

# INFRASTRUCTURE FINANCE: HISTORICAL PERSPECTIVES AND THE EVOLUTION OF FINANCIAL INSTRUMENTS

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## Abstract

This paper reviews the historical development of infrastructure financing<sup>1</sup> instruments, spanning from the development of transport and communications infrastructures in the 19th century through to Bretton Woods, post-war reconstruction, and the current drive for private investment by the G20 and World Bank Group. This analysis traces the evolution of financing instruments across three institutional forms: multilateral organisations, national development banks and private finance. Historically, financial systems and infrastructure development have demonstrated strong interdependence: rail development in North America and Europe spurred the development of transatlantic financial markets in the 19th century, and the imperative for post-war reconstruction led to the creation of development finance institutions, such as the International Bank for Reconstruction and Development, at Bretton Woods. Infrastructure projects are used instrumentally by state actors as vehicles for national economic development and expanding into foreign markets. Concurrently, the performative work of economic expertise was pivotal to legitimise major capital investments (Callon, 2006), and in turn, the necessity to adopt complex financial instruments. Indeed, infrastructure continues to hold this discursive role: the notion of the global infrastructure ‘gap’ (McKinsey 2016) is prominent within the discourse of governments and international organisations. Findings illustrate how the financing instruments adopted to enable infrastructure development are heavily embedded within socio-political systems and international regimes, with strong regional variation. Both the selection and outcomes of specific financial instruments demonstrate the interdependencies between physical infrastructures and financial systems. For example, financial models and deal-making practices restrict the scope of infrastructure’s physical properties (Johns, 2011), and financing arrangements also mobilise infrastructure’s distinct form of property relations (OfiNeill, 2013). Causal drivers for financialisation have been relatively under-examined in academic literature. It is critical to understand the drivers and constraints shaping the current approaches to financing. By reflecting on the development of financing mechanisms across different institutional forms, the findings are used to test hypotheses on the socio-political drivers and preconditions required for financialisation (Pitluck et al., 2018).

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<sup>1</sup>For this paper, infrastructure *funding* refers to the revenue source that ultimately pays for infrastructure capital or operating expenditure, typically in the form of user charges or taxation. Infrastructure *financing* refers to the capital raised through debt or equity instruments to cover the upfront costs of construction, which is then repaid or held as equity shares.

# 1 Introduction

Financing is a critical dimension of the ongoing ‘infrastructure turn’ in national and global discourses on economic development (Dodson, 2017). While finance is not inherently problematic - indeed, the availability of financing is necessary to build or upgrade physical infrastructures - financial arrangements have important implications for governance and policy. The technical, legal and institutional boundaries they establish can reconfigure jurisdictional or institutional spaces, re-orienting local infrastructures as assets tradable on global financial markets (Johns, 2011).

The term ‘infrastructure’ is used throughout the analysis, although it is acknowledged that this category has evolved: physical infrastructures such as canals, roads and water supply systems networks, existed long before they were grouped in this category. The term ascribes specific economic and political values to a broad variety of physical systems (O’Neill, 2018), and it is instrumental in identifying them as an asset class. Section 3.3 elaborates further on the historical emergence of the term amidst the development of multilateral financing institutions. Further, Larkin (2013) asserts the unique duality of infrastructure, which is both ‘things’ and the ‘relations between things’. Infrastructures are usually identified as large physical assets or networks, but it is their relational characteristic, providing connectivity or supporting flows, that qualifies them as *infrastructural* in nature. In the context of finance, this duality translates into physical assets (things) that can be leveraged as collateral, and flows (the relations between things) that are typically treated as potential revenue streams.

