to build the hospital now”” (Author’s interview, Infrastructure Strategist, Asset Management firm #4, 2016)

These opinions, expressed by a major consultant to government and a global asset manager respectively, regardless of whether we agree with them, pose the question as to who, ultimately, bears the risk of financially over-extended utility operators in a post financialisation world? The essentiality of infrastructure means that these assets will need to continue to operate in some form. Socially and economically they cannot be allowed to fail. The financial burden of technology risk, leverage risk, and other variables, falls on government and ultimately, via a regulatory or market mechanism, on customers. Again we can look at TTT as an example: ‘the risks don’t disappear, it’s a question of how you allocate them...there is some risk to the government, but fundamentally the people who are really exposed are the consumers’ (Author’s interview, Partner, Consultancy firm #1, 2016).

So if it can be said that some of these contracts between public and private institutional actors result in risks being passed to consumers; it is important to realise that this does not necessarily constitute the same group as taxpayers. Indeed, this tension goes to the heart of the political nature of financial and regulatory agreements in respect of financialised infrastructure:

‘No-one is going to put up bills let’s say in Indonesia if it means the ruling party gets thrown out of office next time around, which is not necessarily the way it should be. Which is one of the interesting discussions Treasury and we have around divergent strategies, they are focussed on tax payers whereas we are focussed on customers and they are not necessarily the same audience’ (Author’s interview, Director of Corporate Finance, Regulator #1, 2016)

It could also be argued that the longer term regulatory regime and tariffs agreed recently on contracted infrastructure projects such as Hinkley Point-C and TTT constitute binding future financial commitments that may yet prove to be highly politically sensitive. In the case of TTT, the regulated entity’s cost of capital was bid out to the marketplace and this is a key input in the calculation of what TTT can charge to Thames Water based on its

capital spend programme. In turn Thames Water will reflect that amount when calculating the bills for its customers (OFWAT, 2017); as Loftus and March (2017) note ‘what undergirds the transformation of the hydrosocial cycle, is a financial model more focused on the extraction of rents from Thames Water’s consumers’. This outsourcing type model, for all its challenges, is suggested to be replicated in other infrastructure projects of over £100m in operating and capital costs, and is seen as applicable to other sectors (such as the OFCOS and ONCOS developed by OFGEM); with the learning from TTT et al being shared across forums such as the UK Regulators Network (Author’s interview, Director of Corporate Finance, Regulator #1, 2016).

In the case of financialised infrastructure there is, as the literature acknowledges, an implicit understanding that it has been opened up to market forces and financial investors. For regulatory regimes (an example being the UK), that results in an iterative feedback loop between institutional investors’ costs of capital and IRR expectations, policy makers, and the cycle of regulatory settlements for utility businesses and, by extension, their customers:

‘We do try to understand what drives investors, return requirements, timing expectations both for timing and exit because when we come to set the cost of capital for 5years we are taking into account not just costs of debt both new and embedded, but also what the equity return requirements are’ (Author’s interview, Director of Corporate Finance, Regulator #1, 2016)

This process helps the regulators to establish what is an adequate return for investors;

‘and the word adequate is an interesting one...we are looking at customer bills...it is one of our primary duties, but we also need to make sure that the regulated companies earn a sufficient return to attract investment. We have to balance the two – customers and financing. The third main duty we have is resilience, the sector, not just the physical assets, that companies are financially resilient too’ (Author’s interview, Director of Corporate Finance, Regulator #1, 2016).

A further challenge for a deeper alignment between institutional capital and governance bodies for infrastructure is that an optimal relationship requires a level of jointly identifying problematic provision and working together on holistic solutions that factor in the

reasonable needs of all parties. Such vested interests would include the governance body (and asset owner), customers, taxpayers, unions and investors. The difficulties of such an approach however, are outlined here:

‘one of the most difficult agendas in infrastructure is to go to cities and study how we can work with them on improving the performance of the infrastructure. Most infra funds don’t do this because there is no obvious deal to be done, you have to develop the deal. They get money from institutional investors who don’t have the patience to develop the deals. They don’t want to take the risk, pay the cost or deal with the public policy issues in developing the deal. What we find is that there is no framework, or we should say there is an old, tired, worn out, beleaguered, disorganised framework for procuring long term assets in most cities. The majority of cities have worn out their governance, and are not keeping up with the needs of their infrastructure’ (Author’s interview, Founding Partner, PE firm #1, 2016. The principal in this interview was also a part of the Obama administration US Presidential Commission for Infrastructure).

Whilst we may have concerns about bringing financial investors into governance at this blue sky (pre greenfield), conceptual phase of designing future utility provision, such a dialogue may be one logical outcome of a truly aligned approach in a post public-private binary infrastructure market. Impediments here exist on both sides of the debate. There is institutional investor reluctance for the reasons outlined above. Similarly, there is a theme of institutional stasis and fear of action within US municipalities, as a PE house that characterises itself as *PE on a mission* (to solve USA’s infrastructure problem) recounts:

‘We’ve screened the whole country on modern wastewater systems and identified 65-100, and we are having incredibly deep conversations with council members, utility director, tax-payers’ associations...but public or private people are just not moving forward...it’s not about our framework or transaction, its more fundamental, it’s about doing anything at all. They don’t want to move forward because there may be controversy around this. I said controversy attends today taking any action at all...it doesn’t matter if its public or private, but taking a step forward and making something happen, unless it’s a building, is controversial’ (Author’s interview, Founding Partner, PE firm #1, 2016).

In the eyes of many infrastructure industry commentators, this stasis applies not only to the envisioning and commissioning of new infrastructure, but also to the ongoing governance of existing infrastructure; often well beyond its originally intended useful life. Just one example of many mentioned during the research interviews was that of the Bay Area Rapid Transit (BART) system in San Francisco, California:

‘BART is at the end of its useful life and it is failing on a weekly basis, and its affecting a lot of people. Look at the BART board, it has flawed governance. You have to have an operations and maintenance (O&M) plan to operate and maintain your infra. The history of the US is we have already built a lot of infra and now its wearing out. BART doesn’t need to be built, its already built. What was your Operating, Repair and Replacement (ORR) plan? During the 50year life of the system what was your Capital Improvement Plan (CIP), because not all the parts of the system last 50 years, the cars have lasted, but the electrical wiring wasn’t meant to last 50 years. it’s a failure of governance, they didn’t have the equivalent of a concession agreement with operating requirements in it that included a definition of O&M, ORR and CIP...I don’t care whether you are public or private – “oh you sound like a P3 guy” – no, no don’t talk to me about P3. Look if you are going to run an asset today, you have to do it on a whole lifecycle basis, there are almost no examples in the US where assets are run on a lifecycle basis’. (Author’s interview, Founding Partner, PE firm #1, 2016).

This raises some difficult questions around governance, and the interplay of political exigencies and fiscal and budgetary financial reality:

‘Is it not true that for the vast majority of infra we are talking about that you could produce a reasonably accurate whole lifecycle cost estimate? It’s a readily available piece of information, it can be defined by a performance contract, whether the public or private sector operates it...I don’t care. We mislead people...when you don’t tell me how that is going to affect what is in my wallet in my house over 30 years...you are misleading me. Not to mention the fact that it is reckless governance and results in crashing infrastructure and neglect and everything else...’ (Author’s interview, Founding Partner, PE firm #1, 2016)

For potential routes forward it is perhaps better not to attempt simplistic comparison between examples of governance of infrastructure assets that are owned and operated either in the public or (so-called) private sector. There are multiple instances of both good and bad governance in both. As such we might say that good or bad governance is not the preserve of either the public or private sector. Chapter 4 discussed the concept of the enmeshment or intertwining nature of public and private capital, and as we have seen in some of the cited examples in Chapter 5, problems occur when the twin forces of the state and institutional investment do not recognise that an optimal outcome needs to recognise the needs and issues of both parties (as well as users and other stakeholders). Essentially, what is required is an enmeshed or aligned model of governance.

It is notable that the CDPQ Infra example with the REM proposes a co-designing and co-working with the state government, a public vs private comparison of the overall project, detailed input from the local population (users of the system), unionised jobs, and ongoing monitoring by an independent entity, as well as the continued regulatory oversight of the Federal and state governments.

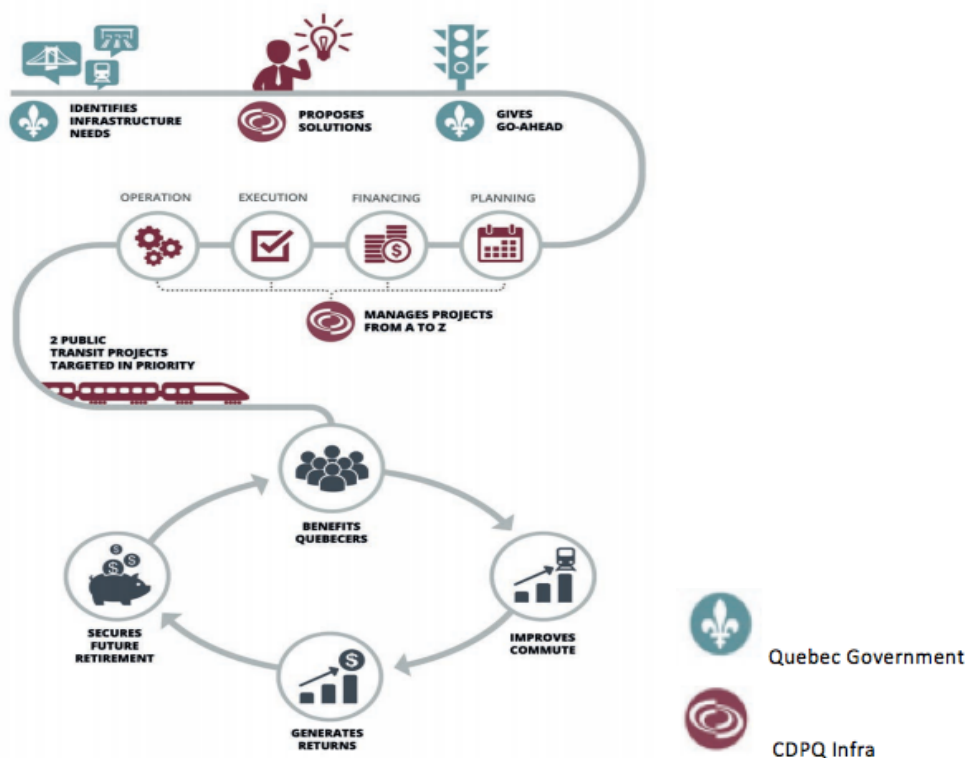


Fig 5.12: Overview of CDPQ Infra REM Project

Source: CDPQ Infra, 2017

Against these safeguards CDPQ's relatively low yield expectations (and low risk requirements) represent a competitive source of financing. Such a structure does not guarantee good governance but at least it puts in place many of the foundations needed for it to occur.

The REM is a large scale infrastructure project with construction costs alone in excess of \$6bn (funded 45% by CDPQ Infra with the balance split between the Quebec state and Federal governments). The economies of scale for REM allow for an extensive design and structuring phase, and its size ensures the close attention and engagement of the state government. Similar collaborative approaches demonstrating characteristics of transparency, a comparison between public and private solutions, early stakeholder engagement, a holistic view of the asset, political candour re the financial outcomes and future costs, and independent oversight, *and* occurring at the smaller end of the scale, are hard to find. There is however, an area of infrastructure provision in North America that operates at the level of the municipality and is facing extensive challenges to invest and update, but for which there seems to have hitherto been little industry support; namely local provision of water and wastewater services.

The City of Rialto in California represents the opposite end of the scale from Montreal. It did however have a similar issue of being constrained by an aspect of its infrastructure; in Rialto it was an ageing water and wastewater system. The interesting aspect of the solution that eventually reached financial close in November 2012, was that the solution came about through the joint working of the City of Rialto, unions, a public sector pension scheme, and a PE firm from the same state, Table Rock Infrastructure Partners, part of Table Rock Capital (TRC). A snapshot of the project is at Fig 5.13:

Concessionaire: Table Rock Infrastructure Partners/Ullico

Operator: Veolia North America

Financial Close: November 2012

Owner: City of Rialto/Rialto Utility Authority

Project Need: Aging water & wastewater system + integrated goals re: economic development

Procurement: Evaluated full privatization vs. traditional delivery vs. P3; Issued RFP for P3 (30-year financing

and services agreement, private equity at risk, revenue secured, public ownership)

Public Role: City retains ownership of all water rights, infrastructure and all improvements, retains control of

water supply and rate-setting, maintains intensive role in decision-making

Performance, first 4 years:

- 27% above plan on performance payments to City
- Identified 46% savings in water projects to date, funds will serve other CIP
- 30% reduction in wastewater project cost, through Progressive DB process
- Anticipating 40% lifecycle savings annually after wastewater upgrade
- Fitch affirmed investment grade rating annually since close
- 2,800 new jobs in place, another 5,650 new jobs projected by 2019 through the redevelopment enabled by the P3's upfront payment

Financing: Private placement debt investors; Table Rock & Ullico buy-and-hold equity; 85% debt, 15% equity

Fig 5.13 Project snapshot: Rialto, California water and sewer

Source: Table Rock Partners, 2017

Aspects of note with this transaction is that the structuring process was every bit as lengthy as that needed for REM in Montreal. This normally mitigates against fund managers or PE firms being willing to bear the transaction costs given the size of the individual transaction. However, that time is critical if you are to achieve any kind of transparency, joint working and real alignment around shared objectives. That this seems to have occurred in this case is suggested by the fact that a panel of all the main participants was convened in 2017, and all (mayor, workers, operators, users and financiers) reported satisfaction with how the structure was operating.

One rationale for TRC to spend the time on Rialto was that, in the fragmented US local water market, such approaches may be replicable, the question is that, if this is a desirable

instance of a virtuous circle, then how can municipal, state or federal government facilitate its replication?

Interestingly in examples such as Rialto, the investment interest is coming from pension funds and the likes of ULLICO (Union Labor Life Insurance Co), whereas the infrastructure funds who looked at it (including some of the major global fund managers) viewed the transaction costs, in terms of deal construction, as too high and exited. A major US based private pension fund, commenting on municipal water deals, also confirmed that ‘budgets are dire and there is political pressure from legislators’ and admitted that ‘institutional capital does not know how to deal with government, as a matter of fact there is a certain sense of novelty and a bit of a perceived risk on the part of institutional investors in dealing with government directly. You need to appreciate the political pressures’ (Author’s interview, MD Energy & Infrastructure, Private Pension Fund #2, 2016).

5.5 Variegation and complexity as a signifier of markets

So there is an engagement by the state with institutional capital, an interest in those quasi-public coupon pools, and how they may become mediated agents of state policy through their financing activities around strategic infrastructure. We know from the empirical research interviews with Government agencies, Consultancy firms, regulators and fund managers that there is substantial dialogue between arms of government and investor entities; but how deep does that understanding go?

In the context of the infrastructure of the market; and in the building of an asset class and an investor community, we can understand that it is the combined heterogeneity of infrastructure assets *and* institutional capital *and* investment methodologies that has driven, and continues to fuel, market growth. It is the variegation of available asset risks (on the sell side) and risk/ return approaches (on the buy side) that is a key factor. This is best summed up by sentiments such as ‘our investment perspective is purely relative value...we don’t have sector restrictions...there are no [geographic] no-fly zones’ (Author’s interview, Partner and Co-Head, PE firm #3, 2016). For others, these distinctions are a matter of semantics: ‘whether infrastructure is an asset class or an investment proposition...does that

really matter? We are not purists or academics, we are opportunity driven' (Author's interview, Senior Investment Manager, Private Pension Fund #1, 2016). Add into this mix a dynamic and fast moving evolution of revenue models and investing methodologies, as well as a variegation of scalar, spatial and temporal considerations for both investors and state actors, and the results are complex, highly contextualised, dense infrastructure markets in operation across North America, Western Europe and much of the OECD.

Once again, complexity is everywhere in these spatially contextualised and variegated infrastructure markets. The state and quasi-public actors invest directly and through mediating entities. Policymaking and regulatory oversight has to take into account market norms and investor IRR targets and, by virtue of infrastructure's financialisation, is itself financialised. In turn institutional investment capital becomes politicised by its deployment into infrastructure. Public and private become harder to untangle in such markets, and the extent of that enmeshment is spatially uneven since it is a function of political systems, local market characteristics, public policy, and transactional conventions; all of which have a historical derivation and heritage from which they have arisen.

The previous Chapters have examined the roles of both state and private actors within contemporary infrastructure markets. They have considered reasons for these actors to engage with these markets, with infrastructure as a diverse type of asset class, and with each other, regardless of where they may respectively sit on the notional spectrum from public to private. We have then considered the heterogeneous nature of infrastructure and how that has contributed to the variegations of capital being invested. Finally, we have looked at the impact that processes of financialisation are having on capital, policymaking and governance; but also how the inherently political nature of infrastructure is adding a political dimension to even privately derived capital.

This chapter specifically has, in answer to Research Question 2, examined the inter-relationships between state actors (in all their variegated forms) and private institutional actors. It has also considered the influence of the realities of infrastructure assets and operating concessions on the ways in which these diverse actors engage with and shape markets, and are in turn influenced and shaped by them. It has explored the governance implications of engaging with financialised forms of infrastructure investment and

delivery. Lastly it has considered not only the financialisation of state assets and services, but also the less often remarked upon issue of the politicisation of investment capital.

The next Chapter, will pull these diverse strands together and, using the empirical findings, will consider the efficacy and value being delivered by these infrastructure markets, whether they are providing essential new infrastructure investment or answering the needs of surplus capital. Within that question of market operation and functionality, Chapter 6 will examine the spatial context, to arrive at some interim conclusions around the geographies of infrastructure markets, and what that may mean for the future development of infrastructure as a physical delivery mechanism for essential services but also as a store of future investment value for the investment industry that has committed in such volumes to this asset class that is now competing in an array of investor and investment portfolio choices (Malone, 2005; Hodge and Coghill, 2007; Pels and Verhoef, 2007; O'Neill, 2017).

Chapter 6. The role of economic geography in reconciling issues of infrastructure need and capital surplus

This Chapter opens, in 6.1, by briefly examining the investment actions and geographical focus of MFIs, ostensibly an institutional type that should be most closely aligned to both infrastructure need and a clear demarcation of geography. Since many MFIs, such as the EBRD, EIB, Asian Infrastructure Investment Bank (AIIB), Asian Development Bank (ADB), and Inter-American Development Bank (IADB), are explicitly linked to a specific geographical remit, and are bound by mission statements that include social, environmental and developmental outcomes agreed by their multi-state sponsors, we ought to be able to see a clear linkage between infrastructure need and capital deployment.

Section 6.2 seeks to go beyond the world of MFIs, to consider and explain the inter-relationships and interdependencies of the forces of supply and demand within broader globalised infrastructure markets and the wider population of institutional investors. This includes (a) the availability of existing and proposed infrastructure requiring non state debt and equity financing, and (b) the *infrastructure* of global institutional capital and its ever present need for attractively priced risk assets. It questions the conventional assumption that the well documented need for new and upgraded infrastructure (OECD, UN, IMF, World Bank et al) represents the demand side of the growing global market in that asset class; and in evidence, cites the fact that significant pools of institutional, sovereign and aggregated personal capital, unevenly spatially located, are increasingly looking for investment opportunities with just the sort of economic characteristics that infrastructure offers. This supply push might be suggestive of the fact that excess capital is shaping and developing the market for financialised infrastructure in such a way as to prioritise assets in geographies with the characteristics required by the major global infrastructure investors. If we accept this scenario then there is a case to be made that burgeoning markets for financialised infrastructure are, at least in part, about developing finance as much as they are about financing development (Hildyard, 2012).

6.3 considers more closely the principal institutional investment actors active in global infrastructure markets such as SWFs, pension funds and infrastructure funds. Through analysing the source of their investment capital, and their methodologies for deploying that

capital, this study discerns very distinct *spatial signatures* for each of these actors. The impact of these differing signatures are profound, since they determine how the source capital is spatially aggregated and the means by which it is transferred into new geographies. Once it has been re-spatialised it undergoes a further temporal transformation before eventually being returned in the form of dividends, debt coupons (interest payments) and eventual capital (sale) realisations. This process of uplift or aggregation, spatial extraction and transfer, and then a slow return over a lengthy cycle is somewhat akin to a weather cycle and this metaphor is used further to examine the typologies and characteristics of these institutional actors.

6.4 considers the role of geography in processes such as financialisation, and finds that the concentrated geographies of capital and the more spatially diverse geographies of infrastructure are creating a wide disparity of investment markets, from thick to thin, from functional to dysfunctional. It explores the way in which processes of financialisation are re-working the traditional role of the state; and suggests that the ability of states to proactively engage with and benefit from these processes is highly spatially uneven, and that evolutionary factors – particularly pertaining to economic and political geographies – are critical in determining value outcomes. It also briefly addresses the scalar capacity of states to engage with markets and financial actors. By which we mean that the ability of a state to fiscally and institutionally engage with international markets and global institutional investors on an equal, proactive and informed basis, is not evidenced evenly across institutions of national, regional and local scale.

It would appear that there is a spatial mismatch between the geographic specificity and concentrations of the vast pools of investment capital fueling global infrastructure markets, and the diasporic global investment of these same funds. Sections 6.4 and 6.5 consider that this mismatch, whilst manifested spatially, is also a function of risk *appetite* versus the underlying infrastructure asset's characteristics and geographies; what we might term as the risk *reality* of the infrastructure sector. In that sense, whilst there are geographies that suffer from an adverse imbalance of investment capital, there are also sectors and project phases (greenfield) that are similarly constrained.

The Chapter closes by questioning whether these geographically and temporally distorted markets, and the uneven capacities of states to engage with them, makes for an efficient

way of allocating capital. It builds upon the idea of the functionality and efficacy of markets further, by noting the mismatch of capital and need. It then presents evidence for emergent valuation bubbles in overheated investment markets, explores systemic risks within global infrastructure portfolios, and finally, considers the potential economic and social consequences if such factors remain unchecked.

