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Water, Finance and Financialisation: A Review

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ABSTRACT: This article reviews the literature on the financialisation of water. Water financialisation is generally defined as a global trend wherein financial actors, instruments and practices increasingly penetrate the water sector. Literature conveying a Marxist interpretation of the phenomenon of water financialisation emphasises the way in which financial profits in the water sector derive from the capturing of rents. We identify three sectors that correspond to different pathways of financialisation in the water sector: large water infrastructure, water utilities/water supply and sanitation (WSS) and water resources as such. The literature points out that water financialisation is leading to increasing socio-spatial fragmentation as water flows towards spaces where water can reap the highest benefits for financial investors. We conclude that there is evidence that financialisation is occurring in different water sectors and in different world regions, with the main driver being the general financialisation of the global economy and sectors relevant for the water sector such as energy and agriculture. There is little or no evidence, however, that private finance in the water sector has increased substantially since the 1990s, despite the promotion of blended finance policies by multilateral agencies and development actors. The literature points out that water financialisation often does not happen through the direct ownership of water-related businesses by finance capital, but rather through complex financial instruments such as water- or environment-focused investment funds that link water to financial gains. There is as yet little knowledge of how these processes function and what their impacts are on socio-spatial development and environmental sustainability.

KEYWORDS: Water finance, water financialisation, blended finance

INTRODUCTION

Since the early 2000s, the topic of financialisation has attracted increasing attention in the social sciences and critical political economy literature (Aalbers, 2019: 2). The central feature of financialisation is the growth of financial assets and liabilities in a way that is detached from overall economic growth. The beginning of the current phase of financialisation is usually dated to the 1970s, with an increasing importance in the 1980s and an almost uncontrolled spread from the 1990s onwards (Abeles et al., 2018). There are substantially different theories about the growing role of finance; these can be divided into two blocks. The first block comprises the mainstream approaches that are derived from neoclassical economics in which a neutral or rather optimistic view of the growing importance of finance prevails. Here, the increasingly important role of the financial sector in the economy is seen as a sign of capitalism

becoming more efficient (see, for example, Levine, 2005). Any negative perception of financialisation is foreign to these perspectives. Instead, since the 1970s, they have themselves been at the basis of a growing financial sector; since that time, neoclassical economics has had a major impact on economic policies globally, promoting the widespread liberalisation and deregulation of finance.

The second block of theories is comprised of critical-heterodox approaches. Although they represent a diverse range of perspectives, they share a rather pessimistic view of financialisation in terms of its effect on the functioning of capitalist economies and of society in general. Critical-heterodox perspectives generally include works by authors who take post-Keynesian and Marxist perspectives. What these approaches have in common is, first, that they tend to view financialisation as a socially problematic phenomenon and, second, that financialisation is characterised by the primacy of the logic of the financial markets over the real economy. Essentially, post-Keynesians emphasise the political-institutional roots of the phenomenon of financialisation and thus assume that the 'problem' can also be solved by adjusting the political course (see, for example, Epstein, 2005; Krippner, 2005; Stockhammer, 2010). Marxists, on the other hand, attribute financialisation to the inherent and recurring contradictions of historical capitalism. Although the Marxist literature adopts many elements of the Keynesian analysis of financialisation, its main criticism on the latter is that Keynesianism ignores the long-term structural tendencies in the accumulation process of the capitalist system. Financialisation is understood as an historically recurring transformation of capitalism that has gained predominance since the 1970s (Harvey, 1989; Arrighi, 1994). It refers to a pattern of accumulation in which profit is increasingly generated through the mobilisation of, and trade in, interest-bearing capital rather than through the production of, and trade in, commodities (Fine, 2010, 2013; Lapavistas, 2013: 202). Interest-bearing capital appropriates part of the surplus value through interest, at the expense of other fractions of capital (Fine, 2013).