At present, access to finance for infrastructure investment is posited as a key constraint to achieving the Sustainable Development Goals and Paris Agreement. There is an abundant supply of long-term finance held by pension funds, insurance companies and institutional investors - however the ‘infrastructure bottleneck’ is attributed to a lack of infrastructure projects that are attractive to investors (Ehlers, 2014). The current agenda to scale up infrastructure investment significantly is supported by the G20, OECD and World Bank (Qureshi, 2017), adopting the discourse of the ‘global infrastructure financing gap’ (McKinsey, 2016). The current landscape of financial institutions and instruments have emerged from the particular historical trajectories of states and international organisations, and it cannot be assumed that they are appropriate to meet new objectives, such as the Sustainable Development Goals and Paris Climate Agreement. New financial architectures, with innovations across multiple scales, may be required to deliver equitable and sustainable development (Mitlin et al., 2018).

Histories of infrastructure finance are concomitantly histories of the state, histories of empire and conquest, and histories of industrialisation and money - throwing up a hugely complex picture of political, technical and social change. This confirms that infrastructure finance - like infrastructure - is heavily embedded within political-economic systems. To understand the drivers for new financing mechanisms and institutions, the scale of infrastructure projects is important. It was only when infrastructures could not be funded from current revenues that the imperative arose to either raise equity or borrow money. For extended periods, systems such as the *corvée* allowed infrastructures to be expanded and maintained in a relatively decentralised manner. Increased scales of infrastructure expansion, particularly driven by military needs of industrialisation, necessitated new forms of finance.

## 1.1 The rise of financialisation and implications for infrastructure investment

The financialisation of infrastructure describes a set of processes by which financial motives, actors, institutions and markets exert greater influence over domestic and international economies (Epstein, 2005). Importantly, this represents a set of heterogeneous processes that manifest in different ways. Financialisation is characterised by the recasting of public infrastructures as financial assets, and their services as creators of financial value (either through revenue generation or increasing the value of proximate capital or land assets (O'Neill, 2013). For public infrastructures, financialisation often takes the form of public-private partnerships, private financing schemes or the development of infrastructure as an asset class (Weber et al., 2016). Importantly, financialisation is not simply private sector ownership or investment, and the agency of state actors to reposition infrastructures as financial assets is often underemphasised (O'Brien and Pike, 2017).

Critiques of the financialisation of infrastructure focus on the tensions between the economic logics of infrastructures as long-lived, spatially-fixed public assets providing services, and the financial logics of investors and increasingly-globalised financial markets (Lorrain, 2010). Specifically, infrastructure has distinctive properties arising from its materiality and the nature of services - when recast as a financial investment, this requires the design characteristics and operating conditions to be revised to deliver the optimal investment return and manage risk (O'Neill, 2013). Infrastructures are also uniquely bound to property assets, as they function as conduits or rights-of-way between different locations (*ibid.*). In doing this, financialisation provides opportunities for value extraction across wide geographical scales, exemplified by pension fund investment in foreign infrastructure assets (Pryke and Allen, 2017; Torrance, 2009). This acts to restructure the ownership networks and decision-making powers governing infrastructure provision, displacing the authority of the state to decide how infrastructure can be used.

Monk et al. (2017) highlight the role of financial intermediaries within this process, as asset or fund managers who operate with short-term incentives and significant information asymmetries between asset owners and those managing the investments. A transformation in the nature of private sector involvement is evident: while private investors once financed infrastructure through government-guaranteed bonds that provided a modest, low-risk return, financial intermediaries are now permitted to collect revenues from three sources: returns on invested capital, appreciation of equity value and fee income where they act as the project service manager (Sclar, 2015).

The technical practices required to obtain financing can also exert substantial influence over the design, scope of service provision and funding mechanisms for new assets. Johns (2011) demonstrates the importance of deal-making and negotiation, and financial modelling and forecasting, to constrain the possibilities for investment. Financing can also rescale governance, often creating a micro-scale institutional or jurisdictional spaces with the boundaries of a project or special-purpose vehicle, and the concomitant spatial and temporal bounds.

The problematic implications of financialisation have been examined in detail, however, there is limited attention to the causal processes that drive financialisation across different sectors of the economy. As argued by Pitluck et al. (2018), most explanations rely on functionalist approaches and underplay the important socio-political and economic dimensions. This paper seeks to address this shortfall, reviewing the historical evolution of infrastructure finance to better understand these

drivers. Existing literature does not offer sufficient explanation of the key preconditions and causal processes by which financialisation is advanced. Gaining insight into these can inform financing approaches that are better aligned with the goals of sustainable development.