6.1 MFIs and the case of development finance

There are instances where financing development and developing finance could be said to be congruent goals: notably in the case of MFIs looking to stimulate local development, inward investment, a more sophisticated financial architecture, and a deeper capital base in emerging or frontier markets; a sentiment expressed by all the MFIs interviewed. Such institutions exhibit the explicit effect of geography within their actual remit. More often than not specific geographies are inherent within the identity of the institution; for example, the EIB, Asian Infrastructure Investment Bank, Asian Development Bank, Inter-American Development Bank, and EBRD. Though as we shall see the geographical nomenclature can be misleading as to their true spatial focus, which tends to reflect a softer and more fungible reality of political geographies, and the fact that economic and social outcomes in one geography can have profound impacts on neighbours on the other side of a border.

It is a matter of public record that the EBRD are involved in some way with 120 PE funds mostly in challenging geographies and involving greenfield infrastructure (EBRD, 2017), perhaps in combination the area of greatest market failure. The EIB also, under the European Fund for Strategic Investment (EFSI) looks to invest equity alongside funds and identify those funds that have a targeted sectoral or geographic focus with appropriate management teams, in which to invest. The catalytic effect of this MFI derived, policy driven equity, is that it is there to provide *additionality* and so to leverage in private sector capital:

‘we don’t want to be the market...we want to crowd in investments. Investing in funds, the financial infrastructure, is very much a part of [peer group MFI’s] mandate. Certainly we do consider when investing in a fund...whether or not it will

have a catalytic effect in a country or sector...it's part of our mandate' (Author's interview, Regional Head, MFI#4, 2016).

Infrastructure fund #7 also cites the example of MFIs investing in their African based funds as being motivated by this wish to build the financial infrastructure as a long term facilitator for greater endogenous financing capacity within these EM territories.

Facilitating institutional investors, such as funds, provide a means by which pools of endogenous capital can deploy in local market infrastructure equity and debt (Author's interview, Executive MD, Infrastructure Fund #5, 2016). As these investors get familiar with the GP/LP structure they can then be hand-held into other markets by the fund manager. So geographically specific funds can be effective in flushing out domestic investors and developing the local investment ecosystem that is seen as so beneficial by external investors (Nabarro, 2015).

Within development finance there are political geographies and geographies of influence that are not immediately apparent. EBRD have a publicly stated investment mandate in North Africa (Tunisia, Egypt, Morocco) and the Middle East (Lebanon and Palestine) as a result of the Arab Spring. They are also active in the former CIS states as a result of the collapse of the Soviet Union, taking them as far afield as Kazakhstan and Mongolia. One key criteria being that a country, to be assisted, must be a shareholder of the EBRD. Another MFI also focusses on these adjoining geographies as their stability impacts on their (the MFIs) region of focus:

'the migrant crisis has highlighted some of those issues, and so investment is being made as a means of trying to alleviate this crisis and the conditions causing these issues' (Author's interview, Regional Head, MFI#4, 2016).

Similarly, the EIB has global mandates to renewable projects in South America and Asia and development mandates which cover Sub-Saharan Africa, North Africa and Eastern Europe (potential accession countries). Much of this is infrastructure related; again infrastructure is seen as a key economic and social enabler, as well as a critical input factor in the achievement of strategic macro global policies (for example around climate change).

The instances of MFIs investing state derived pools of capital in a third party state against an agreed development or capacity building mandate, is one manifestation of capital translating across geographies into political and economic influence. This in itself can be controversial, as post-colonial interpretations of this activity have questioned the appropriateness of the global north exporting theories of neo-liberal markets and financialisation, into political geographies where they may be socially unpalatable, culturally problematic and economically inappropriate (Author's interview, Director, MFI#3, 2016). For example, there has been an observable spread of PPP type infrastructure approaches (already common across the OECD) into EMs (Whiteside, 2012) promoted by the major multilateral institutions such as the IFC, World Bank, IMF, IADB, and PPIAF.

This approach does configure transactions into structures readily investable by the institutional market but, it is alleged, in a manner insensitive to local conditions and needs (Author's interview, Director, MFI#3, 2016). MFI#1 observe that 'projects need to be bankable' (Author's interview, Infrastructure Head, 2016), and that requirement hardens in structural terms when the investment is coming from the market (SWFs, funds and pension funds) rather than the multilaterals and MFIs.

It should be noted however that MFIs and similar institutions represent a fairly small segment of the broader global infrastructure market. Additionally, their investment drivers go beyond pure financial return to include social, developmental and environmental goals; as such they are a distinctly different segment of the market to the mainstream institutional investor ecosystem. Their role and presence assumes greater importance the more challenging the economic and political circumstances of a geography are.

6.2 Financing development or developing finance: the irresistible lure of financialised infrastructure for sponsors and investors

It is tempting to view other institutional investors and the wider investment markets (beyond government agencies and MFIs) as serving and responding to the needs for new and upgraded infrastructure in whatever geographies they may manifest. We have seen

previously however, that infrastructure, as well as an essential social need, is also an emergent financial asset class, albeit a contested one (Hebb and Sharma, 2014), and is forming an increasingly material, useful and unique part of global institutional portfolios. Infrastructure demonstrates compelling investment characteristics that, in our current fiscal and risk environment, makes it particularly attractive to the exigencies of surplus institutional investment capital. It is therefore reasonable to ask whether fast growing global infrastructure investment markets are serving the socio-economic infrastructure needs of developing economies (financing development) or in fact creating a necessary investment asset for a beleaguered institutional investor community with too much capital chasing too few opportunities (developing finance). These tensions are addressed by Hildyard (2012) but also by Christophers:

‘The question has increasingly been asked: how is it possible for “finance” to capture so much value if it is not also, to one degree or another, creating it?’
(Christophers, 2016: 73)

A point, that Christophers suggests, indicates value is being created in the process of circulation itself, namely in financial markets. If true, this is an aspect that contradicts the Marxian view of financial activities being outside the sphere of production. In light of the significant *value* created by secondary sales, trading, debt restructurings and re-capitalisations of infrastructure assets, we must admit the possibility that Christophers has a good point.

So, in answer to the question of whether we are financing development or developing finance, there is considerable data to suggest that it is both. Issues of portfolio repair for global pension funds and annuity providers, can be set against governments’ fiscal inability or unwillingness to finance the necessary infrastructure development, to make a case each way. This impairment issue among pension funds (both public and private) and annuity providers has its roots in tight solvency ratios (following decades of pension holidays and concomitant small contributions by scheme sponsors) pre the financial crisis, the manifest impacts of the financial crisis itself, ongoing weakness in global equity and fixed income (bond) markets, and prevailing historically very low interest rates:



Fig 6.1: Long term interest rates (%) for selected countries since 1980

Source: OECD, 2017 (data output generated by Author)

An example of the ongoing vulnerability of many large institutional actors in this volatile, low interest rate, low inflation era, can be demonstrated by the impact of one event; the UK Brexit vote in 2016. Overnight the impact of increased political uncertainty, and currency volatility, together with a sharp depreciation in sterling, caused Canadian DB Plans (large investors in the UK and Europe) to show a 3% impairment (Author’s interview, Partner, Investment Consultant #3, 2016). This is a clear demonstration of the spatially interconnected nature and geography straddling risk inherent in our flow world (Cetina, 2005).

Against this backdrop, it is perhaps unsurprising that large scale institutional capital should look for a (notionally) safer asset class. It is however the case, as has been seen in 4.2, that many pension funds continue to require real investment returns above historic levels in order to repair impairments arising from the GFC and the ensuing low global interest rate environment. In truth, there is a paucity of other investable assets that will provide long term, inflation linked, regulated earnings against physical, quasi state assets and which have low volatility (beta) and low correlation (delta) with other portfolio investments. Infrastructure has emerged as just such an asset, and HICL (the UK’s first listed infrastructure fund) is an example of such an investment fund. It has a beta of 0.1, meaning

it is 90% less volatile than the market average and even 40% less volatile than a quoted basket of utility stocks (not least since HICL contains significant amounts of very stable PFI/ PFI2/PPP assets), see Fig 6.2, Chart 1. As can also be seen from Fig 6.2, Chart 2, the volatility of the HICL fund is even lower than gilts, often used by large financial investors as a low risk, safe haven bedrock of their broader portfolios.

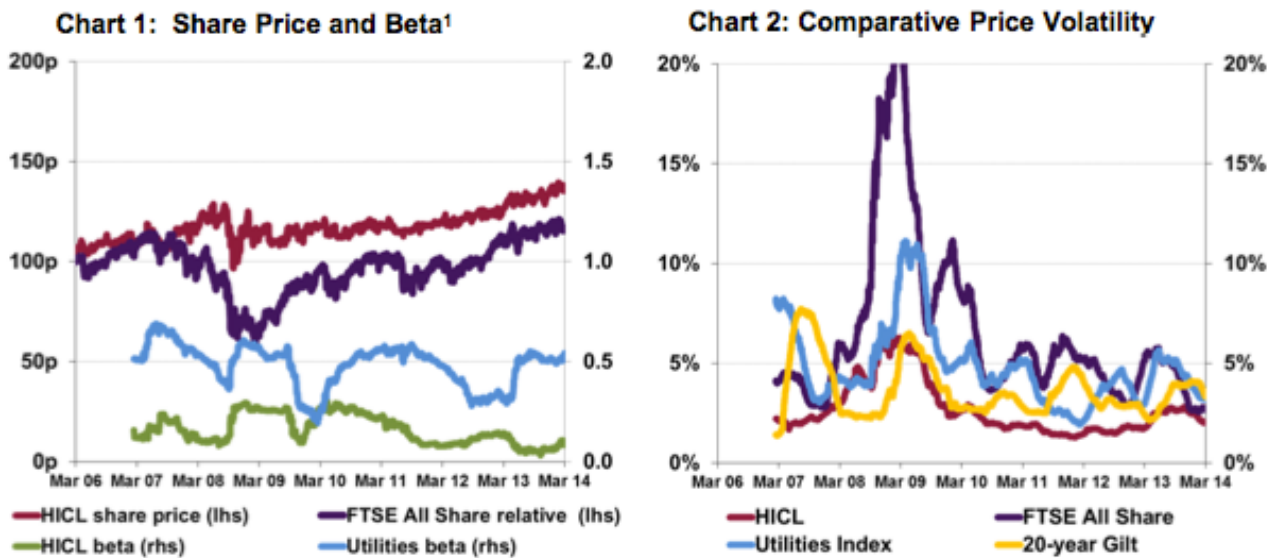


Figure 6.2: 1) Share Price and Beta, and (2) Comparative Price Volatility

Source: HICL (2014)

Despite the considerable attractions of low volatility and low delta, infrastructure is still delivering a total shareholder return of 9.7% pa:

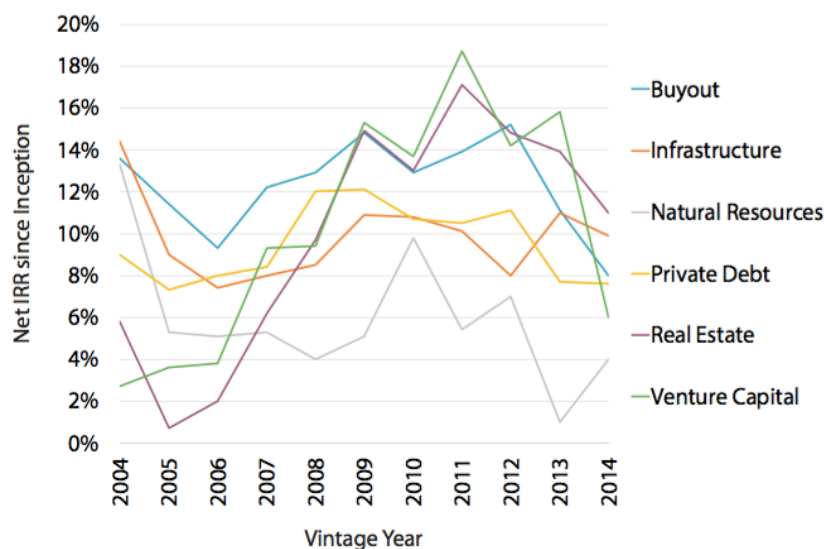


Fig 6.3: Median net IRRs by fund vintage year and strategy

Source: HICL interview and Preqin Infrastructure Online, 2017

This figure (of 9.7%pa) is broadly in line with, though just below, the reducing IRR expectations of the fund management community as derived from publicly filed information in fund prospectuses:

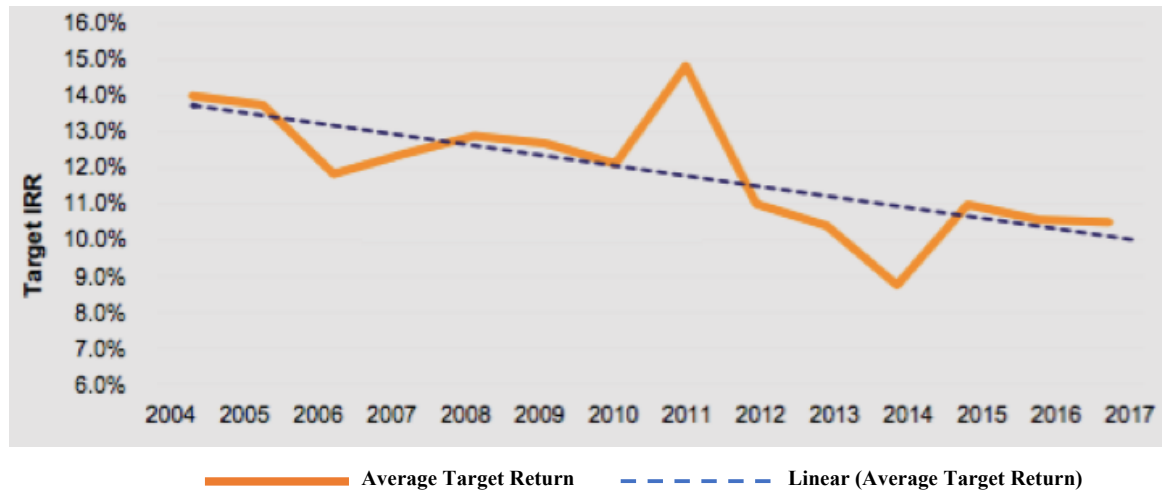


Fig 6.4: Average targeted return of funds raised globally

Source: *PwC analysis of InfraDeals fundraising information, PwC, 2017*

At these levels of return, and taking into account the low volatility and other portfolio attractions of infrastructure, it is perhaps unsurprising that global institutional investors see few other assets that can replicate the characteristics of this asset class:

‘I don’t know if anything else could replace infrastructure’s 7%+ returns and long duration’ (Author’s interview, Principal, SWF #4, 2016).

This broad spectrum attraction of infrastructure, and its ability to tick so many boxes for portfolio managers, is absolutely critical to many institutions now investing in the asset class and indeed for those mediating institutions (infrastructure funds and asset managers) that manage so much of their capital. For those with no specific liabilities (such as SWFs) any portfolio impairment could impact on their domestic state budgets and spending programs. For pension funds and annuity providers, impairments can mean unfunded or underfunded pensions and annuities, and the potential need to call upon their state or private sector program sponsor, with significant attendant adverse social, economic and reputational consequences.

6.2.1 Financialisation: not necessarily solving the problem of infrastructure provision

Infrastructure assets, the cashflows that flow from their daily operation, and the exceptional gains from trading in their ownership, therefore represent an increasingly important part of institutional investment portfolios in return terms. Indeed, infrastructure is the largest emergent asset class (Weber and Alfen, 2010) of the 2000s. Crucially infrastructure is widely viewed as having few other corollaries among other investment assets. There is a sense in the market (and expressed in the research interview data) that an asset class with the features of infrastructure is so perfectly suited to many investors' portfolios, that if it did not exist, then the financial markets would need to invent it (Author's interviews, SWF#4, Public PF#1 and Investment Consultant #2, 2016).

The apparent and pressing need for an asset with the economic characteristics of infrastructure is again made clear by the current state of the pension sector (see Figs 6.5 and 6.6 below). The suggestion here is that decades of corporate under-commitment to pensions, GFC related volatilities and asset impairments, and more recent events such as the sterling devaluation post Brexit, may mean that we now require a financialisation of the aggregated pension pool as a *necessary* engagement with markets to attempt to correct structural vulnerabilities in old age economic provision. Not only is this rise in the total deficit to £62.1bn, close to the post GFC 2009 high (£67.9bn), it is higher in absolute terms, representing as it does a greater portion of the overall market capitalisation of these firms: 6.3% vs the 5.7% recorded in 2015.

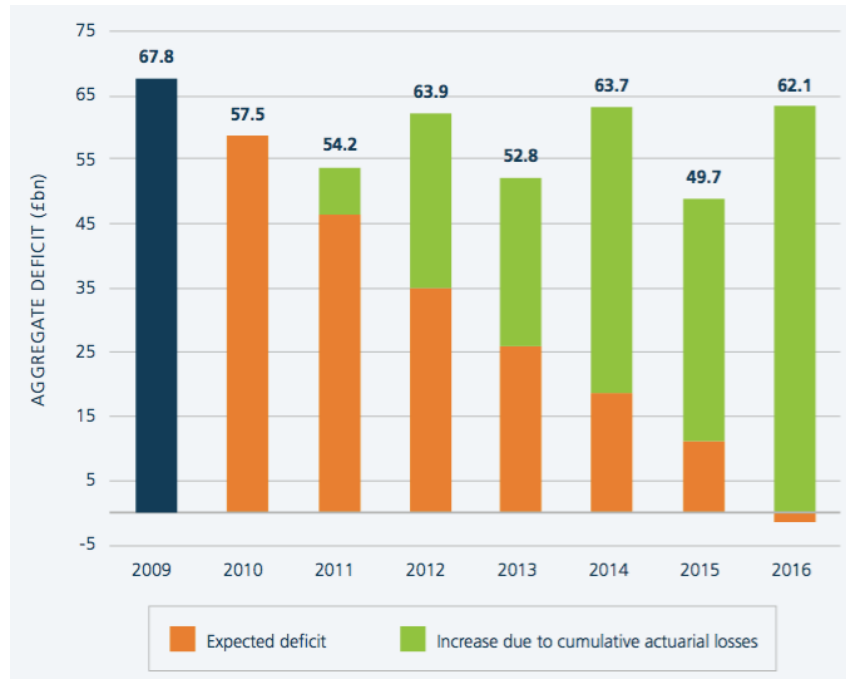


Fig 6.5: Progression of aggregate FTSE 350 pension deficit since 2009

Source: *Impact of pension schemes on UK business: reviewing the effect of DB Pensions on companies within the FTSE 350* (Barnett Waddingham, 2017)

The debate in the political economy literature around the short term crisis prone nature of capitalism (Harvey, 2011) is perhaps supported by the data in Fig 6.5 (above) and the analysis of pension contributions made by the FTSE 350 in the period 2009-2016 when compared to the monies paid out in shareholder dividends (see Fig 6.6), since 2014 largely unchanged at a mean of only 11-12%:

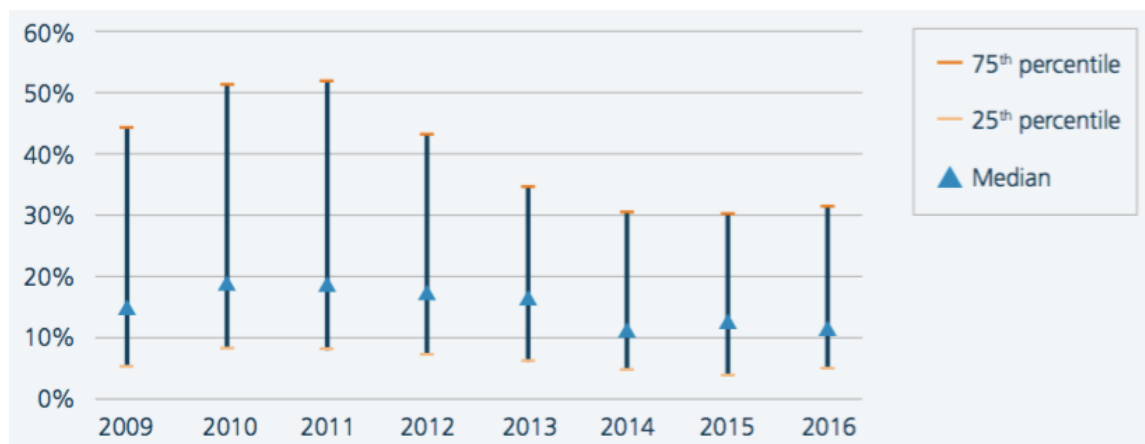


Fig 6.6: Deficit contributions as a % of dividends

Source: *Barnett Waddingham, 2017*

Conventionally we might assume that extensive infrastructure projects are the demand side of the market, and that capital, be its derivation public or private, is the supply. But if Say's law (Say, 1803) (a law stating that supply creates its own demand) is correct, then it is the multiple actors representing global capital, requiring attractive yielding, long dated assets in which to invest, who are creating the demand. Moreover, it might be surmised that the quantum of the demand of global capital exceeds the ability of investable infrastructure assets to absorb; thus creating a destabilising imbalance. Harvey (1975: 9) too has stated that the progress of capitalist accumulation depends on 'the existence of a market to absorb the increasing quantities of commodities produced', and this is echoed by the co-head of global investment banking at Goldman Sachs: 'the constraint on private equity has been the opportunity set of available targets rather than the backing of financial markets' (Nachmann, 2017).