The financialisation concept has only recently entered the critical water literature; this new interest is due to the observation of a changing trend in the water financing model globally. Over time, water management and financing models have undergone significant changes. Neither urban water supply nor agricultural water were ever solely provided by the state, especially in the Global South (Swyngedouw, 2004; Coutard, 2008). The 19th and 20th centuries, however, were characterised by the state playing a central role in water management (Hall and Lobina, 2008; Loftus et al., 2019). While in the past water was conceived of as a public service, it has more recently come to be seen as a commodity with economic value (Bayliss, 2014: 292). Beginning in the 1980s, the state-led development model came under increasing critique and, following the so-called Washington Consensus, neoliberal policy reforms were promoted by key actors such as the World Bank. International water policy was substantially affected by these reforms which materialised in the 1990s in a commercialisation and privatisation agenda. As pointed out by various authors, privatisation in the water sector often did not turn out as its proponents expected (see, for example, Büscher, 2021: 3; Hall et al., 2005; March and Purcell, 2014). As emphasised by McDonald (2018), towards the end of the 2010s remunicipalisation processes outnumbered privatisation processes; this was at least partially attributable to the huge social movements that actively opposed the privatisation of drinking water services. While most cases occurred in only two countries (France and the US), remunicipalisation has been a global phenomenon across Africa, Asia and Latin America, wherever privatisation has taken place (McDonald, 2018: 47). Most recently, there has been a push by key global water policy actors for the inclusion of private finance in the financing of water in order to achieve Sustainable Development Goal (SDG) 6, which aims to provide universal access to, "safe, affordable and available when needed" water supply and sanitation services (WSS) by 2030.

Private operation and profiting from water systems do not always equate to financialisation; however, an increasing body of literature critical of the financialisation of public infrastructure and services argues that there is a global trend towards increasing penetrating of the water sector by financial actors, instruments and practices. This trend extends beyond mere privatisation and can be understood as water financialisation, the literature on which is the focus of this article. The review is structured in three sections. We first present the definitions of financialisation that are used in the water literature and then

elaborate on how they relate to broader theoretical questions. We also review some of the general drivers and characteristics of financialisation in the water sector that are highlighted in the literature. We then classify the literature into three subsectors that correspond to the different pathways of financialisation within the water sector; these are: large water infrastructure, water utilities/water supply and sanitation (WSS), and water rights/water resources as such. Subsequently, we analyse the discourse on blended finance and its materialisation since it arose as a key element of global water policy. We ask to what extent there is evidence in the literature that it has been a driver of financialisation in the water sector. We then explore what the literature finds about the impacts of water financialisation, particularly regarding the consequences of the new financing models as they affect socio-spatial equity. Finally, we conclude that there is evidence that financialisation is occurring in different water sectors and in different world regions, and that the main driver is the general financialisation of the global economy and of sectors relevant to the water sector such as energy and agriculture. There is little or no evidence, however, that private finance in the water sector has increased substantially since the 1990s, despite blended finance policies. The literature also points out, however, that water financialisation often does not happen through the direct ownership of water-related businesses by finance capital, but rather through complex financial instruments such as water- or environment-focused investment funds, thus linking water to the capturing of rents by financial actors. So far, there is little knowledge of how these processes function and what their impacts are on socio-spatial development and environmental sustainability.

In our review, we focused mainly on English-language literature. Our methodology involved an iterative process based on a 'snowball' strategy. We began with the identification of key terms such as 'financialisation', 'water', and 'infrastructures' in academic search engines such as JSTOR, LICIT, Connected Papers, and Google Academic. Iterative filters were then applied to refine the results, which produced a database comprised of 88 papers. It was then analysed, leading to the grouping of authors and perspectives. Recognising a gap in the literature concerning the mainstream discourse, the search was expanded to include derivatives of the term 'finance'. As the reading progressed, terms such as 'blended finance', 'de-risking state', 'public-private partnership', and 'privatisation' were incorporated on the basis of emerging themes in the literature. The new connections and emerging topics that were discovered resulted in an expanded database of 161 documents. The extracts from the literature were analysed using qualitative data analysis software.