## 2 Methodological approach

This exploratory paper uses process-tracing to differentiate the historical trajectories of financial innovation across three distinct, but interconnected, institutional forms. The purpose is to provide a proof-of-concept that lessons and more nuanced causal explanations can be derived from historical perspectives. The analysis draws from existing literature, and so it only provides partial coverage of different geographies, infrastructure sectors, and time periods.

Specific attention is given to the political, economic and regulatory preconditions that enable, or necessitate, financial or institutional innovations. This treats the 'rules' of finance as contingent structures, arising from distinct histories and legal-political contexts (Hart and Ortiz, 2014). Influenced by Grabel (2018), this analysis focuses on the nature and sequence of institutional and financial innovations in conjunction with the evolution of the ideas and discourses that shape them.

Tracing these historical trajectories provides insight into causal relationships that are important to explain the variegated forms of finance currently in use, and the political agendas driving the financialisation of infrastructure. These findings are evaluated against the three causal drivers for financialisation, proposed by Pitluck et al. (2018):

1. Political struggles in nations or empires, either between, against or among state and financial elites
2. Expanded use of financial media in social relationships,
3. Discursive or material redefinition of cultural practices as financial

### 3 Tracing the evolution of three institutional forms

Broad review of literature on global finance, infrastructure development and economic change identified three distinct institutional domains: national development banks, multilateral and bilateral development finance institutions (DFIs), and private financing through asset securitisation. These forms are inter-related, both in terms of the infrastructures that they finance, and the modes of financing that are utilised. While the state - arguably the main institution responsible for financing public infrastructures - is not included as a category, the role of the state (or states) is prominent within each institutional domain. Table 2 outlines the key characteristics of each domain:

Table 1: Key characteristics

<i>Institutional domain</i>	National development banks	Multilateral development finance	Private finance
<i>Purpose of financing</i>	Lending to sectors that are not adequately serviced by commercial banks.	Lending for projects that support economic or social development in low or middle-income countries	Lending to optimise investment return. In the case of impact investing, social or environmental objectives may be included.
<i>Institutional properties</i>	Created by the state, lending backed by state-guaranteed bonds.	International lending entities, funded by member countries.	Financing raised from capital market sources, lending to a special-purpose entity.

#### 3.1 Private financing and asset securitisation

The private sector has a long history of participation in financing infrastructure development. The concession model for public works was first used by the Roman Empire (Goldsmith, 2014), and continues to be the dominant approach for public-private partnerships.

Tracing the evolution of financing arrangements and instruments, there are several key discontinuities. First, the transportation revolution and expansion of roads, canals and rail networks between the 17th-20th century saw the emergence of transatlantic investments and the creation of an investment model that was subsequently adapted for other types of infrastructure. Second, the deregulation of global financial markets in the 1970s opened up new sources of capital from money market funds. This was also accompanied by an investment model, in the form of project financing. While project finance was not a new approach (it was initially used by Italian merchant bankers in the 13th century), relaxation of the Glass-Steagall Act in the United States allowed banks to operate in deposit banking as well as investment banking (Kensinger and Martin, 1988), leading to rapid growth in the use of project finance.

### **3.1.1 The transportation revolution, investment frenzies and the emergence of transatlantic capital markets**

Across the 18-19th century, the transportation revolution saw a dramatic reduction in transport costs, resulting from the expansion of roads, canals and railways. This revolution enabled economic industrialisation, particularly in the United Kingdom and Western Europe. Financial innovations were needed to resource the large volume of construction across this period.