So, in light of the current wall of capital (Author's interview, Partner, Consultancy firm #1, 2016) looking for a home and finding it (or attempting to find it) in infrastructure as an asset class; we can assert that capitalist accumulation relies on the existence of a market to productively deploy the increasing quantities of excess capital being produced. Again we are back to the recurring question of are we financing development or developing finance; if the latter then there will be those who recall Keynes' wariness of giving over too much influence to the risk taking financial classes:

'When the development of a country becomes the by-product of the activities of a casino, the job is likely to be ill-done' (Keynes, 1936)

Section 4.2 demonstrated the significant growth in pools of capital held by SWFs, pension funds and infrastructure funds. This characteristic of unprecedented concentrations of institutional wealth is further supported by the growing amount of dry powder (as yet undeployed capital) held by funds awaiting investment, as can be seen below:

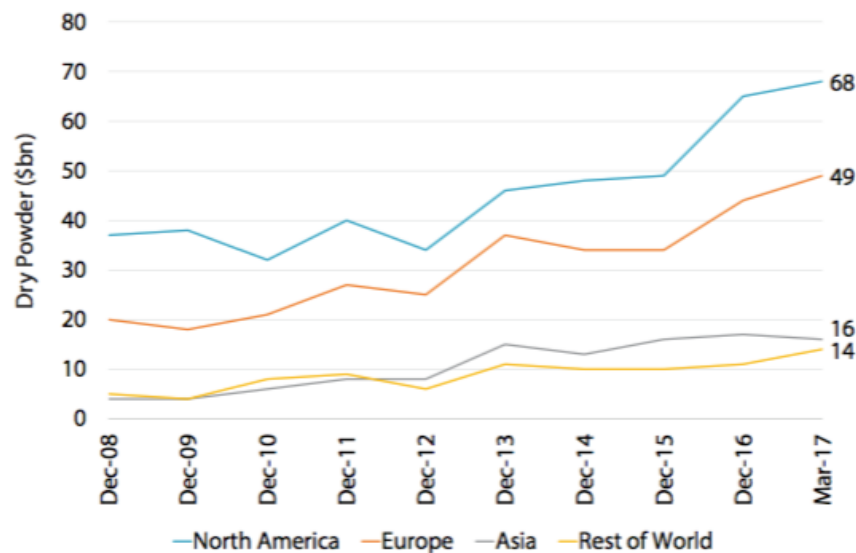


Fig 6.7: Unlisted infrastructure dry powder by fund primary geographic focus, 2008-17

Source: Preqin Infrastructure Online, 2017

This fact, combined with the move of the pension fund and annuity sector to allocate increasing amounts of their substantial portfolios to infrastructure investment, would suggest that the commodity of which there is the greatest surplus on international markets at present is capital itself. Indeed, it was that very fact, in terms of huge Australian pension surpluses relative to a small domestic listed stock market in the 1990s, that contributed to the growth of the Macquarie infrastructure investment model, which has perhaps been the most significant buy-side event of recent decades. This mismatch in terms of the quantum of capital and the supply of investable infrastructure projects and assets in which to invest, was mentioned by many as a potential issue present (and pressing) in a number of sectors and geographies:

‘there is a hell of a lot of money being generated economically, mainly in the far east. A lack of good risk adjusted investment opportunities’ (Author’s interview, Senior Partner, Infrastructure Fund #1, 2016).

Section 4.1 outlined how the ad hoc and sporadic nature of early infrastructure markets were driven by specific factors of economic geography; the quantum of local pension funds compared to the size of the endogenous equity and bond markets, and the presence of a neo-liberal voice within government, such that the idea of private sector investment in

infrastructure found a receptive audience. The relative chaos of those nascent infrastructure investment markets has evolved, over just a few decades, into fairly transparent, codified, liquid global markets in which the broadest range of institutional investors and state actors can participate.

The mechanism by which this has occurred goes to the heart of discourse around the nature of markets. Was it as the outcome of a politically, institutionally or socially driven construction (Polanyi, 1944; Mackinnon and Cumbers, 2007; Wherry, 2012); or as the result of a more organic process of catallaxy. The catallaxy theory addresses the emergence of order (over time) from chaos, and was proposed by Hayek, working within the Austrian school of neo-classical economic theory and expressed as:

‘the order brought about by the mutual adjustment of many individual economies in a market’ (Hayek, 1972)

So in the case of infrastructure markets we may be looking at a form of institutional catallaxy, as it would appear that it is the individual economies of institutions that are, in some way, becoming reconciled. In considering the rather seductive idea of catallaxy, however, we would do well to remember Polanyi’s perceptive observation, pertinent to any organic theory, that even ‘laissez faire was planned’. In that respect, the enabling architecture of regulatory frameworks, systems of law, freely tradeable currencies, and established trading practices are present and observable in those geographies, states and markets that manifest as attractive to investors; as Table 6.1 and its attendant methodology demonstrates:

The Index Results Table			
Country	Rank	Index Score	Movement since last Index
UK	1	174	↔
CANADA	2	161	NEW
US	3	153	↑
AUSTRALIA	4	152	↓
UAE	5	142	↑
GERMANY	6	128	↑
SINGAPORE	7	121	NEW
FRANCE	8	109	↓
BRAZIL	9	108	↓
TURKEY	10	107	NEW
NORWAY	11	104	NEW
CHINA	12	101	↓
SAUDI ARABIA	13	95	NEW
ITALY	14	94	↑
QATAR	15	91	↑
KUWAIT	16	86	NEW
INDIA	17	84	↓
SPAIN	18	84	↑
PHILIPPINES	19	83	↑
THAILAND	20	79	NEW
INDONESIA	21	72	↑
MALAYSIA	22	60	↔
JORDAN	23	41	↑
VIETNAM	24	40	NEW
EGYPT	25	34	↑

Key:

↔ No change

↑ Moved up

↓ Moved down

NEW New entry

METHODOLOGY

Based on 13 indicators grouped into 6 sub-indices:

1. Credit and stability
 - Credit Rating
 - Credit Outlook
 - Currency Volatility
2. Sustainability and innovation
 - Environmental Performance
 - Ecological Sustainability
 - Innovation
3. Tax Environment
 - Corporate Tax Rate
 - Resource Drain
 - Complexity
4. National Stability
 - Governance and Stability (incl. Regulatory Frameworks)
 - Safety and Security
5. Ease of Doing Business
6. Private Participation Rate

Table 6.1: Nabarro Infrastructure Index

Source: Nabarro, 2015 and Author's own annotation

Examples of these planned interventions and the passing of primary legislation by national governments affecting free markets would include, in the USA, the 2013 Sustainable Water Act and Water Infrastructure Now PPP Act and 2005's Transportation Infrastructure Finance and Innovation Act (TIFIA); and in the UK, the Thames Tideway Tunnel order of 2014. In addition to these, the ongoing regulatory actions in their sectoral marketplaces for the fixing of feed in tariffs and the like, are further demonstrations of state action in heavily financialised markets.

By whatever means this catallaxy, this ordering into a global market or markets for institutional investment in infrastructure, has occurred, its arrival can be viewed as timely. We have witnessed, in recent decades, a prolonged state under-investment in infrastructure across all geographies. At present global investment in infrastructure is estimated at \$2.2tn

pa against an estimated need of \$3.3tn pa if we are to meet growth forecasts out to 2030 (McKinsey Global Institute, 2017).

We can additionally say that even the investment activity that is occurring is, in many cases, not necessarily ‘solving the problem’ (PE firm #1, SWF#1), or ‘serving the [UK] Government’s interest at all...its not chasing greenfield projects’ (Author’s interview, Senior Partner, Infrastructure Fund #1, 2016). Perhaps this is a key factor in considering the question of whether we are developing finance or financing development. If it were the latter the deployment of investment capital would be more closely correlated to the geographic and sectoral areas of need. Most notably, this would involve an increased allocation towards EMs, but also to greenfield assets in developed markets. This is not the case however:

‘because most of the new investors...want to mimic what they can achieve through investing in the bond market...investing in brownfield assets is clearly everyone’s favourite target...greenfield assets, that’s not where we want to be right?’ (Author’s interview, Principal, SWF#3, 2016).

To address this mis-alignment it has been necessary for Government to intervene to adjust the risk and cashflow characteristics of a project to a point where it becomes investable and at return levels where the government, the National Audit Office (NAO), and the taxpayer can be comfortable:

‘A project generally felt to be well constructed, although placing certain construction risks at the door of Thames Water customers, is TTT; whereas a more contentious case would be Hinkley Point-C’ (Author’s interview, Partner, Consultancy Firm #1, 2016)

This is not due to the issue of private sector delivery in nuclear power per se, though it is a factor, but rather the extreme difficulty in setting price points for power generation out for decades. This issue was highlighted in September 2017 by the UK Government’s auction for wind power subsidy contracts. In this auction, experienced wind farm operators from Germany, Denmark and Spain committed to build capacity at rates of £74.75 per MWh,

£57.50 per MWh and £57.50 per MWh respectively, as against the £92.50 per MWh agreed for Hinkley Point-C (The Guardian, 2017).

What the examples and markets discussed in these preceding pages demonstrate is that the inter-relationships and interdependencies of the forces of supply and demand within globalised infrastructure markets are operating with varying levels of efficacy, and therefore that the ability of these markets to solve the infrastructure problem is geographically uneven. We will now turn to look at the economic geographies of the major forms of institutional capital seeking to invest in infrastructure assets, how these are constructed and why their inherent spatial differences, both in the derivation of their capital and its deployment, have real consequences for what infrastructure gets built and where.

6.3 Spatial and temporal signatures of institutional investors

The investment of surplus capital by institutional investors, either directly or via mediating entities, into infrastructure companies, assets and systems, takes place within the context of a market. How that market is accessed by the various institutional investors and actors, and its institutional construction, is the subject of this Section. The research interviews, supported by transactional data from Preqin and InfraPPP, suggest that the ways in which the three largest institutional investor types aggregate capital, access the market and then deploy that capital into a temporally significant investment cycle, differs markedly between SWFs, pension funds and other annuity providers, and infrastructure funds and the wider asset management community.

Each of these institutional types exhibit a distinct spatial signature. These are important since these signatures express how spatially capital is accumulated within, and moved across, geographies; and are thus indicative of the role played by geography in how these flows of capital are derived and deployed. They address how capital is aggregated and at what levels (locally, regionally or nationally) and in what type of process. For instance, small pension funds aggregated into a larger pool, which then invest through funds or funds of funds, achieve a high degree of spatial variegation relative to the size of the original pool of capital. This variegation however comes at a cost, and that is the ongoing fees and

charges that support the aggregating or mediating entities, in most cases funds. A more direct spatial trade; for instance, one SWF investing directly in an asset in a 3rd party country, has a very different spatial signature. There may be less fee cost associated with that, but the SWF needs to maintain the institutional capacity to act in that manner, and this does not come cheap (Author's interview, Portfolio Manager, Public Pension Fund #1, 2016). Also a direct investment of that type results in the use of capital with a very specific and identifiable geographic origin; potentially causing political issues if anything adverse occurs in the operation of another country's critical asset (the reason given by Norway for not investing in unlisted infrastructure – as discussed in Chapter 5). In the first example however the mediating layers and spatial variegation lends the original pool of capital as somewhat geographically amorphous, as the PE literature would contend.

The temporal signature, put simply the speed at which capital is deployed and the time duration before it returns to its spatial origin in the form of dividends, interest, coupon or capital repayment, has multiple ramifications:

- a. The velocity of capital; how it is invested, but more importantly how long it may be until it is returned. With some assets having a ready and liquid secondary market, it is possible to run a heavily traded, short term portfolio. At the other end of the scale, directly investing into outright asset sales or privatisations, concessions or PPPs of 50+ years, can mean the locking away of capital for many decades. The empirical data clearly demonstrates that institutions are very conscious of their duration appetite when determining their investment preferences and strategy. It is however, also clear that those smaller pools of capital that are forced to take a mediated route to market, tend to cede a measure of control over duration as a necessary cost of constituting part of a larger pool of capital, and hence access to a wider range of opportunities.
- b. Asset liquidity; essentially its availability on the market. Chapter 5 has examined the fact that some core operational assets in low risk jurisdictions are being held for the very long term by certain investors (the largest pension funds and SWFs). This may align with government wishes for investors to take a long term view re the operation of infrastructure assets. It does however imply that, for the coming decades, core sectors of our infrastructure landscape will be operated on the basis of contractual and financial arrangements and methodologies pertaining today. Given the fact that assets in the most

sought after markets are precisely the ones most likely to be *withdrawn* from circulation, we can see that there is the potential for an inbuilt weakness in the efficiency of some markets to reconcile supply and demand (echoes of Harvey, 2011). Whilst there may be the ameliorating effects of 5 yearly (or similarly) regulatory cycles, this degree and impact of ownership, governance and business model *lock-in* needs to be acknowledged and analysed.

6.3.1, 6.3.2 and 6.3.3 consider the spatial signatures of SWFs, pension funds and infrastructure funds respectively. In each case examples of actual actors within that sector are cited in order to support the spatial signature model being proposed. The implications of these differing spatial signatures are then discussed in 6.3.4. In the accompanying schematics at Figs 6.8, 6.9 and 6.10, the notion of capital being uplifted, aggregated and re-spatialised or re-deployed into an alternative geography, only to return gradually over time to its source, is likened to a weather cycle. As with a weather cycle and rainfall, it is possible for extreme surpluses of capital (thick investment markets) and extreme shortages of capital (thin markets) to have adverse consequences for the geographies in which they manifest. These issues are explored further in 6.4 and 6.5.

A caveat. These signature schematics are not intended as deterministic or fixed, rigid templates. They represent interpretative frameworks that encompass and cast light on the typical or modal behaviours of each of these institutional types in order to visualise the distinct variegation in the spatial derivation and deployment of investment capital by these different institutional market actors.

6.3.1 Spatial signature of a typical Sovereign Wealth Fund

SWF pools of capital are compiled or formed at a national level even though the fund may well be a function of national trade surpluses across many sectors and geographies, or the result of sales of fossil fuels with a specific (sub-national) spatial derivation. In many SWF models investment in the national domestic market is legally proscribed which results in a state mandated external flow of capital. This is true for example in Singapore, where GIC was established solely with a mandate for overseas investment, whilst Temasek is a more

domestic based SWF investing mainly in Singaporean and some selected neighbouring economies.

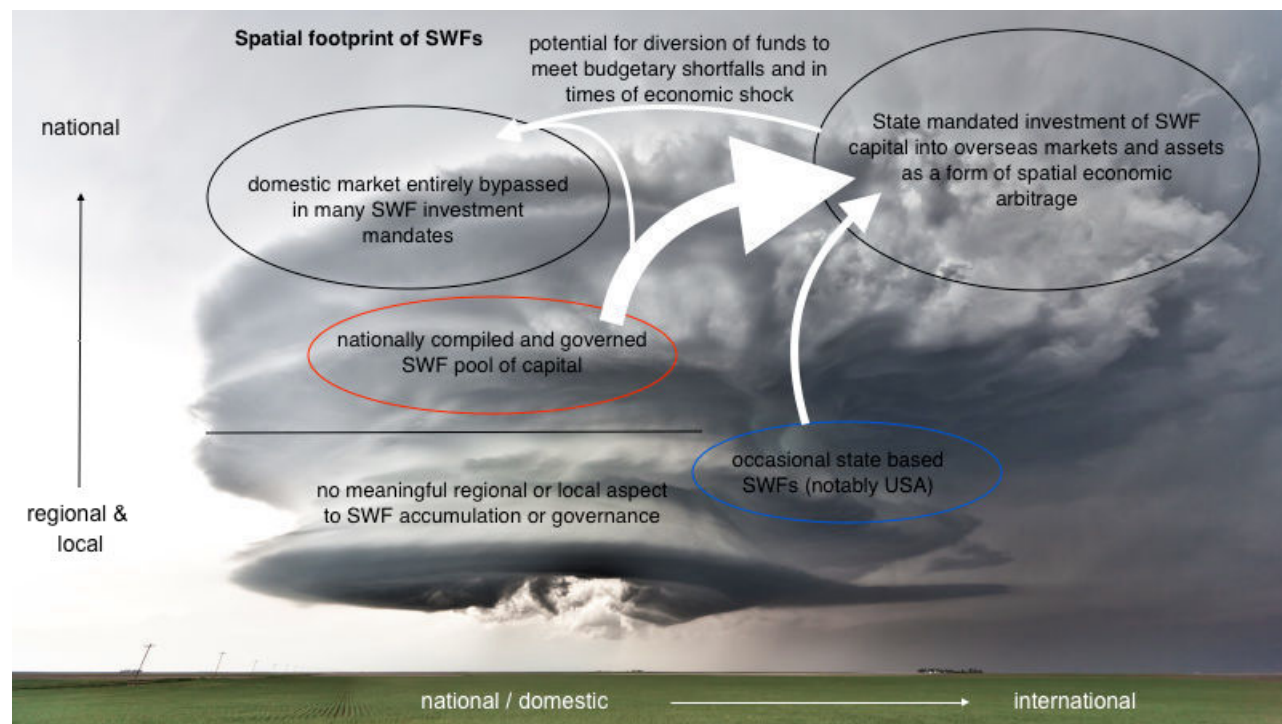


Fig 6.8: Spatial signature of a typical Sovereign Wealth Fund

Source: Author's own, 2017

These SWF investment flows into external geographies result in a degree of arbitrage, or a financial stake by the investing state in respect of the economic prosperity and asset values of the external investee state(s), particularly in instances where the concentrations of capital invested in a specific overseas market are substantial. The economic linkages may accord with the broader political and industrial policy of the investor SWF's domestic government, in which case there has been noted the potential for some conflicts of interest (Haberly, 2011; Monk, 2011).

It was for such situations and conflicts that the global SWF community broadly adopted a set of guidelines drawn up by the IMF and the International Forum of SWFs (IFSFW), *The Santiago Principles*, in 2008. Currently SWFs representing 80% of AuM have signed this accord.

It must be noted that, whilst most SWF investment is focussed on external economies and markets, particularly in the case of ‘post-colonialist funds’ (Clark, Dixon and Monk, 2013: pp36-38); it remains the case that their pools of capital can be diverted back to their domestic economy in times of need, crisis or fiscal stress. Fig 4.6 detailed the impact of falling oil prices on reserve assets in Saudi Arabia; however, such commodity based price volatility seems unlikely to have a material impact on the short term liquidation (sale) of SWF held infrastructure assets. Firstly, because the infrastructure portfolios of SWFs remain small compared to listed equities and bonds, and secondly because listed assets are significantly more liquid and thus easier to sell to meet near term fiscal needs:

‘You worry. I guess. People talk about what’s going to happen if the oil price falls to \$10 to all the oil based SWFs. They may stop investing, they may sell assets, but they are going to do that from their liquid portfolio not their private portfolio’ (Author’s interview, Head and MD, SWF#1, 2016).

6.3.2 Spatial signature of a typical pension fund or annuity provider

Pension funds in many markets can be seen as a locus for, or concentrators of, individual capital. Smaller local funds can and do aggregate into larger regional and national funds or, where legal entities remain separate, management and investment functions can be aggregated or delegated upwards into a single body. Examples of this aggregation can be seen in APG in the Netherlands, Australian Super (Australia), the KiwiSaver (New Zealand), the Individual Retirement Account (USA), and the Registered Retirement Savings Plan (Canada). It could also be said that initiatives such as PiP in the UK act as a sector specific (infrastructure) aggregation tool to facilitate the ability of smaller (often LGPS member) schemes to invest in the infrastructure asset class.

Unlike SWFs, pension funds are free (and indeed often encouraged) to invest in their own geography or domestic market. Investments with external currency and political risk elements tend to be more problematic for PF investment committees. That said, some PFs (due to their size relative to their domestic investment/ equity market) reach a point where

domestic investments can no longer sensibly absorb endogenous funds, this is true for example in Australia, Netherlands, South Korea, Switzerland and Canada.

‘I don’t think there is any surprise that those parts of the world with fully funded pension schemes or mandatory contributions tend to be the source of some of the larger pension funds. I’m thinking about places such as Australia, mandatory contributions of 12-15% which gives rise to an enormous amount of pension savings managed by institutions there, and the domestic market is not big enough there so they have to look overseas. Ditto NPS in Korea, mandatory contributions, massive surplus, they own whatever percentage it is they own of the domestic market and it’s not sensible to continue to deploy in that market, they need diversification’ (Author’s interview, Co-Managing Partner, Infrastructure Fund #2, 2016).

Consequently, capital is forced to flow into external markets and endogenous savings are converted into variegated forms of multi-territorial, multi-spatial, multi-sectoral risk.

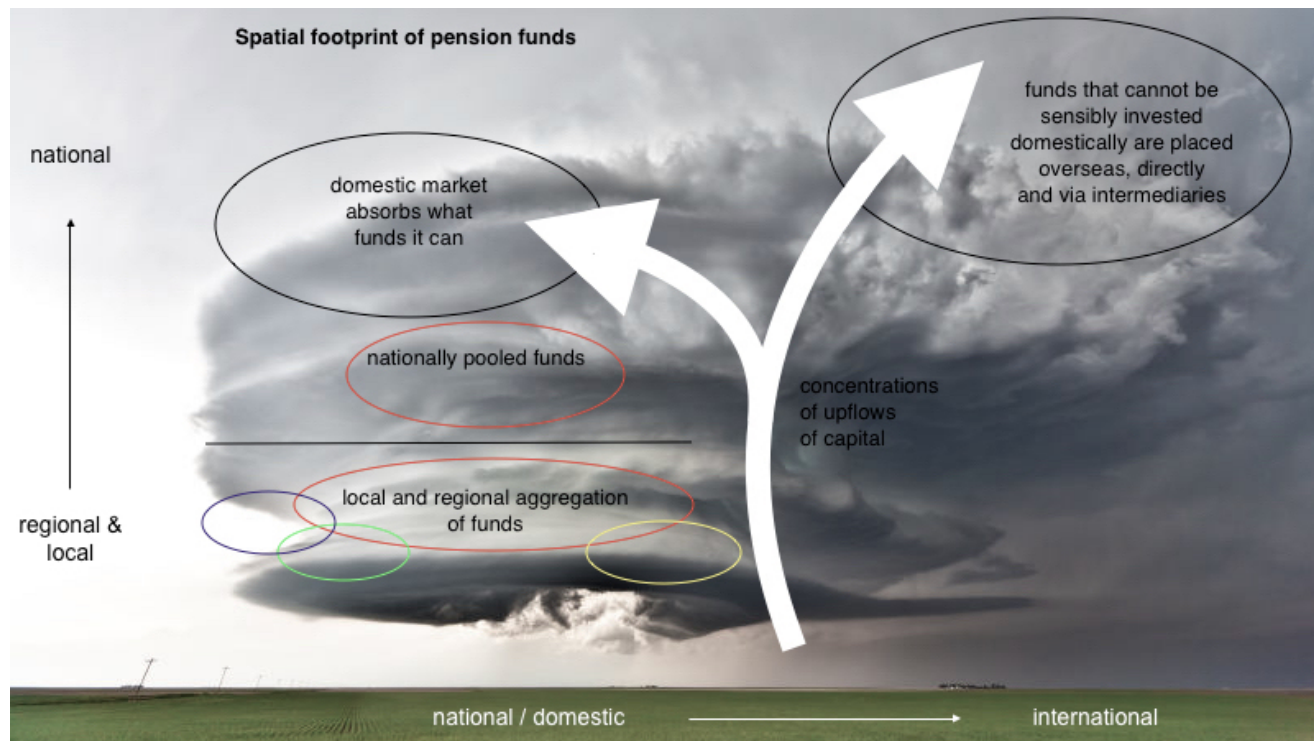


Fig 6.9: Spatial signature of a typical pension fund or annuity provider

Source: Author’s own, 2017

The geography of a pension fund is critical in terms of determining its likely investment outlook. Unlike an SWF, a pension fund wants to be closely correlated with its domestic market. Since the long term liabilities of a pension fund are denominated in its host currency and subject to ongoing factors such as inflation, there is a desire on the part of a pension fund to find attractive yielding assets in its own currency and where domestic inflationary factors are somehow naturally hedged. Domestic infrastructure is, for these reasons, an attractive asset for the pension fund and annuity institutional market.