THE FINANCIALISATION OF WATER

There is an increasing body of literature that maintains that the financialisation of water and water infrastructures is an ongoing global trend. In this section, we examine the available literature to determine if it provides evidence to support this claim. We first present the various definitions of financialisation that are identified in the literature and relate them to broader theoretical differences. We then review some general drivers and characteristics of financialisation in the water sector that are highlighted in the literature. Finally, we classify the evidence for water financialisation that is presented in the literature into three subsectors that correspond to the different pathways of financialisation: large water infrastructure, water utilities/water supply and sanitation (WSS) and water rights/water resources as such. These subsectors are not separate from one another, as financialisation in one sector can potentially lead to the financialisation of another (Moore, 2024); however, we find that financialisation in these three sectors is happening through different investment vehicles and instruments and with different preconditions. Large water infrastructures are set apart by: 1) the large sums they require; 2) the possibilities they offer for investment of over-accumulated capital; 3) the participation of transnational energy corporations; and 4) their large geographical footprint. WSS investment by financial actors aims to capture heterogeneous income streams that are differentiated by consumers' ability to pay and are facilitated by securitisation,

by other complex financial instruments, and by accumulation through public debt. Water trading markets increasingly allow for the commodification and financialisation of water itself.

What is the financialisation of water?

No single coherent definition of financialisation guides all the works reviewed for this paper, and there are also substantial underlying theoretical differences. We thus begin with the question of how the financialisation of water is theorised in the literature and to what extent this theorisation takes up and contributes to broader debates on the nature of financialisation (as raised by, for example, Christophers, 2018).

The literature on the financialisation of water can be roughly divided into two groups. The first group, which comprises the majority, is made up of studies that are conceptually ambiguous and do not have a clear theoretical concept of financialisation; these tend towards loose definitions that are based on an empirical interpretation of financialisation. Many refer – albeit not explicitly – to post-Keynesian definitions of financialisation; Epstein (2005), for example, defines financialisation as, "the increasing role of financial motives, financial markets, financial actors and financial institutions in the operation of the domestic and international economies". This definition is used by, among others, Bayliss (2014), Bertomeu (2019), Bresnihan (2016), Gibson (2021), Grafe (2020), Grafe and Mieng (2020) Heckel (2022), Klagge and Nweke-Eze (2020), Tristl (2023), and Cousins and Hill (2021). Financialisation is defined here as a kind of expansion of financial actors into areas that were previously limited to non-financial corporations. These financial actors are seeking to make a profit by connecting private capital with public services or infrastructure. This implies an intensive extension of the presence and logic of shadow banking.¹ This trend ends up driving local and federal governments to develop financial instruments that convert physical and tangible assets into financial assets that can be traded and capitalised into future revenue streams that are generated through infrastructure investments. This conceptual ambiguity is acknowledged by Williams (2021), who argues that, "conceptual pluralisation is not necessarily undesirable, given the vast range of phenomena, processes and socio-material relations that are potentially or involved by finance and financialisation, and indeed the diversity of financialised accumulation strategies pursued by private capital". This first group of studies generally does not specify, nor pose the question of, from where the profit of financial investments in the water sector is derived.

The second of the two groups from our literature review leans towards Marxist interpretations of financialisation. For these authors, financialisation, "comes down to the expansion and increasing influence of interest-bearing capital and its intermediaries in all sectors of economic, social, and political life" (Ahlers and Merme, 2016). The Marxist category of interest-bearing capital is central. Within this logic, Ahlers (2020) explains that it is the vast amounts of over-accumulated capital – the "wall of money" accumulated in the last three decades – which seeks to expand and be valorised by getting involved in, and directing, new market segments such as water infrastructures. Financialisation, in this view, refers to, "novel ways to extract value through innovative financial devices and mechanisms that speak to the process of commensuration"² (Allen and Pryke, 2013). In this sense, financialisation is not necessarily a "qualitative break", but is rather an "intensification of existing capitalist processes" (Christophers and Fine, 2020). That is to say that financialisation, from a Marxist perspective, is conceptualised as an historical phase of capitalism in which interest-bearing capital becomes extensive (to new areas) and intensive (within existing areas of application) (Fine et al., 2016).