The creation of a new institutional mechanism in the early 18th century in England and Wales, allowed roads to be operated and governed by a trust, in place of the local parish. As trusts had fewer borrowing constraints than parishes, the expansion and upgrade of road infrastructures increased significantly. Turnpike trusts could finance improvements with external sources of funding, secured by tolls collected on the route. Speculative investment led to the 'turnpike boom' in the 1750s-60s, and eventually the English parliament introduced the Bubble Act, ceasing to renew trusts and returning the ownership of road corridors to local governments. Following the expansion of the road network, canals grew rapidly between the 1760s-1820s, and also experienced a period of frenzied investment between the 1790s-1810s. Canals were also rendered uncompetitive by rail technologies, and from the 1830s onward, investment fell significantly (Goldsmith, 2014).

The introduction of rail technology, particularly steam engines, drove the third (and the largest) surge of investment in transport infrastructure. A key difference with the expansion of rail networks was new legislation enabling joint-stock companies, and the repeal of the Bubble Act in 1824. This allowed the creation of limited liability companies, in which investors could purchase and trade shares. Crucially, this opened up a broader pool of potential investors, as joint-stock companies could be traded through the London stock exchange (Goldsmith, 2014). The Railway Mania peaked in the 1840s, from which point a growing share of investment was obtained through debt, leading the bubble to burst when the Bank Rate increased in 1845 (Chaplin, 2016). The activity of private investors in the UK's rail development contrasted to nations in continental Europe, where centrally-planned networks in Belgium and were led by the state (Wüdsch, 2016).

Expansion of the rail network across the United States also involved substantial private investment. Investment capital was limited within the United States, so capital had to be raised from European markets. This required lower-risk financial instruments: geographically-distant investors could not depend on social networks and business contacts for information on the quality of investments, and so most finance was raised in the form of bonds (Baskin, 1988). Since rail expansion in the United States came with significant technological uncertainties and demand uncertainty, government guarantees on bond interest were required in many cases to reassure investors. In other instances, land grants provided for the rail corridor, which provided collateral in case a project failed, and also allowed land parcels along new routes to be assembled easily (Eichengreen, 1995).

### **3.1.2 Financial deregulation, money market funding and project finance**

The second pivotal point for private financing of infrastructure followed changes in financial regulation and globalisation of financial markets after the collapse of the Bretton Woods monetary system. This resulted in new sources of capital funding and financial instruments that could be mobilised for

infrastructure investment (Merna and Dubey, 1998). In conjunction with this, the accumulation of savings in pension schemes and insurance and the introduction of asset securitisation increased the supply of capital, and the mechanisms for private actors to leverage finance for investments. Securitisation involves lending that is secured against the future revenues streams of a financial asset, by creating a special purpose vehicle (SPV), separate to the firm, that issues securities on international capital markets (Schwarcz, 1994). The SPV is critical to isolate the risk of a specific investment, and benefits firms by allowing them to take on debt through an independent entity.

The most prominent investment model using this approach was created by Australian infrastructure investment bank, Macquarie Group, in the 1980s. While Macquarie Bank are only one actor within a much broader market for infrastructure investment, including direct investments, listed and unlisted funds (Weber et al., 2016), the distinctive investment model and increasing global reach make them a relevant case to understand private investment. The value creation model combines the roles of merchant bank, capital fund, asset operator and fund manager in a hybrid approach to infrastructure finance (Gordon, 2011). Macquarie Group operate with a 'solar system' model, a number of satellite funds orbit the core entity, transferring revenue from the range of fees charged. The purchase or development of infrastructure assets through public-private partnerships uses a mix of debt and equity finance, with the asset subsequently sold to a new investment fund listed on the stock exchange. Macquarie then take on the management of the fund, collecting fees both for management and performance (Jefferis and Stilwell, 2006). This model relies on debt refinancing and the distribution of dividends to generate income, with a large share derived from revaluation of debt and asset appreciation. This approach to infrastructure investment is criticised for the emergent trade-offs between long-term value creation for the infrastructure asset, and the short-term value creation through financial engineering Lorrain (2010).