Since it has been seen in Section 4.2.2 and Fig 4.7 that the pension fund and annuity sector (a) is extremely concentrated spatially with just 7 countries representing almost 93% of total assets, and (b) exhibits strong preferences for investments with minimised currency and inflation risks, then it follows that the net outcome is that this huge pool of investment capital, estimated at \$37tn (Willis Towers Watson, 2016), is geographically pre-disposed towards markets (Western Europe, North America and Australasia) that are already showing signs of lower returns driven by challenging rises in already high asset values. An example being that PFs represented 57% of UK based infrastructure investors as at mid 2016 (Prequin, 2016; Author's analysis). In fact, we may go further and say that it is the economic geography of the pension and annuity sector and the fund management industry, so reliant on PF and annuity capital, that is a material contributor to the high asset values being witnessed in these core infrastructure markets. This trend is set to continue as pension fund AuM increases and the sector raises its allocation to the infrastructure asset class.

6.3.3 Spatial signature of a typical infrastructure fund

Infrastructure funds and other asset management institutions such as PE firms fulfil a market role as mediating agents. In the finance industry *rainmakers* are initiators and facilitators of transactional activity and, in so far as infrastructure funds connect pools of surplus capital with assets or projects requiring capital, they can rightly be regarded as rainmakers. And just as weather systems draw up moisture from one geography hold it for a time interval within the cycle and then spatially re-deploy it, so too do fund management firms accumulate capital from a range of sources (Government agencies, MFIs, SWFs,

pension funds, and foundations, and even other funds) and then re-deploy or re-spatialise that capital into new geographies or markets.

‘Our job is to identify investment opportunities, deploy capital into those opportunities and ultimately harvest the investment returns for institutions’ (Author’s interview, Co-Managing Partner, Infrastructure Fund #2, 2016)

Whilst infrastructure funds are much less spatially fixed than Government agencies, MFIs, SWFs and pension funds, in practice as we have seen in Section 4.2.3 and Figs 4.12 and 4.13, the geographies of infrastructure funds tend to reflect the geographies of their source capital. As such the bulk of these funds are operationally headquartered in North America and Western Europe, with the remainder located in Australia and the major Asian financial centres. This spatial reflection of their source investors will also to a degree reflect pipeline proximity. Having settled on specific geographies, then possessing the networks to source and execute transactions remains a major factor in the *raison d’être* of an infrastructure fund.

‘If you want to do anything smaller, that isn’t shopped around by a bank, that’s not a multi-billion dollar deal, any space that is a little bit different, you need a manager to help do that, to execute strategy. Access is one thing, experience and expertise re execution and to sift through a sub sector or deal size. Ability to originate, identify and execute that they [smaller investors] don’t have the manpower or sector expertise to execute’ (Author’s interview, MD & Head, Infrastructure Fund #8, 2016)

And it is to those areas of labour, expertise and local networks that the infrastructure funds interviewed consistently returned:

‘On the access to investments side we’ve got a team of people sitting in Beijing, in Mumbai, in Seoul, local people, local nationals, they live the culture, they have networks, they understand what they are doing, and they are pursuing these opportunities for their own fund’ (Author’s interview, Executive MD, Infrastructure Fund #5, 2016).

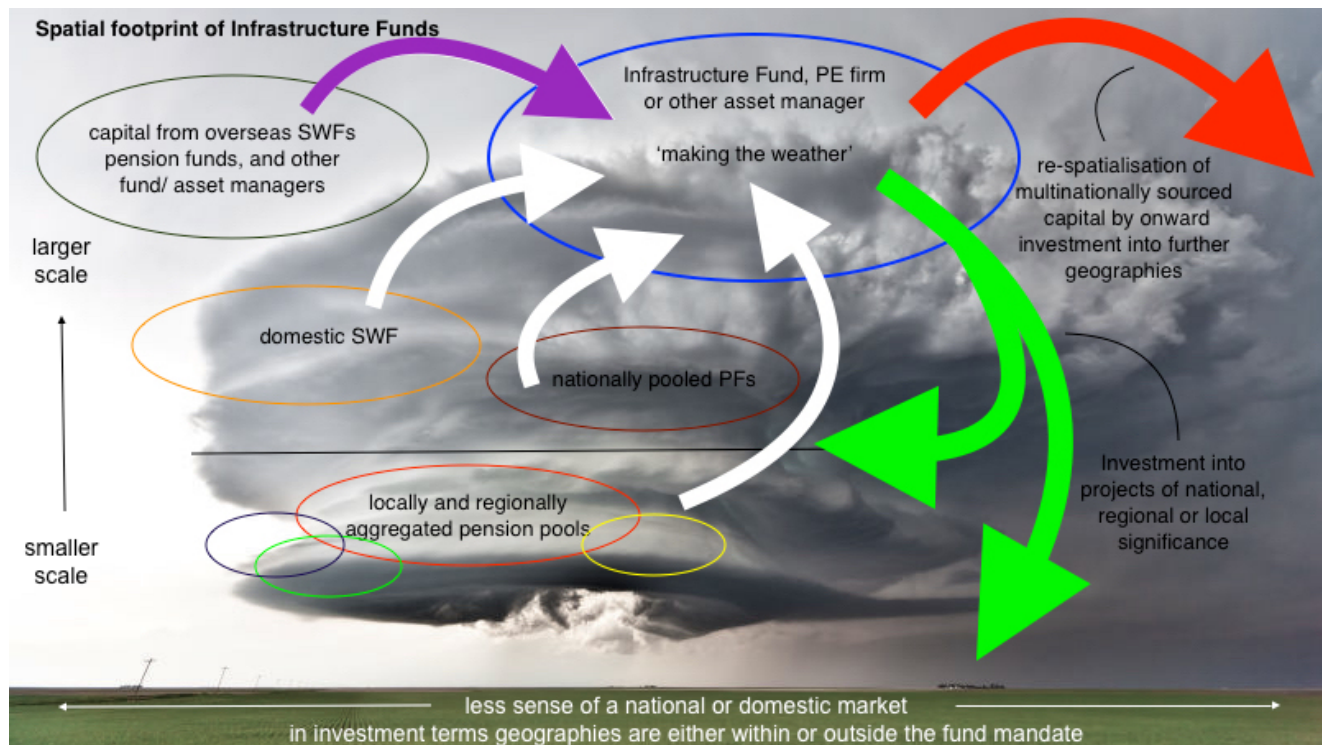


Fig 6.10: Spatial signature of a typical infrastructure fund

Source: Author's own, 2017

As Fig 4.3 showed, infrastructure funds make up 64% of the non-corporate infrastructure investment market. As such their patterns of behaviour are critical to the complexion of the broader investment ecosystem. Their role in *making the weather*, at least in part, consists of them matching or reconciling the needs and aims of their source investors, with the identified capital requirements of the target infrastructure investment or asset sponsor. In reality they ameliorate the demands of their clients, with those smaller pools of capital (small pension funds, foundations and family wealth offices) most likely to have to take a passive LP role whilst the GP and larger institutional investors direct and drive the investment strategy.

6.3.4 The importance of spatial and temporal cycles

The spatial signatures of these three largest institutional market actors disclose widely variegated sources of capital, differing attitudes to the geographic focus of its deployment, and each imply a certain term for the temporal cycle, the duration for which the capital will remain in a given investment or fund; in the weather cycle so to speak.

These geographies have not been incidental to the development of global infrastructure markets, and they remain a critical factor in the way these markets operate currently. They also are contributing to the presence of thick markets in geographies such as Western Europe and North America, and similarly thin investment markets in the Global South and Eastern Europe.

These institutional signatures start to explain what infrastructure investment and development takes place and where. More fundamentally they suggest where markets may result in aligned infrastructure development, taxpayer value and effective relationships between public and private actors; and where this is demonstrably not the case. In this sense it is these cycles, and the geographies of institutional investors driving them that decide who, what and where gets left behind. This fundamental question for economic geography is addressed further in 6.5, and later in Chapter 7, where some conclusions are drawn as to the resultant operating efficacy of global infrastructure markets.

6.4 Geography as a factor in financialisation

Having considered the geographical impacts of the processes of marketization and financialisation, and also the geographies of institutional investment capital on these processes, this Section now turns to consider the ability of the state to meet institutional capital on an equal footing. The dynamics of this state-capital or state-market interface has, this thesis suggests, a profound impact on the ability of the public sector to extract benefit from its engagements with broader infrastructure markets.

O'Brien, Pike and Tomaney (2015) present a useful analysis of processes of financialisation resulting in the reworking, rather than diminishing, the role of the state. Given that financialisation itself represents the growing reach and power of finance and financial institutions in the wider economy (Pike and Pollard, 2010), and that its manifestation in infrastructure has been the conversion of utility services into tradeable assets and investable cashflows, then it can be said that these processes have necessitated

an engagement between the state and financial actors. The quality and power dynamics of that engagement are however, not spatially consistent.

6.4.1 *The scalar capacity of the state*

There is a necessary caveat to the thesis of the financially empowered, engaged, informed qualitative state and it relates to scale and geography. Most of the roles outlined in Section 4.1 are, in many sovereign states, decided by and executed centrally at a national government level. The ability to execute any of these roles at the regional or local level is spatially uneven and highly dependent on the political and institutional geographies and fiscal controls pertaining in any given jurisdiction. Local government in the UK for example is seen in the literature as financially denuded (O'Brien, Pike and Tomaney, 2015), and by investors as having limited deal structuring capacity (Consultancy Firm #1) and thus deemed to have little role to play:

‘I guess there’s a role there [in planning] for local government; other than that I can’t see anything’ (Author’s interview, Head of Alternatives, Investment Consultant #2, 2016).

‘There is some minor role for local councils in smaller greenfield deals and interactions for local accounting purposes’ (Author’s interview, Co-Founder, Asset Management firm #1, 2016).

This power and capacity disparity between the central/national and the regional/ local is a particular feature of the UK and differs from markets such as North America. In the USA we see a largely municipal market (Strickland, 2015) aside from federally driven tax breaks. Whereas in Canada, it is often the provinces (regions) who are the more significant actors and counterparts:

‘In Canada the government in infrastructure terms was pretty much a bystander. It was the provinces that drove the agenda and they all have differing objectives, differing fiscal positions’ (Author’s interview, Partner, Consultancy firm #1, 2016).

In the UK too the impact of city deals and devolution may ultimately move the agenda down to a regional or municipal level: ‘as devolution pushes out cities will take differing approaches’ (Author’s interview, Partner, Consultancy firm #1, 2016). It is moot however as to whether devolution will be accompanied by the powers to finance and fund infrastructures or the institutional capacity and expertise to transact.

In the UK, issues of scale and expertise continue to hinder transactions between institutional investors and local authorities:

‘It seems that the major councils have the funds and the government backing for the funds, but getting them over the line and then getting government comfortable how you invest is difficult. We had a meeting with DCLG, we were trying to push them, but it seems to get stuck’ (Author’s interview, Infrastructure Strategist, Asset Management firm #4, 2016).

This is a particularly vexed issue for smaller councils with less devolved powers, less expertise and smaller projects. So we can observe that this financialisation of infrastructure is spatially uneven and potentially more so in a devolved scenario (Pike & O’Brien, 2016):

If you have a Local Authority (LA) responsible for building new schools, on average most of their time is spent repairing schools and admin of education budget; the building of a new school is a rare event, and as a PPP that’s even rarer. You are going to get that skill set issue, if you are only doing it very 4 or 5 years at best (Author’s interview, Senior Partner, Infrastructure Fund #1, 2016).

In terms of geographies of knowledge in a UK context, these are felt to be broadly reflective of the political and fiscal institutional framework, namely highly centralised. A major fund manager [Infrastructure Fund #1] cited the example of PFI road and prison projects structured by central government departments based in London. There were perceived to be issues at LA and Local Enterprise Partnership (LEP) level with the infrequency of exposure to these structured public-private transactions.

Globally there is a high degree of variegation in terms of control models for infrastructure, and to complicate things further, these vary by sector. In water for instance France and Germany own the physical assets which are funded through local taxes. In the US, there exists a strange, fragmented, and inconsistent duality of 5000+ utilities, most of which are municipality owned and controlled, but where privately owned utilities are regulated at the state level. Chile has a centralised federal system of regulation, and ‘has privatised its water sector in a model akin to the UK’. (Author’s interview, Director of Corporate Finance, Regulator #1, 2016).

Whatever institutional form the state takes, and however powers are devolved or centralised, it is to this structure that market actors and institutional investors need to acclimate; reconfiguring their own processes and geographical coverage to reflect the nature of the local market. So the state in infrastructure terms is a highly variegated super actor and one, to whose timelines, scales and political framework, institutional capital has to defer.

6.4.2 Evolutionary political and financial geographies

There is a stark contrast between the geographic specificity and concentrations of the world’s greatest pools of investment capital, and the diasporic global deployment of these same funds (Clark, 1999; Froud, Johal and Williams, 2002). As we saw in Chapter 4, SWFs tend to arise from either the existence and exploitation of fossil fuels, or from aggregated and ongoing budget surpluses. Pension funds are aggregated pools of pension savings and investable personal surpluses held by certain socio-demographic segments of specific wealthier countries (Willis Towers Watson, 2016). These evolutionary physical and economic factors have given rise to vast, but spatially and socio-economically uneven, pools of capital. Their global reach has exported financialised models of infrastructure provision, neo-liberal contractual templates such as PFI and PPP (Whiteside, 2014), and arguably acted as a Trojan horse for neoliberal development (Miraftab, 2004). These evolutionary financial geographies, when viewed in conjunction with evolutionary political factors (such as sovereign institutional and regulatory capacities), and the historically installed infrastructure base, combine to profoundly impact on contemporary infrastructure

outcomes. This is because the interview research data, supported by investor questionnaires and transactional records (from Prequin 2012, 2014, 2015, 2016, 2017a, 2017b, 2017c; InfraPPP, 2016), suggest a strong investor and institutional market preference for stable regimes, high degrees of sovereign capacity, endogenous pools of equity and debt finance, and brownfield opportunities, which in turn require high levels of already built and operational infrastructure assets. As we have seen in earlier Chapters the desire for brownfield assets relates to a desire to minimise build risk, and also a preference for an existing cashflow stream to service both the leverage placed on the asset itself and to meet the ongoing cash liabilities of the investor (be they pension payments, budgetary contributions or shareholder dividends). In practice this means that institutional investors favour those states with a larger existing installed and operational infrastructure base operating in a stable political, fiscal and regulatory environment; thus lagging states continue to lag.

‘One of the benchmarks is the risk free rate of the country, so at the moment you can get Brazilian government bonds for 15%, so for me to invest equity, to take risk, then I’m going to need something over 20%. Whereas in Japan its -1%. So we would be benchmarking across that. So you look at a country and its track record of laws and regulatory stability, what is the business dynamic, the growth. So a lot of it is making that whole risk-return of a country [assessment]’ (Author’s interview, Head and MD, SWF#1, 2016).

Lagging or less developed states also suffer from the fact that ‘capitalism requires government’ (Amy, 2007), and the quality of that government (both in actuality and in how it is *perceived*) both now and historically, is critical as to how capital will respond (MFI#1, MFI#2, MFI#3, SWF#3). Thick markets (those attractive to most investors) are ‘generally held to be within the OECD’ (Author’s interview, SVP Structured Finance, Public Pension Fund #4, 2016), and particularly in the area of operational assets. Thin markets tend to be emerging or frontier in nature, non OECD, and situated in the global south (Ankrah, Mante, and Ndekugri, 2015). However, thin markets can also exist within the OECD, but in areas of policy uncertainty, extreme greenfield (long pre-cashflow phase), and new technology. Whether such challenging geographies and markets are benefitting from the discriminating signature of globally circulating institutional capital is moot (Miraftab, 2015). Not

everyone is equally attractive in this ‘enduring capitalist dance’ (O’Neill, 2012); an observation deeply rooted in not just history, but also geography.

Some countries are regarded as *peripheral geographies*, exhibiting traits that make investors, even the MFI sector, reluctant to invest or even to engage. Political despotism, human rights abuses and endemic corruption are all clearly negative factors. The first two carrying material reputational risks for any investor, whereas corruption significantly increases transactions costs and project uncertainty. The result is thinner markets and increased costs of doing business. This also applies to development banks such as MFI#2 who have problems working with the Russian state and Baltic based investment funds, due to (the MFI’s) strict in-house requirements for transparency in terms of procurement and financial reporting.

These issues of perpetuated disparities of income, opportunity and asset provision, based on political, regulatory and economic geographies, and which are heavily derived from historical factors, do not only pertain at a state level; where, as we have seen, the global north and OECD member nations are broadly the favoured geographies. Within countries similar processes are also at work on a regional or sub regional basis, and on the basis of socio-economic factors. These are manifested in terms of the aggregated coupon pool of individuals often being a function of embedded property equity (higher in more expensive real estate markets – eg London and the South East in a UK context), personal savings (greater in areas of high employment), and accumulated pension assets (again historically higher in areas of high employment, higher level jobs, and state sector jobs) (French, Leyshon and Wainwright, 2011). This has clear resonance with Critical Social Accountancy and the literature of the disenfranchised and disempowered (Froud, Johal and Williams, 2002).

These political and economic geographies impact on the attractiveness of a given market to investors and in turn the efficiency of the market in delivering positive infrastructure outcomes for that state or region. It is highly suggestive of the opportunity for (though not certainty of) a beneficial outcome if a state has many bidders for a given asset or concession. Due to the laws of market forces, high demand should drive value for the seller. Conversely the same is true; where infrastructure assets are made available to the market

in an environment of few bidders and little investor interest; then there is little pressure on bidders to deliver good value or customised solutions.

Global capital is highly mobile (Clark, 2005), geographically amorphous (Pike, 2005), and geographically and sectorally fickle. By contrast ‘infrastructure is *always* a local asset’ (Author’s interview, Principal, SWF#4, 2016); so the ongoing challenge is how to attract and retain globally mobile capital to a geographically fixed asset and location. The mobility of capital in Cetina’s flow world (2005) is a growing issue as ‘more infrastructure investors are following the relative value path’ (Author’s interview, Partner and Co-Head, PE firm #3, 2016). Relative value here, being a methodological approach to investing that reduces geography, sectors, and the nature of the asset to a mathematical equation of risk adjusted or risk rated return:

‘Taking a relative value approach has real benefits. You have excess demand for brownfield infra in western Europe and contracted assets in North America...with these comes higher valuations, lower returns. Let’s say you have raised an infra fund in Europe with a target of 10-12% gross IRR then it’s very hard to deploy capital and meet those returns in that market...so you find investors having to like that market because they have to [being geography or sector based]. We don’t have to do that...we can look for the best solar plant globally...where is the best risk rated return possible, and if that’s a solar plant in Australia returning better than one in Tennessee. Same thing for an airport...we are about to conclude an investment in Toronto city and I think that’s a better investment risk rated than some others like City Airport. I think that flexibility really pays off’ (Author’s interview, Partner and Co-Head, PE firm #3, 2016).

We will now consider one of the institutional mechanisms deployed when the economic and political conditions of the local infrastructure asset are not sufficient in themselves to attract geographically fickle sources of international capital.