¹ The Cambridge dictionary defines shadow banking as, "financial activities such as lending or investing money carried out by organizations that are not officially banks and so do not have to obey the same rules" (Cambridge Dictionary, 2024).

² Commensuration refers to the process of abstracting the material and contextual specificity of an object – such as water infrastructure – in order to render it as a financial asset. This transformation focuses solely on its qualities as an investment, making it comparable to other financial assets.

A part of this literature has begun to examine how financial 'surplus' obtained in the water sector links to a theory of value. This is relevant from a Marxist perspective because finance, in a classic understanding of the labour theory of value, does not generate surplus value. In this context, several authors in the Marxist tradition understand the financialisation of water in relation to processes of rent extraction (Bertomeu, 2019; Loftus et al., 2019; Fine et al., 2016). Financialisation of infrastructures is understood as the transformation of illiquid forms of assets such as water infrastructure to liquid assets where rent flows from monopoly ownership (Loftus et al., 2019: 1).

The theoretical debate regarding the definition of financialisation is not primarily concerned with which phenomena qualify as such; rather, it is focused on discerning the precise sources of financial gains within the water sector and evaluating the relevance of this inquiry. Some authors thus use plural and empirically based definitions without delving into the question of the origin of profits (see, for example, Bertomeu, 2019; Bresnihan, 2016; Gibson, 2021; Grafe, 2020; Grafe and Mieng, 2020; Heckel, 2022; Klagge and Nweke-Eze, 2020). Others use Marxist definitions that focus on the expansion of interest-bearing capital, the modalities of rent extraction, and the links between financial surplus and a theory of value that emphasises the commodification of water infrastructure (see, for example, Ahlers, 2020; Fine et al., 2016, 2016; Bertomeu, 2019; Loftus et al., 2019).

Although there are important differences around the definition of financialisation of water and a notable conceptual vagueness in the use of the term, the reviewed literature refers to a set of empirical developments that fit into a general descriptive definition of financialisation as, "the increasing dominance of financial actors, markets, practices, measurements, and narratives" (Aalbers, 2019). The empirical developments referred to as financialisation in the case of water and water infrastructures include the increased presence of financial investors in water infrastructure development through Special Purpose Vehicles (SPVs), the securitisation of revenue streams, the expansion of microfinance as an intermediary in the access to urban water, and the trading of water rights and land rights associated with them on financial markets. In the following section, we present some general drivers of financialisation in the water sector.

General drivers of water financialisation

The financialisation of water has been driven by some general economic factors, which are set within the broader transformation of capitalism into finance capitalism. In other words, as the world economy and public policies have become financialised, so has the water sector. We first highlight some general drivers of financialisation and then propose a classification of water sectors that shows evidence of different pathways to water financialisation based on the specific conditions that make it possible.

A key feature is the financialisation of the real economy, that is, the increased activity of non-financial businesses in financial markets and the increasing predominance of shareholder (financial) value (as opposed to economic growth) in corporations (Stockhammer, 2010: 4-5). In this sense, it is evident in the water literature that, since the 2000s, traditional water companies have financialised their accumulation strategies. The trend to financialisation is visible in the transformation of water corporations more broadly, in that corporate strategies have centred around reducing exposure in developing countries, reducing debt, and selling assets like infrastructure to financial investors (March and Purcell, 2014). Loftus et al. (2016) write, with regard to the UK, that the ownership model that now predominates in the water sector is one where half of the industry is controlled by private equity consortia. Loftus goes on to say that the main characteristic of the water sector now is that its property titles are traded on financial markets. There, their valuation is 'delinked' from the 'real economy' in the sense that securitisation and the participation of financial intermediaries opens a window to the possibility of separation between financial operations and the underlying economic reality. The valuation and transactions of property titles can thus be predominantly influenced by indicators and shifts in the financial markets (Loftus et al., 2016: 324, citing Tinson and Kenway, 2013: 6).