Following the Global Financial Crisis, reform of financial regulations has restricted the possibilities for financing public-private partnerships. The Basel III regulations require banks to reduce their dependence on short-term funding, and hold significantly higher levels of capital, which has made project financing untenable for a number of banking entities (Ma, 2016). Institutional investors are continuing to develop innovative approaches to infrastructure investment. The inefficiency and mismatched incentives of external asset managers has led many institutional actors to either bring this capability in-house or develop alternative structures for governance and monitoring (Clark and Monk, 2019; Monk et al., 2017).

In summary, the evolution of private participation in infrastructure finance illustrates the ongoing negotiation between the demand for, and supply of capital, across states and financial intermediaries. This shows the critical role of the state in facilitating private sector investment, through the creation of institutional mechanisms, or the provision of guarantees or collateral.

## 3.2 National development banks

National development banks (NDBs), also known as state investment banks, allocate credit for a specific mandated purpose, such as infrastructure development or counter-cyclical lending, backed by state-guaranteed bonds<sup>2</sup>. NDBs do not lend exclusively for infrastructure projects, and often have a broad mandate across public investments, small firms and targeted industry sectors. They can take any of the following roles to support economic development: counter-cyclical lending, promoting innovation or structural transformation, improving financial inclusion, financing infrastructure investment, or facilitating the provision of public goods or green growth (Griffith-Jones, 2018). A 2012 survey of development banks identified a broad variety of institutions, by size and scope of activities. Importantly, only 4% focus solely on infrastructure finance, although 65% adopt broader cross-sectoral mandates that include infrastructure (de Luna-Martinez and Vicente, 2012). The variety in the scale of lending is also significant: 51% have less than US\$1 billion in assets, 33% between US\$1-10 billion, 11% between US\$10-99 billion and 5% over US\$100 billion. Of the largest NDBs, the China Development Bank, KfW (Germany) and BNDES (Brazil) are larger than the World Bank.

Functionalist perspectives propose that these institutions arise in response to a market failure, where commercial banks cannot serve the long-term financing needs of the domestic economy (Chandrasekhar, 2016). However, closer review of the historical emergence and evolution of state investment banks demonstrates that the development of NDBs results from the ‘conjunction of economic demand and political supply’ (Verdier, 2000). Attention to the political and economic factors influencing the creation, scope and evolution of NDBs reveals the importance of these dimensions to explain the causal drivers and processes responsible for financialisation.

### 3.2.1 Early growth and expansion

NDBs first emerged during the later period of the 19th century, as mortgage banks for the agriculture sector. This model is attributed to French bank, (Crédit Foncier), established in 1852 to appease rural voters. The evolution and significance of these financial intermediaries varied substantially across countries (Verdier, 2000). This is variously attributed to the instrumental use of state banking to buy political support of sectors that are threatened by industrialisation (Loriaux, 1991), the presence of strong states that assert political control over the allocation of credit (Perez, 1997), and political resistance from the commercial banking sector. Verdier (2000) identified three prominent waves of NDB expansion, lending first to the agricultural sector, subsequently expanding to service small firms after World War 1, and finally to include traditional sectors<sup>3</sup>. As national economies industrialised, the value of transport, energy and communications infrastructures to that generated ‘economy-wide externalities’ grew, however the sheer scale of investment capital required, and high-risk nature of many projects, was beyond the capacity of many individual investors (Chandrasekhar, 2016).

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<sup>2</sup>State banks are distinct from government-owned, commercial banks and national savings banks

<sup>3</sup>The third wave was mostly found in countries that separated investment and deposit banking following World War 2, including Japan, Italy, France and Belgium.



### 3.2.2 Organisational reconfiguration of larger NDBs

The investment activities of larger NDBs are often aligned with economic strategies: for example, Brazil's Banco Nacional de Desenvolvimento Econômico e Social (BNDES) focused on supporting the international expansion of Brazilian firms and providing countercyclical finance, under President Lula (Grabel, 2018)[p.178]. Within the European Union, regional integration goals steered the growth of NDBs and the European Investment Bank, in an attempt to compensate for the limited fiscal capacity of the European Union (Mertens and Thiemann, 2019). Specific countries also used financing to promote economic strategies. The German development bank, Kreditanstalt für Wiederaufbau (KfW), provided significant financing for clean energy and energy-efficiency technologies, and more recently in climate protection (Mazzucato and Penna, 2015).