6.5 Stresses in the system, emergent valuation bubbles, and systemic risk

It is the case that the size of global infrastructure markets have grown significantly in recent decades, with the aggregate value of completed transactions in 2016 reaching \$645bn, of which \$413bn represented new investment (see 6.11 below). This \$413bn of new capital represented a rise of 14% on 2015. Despite that the number of deals has remained broadly consistent in the 1,700-1,800 range since 2013 (Preqin, 2017) with deal values on the increase:

‘Demand for infrastructure has increased over the last decade, [so] greater competition for assets – particularly secondary stage [already-built and operating] assets in developed economies – has pushed valuations upwards’ (Preqin, cited in FT, 2017):

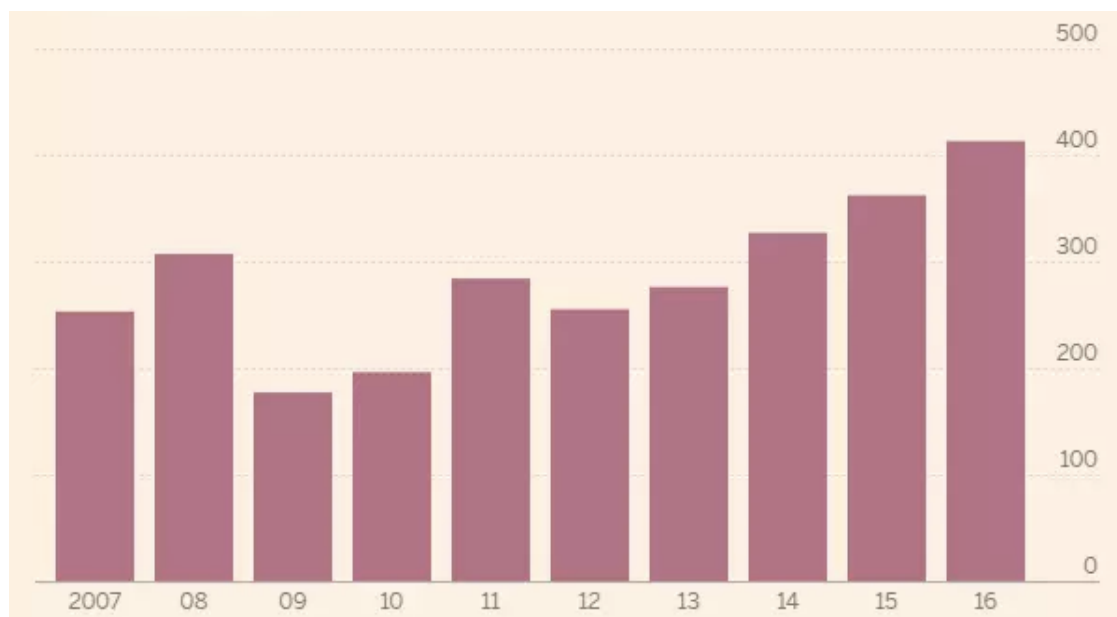


Fig 6.11: Global infrastructure deals (investment value in \$bn)

Source: Preqin/ Financial Times, 2017)

We have seen in Chapter 4 the major drivers for institutional capital to move into these markets. We have also seen in the same chapter the reasons for the engagement of the state with this process of the financialisation of infrastructure, part of a broader trend in what has been termed the marketisation of the state (Birch, Kean and Siemiatycki, 2015).

This Section has considered the emerging concerns on the part of some observers, academics and public sector stakeholders, that the rising deployment of surplus pools of capital by the likes of SWFs, pension funds and annuity providers, both directly and via infrastructure funds, may not just be about answering a societal and economic need for new and improved infrastructure. It is certainly clear that infrastructure demand is not even, or even driven by the same exigencies, across geographies. It is also clear that investment appetite, the presence of large scale investment actors, and the derivation of investment funds is spatially uneven. We have then seen that the patterns of infrastructure need and the availability of investment capital are not spatially aligned, nor are they necessarily synchronous in terms of sector need or phase of infrastructure development.

Infrastructure markets have been the beneficiaries of larger macro factors such as the fact that sovereign, corporate and individual coupon pools of capital have been growing (as we have seen in Chapter 4) at the same time as rates on cash or bonds have reduced to minimal levels, and stock markets have been exhibiting high levels of volatility and low returns. Over time, and the research interview data and industry records confirm this, there is developing an issue wherein greater pools of capital are chasing fewer reasonable geographies and assets in which to invest.

This Section therefore seeks to examine whether these spatially uneven, institutionally mediated markets, are exhibiting any signs of structural stress or investment bubbles, and if so, where they are occurring and how they are manifested. These considerations go then to the heart of whether today's infrastructure markets are functional and sustainable; and the ramifications of any structural weakness.

To the extent that infrastructure markets, or specific geographies or sectors within them, are overheating then neo-classical economics might lead us to expect the occurrence of supply and demand imbalances, leading to impacts on asset valuations. As a consequence, we would then observe price, value and competition to emerge as key challenges for investors within the market. As 6.5.1 and 6.5.2 demonstrate, that is exactly what is now being seen in thick markets, those geographies with high densities of capital looking to be deployed. It is interesting to note that, even in such markets, the density of infrastructure opportunities appears to be insufficient to absorb the profusion of available capital. As we have seen in discussions about thin or emerging markets, the converse is also true. We may

therefore consider that the geographies of infrastructure opportunity are less polarised than the geographies of investment capital.

6.5.1 Supply and demand imbalances, and impacts on asset valuations

In the earlier days of large infrastructure funds and institutional investment in infrastructure, the information asymmetries and relative illiquidity of tradeable assets resulted in some exceptional profits being realised by the early movers (Whitfield, 2011; Whiteside, 2015). This fact is corroborated in interviews with Infrastructure Funds #1, 2 and 5, Private PF #2 and SWF#4. These returns accompanied by technical factors such as low volatility, low correlation, inflation hedging, a model-based theory of low likelihood of loss, and a see-through to a sovereign credit covenant, were all contributory factors in building the market appetite and establishing the asset class.

Since that time infrastructure asset prices have, in the main, materially inflated:

‘they are all clamouring for assets that may not have been seen as prize winners in the past, London City Airport for example springs to mind, or Billy Bishop Airport in Toronto’ (Author’s interview, Portfolio Manager – Infrastructure, Public PF#1, 2016)

We may not be able yet to say that these are early signs of Autumn (Braudel, 1984; Thrower, 2014), but we can say that core infrastructure assets are getting scarcer, few new operational assets are coming on stream, and buyers (such as SWFs, pension funds and annuity providers) are moving to longer term holds, thereby taking assets out of market circulation. It is therefore harder to find value in the major markets and core assets. Again and again examples such as City Airport, acquired at 35 x Earnings Before Interest, Tax Depreciation and Amortisation (EBITDA), were cited:

‘The returns they [Canadians] are looking for and the multiples they are buying at are quite eye watering’ (Author’s interview, Senior Partner, Infrastructure Fund #1, 2016).

This compares with Zurich Airport, valued at 10 x EBITDA; and Charles de Gaulle at 9 x EBITDA. So industry observers conclude that Borealis (purchaser of City Airport) are looking at that asset as in effect a real estate deal:

‘I think that could be a mistake for some people at some point. I’m not saying it [City Airport] was a bad investment but it wouldn’t work for our pension funds, I wouldn’t even pitch it to them, because I know they’d say no...it’s too risky’. If I was giving my child £50k I wouldn’t put it all into city airport, it wouldn’t be as safe as a buy to let property probably. So the question is, is infrastructure suitable for a long term investor? I think PPP still is’ (Author’s interview, CEO, Infrastructure Fund #4, 2016).

A sentiment echoed by many others:

‘At the present time there is more capital than there are sensible opportunities to absorb it...so you are seeing high prices, compression on discount rates [a price inflationary factor] and so on’ (Author’s interview, Co-Managing Partner, Infrastructure Fund #2, 2016), and

‘Everything is overvalued at the moment, it’s very difficult to see value anywhere...anecdotally the UK is the most expensive infrastructure market...but even across Europe...infrastructure is expensive’ (Author’s interview, Head of Alternatives, Investment Consultant #2, 2016).

The risks of accepting these high valuations, and taking a real estate or developer type view of a utility asset, are quite clear. Essentially investors are overlaying development speculation onto utility asset performance. In a competitive market such as airports, and where most (in the UK) are in the hands of institutional investors, is it possible for everyone’s most optimistic business case to be correct?

‘On City Airport your investment return will depend on you getting development approval. You ask me I think you will probably get it, but maybe you don’t...a massive impact on your investment case. Removal of limits on volume of aircraft,

will you get it, I think possibly not. A lot of unknowns. So to say it's a safe investment; sure it's never going to go away but is it possible to lose money? Certainly' (Author's interview, Executive MD, Infrastructure Fund #5, 2016).

For many people their infrastructure exposure broadly reflects what has come onto the market, so there are a lot of operational energy and transport assets. These are, in the words of SWF#6, essentially 'Private Equity dressed up as infrastructure' (Author's interview, Director of Alternative Investments, 2016), and in a scenario where many equity investors do not understand the operational risks of being an owner.

When considering whether the market is working effectively and reflecting neo-classical economics theories of the efficient circulation of capital, we need to state that the area of main price stress and where investors feel assets are most overvalued, is Western Europe and North America. And yet that is also exactly where most funds say they are focusing their resources and investment:

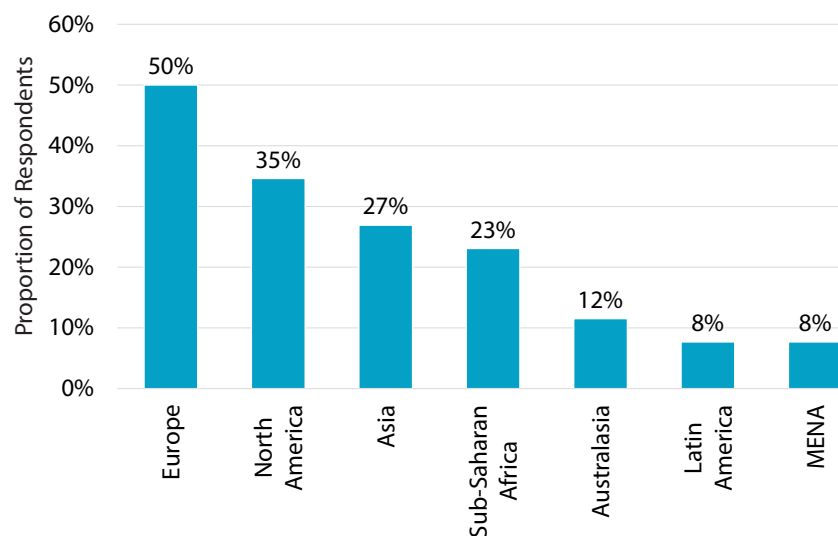


Fig 6.12: Fund managers view of the regions presenting best opportunities for investment

Source: Preqin, 2017c

Since the majority of infrastructure investors have concerns about valuations (Preqin, 2017c) and see them as a particular issue in markets such as the UK, North America and Australia; then their continued focus on these same geographies appears to be illogical.

This illogical behaviour notwithstanding, there continues to be significant growth in the infrastructure fund sector; and not only in terms of AuM, but also in the emergence of ever larger mega-funds. In this respect the ground breaking funds by GIP (\$15.8bn) and Brookfield Asset Management (\$14bn) from 2016, have now been thoroughly overtaken by the debut Blackstone Infrastructure Fund, sized at \$40bn. So in 2017, the infrastructure investment market is seeing record amounts being raised, large numbers of new funds in the market, and sharp increases in the amounts of dry powder available to be deployed, with the greatest increases in deployable capital occurring in North America and Europe (see Fig 6.7).

It is also notable that this dry powder is not evenly present across the fund management spectrum. As Fig 6.14 demonstrates, dry powder now represents 49% of all AuM within those mega funds in excess of \$2bn. The allocation strategy of all of these mega funds is global and opportunistic, but in practice is largely PE in nature and aimed at large scale brownfield operational assets in the main OECD geographies. It is therefore reasonable to assume that these significant sums will be looking for further investment opportunities within already competitive (if not overvalued) markets.

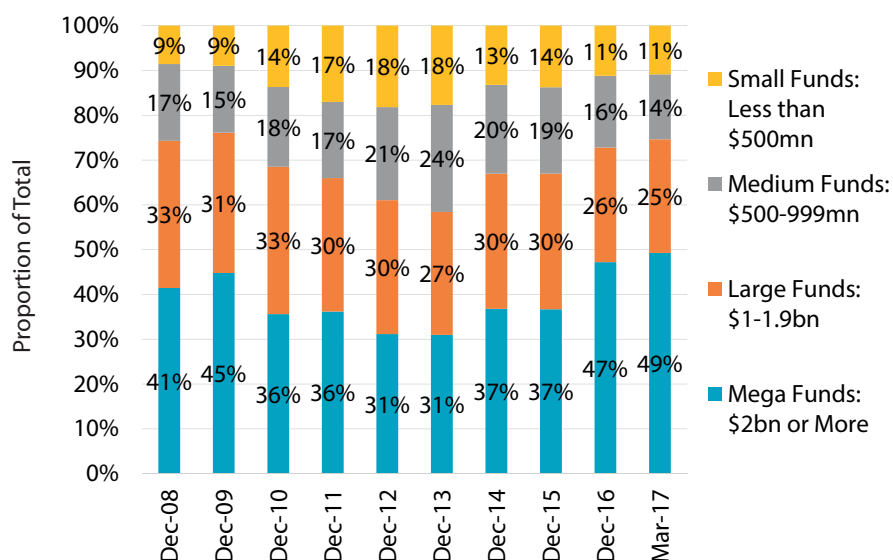


Fig 6.13: Unlisted infrastructure dry powder by fund size, 2008 - 2017

Source: Preqin Infrastructure Online, 2017a

Another asset manager, relatively new to the infrastructure market (since 2010), and which already has \$8bn under management, shares this global strategy and also admits:

‘we have a non OECD bucket in the fund, but there is not an intention to use it (Author’s interview, Director, PE firm #2, 2016).

It is notable that this PE firm, GIP, and Blackstone et al have focussed on the principal area of market volume growth, namely brownfield, operational, cash yielding assets in OECD markets. As PE firm #1 observe: ‘they are not in the city business’ (Author’s interview, Founder & Managing Partner, 2016), meaning they do not deal with cities and their local, smaller scale, infrastructure needs. In that sense the likes of GIP could stand accused of being in the area of the market that is not answering the high volume of new infrastructure need, not solving the problem. It is this sector, which is looking for high teens and above in terms of IRR, that deploys PE traditional fund structures (rather than the typical LTIIA members for example), and that is arguably PE dressed in infrastructure clothing:

‘we look for assets where there are things you can do – an expansion plan, an efficiency plan, a re-financing opportunity...things that will make the asset work for us’ (Author’s interview, Director, PE firm #2, 2016).

6.5.2 Price, value and competition emerge as growing issues

‘The number and estimated aggregate value of infrastructure transactions in Q1 2017 was lower than previous quarters at 339 and \$206bn. However, the average deal size is significantly higher than previous quarters; this suggests valuations have increased significantly as low interest rates and sizeable amounts of dry powder have led to significant competition for attractive assets’ (Preqin/ FT, 2017).

The above sentiment is derived from the results of a 2017 fund manager survey conducted by Preqin in 2017, and summarised at Fig 6.14:

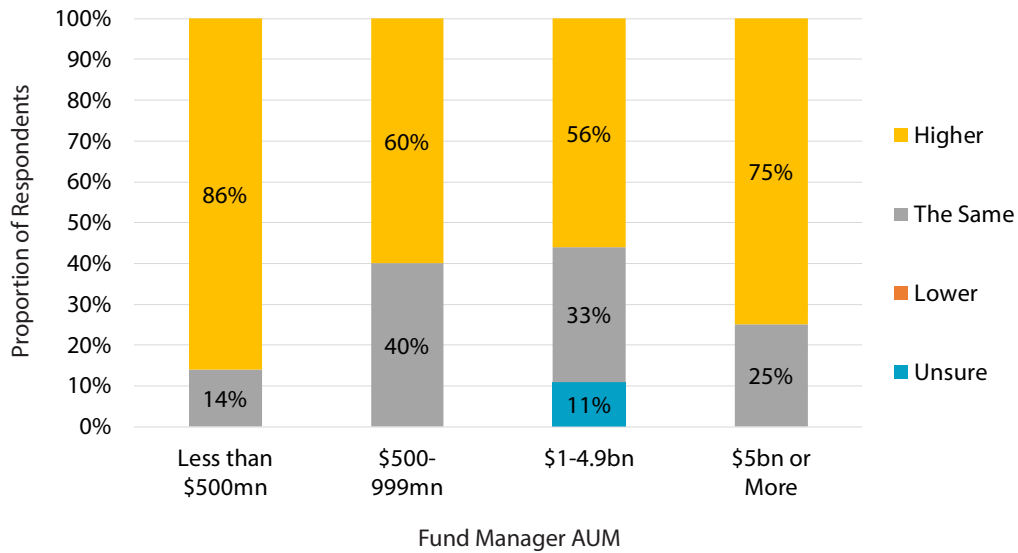


Fig 6.14: Fund manager views on pricing for infrastructure assets compared to 12 months ago by AuM

Source: Preqin Fund Manager Survey, cited in Preqin, 2017c

This sense of pricing being driven higher, particularly in the core markets of Europe and North America, is just one factor causing stress within the infrastructure fund manager community. This pressure is compounded on both sides of the fund managers' core activities, namely the competition to manage the funds deriving from institutional investors, and in turn, the competition to find appropriate assets yielding the necessary IRR into which that institutional capital can then be deployed:

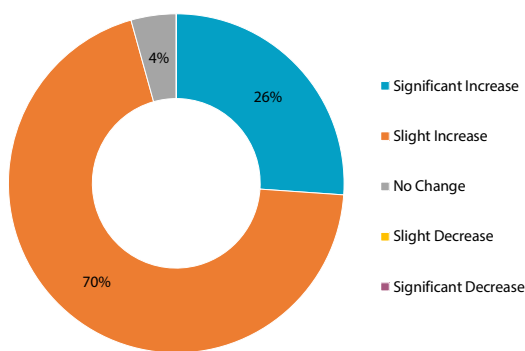


Fig 6.15: Fund manager views on competition for institutional investor capital compared to a year ago

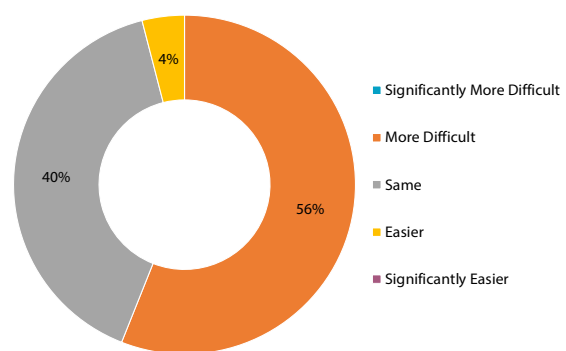


Fig 6.16: Fund manager views on level of difficulty of finding attractive investment opportunities compared to a year ago

Source: Preqin Fund Manager Survey, cited in Preqin, 2017c (for both)

Fig 4.11 outlined the considerable number of funds currently engaged in fundraising, but the degree of competition for investor funds (referenced in Fig 6.15) is meaning that they are having to spend longer on the road, expending more management time and cost in the process of accumulating investment capital. The average time spent on the road for unlisted infrastructure funds was 22 months as at the end of Q1 2017, an increase of three months from Q4 2016. That fund managers are needing longer to assemble their funds, and are having to acknowledge reduced target IRRs (as demonstrated by Fig 6.4) is further tangible evidence that the supply of infrastructure assets and opportunities is running out of step with the ever growing pools of investment capital attracted to the sector.

The UK context to this constraint of market opportunity is an almost complete absence of PPP projects (only 3 transport transactions since 2014). Silvertown (a road tunnel to the East of London), a £750m project with expected close in 2019, is the only one out there. Instead a major infrastructure sector trade journal observes that ‘in a bid to remain gainfully employed [the industry has been] wheeling out more refinancings than you can shake a stick at, a host of M&A deals and the evolution of an incredibly aggressive equity and debt market’ (IJ Global, 2017), indicative of a mismatch between supply and demand, and an effort by institutional investment actors to construct a synthetic deal flow (to maintain their high cost bases) in the absence of underlying fundamental primary (state-driven) activity.

6.5.3 An asset class with momentum or an emergent bubble?

Whether or not there is a true market bubble emerging, it is clear that there has been a general rise in capital prices of prime infrastructure assets in the most desirable geographies. As a result, investors’ search for ‘value’ is starting to lead them up the risk curve:

‘Everything is overvalued at the moment, it’s very difficult to see value anywhere’
(Author’s interview, Head of Alternatives, Investment Consultant #2, 2016)

In behaviour terms, this journey may result in investors seeing links to government that may not be there (to imagine the comfort of a quasi-sovereign risk profile). This may result in increasing leverage against inflated capital values, moving from operational assets to greenfield and taking on construction risk, migrating along the curve from core to core+ assets (see Fig 5.1), trading regulatory risk for market risk, moving an LP role to GP, co-investor, or managing partner role (taking on board and operational management risk), moving from diversification to asset concentration in a *hot* sector, moving from developed markets to emerging ones, and from emerging to frontier; or taking on more technology risk.

Asset bubbles can also occur in the context of sectors driven by subsidy. Offshore wind and solar power being just two that are exercising investment actors at present (IJ Global, 2017a). By definition such governmental pump priming is often applied to develop or promote immature and illiquid markets. The process of judging when such assets no longer require fiscal or regulatory support is a delicate balancing act and has implications beyond the subsidising state due to issues of broader supply chains and the interconnected web of ownerships across global markets:

‘These days the [solar] industry is so huge and global that these projects get a huge flood of applicants, it either drives the price down or creates a bottleneck. That wasn’t the case 5 years ago; now it is. Brazil just took 10.5 Gw of tenders for its renewable PPA auction; it’s crazy. The Mexico auction just priced at \$30 per MWh for solar and again significantly less than anyone expected’ (Author’s interview, MD & Head, Infrastructure Fund #8, 2016).

There is a theme here of markets being unable to self-regulate in terms of efficiently configuring the supply of capital to the changing demands of infrastructure sectors and geographies; instead ‘everyone on the equity side is competing to win deals so they are reducing their returns’ (IJ Global, 2017a). What are the reasons for this apparently illogical behaviour? These may include the spatial derivation of those funds and the regulatory and economic spatial bias and constraints dictated by them, such that there are only certain areas in which they can be invested. This focus does not necessarily dovetail with areas of economic need for new infrastructure, or with areas of relative *value* in price terms. In fact, we can argue that this idea of bubble risk around valuation

also ties in with pools of capital that, having outgrown their own domestic markets, are now outgrowing some of the wider OECD core and core + investment markets. This mismatch creates areas of thick markets, high prices and lower relative value, and leaves behind thinner markets and geographies of higher societal need.

This theme of markets being unable to self-regulate may lead us to consider the case for state or regulatory involvement in the ongoing reconstruction of markets, but it certainly reinforces the nature of markets as always in need of ongoing evolution, repair or reform. The data presented here, and supported by the research interviews, presents the possibility that capital is pursuing specific segments of the broader infrastructure markets even as that very choice becomes less and less logical or sustainable. This is occurring in both the equity investment markets and infrastructure debt funds also:

‘It’s only a matter of time before the realities of a perpetually-constrained European market start to hit home for the swathe of infra credit funds. It’s impossible to say when this will happen (sooner rather than later, we fear). And this is the real issue: lack of prospects. Sure, there has been plenty of activity in the re-fi space and that will continue, but there are only so many times you can rearrange the Titanic deck chairs. It’s a car crash in slow motion’ (IJ Global, 2017).