Financialisation in the water sector thus does not always, or even primarily, happen through the direct ownership of water-related businesses; rather, it occurs through complex financial instruments that link the water sector to financial actors. Several authors point out that, in this context, new financial actors have entered the water sector, including lenders, private equity investors, institutional investors, sovereign wealth funds, water funds and new multilateral banks (Ahlers and Merme, 2016). Water-focused investment funds, for example, have allowed investors to profit from water infrastructure without owning it directly or participating in the administration of water services (March and Purcell, 2014; Bayliss, 2014). Bayliss (2014: 8) explains that, "complex financial instruments have been created that are specifically aimed at investment in the water sector", including services, utilities, technology and equipment. Major investment banks also offer "structured water products"; these include the ABN Amro Water Stocks Index Certificate (MarketScreener, 2024), BKB Water Basket, ZKB Sustainable Water Basket (Zürcher Kantonalbank, 2024), Wagelin Water Shares Certificate, UBS Water Strategy Certificate (UBS Investment Bank, 2018), and Certificate on Vontobel Water Index (Vontobel, 2024; Ahlers and Merme, 2016). Water-related Exchange Traded Funds (ETFs), active since 2005 (Bayliss, 2014), are a form of Commodity Index Funds (CIF) that, "track the value of stocks of water-related businesses" (Clapp and Stephens, 2020: 233). Investment funds and managers play an important role in pooling their clients' capital into ETFs, thus taking part in the ownership structure of large transnational corporations (TNCs) such as Suez and Veolia (Bayliss, 2014: 9). Similarly, March and Purcell (2014: 8) show how investors in water-based vehicles are more interested in investing in water-focused investment funds rather than directly investing in the utility company since, "it is not the asset itself that is sold on, but the performance of the asset". The exact volume of capital invested through water-focused investment funds is hard to determine. Ahlers and Merme (2016: 3), for reference, found that the Pictet-Water-EUR fund holds close to EUR3 billion in water-related assets. Bayliss (2014: 8) found that the four largest water-focused ETFs, "have more than US\$1.4 billion in assets". As of October 2023, the seven largest water-focused ETFs hold a total of US\$4.29 billion.

The development of complex financial instruments that allow for profiting of water infrastructures without direct ownership acts as a general driver of financialisation by transforming water infrastructures into financial assets. The process involves converting non-liquid objects into liquid assets through practices like liquefying, valuation and standardisation (Larder et al., 2018: 10). This transformation encompasses various forms of liquidity such as bonds, securitisation and derivatives trading; assets are often connected across different regions to capture value locally while spreading ownership risks globally (Pryke and Allen, 2019: 3). A professional elite has emerged to manage this transformation; it is forming around new organisational structures in the infrastructure sector and is facilitating the formalisation of infrastructure as an asset class through standardised practices and specialised services (O'Neill, 2019: 12).

Investors, as a consequence, are disconnected from their investments. Sophisticated information technologies and algorithms allow for high frequency and fully automated trading; the process is thus opaque and highly complex, making it difficult to track financial flows (March and Purcell, 2014; Ahlers and Merme, 2016). Ahlers and Merme (2016: 4) therefore conclude that, "[t]he combination of actors, skill sets, and financial products creates a convoluted and complex spaghetti-like configuration of global financial flows, thus obfuscating the investors, sources, and volumes of capital involved".

Water financialisation is thus driven by tendencies and instruments that derive from the broader trends in the global economy, which can also be observed in different economic sectors. Different from other economic sectors, however, the literature highlights that the financialisation of water is also driven by discourses of water scarcity and, relatedly, water security.

The discourse around current or anticipated water scarcity – aggravated by climate change – has been an important motor for investment in, for example, desalination infrastructure (O'Neill, 2020). Anticipated water scarcity also appears to be a key driver of water rights trading and speculation. The discourse on the 'nexus between food, water, and energy' has been used by international institutions such as the

World Water Council (WWC) to encourage financial actors' engagement in water infrastructure development (Schmidt and Matthews, 2018); it has also been used to reframe water as a financial asset in both the Australian and the Californian water trading markets (Orobello and Cirella, 2021).