Across the 21st century, NDBs have also expanded into bilateral lending, providing development finance for low and middle-income countries - led by BNDES (Brazil), Chinese Development Bank and China Eximbank (China) and South African Development Community (SADC) (Hochstetler, 2014). Compared to multilateral development finance institutions, these loans did not always apply strict conditionality on governance, environmental and human rights considerations and raised concerns that states were using development finance for their own self-interest and foreign policy purposes (Hochstetler, 2014).

The shift towards financialisation is most evident in the European Union, where the EU's approach to 'governing through financial markets' steers NDBs toward market-based finance (that is, shadow banking), with the aim of using this alternative source of funding to supplement bank credit (Mertens and Thiemann, 2018). This approach is supported - and arguably necessitated - by the Maastricht Treaty's debt limits for national governments, as well as further fiscal regulations imposed after the global financial crisis.

### **3.3 Multilateral and bilateral development finance - Bretton Woods to 'Billions to Trillions'**

The 1944 Bretton Woods conference marked the creation of the World Bank Group, the first set of multilateral development finance institutions. Within this set, the International Bank for Reconstruction and Development (IBRD) is the main entity providing development finance. The IBRD had the explicit aim of allocating finance to nation states for specific objectives: initially the reconstruction efforts in Europe after World War II, and subsequently shifting to economic and social development more broadly. The evolution of development finance to include a broader range of financial institutions, and more recently a turn toward private sector financing, can be understood in relation to the World Bank's trajectory, from the initial, sole financing institution for development to become one of a wide range of actors.

In contrast to private financing and national development banks, the multilateral development finance regime arose from global co-operation and its ongoing evolution is shaped by shifting power relations between global governance actors and nation states. Although, the boundaries between these domains are becoming less clear, with NDBs extending into bilateral lending, and the leveraging of private finance across national and multilateral financial institutions.

#### **3.3.1 Bretton Woods and the creation of development finance**

The World Bank was conceived at the 1944 conference at Bretton Woods, in conjunction with the International Monetary Fund (IMF), and the creation of a new global monetary regime. From the outset, the World Bank's intent was to stimulate reconstruction and development by facilitating private-sector investment (Marshall, 2008)[p.26], although the initial charter did not focus on specific countries (by income group), or even define clearly what constituted a 'project'. Initially the World Bank was financed by US \$10 billion subscription capital (equity contributions) by member states, of which the United States is the majority shareholder. Since only 20% of this capital is paid in, the remainder is raised by borrowing from private markets.

The primary instrument used by the IBRD is concessional lending, with reduced interest rates and longer grace periods. During its earlier years, the IBRD focused on lending for infrastructure projects, later expanding scope to include healthcare and education. Initially, the belief that development was held back by the weak institutions, inadequate management capabilities and a dearth of well-prepared projects, and so the IBRD expanded to provide technical assistance alongside lending (Marshall, 2008).

Several global economic shocks created critical turning points for the development finance landscape. The oil shocks in 1973 and 1979 caused economic problems for many highly-indebted countries, and the World Bank was forced to shift away from project-based lending to structural adjustment loans, to address fiscal imbalances (Marshall, 2008)[p.40]. These loans were typically conditional on monetary policy reforms, market liberalisation and reduced public spending, often to the detriment of the debtor countries. Where the structural adjustment policies failed to stimulate recovery in debtor countries, the initial problem was exacerbated and developing countries continued to borrow from multilateral institutions, as well as banks, eventually leading to the Third World Debt Crisis in the late 1980s. Following these events, developing countries sought greater autonomy

from the Bretton Woods Institutions, to avoid interference in domestic policy (Grabel, 2018)[p.138]. Regional development finance institutions, many of which established across the 1960s and 1970s, stepped up to play a larger role in financing infrastructure for development. Within this changing landscape, in 1996 the World Bank repositioned itself as a 'knowledge bank' (Marshall, 2008)[p.41] as well as a financing institution, and in this way the institution's smaller role in financing infrastructure has been counterbalanced by its power to produce and mobilise expert technical knowledge on infrastructure financing, planning and delivery.