This would seem to accord to theories of the crisis prone nature of capitalism (Harvey, 1985), and the inherent destructive violence of financial markets (Leyshon, 2010; Marazzi, 2011; Berndt and Boeckler, 2009). A sentiment echoed by the Governor of the Bank of England; ‘markets left unattended...are prone to instability, excess and abuse’ (Carney, 2015).

6.6 Market stresses, social consequences

These negative connotations of capital and markets have been with us since Marx, and have been seen as a consequence of the hegemony of capitalist accumulation (Lapasvitas, 2010). As these ‘spaces of global capitalism’ (Harvey, 2006) extend further and further into our everyday services and our daily life (Dore, 2008) it is the scope for societal and individual

economic damage to occur as a consequence of these system risks and valuation bubbles that should concern us.

Markets are not divisible from society, as the GFC clearly demonstrated. When, however, the actors within those markets are providing essential infrastructure services, then the consequences of market failure, or the failure of entities operating within those markets, are that much more profound. As previous failures in (among others) rail transportation and school construction in the UK have shown, infrastructure services can, in extremis, be de-financialised and taken back into state control. The empirical findings within this thesis are suggestive of a downward trend in investor IRRs and of a growing difficulty in finding profitable areas of key infrastructure operation in core markets. At their extreme, such conditions can lead to unprofitable contractual commitments for the tendering entity (such as in the 2018 collapse of Carillion in the UK). Whilst such developments may, at time of tender, be suggestive of the state achieving better value in their contracting for infrastructure services, the disruptions to key infrastructure delivery, and the costs and governance challenges of re-building an alternative supply chain should not be underestimated.

The empirical research of this thesis has considered the role of the state and of institutional investors in the construction of contemporary infrastructure markets. It has examined the nature and drivers of investment actors across the public-private spectrum and highlighted the financial activism of the modern state manifested as a re-casting of the qualitative state and, through the actions of quasi-public actors and mediating entities, the mediated state. It has analysed the complex relations between investment actors, the underlying heterogeneous asset class that is infrastructure and the demands of market and transactional realities.

This Chapter has, in answer to Research Question 3, further addressed the role played by geography, specifically economic geography, in the drivers of institutional actors and in the derivation and deployment of their investment capital. It has in turn examined the extent to which the resultant markets formed by that capital, currently appear unaligned to issues of underlying infrastructure need. Lastly it has considered the health and efficiency of contemporary infrastructure markets and whether they are functional and able to deliver

economic value or are exhibiting traits of dysfunctionality and stress more often associated with the destructive tendencies of unchecked capitalism.

These themes will, in the next and final Chapter, be brought together in order to draw some conclusions about contemporary markets for infrastructure, and the institutional and spatial factors that are creating and re-creating these structural spaces for the financialisation of our utility assets and services.

Chapter 7. Spatial concentrations of institutional capital, and the construction of infrastructure markets: conclusions, contributions and reflections

Infrastructure assets, systems and services exist today at the intersection of institutional capital, society, and a re-imagined, re-cast qualitative state. Fit for purpose infrastructure, both publicly and privately owned, remains crucial for the delivery of essential utility services; and societal debates and sensitivities around its ownership retain neo-classical perspectives of public good, and cultural expectations of government led service provision. Since we all interact with infrastructure every day in terms of our power, communications, water and transport networks, and our usage of schools, hospitals and emergency services; infrastructure has a profound effect on society and our daily lives. The opening up of previously *public* works (OECD, 2007) to market actors and metrics therefore is, at least in part, a phenomenon with profound social and cultural implications, and consequently of considerable interest to economic sociology theorists. Allied to this of course, is that hitherto state-dominated roles of design, construction, financing, delivery and ownership of this infrastructure, are being replaced by a variegated range of institutional investment actors. This transition of utility assets, and the revenue streams that can be derived from them, from the public realm to that of private or institutional capital contains rich material for the field of political economy. Debate swirls around issues of value extraction from the state, the continued and deepening penetration of the financial world into the day to day (Martin, 2002), and whether market based solutions can truly deliver public good and social value. In this context, contemporary markets for financialised infrastructure represent a unique lens through which we can examine the evolving roles of the state, markets and private capital.

These growing markets for direct infrastructure investment, be that via models of ownership or long term operation concessions, and by the investment of either equity or debt capital, are experiencing unprecedented growth. And yet the empirical evidence is that there is a profound spatial mismatch between the geographies of capital investment and the geographies of infrastructure need. Some capital starved territories are almost wholly reliant on the actions of development banks and grant finance acting in concert with a profoundly constrained state, whilst other territories are experiencing high demand from

institutional investors, an oversupply of capital, and a consequent inflation of infrastructure asset sale values, overbid tender concessions and under-capitalised infrastructure operators.

It is this spatially uneven market outcome that is of particular interest to this thesis. In order to understand the markets of infrastructure need and of investment capital demand, it is essential to take a fine-grained institutional approach to examining the principal market actors, and to explore the spatial and structural factors driving the nature of their participation in infrastructure markets and specific transactional activities.

Through an in-depth empirical analysis of the institutional make-up of infrastructure markets, the varying institutional drivers, and the nature of infrastructure as an emergent asset class, this thesis has argued that previous monolithic readings of capital are no longer sufficient for the understanding of fast moving capital markets, that the old public-private binaries of the state and private capital no longer reflect either the financial investment actions of the re-cast qualitative state, its enmeshment with markets, or the increased politicised capital deployed by institutional investors. It also a finding of this thesis that the geographic derivations of institutional capital are profoundly affecting the geographies of its ultimate deployment, and in turn, that this determines what type of infrastructure is getting built and where; who benefits and who gets left behind.

By way of conclusion, this Chapter reviews the analytical and methodological decisions taken in this thesis. The approach to the organisation and examination of the current academic literature relevant to the study of the processes of market construction and reconstruction is revisited. Section 7.1 restates the firm conviction of this thesis that it is a spatially contextualised and institutionally informed analysis of the institutional actors within contemporary infrastructure markets that best addresses the gaps in the literature and provides the most robust empirical approach to answering the research questions.

7.2 presents a summary of the principal empirical findings. These are aligned with, and examined against, the three research questions; and divided according to the findings Chapters 4, 5 and 6 of this thesis. These are organised as follows. 7.2.1 presents institutional findings and conclusions, primarily focused around notions of a re-cast qualitative state as a financial actor as well as a market maker, and unpacking the black box of the firm to better understand institutional variegation along the public-private spectrum and the role

that geography plays in institutional characteristics and investment capital. 7.2.2 presents relational conclusions focussed on the reflexive relationship between heterogeneous infrastructure as an asset class, spatially uneven markets, and variegated institutional capital. 7.2.3 then outlines conclusions around the dilemma of supply and demand, the functionality and efficiency of infrastructure markets, and whether these markets are financing development or developing finance.

The principal conceptual and theoretical contributions to the literature are the focus of 7.3. In that context, this Section discusses the development of notions of a re-cast qualitative state and the mediated state as a complex and powerful market actor at 7.3.1; proposes the value of an institutional and spatial reading of investment capital at 7.3.2; presents an empirical and nuanced picture of financialisation in practice at 7.3.3; and finally suggests the notion of market (re)construction as a manifestation of an institutional and transactional catallaxy at 7.3.4.

7.4.1 and 7.4.2 reflect further upon the study, methodological approaches, and potentially fruitful areas for further research, most notably in the areas of unpacking the state driven demand for infrastructure investment and institutional capital, and a comparative analysis of thick and thin market outcomes both in quantitatively based economic terms and qualitative measures of societal benefit.

The key findings of this research, it is proposed, materially inform our understanding of the geographically variegated nature of institutional investment markets, and the opportunities and challenges they present in terms of infrastructure development, models of governance and, what this study has termed, financialised statecraft (Pike *et al*, forthcoming). In that context, while formal policy recommendations do not form a part of this thesis, there are material implications and learnings for policymaking in practice.

7.1 Summary of the analytical and methodological approach

This thesis has considered the spatial and institutional characteristics of investment capital deployed in infrastructure markets. The approach, informed by the gaps in the literature,

has been to examine this topic at three principal scalar levels, firstly the level of the individual institution (for instance a specific SWF), secondly at the level of institutional type (SWFs in general), and thirdly by taking the aggregate of all these capital actors (as outlined at Table 3.1, Methodological Approach) and analysing the way these collective pools of capital behave and deploy at the level of the meta-case of financialised infrastructure markets, be these operating at a regional, national or global scale.

The literature has been approached and organised in such a way as to facilitate a better understanding of the operations of 21st century capitalism, examining its actions and consequences through the lens of global financialised infrastructure markets. The analytical framework developed for this study, has considered the characterisations of capital, the state, markets and infrastructure primarily through three main bodies of literature selected as having the greatest theoretical contribution and relevance to the areas that are core concern of this research; these being neo-classical economics, economic sociology and political economy.

Neo-classical economic theory is considered as it captures grand theories of circuits of capital and operates in a world where there exists a sharp separation between the state and largely private markets. In this context the ‘erecting and maintaining [of] public institutions and public works’ (Smith, [1776] 1976, 2:244) is seen as a key duty of a sovereign state. This reflects a still widely held belief that essential public services are more appropriately owned and delivered by the state. Moreover, it is reflected in the belief that the motivations of private capital, and the impact of the processes of capitalism, are oblique, cloaked and uncertain. In this context any nuanced consideration of the motivations of institutional capital, or the spatial derivations and deployment of such capital is often absent. In this sense neo-classical economics represents a body of literature still relevant today in policy terms (for instance in the financial globalisation that originated in the Chicago School influenced policy bodies of the IMF and the World Bank in the 1980s), but one which exists as diametrically opposed to the approach taken by this thesis in responding to exhortations for a more institutional, granular approach to our understanding of investment capital. It should also be noted that neo-classical economics denies, in its spatially blind view of abstracted markets (Block, 1990) and tendency toward the theoretical or ‘blackboard economics’ (Coase, 1991), the opportunity for a contextualised spatial approach to 21st century capitalism.

The literature of Economic Sociology, by contrast, takes a more nuanced view of the iterative relationship between markets and society; particularly in the social cause and effect of market phenomena, and the links between cultural reproduction and market personality. It acknowledges that markets do not arrive fully formed but rather it is interested in how markets are created and reproduced. It is therefore highly relevant for this study, as market creation, and the role of geographic and institutional variegation within that, are key to answering the research questions that are posed. Spatially, infrastructure is always a local asset. It is experientially proximate to us all as individuals, and thus the ingress of private investment capital into infrastructure assets and services has, it is alleged, resulted in a financialisation of our daily lives (Langley, 2008, Martin, 2002); a topic again on which economic sociology has much to say. This ingress of the financial on the day to day, of multinational markets reaching down into the world of the individual, of global capital grafted onto local assets; and the consequences for society and the individual are all questions which the economic sociology literature seeks to answer, and all are relevant to this thesis.

The largest body of literature in examined in Chapter 2 belongs to political economy. It is this literature that considers the impact of private capital, ideologies such as neoliberalism, and the effects of processes such as financialisation and globalisation on state actors and ourselves. Political economy is concerned with the extractive, negative potentialities of capitalism on public value and social health. In turn it also contains a view of the state as a kind of Polanyian shield (Polanyi, 1944), a bulwark against unchecked market forces. O'Neill sees, in his reading of the qualitative state (2004), the state as an actor involved in the segmentation, unbundling and privatisation of infrastructure (Strickland, 2016). This thesis extends that conceptualisation to include an enmeshment (O'Neill, 2004) of the state, institutional capital and markets. This re-cast qualitative state is characterised as an empowered public sector actor, a critical market maker (Thrower, 2014) and, in an important contribution to the literature, as a financial actor investing *alongside* increasingly politicised pools of institutional *private* capital.

The review of the literature demonstrates that, in their different ways, both neo-classical economics and political economy see a distinct separation between the aims and activities of the state in comparison to institutional or private capital. This adversarial, or binary,

demarcation, makes clear that there is a growing tension in the shift from industrial capitalism to financial capitalism, from manufacturing yield to investment yield, and from social equity to equity return. Economic sociology tracks the cultural production and reproduction of markets and the influence of these forces of neoliberalism and financialisation on our daily lives. All three bodies of literature however, largely fail to unpick the institutional constituency of global capital and, by failing to examine its institutional drivers and behaviours, our understanding of capital's spatial and scalar signatures is, this thesis would contend, that much weaker. This thesis therefore, driven by the institutional deficit in the literature and Clark's (2005:99) exhortation that 'the economic landscape of twenty-first century capitalism...should be understood through global financial institutions [and their] investment practices', takes a strongly institutional approach to analysis and understanding global infrastructure markets.

Arising from the literature, three research questions were developed to explore the respective roles of the state, quasi-public and private institutional investors and their role in the construction and maintenance of infrastructure markets. To examine the degree of enmeshment between the financialised arms of the state, referred to in this study as the mediated state, with private capital. To consider the somewhat reflexive relationship between institutions and the market, how each is shaped by the other, and how the nature of infrastructure as a heterogeneous asset itself shapes institutional behaviours and market dynamics. And lastly, the research questions require an analysis of the role played by geography in the formation of pools of investment capital and thence in the ongoing formation and characteristics of infrastructure markets. A key consideration being the degree to which markets of different types (in terms of density of actors and capital) deliver against infrastructure need or rather are driven by the exigencies of surplus investment capital.

Having constructed the thesis' research questions consequent to the review of the literature and the aims and objectives of the study, a robust methodological framework was then developed to ensure that the three research questions could be robustly answered through a mixed methods approach centred on original empirical interview data analysis (Chapter 3). The most salient feature of the methodology is the decision to segment the markets for infrastructure investment into the principal typologies of institutional investor (SWFs, public and private pension funds, infrastructure funds and PE) based on a quantitative

analysis of global infrastructure commitments and transactional activity, and then to further examine each of these investor types through qualitative interviews with senior figures from a representative sample of the largest institutional investment actors. It is therefore the granular accumulation of content rich qualitative data garnered from institutions representing in aggregate £10.4tn in AuM or advisory mandates, of which £780bn is invested in or committed to infrastructure, that forms the empirical bedrock underpinning the readings of institutional capital and infrastructure markets that are the focus of this thesis.

7.2 Summary of findings and thematic conclusions

The three research questions are restated and addressed respectively at 7.2.1, 7.2.2 and 7.2.3. This Section explains how these research questions have been answered and how the original aims of the study have been fulfilled. It also considers the broader findings arising from the original empirical interview data and accompanying contextual transactional, industry and policy research.

7.2.1 Institutional findings and conclusions: the re-cast qualitative state and unpacking the black box

The first of the three research questions posed by this thesis is *‘What are the roles and strategies of the state and private institutional capital in the construction, maintenance, and reconstruction of contemporary infrastructure markets?’*

In order to answer this question and to open up the *black box* (Coase, 1991) of capital, it is, as the gap in the literature suggests, necessary to take a more nuanced and granular approach to the institutional actors active in infrastructure investment. Chapter 4 identifies the institutional and spatial variegation among the public and private investor population that constitute contemporary infrastructure markets, and examines their respective institutional drivers and political and economic roles in the (re)construction and operation of infrastructure markets.

A key contribution of this thesis is to demonstrate and articulate a new understanding of the qualitative state re-cast as a financial actor, and the investment and policy context and consequences of its spatially variegated and financialised statecraft (Pike *et al*, forthcoming). Chapter 4 unpicks the fiscal and political drivers for the state to open up key service delivery and infrastructure assets to market solutions and financial speculation; and also analyses how the degree to which such actions have been applied is geographically variegated among sovereign states and is highly dependent on varieties of capitalism (Jessop, 2013; Peck and Theodore, 2007). It also examines the rationale and methodologies for the state as a *financial* actor alongside quasi-public and private pools of capital. In aggregate, it is argued, this new complex role goes beyond that of market maker setting the *rules of the game*, and challenges the orthodoxy of the hollowed out or denuded central state (Skelcher, 2000). This thesis argues that this role of state as a super-firm (Coase, 1991) or super-actor on all sides of the deal represents a functional investment and financial activity additionality beyond that of O'Neill's qualitative state (2004), and takes the governmental, financial and investment activities manifested through infrastructure markets into a realm that is seen, in this study, as a re-casting of the qualitative state.

The method by which the state plays this enhanced financial role enmeshed with other institutional market actors, is primarily via the activities of directly controlled entities such as government departments and agencies and arms-length institutions such as MFIs and SWFs. The latter itself representing a 'major reassertion and restructuring of the state's economic role' (Haberly, 2011:1833). In all of these institutional examples the research highlights the use of further mediating institutions such as infrastructure funds, private equity and other asset managers. It is in these mediating institutions that state derived capital is co-mingled with quasi-public money (such as that of public sector pension funds) and private institutional capital. In aggregate, this co-mingling, re-allocation and re-spatialising of state derived monies, through institutions over which state control is variegated and partial, is referred to throughout this thesis as the mediated state. The extent of the influence of the mediated state in terms of the quantum of public and quasi-public investment capital, and the way in which it continues to shape infrastructure markets, is both material and significant.

It is also concluded that the state has certain understandable drivers for opening infrastructure assets to the market, but that it also has the means within its own pools of capital, and through arms-length, quasi-public capital to maintain an economic interest in assets of importance post their financialisation. In this context the public finance cupboard is not bare (Hildyard, 2012) and indeed is shown to be a material constituent, somewhere between 30% and 40% of the \$70+tn of globally deployable investment capital (Prequin 2016, Author's own calculations).

The result is a meeting and blurring of previously public and private actors and capital. Of public and private institutional capital *itself* becoming increasingly politicised through its investment in the societally essential asset (Thrower, 2014) that is infrastructure. This blurring of the public-private binary represents, this thesis suggests, an intertwining or enmeshment of capital and society, of the market and the state. 'The state is everywhere' (Author's interview, Senior Partner, Infrastructure fund #1, 2016). It is therefore concluded that the old public-private binary, in the context of capital, needs re-thinking. An engaged, pro-active, re-cast qualitative state has the capacity and financial means to engage with diverse sources of other public, quasi-public and private forms of capital as a co-investor (as well as market maker) in the context of financialised infrastructure.

This thesis also elucidates a new, and more spatially contextualised, understanding of the pension or coupon pool (Clark, 1999, 2000; Froud, Johal and Williams, 2002) in the form of both public and private pension funds and annuity providers, and mediating institutional investors such as infrastructure funds and private equity firms. This is achieved by examining the spatial derivations and concentrations of the source capital for these institutional actors, and also how the quantum and direction of that capital has grown and shifted in recent decades. It is clearly demonstrated that all of these institutional entities have, as sub-sets of the broader investment landscape, experienced considerable growth in recent decades. It is additionally the case that the resulting pools of capital continue to exhibit profound spatial concentration. In the case of SWFs this is in those countries enjoying significant and ongoing budget surpluses arising either from the exploitation of fossil fuel reserves, or from trade surpluses generated by the global production centres in the far east, notably China (Clark, Dixon and Monk, 2013). In the instance of pension funds, 92.9% of total pension assets originate from just seven countries (Willis Towers Watson; 2017), a result of those states adopting early legislation around employer provision for

employee retirement benefits, and the accretion of these pension pools over time. It is proposed that the growth of these pension pools is representative of the core thesis of financialisation in that, in the largest pension markets such as the UK, USA, Australia, Switzerland and the Netherlands, pension assets considerably exceed GDP. This is just one manifestation of the ascendancy of the financial economy over the real economy.

The spatial concentrations of institutional investors such as SWFs and pension funds is further reflected in, and thus reinforced by, the location of asset management and advisory firms. By nature, these are service providers and investment enablers. To execute on their business aims they need to be in proximity to the sources of global capital but, more importantly, to where that capital wishes to be deployed. The iterative nature of this spatial reflection results in a concentration of infrastructure funds, private equity firms and other asset managers in the principal markets of North America, Western Europe and, to a lesser extent, Australasia. That these same markets, all adherents to the neo-liberal orthodoxy of recent decades, also exhibit the greatest degree of infrastructure financialisation, is no coincidence and further exacerbates transaction concentrations in these few *ultra-thick* investment markets.

7.2.2 Relational findings and conclusions: the reflexive relationships of infrastructure and markets on the state and institutional capital

The second research question is *‘What is the extent and nature of relations between the state and private capital as a consequence of their involvement in the co-creation of, and investment in, markets for the ongoing financialisation of infrastructure?’*

By taking an institutional approach to investment capital this thesis has sought to provide a granular, and spatially contextualised, explanation for the return drivers and risk appetites of different types of infrastructure investor. It is only through an understanding of these institutional drivers, specific not only to the type of investor (for instance a pension fund), but also to the individual characteristics of that fund (defined benefit or defined contribution, open or closed, funded or unfunded), that it is possible to understand its market, geographical, sectoral and duration appetite, and yield expectations (Redington,

2014). And it is only through the aggregation of these individual features that it is possible to understand why some geographies, sectors and assets enjoy a surfeit of investment interest, whilst others suffer a deficit. In turn then it is this granular institutional analysis that feeds into the type of spatial analysis of markets discussed in Chapter 6. It is the finding and contention of this thesis that there is no shortcut to achieving this understanding; markets are, after all, aggregated constructs made up of multiple institutions (both buyers and sellers, supply and demand), and each institution acts according to its own internal logic, culture and circumstance.

Chapter 5 further considered the ways in which these internal institutional drivers and behaviours are shaped by the market, by the political nature of infrastructure as an asset, by the enmeshment of public and private actors and models, and through co-investment with other institutions. It is clearly demonstrated by the empirical data that engagement with a market, and with mediating and aggregating vehicles such as infrastructure funds, entails a degree of compromise. The state and its mediated institutions participate in investment constructs (funds and other co-investment vehicles) alongside private institutional capital, MFIs with private equity, SWFs and pension funds. The fund and asset management industry has proliferated to meet the demands of growing pools of capital from newer market entrants such as SWFs and pension funds, but also to permit a diversity of investment focus and fund duration.