### **3.3.2 Growth of regional development financial institutions**

Against the shrinking role of the BWIs in development finance, regional development banks have increased in number, and have a more significant role in financing infrastructure projects to support economic and social development. These institutions are very diverse in nature, and similar to NDBs, many provide financing for a large range of purposes, beyond infrastructure.

The largest regional banks are the Development Bank of Latin America, African Development Bank, Asian Development Bank, Asian Infrastructure Investment Bank, New Development Bank, and Islamic Development Bank. The scope and mandate of these institutions vary, and many emerged in response to the dominance of Western powers in the membership of Bretton Woods Institutions (Grabel, 2018)[p.138]. One of the newest regional institutions is the Asian Infrastructure Investment Bank, which has received significant international attention for the Belt and Road Initiative, which seeks to improve integration within Asia, and between Asia and European markets (Callaghan and Hubbard, 2016). This institution avoids the political problems arising from bilateral financing through Chinese development banks, by creating an institution that seeks to uphold the standards of other multilateral development banks.

### **3.3.3 Mobilising private finance for development**

Across multilateral and regional development banks, the continued reliance on bond markets to raise capital has exerted some discipline over their operational models. While bond-buyers do not have interests in the policies applied to specific countries or regions, in the same way that the banks' member states may, the imperative for MDBs to retain their credit ratings is critical. To do this, a strong focus on project-based lending (based on the perception that risks are better estimated at the scale of a project) and the allocation of loans across countries with perceived credit risk, was critical (Humphrey, 2016). This is particularly problematic for regional development banks, where excessive concentration of loans to countries with higher credit risk is not viable.

Recently, a strong agenda to scale up private financing for infrastructure has emerged in development finance, led by the World Bank. This approach, also known as *Maximising Finance for Development*, calls for ODA and public finance to be used to catalyse or 'unlock' private financing for development, instead of increasing donor contributions of ODA and financing through existing financial institutions (Mawdsley, 2018). This agenda is linked with the imperatives to accelerate infrastructure investment to meet the Sustainable Development Goals and Paris Climate Agreement. While privately-financed infrastructure is not new - its long history is explained in Section 3.1 - the current

agenda links sustainable development and climate change agendas to the shadow banking sector and securities markets, raising concerns over this sector's fragility and tendency toward boom-and-bust cycles (Gabor, 2018).

## 4 Discussion and preliminary findings

Surveying the evolution of financing across these three institutional domains, this paper seeks to identify the political, economic and social drivers of each trajectory, focusing specifically on the factors shaping financialisation. The objectives and priorities across the three institutional domains are not mutually exclusive. Some larger national development banks have expanded into development finance, while development finance has taken a lead role in facilitating the private financing of infrastructure. Demand for investment capital from each institutional domain is relative to the others; often all three types of financing are possible, and the project promoter selects that with the lowest costs or most favourable conditionality.

Table 2 summarises the specific trajectories and significant political and economic preconditions. This shows the broad range of political and economic factors that were important to enable the creation and innovation of financing mechanisms, showing how the supply of investment capital is determined by the availability of capital (such as pension funds or shadow banking) as well as political decisions to use finance to shape economic development or technological transitions, or exert power or influence through foreign policy or the securing of logistics corridors. Since many financing institutions raise capital on international bond markets, the supply of infrastructure finance is flexible according to their willingness and ability to take on debt.

1. There are key discontinuities that characterise the trajectories: Collapse of Bretton Woods monetary regime - shift to floating exchange rates (1973) and deregulation of interest rates (1979) - and emergence of shadow banking (1975). Maastricht Treaty, 1992 - limited borrowing capacity of nation-states in Europe.
2. Supply-side preconditions include innovations in financial instruments or intermediaries, and decisions taken by national governments or multilateral organisations to facilitate investment in certain sectors.
3. Demand-side preconditions are more varied, as project sponsors are either incentivised by private profit in specific sectors, or public investment strategies guiding infrastructure expansion to meet economic, environmental or social objectives.
4. The role of the state in privately-financed infrastructure is arguably as important as that for publicly-financed investments, to provide institutional mechanisms enabling investment and often guarantees.

Testing the findings of this analysis against the causal drivers of financialisation proposed by Pitluck et al. (2018) suggests two important causal processes that warrant further attention. First, financialisation of infrastructure plausibly results from political struggles between, against, or among state and financial elites. Second, the discursive redefinition of public investment into infrastructure has played a key role in its financialisation. Further research is required to understand how institutional mandates, financial innovations and specific international and state actors have contributed to financialisation through these two processes.

Table 2: Summary: institutional trajectories and preconditions

HISTORICAL TRAJECTORY	PRECONDITIONS (POLITICAL & ECONOMIC)	
	<i>Supply of investment capital</i>	<i>Demand for investment capital</i>
<b>Private finance</b>		
Financing throughout the transportation revolution evolved with boom and bust cycles. In each case, the state enabled the institutional mechanism for investment (turnpike trusts, joint-stock companies, investment guarantees) and speculative investment drove an over-allocation of capital	<ul style="list-style-type: none"> <li>• Acts of Parliaments created and subsequently repealed the institutional mechanism to borrow money for investment</li> <li>• Stock exchanges provided financial infrastructures connecting investors with new projects</li> </ul>	<ul style="list-style-type: none"> <li>• Improvements in transport technologies gave an economic incentive to expand infrastructure networks</li> </ul>
Following financial deregulation across the 1980-1990s, entrepreneurial activities of investment banks to purchase and financially restructure infrastructure assets	<ul style="list-style-type: none"> <li>• Availability of investment capital from money markets (shadow banking)</li> <li>• Availability of investment capital from institutional investors (pensions, insurance funds)</li> <li>• Entrepreneurial activities of financial intermediaries to securitise infrastructure assets</li> </ul>	<ul style="list-style-type: none"> <li>• Fiscally-conservative government policies</li> <li>• Increasing infrastructure deficit</li> </ul>
<b>National development banks</b>		
Initial emergence of NDBs to address the agricultural sector expands to small firms and eventually traditional sectors. Emergence of larger banks that engage in bilateral lending, for foreign policy objectives or to expand national economy	<ul style="list-style-type: none"> <li>• Gap in credit markets for infrastructure projects</li> <li>• Targeted support for specific economic sectors</li> <li>• Shaping technological transitions for key infrastructures (ie. clean energy in Europe)</li> </ul>	<ul style="list-style-type: none"> <li>• Absence of financing at competitive prices/terms</li> <li>• National economic strategies requiring infrastructure investment</li> </ul>
<b>Multilateral development finance</b>		
Bretton Woods created the first global development finance institutions to finance post-war reconstruction. World Bank broadened focus to global poverty from 1968, and following a series of economic shocks and debt crises in the developing world, strategic avoidance of the BWIs led to a number of regional development banks, reconfiguring the objectives of development finance around regional development or along global logistics chains (Belt and Road)	<ul style="list-style-type: none"> <li>• Limited paid-in capital left the World Bank reliant on bond markets to raise funds for lending</li> <li>• Member states incentivised to contribute capital to exert control over development finance</li> </ul>	<ul style="list-style-type: none"> <li>• Post-war reconstruction</li> <li>• Avoidance of BWIs spurred increased role for regional development banks and bilateral lending</li> <li>• Advocacy for infrastructure investment as the means to address sustainable development and climate change, by World Bank, OECD, UN, G20</li> <li>• Global logistics corridors create the imperative to secure and integrate infrastructures</li> </ul>

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