It is notable that institutions ostensibly have the choice to invest in infrastructure assets directly, on a co-investment basis, via asset manager constructed special accounts, or through mediating constructs such as funds. As the data has shown however, this apparent choice is largely determined by the unique circumstance and scale of the investor. The main factors being the quantum of the pool of capital under management, the institutional capacity to source, execute and manage any ongoing investments, and the need for portfolio risk diversification.

As this thesis has demonstrated, institutions have a wide variegation in the ways in which they can interact with, and invest in, infrastructure markets. Mediating institutions such as infrastructure funds and private equity forms offer additional opportunities for the mixing and re-spatialisation of capital and, in so doing, engage with investors from across the risk return spectrum. From MFIs and government agencies seeking to achieve social and

developmental outcomes in frontier markets, through to the *sweet spot* of investment capital in established utility assets in so called core markets, and out again to private equity and aggressive fund managers looking to high yield returns from more speculative developments in challenging geographies. Interestingly, at the upper end of the risk (and thus yield) spectrum, some institutions question at what point a financialised utility asset becomes so compromised in terms of its core risk profile that it can longer be characterised as infrastructure. This tension between utility value and exchange value suggests that, if infrastructure is an asset class at all, then it is one that has inherent limitations as to the degree to which it can support overly financialised solutions and aggressive capital structures.

Lastly Chapter 5 addressed the changes wrought by the financialisation of infrastructure on the ability of the state to manage infrastructure provision; and on the characteristics of investment capital itself. It is the case that the transfer of infrastructure assets and services from the state to non-state institutions (be it by outright sale or periodic concession) is achieved by way of some contractual arrangement, be this PPP or one of the myriad other structures. By investing in, owning and running such a politicised asset, investment capital itself becomes more politicised and socially visible, certainly when compared to the more geographically amorphous, fragmentary, liquid and anonymous investment alternatives such as global equity and bond markets. This political sensitivity factor is behind the Norwegian SWF's (the world's largest) decision not to invest in unlisted infrastructure (Jensen, 2016), and can be seen in the adverse public and political sentiment when privately run or owned infrastructure underperforms or is seen to be used as a vehicle for excessive financial returns (Allen and Pryke, 2013; Froud et al, 2000; Hearne, 2011; Hodge and Greve, 2005; Loxley and Loxley, 2010; Weber, 2002; Whiteside, 2015).

This rendering of political infrastructure delivery commitments into a marketised, commercial contractual form contains profound challenges for governance, notably in terms of policy flexibility. This is due, in part, to the fixing of a business model, and hence framework for service delivery, at the start of what can be lengthy concession periods. Indeed, poorly constructed transactions continue to provide ammunition for the political economy perspective of extractive capital profiting at the expense of an exploited state. Value for money is of course only one (albeit important) metric against which the financialisation of infrastructure is judged; another is the quality of service delivery. In this

regard the data would suggest that neither public nor private sector provision has the monopoly on either good or bad governance and service standards. Instances of privatised poor performance are many, but so too are examples of compromised public delivery (Albalade, 2014, Inderst, 2013; Weber and Alfen, 2010; Whitfield, 2011, 2013). What this study has sought to demonstrate, via examples such as Rialto and CDPQ Infra's REM project is that instances of potential best practice tend to involve public actors with capacity (an issue for more fiscally or institutionally constrained governments), early engagement with all stakeholders, information transparency, meaningful independent public vs private comparisons, and ongoing flexibility. Infrastructure is, in the main, a long lived asset. It is difficult to see how it can be effectively managed against short term, inflexible criteria. What can also be said is that, wherever they may be found, these lessons and examples ought to inform future policy, regulatory and transactional approaches.

7.2.3 Market findings and conclusions: the role of geography on the mismatch of capital and need, and the spatial instability of financialised markets

The third and final research question posed in this thesis is *'What is the role of geography in creating markets that are able to reconcile issues of infrastructure need and capital surplus?'*

Chapter 6 considered the role of geography in creating markets that are able to reconcile issues of infrastructure need and capital surplus. This institutionally driven spatial approach to global institutional capital demonstrates that the spatially concentrated derivations of global capital exert a crucial influence in how and where that capital is ultimately deployed. It reveals the spatial characteristics, referred to here as *spatial signatures*, of institutional investors as a route into challenging the notion of for whom infrastructure markets are constructed, and the efficiency with which capital is being allocated and deployed across geographies.

A key consideration here is the extent to which one market driver, the global demand for new and better infrastructure, is balanced against another, the increasingly pressing institutional need for the productive (in economic return terms) deployment of excess

capital. In this context Christophers' question of 'how is it possible for "finance" to capture so much value if it is not also, to one degree or another, creating it?' (2016:73) is pertinent.

As part of the mixed methods approach employed by this thesis, a quantitative analysis of institutional pools of capital was undertaken. This analysis of the Preqin database (Preqin, 2017) examined the AuM, capital raising, and transactional histories of over 2000 institutional investors across the public to private spectrum. This demonstrated that recent decades have seen considerable growth in terms of AuM by SWFs, pension funds and infrastructure funds; the latter largely being a creation of the growing interest in infrastructure as an investment asset since the early 1990s, a development by turns both stimulating and meeting demand. Whilst these institutional actors do not all have ongoing liabilities that require servicing, they do all seek, not unreasonably, to grow their assets over time. Some, such as the under-funded segment of the pensions sector, have a pressing need to recover ground lost, in income terms, as a result of the global financial crisis (GFC) and its consequences. Indeed, it is the post GFC environment of low interest rates, low yields on fixed income (or bonds), and, at least initially, high levels of volatility in equities and real estate, that drove institutional investors to look for other sources of yield. As this thesis demonstrates, and the empirical data confirms, infrastructure answers a number of the needs of a hungry global institutional investment community. It provides relatively attractive risk adjusted returns, yields across a wide range of the spectrum (from 0.5% to over 20% above the risk free rate), low volatility, low correlation with other parts of investors' asset portfolios, in many cases a quasi-sovereign credit covenant, a tangible asset (as opposed to the synthetic collateralised debt obligations extant pre the GFC) and, when built or operated well, these investments can be characterised as contributing to economic development and the social good.

So the case for investment capital's attraction to infrastructure is clearly made. So too, this thesis has demonstrated the drivers for the state in engaging with capital markets and financialised solutions for infrastructure provision: fiscal austerity, constrained sovereign balance sheets, and the considerable demand for new or upgraded infrastructure to meet the conflated needs of population growth, climate change, urbanisation and new technology. So there is clear rationale for the twin forces of supply and demand in the context of contemporary infrastructure markets.

A key question posed here however, is whether the quantum and characteristics of this infrastructure need and capital deployment are spatially, sectorally or transactionally (e.g. greenfield vs brownfield) coterminous. The finding of this study is that, manifestly, they are not. This study has concluded that the geographies of infrastructure investment opportunity are less spatially polarised than the geographies of investment capital deployment; thus there is an evident inherent tension, that infrastructure as a spatially fixed asset, struggles to resolve. Capital from the developed nations is largely looking to invest in its own geographies. Capital from resource rich developing nations is largely looking to hedge against the volatility of commodity price based economies by also investing in the economies and infrastructure of developed nations. The only significant outlier to this being the actions of the Chinese SWFs, the extended Chinese state and the AIIB who have an additional focus on resource rich Asian and African markets. The Chinese exception notwithstanding, the vast majority of global surplus capital seeks to be invested in a narrow OECD geography, and within the context of infrastructure markets, into a sub-set of large scale, built, brownfield, economic infrastructure assets.

This being the case, and this study being an institutionally oriented piece of research, the thesis then examined where institutional capital is being deployed, and compared that to the geographical derivations of that capital, and where, absent all other factors, that capital would wish to be invested. The data shows clearly a strong preference for the major markets of the OECD; North America, Western Europe (particularly the UK) and, to a lesser degree, Australasia. Conclusions can then be drawn from this information. Capital is being deployed primarily according to its own requirements and drivers rather than those suggested by infrastructure need; strongly indicative of the possibility that global infrastructure markets are evolving and operating to the needs of capital rather than infrastructure; developing finance rather than financing development (Hildyard, 2012).

These spatial considerations are, on the capital side, informed by an analysis of the spatial signatures of the principal institutional investors in infrastructure; namely SWFs, pension funds and infrastructure funds (Section 6.3). The latter being mediating agents reliant on attracting pools of capital to manage, that therefore tend to reflect, concentrate and reinforce the drivers of their investment constituency, rather than institutions with significant truly standalone agency. On the demand side, the ability of a state to meaningfully engage with these financialised models of infrastructure provision and these

large scale institutional investment actors is seen to be strongly determined by evolutionary economic and political factors. In that sense historic global inequalities in terms of sovereign wealth, installed infrastructure and institutional capacity are reflected, and indeed magnified, by current investor preferences and broader market dynamics. Lagging states continue to lag.

This finding is discussed in Chapter 6 using the terminology of *thick* and *thin* markets. The former being one in which there is a high density of investment actors and deployable capital investing in a pipeline of infrastructure assets of scale and number, overseen by a state with significant regulatory and institutional capacity. All of these factors are typically accompanied by an environment of material amounts of endogenous capital with capacity to invest in both equity and debt (in the form of endogenous banking capital markets and/or a significant pension pool), and a sovereign credit rating that permits an investment perspective of a long term duration. In such markets, this thesis argues, there is the *potential*, through market competition and investor demand, for the host state to achieve some measure of value and an efficient transfer of infrastructure responsibilities to market actors. This does not mean that a positive or socially beneficial outcome is always the case, since the evidence suggests that the quality of contractual arrangements and institutional governance is often highly uneven. It does however present the *possibility* of the efficient, socially useful and additive market based operation of infrastructure assets and services.

In thin markets however, the obverse is true. These being characterised by low levels of institutional investor presence and investment appetite. The host state may be constrained by poor credit ratings, low levels of institutional capacity (for regulatory and other oversight), and a lack of endogenous pools of long term capital. In such a scenario infrastructure transactions may still occur but will require material support from MFIs and (overseas) government agencies. Such thin markets tend to produce less efficient outcomes as competition pressures are less likely to manifest, and therefore transactions will tend to show value migrating from the state to the few present institutional market actors. This can be seen in many infrastructure asset bid outcomes in developing economies wherein there is a small number (sometimes only one) of qualifying bidders.

Finally, Chapter 6 considered the implications of growing surpluses of un-invested (but allocated) capital in the most active (or thick) investment markets. SWF's AuM are

growing, pools of pension and annuity capital are increasing, and both are, as sectors, increasing their allocations to infrastructure. Given the many tens of trillions of dollars of capital managed by these institutions, even an allocation shift of a few percentage points represents almost a trillion dollars of new capital looking to invest in the sector, and that capital, like its forbears, is primarily focussed on brownfield economic infrastructure assets in the main OECD markets.

Infrastructure funds continue to increase in terms of number, capital raised and dry powder awaiting investment; currently at historically all-time high levels. This sector growth is concentrated in the largest few fund managers, with recent years having seen the rise of the mega-funds (Brookfield Asset Management at \$14bn, GIP at \$15.8bn, and Brookfield Asset Management at \$40bn) whose investment focus is again operational assets in the core OECD markets (Prequin, 2017b). Infrastructure assets of that type coming to market are, however, insufficient to meet investment demand and, as a result asset values are being driven upwards. In these most dense or thick investment markets, high asset valuations and the difficulties of finding investment value are consistently listed among the main concerns of institutional investors. Yet despite this, investors continue to list these very same markets as their priority focus going forward, and continue to affirm the expected increase in their allocation to this asset class. This thesis argues that this apparently illogical behaviour could, if unchecked, result in dangerous asset bubbles in major OECD infrastructure markets. Often cited examples such as London City Airport, and the many fund managers who expressed concerns re asset valuation trajectories, suggest that an emergent bubble may already be building. The recent failure of Carillion in the UK also being a manifestation of unsustainable operation in an overheated market; and the temptation by investors to support ongoing dividends not from profitable activity but by increased leverage. A potential real world manifestation of the crisis prone nature of capitalism that would support a political economy reading of financialisation and the thesis of the inherent volatility of capital markets.

These spatially distorted markets with inflationary asset bubbles in some geographies and sectors, and huge under-investment in others, combined with the uneven capacities of states to engage with institutional actors makes for, this thesis would argue, a sub-optimal way of allocating capital. Compelling evidence for a spatially variegated picture of market stability and instability. Having examined the institutional drivers and spatial factors that contribute

to the construction of infrastructure markets, it is possible to conclude that the manner of the construction of infrastructure markets, itself a product of the market driven imperatives of institutional capital and the financialisation of infrastructure assets, makes it necessarily liable, indeed prone, to market phenomena such as bubbles and busts. As Marx (1867), Harvey (2011, 2014) and Braudel (1984) would contend, capital containing within itself the seeds of its own downfall.

7.3 Conceptual and theoretical contributions to the literature

We will now turn to the principal conceptual and theoretical contributions of this thesis. Since this study has been avowedly institutional in nature it is unsurprising that the first two contributions relate to an unpacking and detailed analysis of critical institutional actors within the context of financialised infrastructure markets; namely the state in its manifest forms (in 7.3.1) and the spectrum of public, quasi-public, mediating and private capital (in 7.3.2).

Having established the institutional character that, in aggregate, constitutes contemporary infrastructure markets (7.3.3), this Section then discusses how such an approach enables a more nuanced and empirical picture of financialisation in practice, *and* is valuable as a contribution to the theory of market development and operation, most notably as a mediated and institutionally and transactionally contextualised form of catallaxy (7.3.4).

7.3.1 Developing the notion of the re-cast qualitative and mediated state

As an extension to the identity and characteristics of the re-cast qualitative state, this thesis then examines the empirical manifestation of that fiscal context, financial capability, institutional capacity and transactional expertise both through the actions of government departments and agencies, but also through quasi-public entities such as MFIs and SWFs, and ultimately to the entities of the mediated state such as public sector pension funds, and infrastructure funds and PE firms in which the state is a material investor. The ability of the state to express its political will and infrastructure policy through these multiple

channels constitutes, it is proposed, a new form of financialised statecraft enacted through and with other forms of institutional capital and other market actors. These financial actions of state capital, accompanied by the politicisation of institutional capital create a hybrid form of enabling finance that reflects, what this study has termed, an end to the old public-private binary.

This view takes us further beyond O'Neill's qualitative state (2004), by addressing and unpacking the financial capacity of the state and its mediated extended entities, as well as by empirically examining how that capital and sovereign credit covenant is actually deployed in practice. In so doing this thesis opens a research space for further studies into a specifically financialised and mediated form of statecraft, and the deployment of capital as an extension of industrial policymaking.

The state is not working alone in these actions, but in concert with, and through, MFIs, SWFs, pension funds and infrastructure funds. This thesis prefigures future research avenues into a more collegiate form of a state enmeshed with market based capitalism, and one where the economic diplomacy (Haberly, 2011) of the state, executed through government agencies, MFIs and SWFs, and the actions of the public or *demos* manifested through the coupon pool (Froud, Johal and Williams, 2002) or pension fund capitalism (Clark, 1999), might offer alternatives to the more adversarial historic models that are the stock in trade of political economy.

7.3.2 Proposing the value of an institutional and spatial reading of investment capital

This thesis has, as has already been stated, taken a consciously institutional approach to understanding the pools of capital that together constitute global infrastructure markets. This approach was taken in answer to an often stated gap in the current literature on capital and financial markets. It is the position of this thesis that such an institutional, ground up, view of investment capital permits a more accurate understanding of the cultural and economic forces and influences that, in aggregate, shape the behaviour of markets. To this extent if markets are, as economic sociologists would maintain, in part a product of the

cultural milieu of their constituent actors, then how can it be possible to understand markets without a consideration of the institutional actors that constitute them?

By understanding the institutional context of capital, it is then possible to examine in more depth, and with greater accuracy, its spatial derivation, and its institutional drivers. If money flows like mercury (Clark, 2005), then an institutional reading of capitalism allows us to better understand why it pools and coalesces in some geographies and not others; and perhaps of equal importance, to calculate what macroeconomic or political factors may cause that capital to be moved on to another geography or repatriated. In the context of understanding market vulnerabilities, this latter point is critical. In this thesis an example of this is given with the reduction in AuM of some of the gulf state SWFs as a result of the prolonged depression in fossil fuel prices, and their concomitant adverse impact on gulf state budgets.

This thesis has clearly demonstrated that, far from the outmoded view of a public – private binary of capital and institutional action; contemporary infrastructure development and markets reveal investment actors present along a spectrum of cultural and economic behaviours from government agencies and departments through to private equity and hedge funds. This enmeshment of the state and institutional capital is manifested in formalised institutional constructs such as MFIs and SWFs, culturally and economically derived influence through public sector pension funds, and the influence of state derived investment capital managed by infrastructure funds and other asset managers - the mediated state. This spectrum of capital, with its accompanying diversity of risk appetite, return requirement and views on duration, offers some prospect of matching sources of investment capital to those infrastructure projects for which they are best suited. Such outcomes, this thesis would suggest, are more likely to occur in thick markets that have evolved and developed specialised investment, and investor, niches over time. The UK government's courting of low yield seeking major pension funds and annuity providers are an example of just such a targeted approach, and one that is made possible by a nuanced and institutional reading of market capital.

This institutional and spatial reading of variegated investment capital, and the conceptualising of its various forms, is an approach uniquely informed by economic geography. In an environment wherein spatially fixed assets such as infrastructure, located

in a geographically fixed state are the subject of ever greater ownership and operation by globally mobile capital; this thesis would argue that an understanding of the spatial context of that capital is ever more important if we are to unpack the ‘architecture of the flow world’ (Cetina, 2005).

7.3.3 Delivering an empirical and nuanced picture of financialisation in practice

This thesis shares with Strickland (2016) a frustration at the sometimes incoherent and inconsistent conceptualisation of financialisation in the literature. Financialisation as a process is often seen solely as the uninvited and pervasive entry of financial norms and practices into our everyday life (Sheppard, 2017: 239; Arrighi, 2010; Engelen, 2008). This implies that financialisation and the financial world is in some way decoupled from the *real* economy (Van Treeck, 2009: 908) whereas, this study and its findings would suggest, that we are in a situation where finance is ‘now inherently attached to all forms of material or *real* economic activity’ (Marazzi, 2011).

A key contribution of this thesis is to institutionally identify the ways in which this attachment of the financial and the *real* occurs. How financialisation represents not only the investment of amorphous private capital generated from an abstracted elsewhere, but rather it is the aggregated sum of individual savings, annuities and pensions (the pension pool), state accrued fiscal surpluses (SWFs), pools of project or purpose specific capital (government agencies and MFIs), and the mediated collection and mixing of these capital sums within the mediating institutional constructs of infrastructure funds, private equity firms and other asset managers.

This unpacking of institutional capital is combined in this thesis with an analysis of the relative sums that each type of investment actor has under management, and the spatial origins and drivers of that capital. By then examining the ways in which this capital is invested into actual infrastructure transactions it is possible to answer the previous lack of attention to ‘actually existing’ financialisation (Strickland, 2016; Christophers, 2012; Pike and Pollard, 2010), to demonstrate the enmeshment of the state, finance and the real

economy (O'Neill, 2004), and to show where this enmeshment takes place; the spaces of financialisation (Fig 7.1).

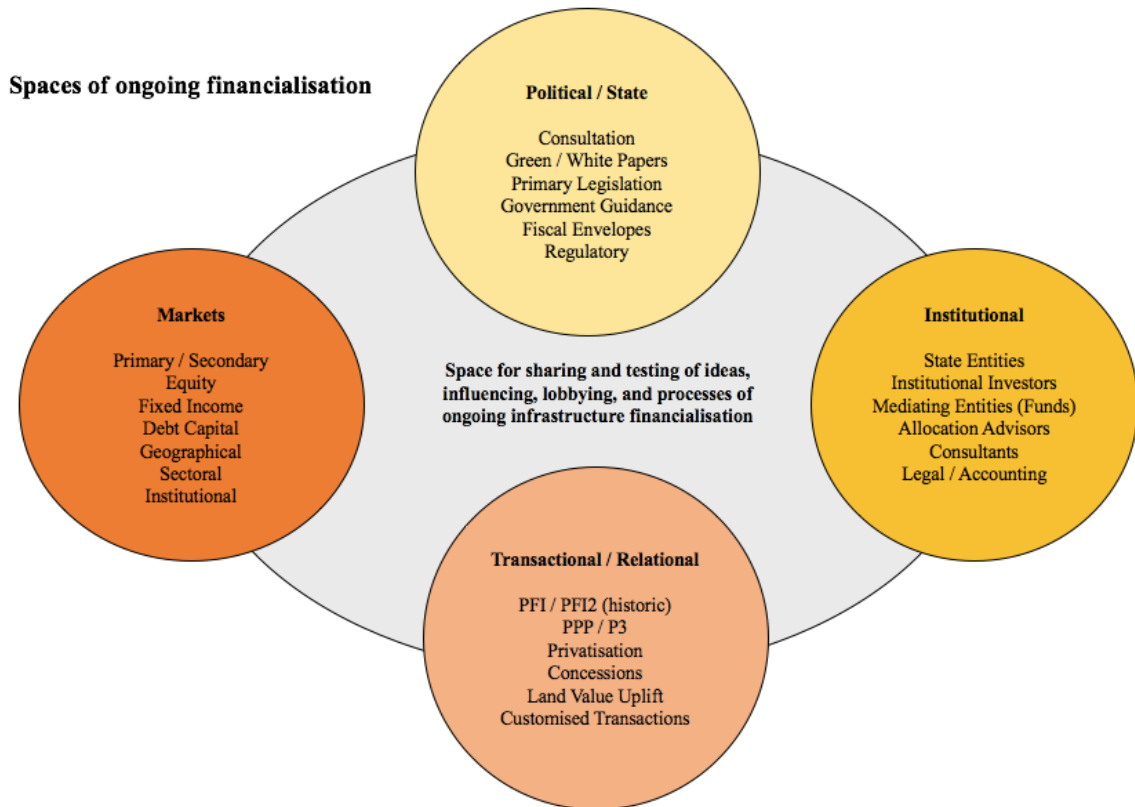


Fig 7.1: Spaces of ongoing financialisation

Source: Author's own, 2018

Whilst the evidence of this thesis is that instances of financialisation are spatially and transactionally distinct, nevertheless there are certain spaces that can be seen as crucial in allowing contemporary processes of ongoing financialisation to occur. As evidenced in Fig 7.1 (above) these include:

Political and state based spaces. As has been shown, in the context of financialisation, the state is not a denuded, hollowed out actor. It is not, in financial terms at least, the party that is the passive, the one that is *done to*. In this granular analysis of infrastructure markets, the state and the mediated state emerge as an active, diverse and significant financial actor. Indeed, when taken into account with the state's role as market maker, regulator, policymaker and lender of last resort, the extent of financialised statecraft presents the state as a super actor or super firm in the context of contemporary financialised markets. It is in the political actions of the state, manifested in policy, fiscal budgets, regulatory frameworks

and the body of law that financialised solutions can be, and are, created and are constantly being evaluated, re-framed and evolved.

Institutional spaces. The rise in importance and size of infrastructure funds, and PE firms active in the infrastructure space, is noticeable and parallels the growth of infrastructure as an asset class. As has been previously stated this institutional class of asset managers strongly reflects the spatial preferences of its investor base, and thus is itself a heavily financialised actor. Whilst these funds provide portfolio and asset diversity for their Limited Partners or investor base, they ironically contribute to, and indeed amplify, investment concentrations in certain core markets as new capital raised increasingly looks to deploy where previous successful investments have occurred, and where existing fund manager market experience has been gathered. By configuring diverse pools of capital into deployable, re-spatialised investment finance, and by converting infrastructure assets and revenue streams into investable financial instruments, infrastructure funds and other mediating entities represent a critical space in which financialisation takes place, and evolves over time.

Transactional and relational spaces. There is a wide variegation of transactional opportunities for the deployment of institutional capital into the infrastructure sector or asset class. These range from the large scale publicly quoted and privatised major utility operators of the OECD, through to small scale, unlisted infrastructure opportunities in challenging geographies. Transactional precedent such as PPP is infinitely re-invented and customised to meet specific sectoral, geographical, duration and political exigencies. What remains however, is that, for financialisation to occur, any given infrastructure asset or service obligation need to be re-characterised or re-framed in such a way as to become an investable instrument. The transactional space is where that occurs and where the relations between market and state actors are negotiated and formalised in contractual terms.

Market spaces. In this context markets may represent the aggregated needs of specific types of institutional investor (such as pension funds or the coupon pool), specific types of finance (eg equity markets), specific sectors (eg offshore wind), or geographies (eg OECD). Each of these markets has its own characteristics and, if financialised solutions to infrastructure provision in a given market are to prevail, then that financialisation ought to exhibit some sensitivity to the local or specific conditions. What can be seen however is

that financialised solutions developed in one market can also, on occasion, be refined, adapted and re-deployed into other markets; PFI/PPP and TIF being just two examples.

7.3.4 Envisioning market (re)construction as institutional and transactional catallaxy

This thesis has sought to contribute to our understanding of market construction, operation and re-construction. The review of the extant literature identified some useful theoretical suggestions in this regard. Firstly, the idea of Hayek's theory of catallaxy ([1976], 2012) combines institutional agency with an organic gradual accumulation of critical mass in a way suggestive of financial markets. Secondly, Waldenberger's concept of markets as a forum for conflict resolution (2002) appears to offer the prospect of actors with differing perspectives and drivers finding some common ground in the variegated transactional potentialities of the market.

The empirical analysis of infrastructure funds undertaken in this thesis provides substantive support to Waldenberger, in the presence of institutional actors from across the spectrum existing within single investment constructs or funds. If the theory of the enmeshment of the state, finance and the real economy, proposed at 7.3.3, is accepted, then this institutional blurring and co-mingling ought not to surprise. It should however cause us to re-assess relations between public and private, the state and capital.

In terms of Hayek, this thesis would accept that free markets have never been free (Amy, 2007), and that the role of the state as market maker setting the rules of the game cannot be minimised. That said however, it is the case that the pattern of capital accumulation and investment, in the context of infrastructure markets at least, appears to reflect the exigencies of spatially specific political, economic and institutional factors, in a way that can be viewed as, at least in part, organic. This is most notable in the relationship between the relative density of investment markets (from thick to thin) and their ability to deliver efficient solutions, in terms of value, to state actors and the users of infrastructure.

In the more mature markets for financialised infrastructure, investment returns have been tightening over time, and target IRRs for new entrant funds are falling, as the number of

actors and amounts of investment capital increase, transactional information becomes more transparent, and the state gains in contractual expertise. Such economic indications, and the gradually refining process of matching infrastructure assets with those investors (from across the public to private spectrum) most suited to holding them, are indicative of catallaxy. Such a process cannot be said to be wholly organic, since it is reliant on political policy and economic interventions, on regulatory frameworks, investment committees shifting portfolio allocations, and extensive bodies of fiscal and contract law. It is the case however, that it is not the state that is *determining* tightened IRRs and increased asset values for infrastructure, but rather the aggregated impact of culturally and spatially derived institutional behaviours, then manifested into specific geographies and sectors.

7.4 Reflections on the study and areas for future research

7.4.1 Reflections on the study

This thesis decided to examine investment markets involved in the ongoing financialisation of infrastructure, by looking at their institutional and spatial constituents. In particular the methodological focus was on the impacts and consequences of ownership and management models that differed from previous state or quasi-state control. In that regard there was a particular (though not sole) concentration on equity capital and transactional models wherein the drivers and exigencies of institutional investment capital are manifest in the resultant operational models of the infrastructure asset.

On reflection, it can be seen that infrastructure markets consist of debt capital as well as equity and quasi equity; the spatially variegated nature of this debt capital provides, in isolation, another perspective on market size and complexity which may or may not mirror equity markets for infrastructure. Similarly, a concentration on the polar ends of the public – private spectrum, namely on government agencies and departments at the public end, and private equity firms and hedge funds at the private end would also have given a contrast in outlook and approach that may have informed our thinking in other ways.

This study was ambitious in institutional scope and geographical breadth, also in the seniority of interviewee within their respective organisations. It is a matter of regret that I was unable to interview *all* those organisations that are actively deploying significant sums of institutional capital into infrastructure. Perhaps with additional time and a link into specifically state-backed research it may have been possible to gain further access into major institutional investors. That said, as Chapter 3 demonstrates, industry engagement was significant, and the final cadre of interviewees represent a material portion (by AuM) of the overall infrastructure investor community. Lessons learned in this study will inform future research in this area, contributing (it is hoped) to a more dynamic and healthy research infrastructure between academia and institutional finance, one that is much needed.

7.4.2 Areas for future research

This thesis is an institutionally driven study of contemporary investment markets for financialised infrastructure. Its focus has been to address the largest identified gap in the literature, namely the need for a more fine-grained study and appreciation of institutional drivers and factors in order to better understand and analyse 21st century capital. As such, while it has addressed market actors across the public-private spectrum, it has consciously focussed on institutional investment actors.

7.4.2.1 Unpacking the state

To further expand and evolve the research presented here, a productive next step might be to unpack further the motivations of the state in its departmental, agency and extended institutional forms; to look in more detail at the differential behaviours and drivers within the actions of the direct state and mediated state. In such a study there is a clear need to look further at the development of the demand case, namely the consideration of need in terms of new and upgraded infrastructure. Such an approach would, of necessity, involve a deeper analysis of policy formulation including such factors as regulatory frameworks,

fiscal envelopes, budgetary and capacity constraints, institutional constructs, enabling legislation and execution mechanisms.

One aspect of such a holistic consideration of the state's aggregated economic and policymaking actions would be to contribute to an emergent research area around financialised statecraft (Pike et al, forthcoming), particularly in the area of infrastructure. In the context of this, there is of necessity, a need to consider the reflexive and iterative impacts of the state as a financial actor, but also financialising processes and pressures (created by markets and market actors) on the state as it exercises its fiscal, governance, policy, regulatory and oversight roles in society.

In order to make such a study manageable, it would best be performed initially at the level of the national government of one sovereign state. This would then permit the gathering of rich qualitative data from all those entities that would impact on state decisions around infrastructure provision. In addition to government agencies and departments, this would need to include regulators, key advisors and consultants, credit rating agencies, central banks, and infrastructure industry bodies. Such an approach to the formulation and execution of infrastructure policy could then usefully be combined with further studies of institutional capital such as this thesis to provide a three hundred and sixty degree view of the interactions of capital and policy, the tension between supply and demand, and the trade-off between balance sheet and fiscal constraints, taxpayer value and social provision.

7.4.2.2 A comparative analysis of thick and thin market outcomes

This thesis has introduced the concept of thick and thin markets to express the qualitative difference in character and outcome of those markets wherein there is a high density of investment capital appetite and market opportunity, from those markets where there is not. This distinction also references the institutional capacity of the state to commission, regulate, integrate and, ultimately, fund the new or upgraded infrastructure resulting from the investment capital deployed within its borders.

Whilst the conceptualising of thick and thin markets represents a useful contribution of this thesis, it would be beneficial to conduct a comparative quantitative analysis of key market indicators over time between thick and thin markets. Such a study should, it is suggested, ensure that the national markets selected are of a comparable size, and that the focus is on one sector, so as to ensure that sectoral investment preferences do not distort those that are a function of spatially derived difference and historical economic and political factors.

Such a comparative approach, which has been adopted for instance in working papers in the past to gauge the relative value derived from PFI (Albalade, 2014; Blanc-Brude, 2014; Hodge and Greve, 2010; and Inderst, 2013) could start to quantitatively enumerate the qualitative differences observed in diverse international markets and to inform the developmental policies of multinational and global bodies in the context of the stimulation of infrastructure provision and ongoing market (re)construction.

Finally, it is also essential that further research on infrastructure markets, and indeed capital markets more generally, move away from blackboard economics (Coase, 1991), black box characterisations (Coase, 1992; Pollard, 2003), and generalities about a world that is sometimes seen as too hard to understand (Martin, 2017). Building on and extending the institutional approach developed in this study will enable a more informed appreciation of the spatial and sectoral impact of capital not only in terms of infrastructure, but also in terms of wider capital markets. Such a nuanced understanding of these tectonic movements in our societies offers the prospect of a meaningful spatial dialogue in the context of future policy formulation, and more spatially sensitive outcomes to the financing of critical social assets.

7.5 Closing thoughts

Infrastructure markets and non-state solutions to infrastructure problems have been with us for a very long time. Individual actors, by their actions over time, create and shape infrastructure markets. This thesis has aimed to contribute to our understanding of the forces that construct, maintain and reconstruct these markets in a contemporary context.

This thesis has developed a finely grained, institutional and spatial view of contemporary markets for financialised infrastructure. This has been achieved through a deep analysis of actually occurring transactional data, policy statements and practice, and an empirical engagement with and observation of an extensive range of the principal investment actors, and their relations with each other, and with the complex and nuanced asset class that is infrastructure. These investment actors extend across a spectrum, from public to private, from government agencies through MFIs, SWFs and pension funds, and to the aggregating, mediating and mixing institutional constructs that are infrastructure funds, PE and other asset managers.

What has been presented here, is an attempt to portray an institutionally and spatially sensitive analysis of where we are now, in terms of the financing, funding, operation and control of the infrastructure assets, systems and services that are essential to economic development, to society and to our daily lives. As financial institutions capture the value of place through the appropriation and exploitation of urban infrastructure assets (Pryke, and Allen, 2018; Torrance, 2009), and as the academy seeks to capture the transformative impact of finance's entry into the arena of infrastructure provision (Loftus and March, 2017), society is at a point where almost as many of our infrastructure assets reside in the control of non-state actors as those that remain under state control (Peters, 2012). At such an inflexion point, it is necessary to move away from generic characterisations of these non-state actors, and to recognise that a deep understanding of the individual, cultural, economic, and spatial drivers for these variegated institutional sources of trillions of dollars of investment capital is essential, if we are to optimise the nature of our infrastructure and utility service provision into the future.

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Appendices

Appendix 1: List of Interview Pro-Forma Questions

- Please outline your roles and responsibilities, and the nature of your institution's involvement in infrastructure investment, assets and markets (and your preferred methods and modes and of investing - co-investment, intermediated investment, direct sole investment)
- What do privately and publicly derived capital each bring to the infrastructure table: capital leverage, scale/ dry powder, portfolio diversity, access?
- How do you see the relative merits or challenges of managing public derived (SWF, PSPF, MDB/MFI) monies within broader funding envelopes. How does capital from state/ quasi-public sources vary by institutional type, and how does it vary from privately derived capital?
- Would you make a distinction between the outlook and behaviours of Public Sector Pension Funds as compared to their Private Sector counterparts?
- Whose role is it to shape and develop the market for infrastructure assets? Is it the procuring entity (often a State), investors, regulators or some other entity/ combination? *[Within this raise issue of Government pressure to invest in projects of national or regional significance]*
- To the extent you invest alongside or through different types of investor; how does that impact or complement your ability to execute on your own institutional priorities, and why?
- Do you think asset owners/ procuring entities view publicly and privately derived capital differently?
- Is there a preference in the market (particularly from asset owners) for publicly or privately derived capital? If so, is that manifested in a preference for capital derived from a particular type of institutional investor?
- Within your own investor segment (eg SWFs, pension funds, funds, PE) what degree of variegated characteristics and diversity of approach do you see? How does that play out in market terms?
- Why invest via infrastructure funds, aggregated funds, private equity. How does this meet the non-economic targets (eg social, environmental etc..) of the public institutions? *[to public/ quasi-public institutions only]*

- Where are the policy implications and challenges (for governments) of opening infrastructure provision to the market?
- What are your views on policy initiatives to boost markets for infrastructure assets such as EU Project Bonds, US presidential commission initiatives, tax exempt bonds? Should the state intervene?
- What are your views on policy initiatives to encourage larger allocations to infrastructure by institutional investors such as pension funds and other annuity providers?
- With reference to infrastructure; how would you characterise the balance of power between host country governments, developed country governments, investment institutions and multinational organisations (eg IMF, World Bank/ PPIAF etc.)?
- Forward looking, how do you see market appetite; in terms of new issuance and refinancings on one side; and new investment capacity on the other?
 - Which do you see as supply and which as demand?
 - What do you see as the drivers for this, and what will be the consequences?
- Are there any factors, beyond pure economic return on a specific asset/ project, that are drivers for your institutional involvement in infrastructure?
- Do you see any relationship, implicit or explicit, between the geographies from where your capital is derived, and where it is ultimately deployed?
- Where you invest in different geographies, sectors, regulatory environments, financing structures and assets. Do you see these as different markets, or one variegated but singular investment landscape?
- What elements of infrastructure financings and negotiations are conducted at what spatial level: local/ urban, regional, national? Where is your primary interaction?
- Are you agnostic as to where (geographically) and from what source (public or private) your sources of investment capital derive from?
- When raising a geography specific fund is it more about getting better access to deal flow from that area [*a demonstration of commitment, focus and expertise*], an acknowledgement of deal opportunity [*opportunistic and lagging actuality*] or a way of accessing investor capital in that geography [*ie certain investors will invest only in their domestic area/ continent*], or something else?

- Do your institutional/ market preferences for scale, asset liquidity, portfolio diversity, and resilience tend to encourage investment in certain concentrated geographies; and if so how does this play out in your investment strategy?
- To what extent are you investing against a fixed business model. If so how does this impact on flexibility of utility service provision over the asset or financing life?
- In your experience, how are issues of governance, service provision, end user value etc. balanced and by whom?

Glossary

Alternatives - Alternative investments include infrastructure, private equity, hedge funds, managed futures, real estate, commodities and derivatives contracts

Annuity - An annuity is a financial product that pays out a fixed stream of payments to an individual, primarily used as an income stream for retirees. Annuities are created and sold by financial institutions, which accept and invest funds from individuals and then, upon annuitisation, issue a stream of payments at a later point in time.

Asset Class - An asset class is a group of securities that exhibits similar characteristics, behaves similarly in the marketplace and is subject to the same laws and regulations.

Assets under Management – AUM, sometimes called funds under management (FUM), measures the total market value of all the financial assets which a financial institution such as a mutual fund, venture capital firm, or brokerage house manages on behalf of its clients and themselves.

Basel II and III - Basel II provides guidelines for calculation of minimum regulatory capital ratios and confirms the definition of regulatory capital and 8% minimum coefficient for regulatory capital over risk-weighted assets. Basel III is an international regulatory accord that introduced a set of reforms designed to improve the regulation, supervision and risk management within the banking sector. ... Largely in response to the credit crisis, banks are required to maintain proper leverage ratios and meet certain minimum capital requirements.

Beta (volatility) - Beta is a measure of the volatility, or systematic risk, of a security or a portfolio in comparison to the market as a whole. Beta is used in the capital asset pricing model (CAPM), which calculates the expected return of an asset based on its beta and expected market returns.

Defined Benefit scheme - A defined benefit pension plan is a type of pension plan in which an employer/sponsor promises a specified pension payment, lump-sum (or combination

thereof) on retirement that is predetermined by a formula based on the employee's earnings history, tenure of service and age, rather than depending directly on individual investment returns.

Defined Contribution scheme – In a defined contribution pension plan, the formula for computing the employer's and employee's contributions is defined and known in advance, but the benefit to be paid out is not known in advance.

Delta (correlation) - Delta measures the expected exposure of an option to its reference security (e.g., the Delta of Apple options compared with Apple stock). It is more colloquially used as a shorthand reference for correlation generally. In the context of infrastructure assets it would mean how their performance correlates with the performance of other assets in an investor's broader portfolio.

Duration – In investing terms, another phrase that broadly equates to the maturity of end date of an investment.

Family Offices - Family offices are private wealth management advisory firms that serve ultra-high-net-worth investors. They are different from traditional wealth management shops in that they offer a total outsourced solution to managing the financial and investment side of an affluent individual or family.

G20 - The G20 (or G-20 or Group of Twenty) is an international forum for the governments and central bank governors from Argentina, Australia, Brazil, Canada, China, France, Germany, India, Indonesia, Italy, Japan, Mexico, Russia, Saudi Arabia, South Africa, South Korea, Turkey, the United Kingdom, the United States and the European Union (plus Spain as a permanent guest member, invited in a vote by the community). The B20 is a business grouping that, in its membership, echoes the G20.

General Agreement on Tariffs and Trade - GATT was a legal agreement between many countries, whose overall purpose was to promote international trade by reducing or eliminating trade barriers such as tariffs or quotas.

General Partner - If a fund is created then the management of it is done by the General Partner (GP). All the decisions for the fund are done by the GP. They are also in charge of managing the fund's portfolio, which will contain all of the fund's investments.

IFC – International Finance Organisation, a sister organisation of the World Bank and the largest global development institution focused exclusively on the private sector in developing countries.

Impairment - Is an accounting principle that describes a permanent reduction in the value of a company's asset, normally a fixed asset.

Infrastructure Fund - Infrastructure funds provide an opportunity for 3rd party investors to invest in essential public infrastructure assets, such as toll roads, airports and rail facilities. They are often attractive to investors looking for predictable returns, as infrastructure projects are typically characterised by low levels of competition and high barriers to entry.

Institutional Investor - An institutional investor is an entity which pools money to purchase securities, real property, and other investment assets or originate loans.

Internal Rate of Return - Internal rate of return (IRR) is a metric used in capital budgeting to estimate the profitability of potential investments.

Limited Partner - A limited partner invests capital in exchange for shares in the partnership. In the context of this thesis, shares in the performance and underlying assets of a fund.

LTIIA - Long Term Infrastructure Investors Association works with a wide range of stakeholders, including infrastructure investors, policy-makers and academia, on supporting long-term, responsible deployment of private capital to public infrastructure around the world.

Multilateral Financial Institution - an international financial institution chartered by two or more countries for the purpose of encouraging economic development. Often an interchangeable term with Multilateral Development Bank.

NAFTA – North American Free Trade Agreement.

OECD - The Organisation for Economic Co-operation and Development is an intergovernmental economic organisation with 37 member countries.

PE style funds - A private equity fund is a collective investment scheme used for making investments in various equity (and to a lesser extent debt) securities according to one of the investment strategies associated with private equity. Private equity funds are typically limited partnerships with a fixed term of 10 years (often with annual extensions). At inception, institutional investors make an unfunded commitment to the limited partnership, which is then drawn over the term of the fund. From the investors' point of view, funds can be traditional (where all the investors invest with equal terms) or asymmetric (where different investors have different terms)

PFI/ PFI2 - A private finance initiative (PFI) is a method of providing funds for major capital investments where private firms are contracted to complete and manage public projects. Under a private finance initiative, the private company, instead of the government, handles the up-front costs. Succeeded by, and similar in nature to, a Public Private Partnership (PPP) or P3structure.

Pinpoint equity – Used sometimes in very low risk PFI/ PPP transactions such as in the healthcare, education or justice sectors for example. Where the sponsors fund the project company with debt or subordinated debt. There are two reasons: 1. Subordinated debt usually starts earning interest as soon as operations commence. Equity dividends remain far away in future - after debt servicing becomes regular and debt service reserve account is fully funded.

2. Also, equity must, usually, be brought in at the time of financial close whereas debt is brought in as per a draw down schedule. They can therefore contribute only a minimal level of equity - a pinpoint.

Private Equity Firm - A private equity firm is an investment management company that provides financial backing and makes investments in the private equity of start-up or operating companies through a variety of loosely affiliated investment strategies including leveraged buyout, venture capital, and growth capital.

Sovereign Wealth Fund - A sovereign wealth fund (SWF) or sovereign investment fund is a state-owned investment fund that invests in real and financial assets such as stocks, bonds, real estate, precious metals, or in alternative investments such as infrastructure, private equity funds or hedge funds. Sovereign wealth funds invest globally. Most SWFs are funded by revenues from commodity exports or from foreign-exchange reserves held by the central bank.

Sweat Equity - Is a party's contribution to a project in the form of labour, as opposed to financial equity such as paying others to perform the task.

Weighted Average Cost of Capital - WACC is a calculation of a firm's cost of capital in which each category of capital is proportionately weighted. All sources of capital, including common stock, preferred stock, bonds and any other long-term debt, are included in a WACC calculation.