Investment objects: Pathways of financialisation in the water sector

The reviewed literature provides evidence for water infrastructure financialisation across different sectors and geographies. However, given that it is a highly variegated process, there are significant differences in the way that financialisation takes place and the conditions that make it possible. These differences are evidenced in the several possible categorisations of investment objects formulated in the literature. Ahlers and Merme (2016: 3) follow financial investors' criterion of classification, which is based on the economic sector in which the investment takes place, that is, "water treatment, water management, and water infrastructure and equipment". O'Neill (2019: 9) provides an alternative classification based on the investment's "life cycle stage and susceptibility to market and GDP fluctuation"; they use brown-field assets (secure and predictable revenue flows), core-plus assets (somewhat linked to GDP performance) and merchant assets (linked to market performance). In this case, water utilities (including treatment and management) fit into the first category, while infrastructures such as dams and desalination plants share features of the first two classes depending on the links between the water and electricity generated and the type of associated productive and consumptive activities.

To highlight the ways in which different conditions facilitate particular pathways of financialisation, we propose a categorisation of investment objects into three subsectors that represent such pathways: large water infrastructures, water utilities/WSS, and water trading markets. This allows us to identify differences in the way that financialisation takes place and the conditions that make it possible.

Large water infrastructures

Desalination plants and large hydroelectric dams are the two most relevant large infrastructures that are mentioned as objects of financialisation in the literature. Large water infrastructures are attractive investment objects, "because the infrastructure demands substantial amounts of capital that carries publicly backed guarantees against political change and risks over long-term temporal horizons while 'realizing' a relatively secure future profit stream" (Ahlers, 2020: 4). Similarly, Merme et al. (2014: 7) argue that "[l]arge infrastructure facilitates the absorption of surplus capital to avoid its devaluation".

Desalination plants have emerged as an important investment object that allows for complex financial operations. According to the International Desalination Association, there are over 20,000 desalination plants operating worldwide, with industrywide capital expenses in 2023 of US\$5.9 billion and operating expenses of US\$10.7 billion. Desalination facilities are unevenly distributed and are highly concentrated in certain locations and regions. Major capacity exists in the Middle East, North Africa, East Asia, North America, and parts of Europe. In contrast, sub-Saharan Africa, Central Asia, and South Asia have limited desalination capacity (Williams, 2022: 200). Pryke and Allen (2019) and O'Neill (2020) have shown evidence of financialisation in desalination facilities in southern California, but the findings of Williams (2022: 205) suggest that there is a larger trend. Desalination plants (especially large and very large ones) are attractive to financial capital because the size of the operation allows for the absorption of large amounts of surplus capital. They also allow for "generating stable and long-term revenue for investors" due to long-term supply contracts – often with public warranties – that assure revenue flows and the different financial operations on which they are based. Williams (2022: 206) suggests that, "desalination plants are mechanisms for capturing future value by securing revenue from water consumers several decades into the future".

Ahlers (2020: 2), relatedly, contends that large dams are crucial investment targets for "spatial and temporal fixes of capital with financial speculation" as their complexity allows for the development of diverse financial instruments. Merme et al. (2014: 6) reveal a shift in the way these instruments are being

implemented, with regional banks and international energy companies taking a more significant role in dam construction. Large TNCs that are focused on energy generation increasingly take part in water infrastructure development through large hydroelectric projects. Taking the example of the Mekong River basin, "financial actors can be clustered as: Multilateral and Bilateral Development Banks (MBDBs), Export Credit Agencies (ECAs) and Private Commercial Lenders and State-owned agencies" (Merme et al., 2014: 6), while energy TNCs include, "French EDF, the Norwegian Statkraft and the Chinese Sinohydro". Merme et al. (ibid: 8) identified the key players as public-private foreign hydropower developers, multinational engineering firms, and national energy groups. In large dam financing, these entities emphasise financial product expertise over the quality of the energy product.

The importance of these projects as attractive investments for financial capital is evidenced by the role of sovereign funds like those of China, Abu Dhabi, Kuwait and other institutional investors. These have emerged as important participants in large-scale projects (Loftus et al., 2019), into which they channel large amounts of capital. Private sponsors then hold equity shares through direct investment or indirectly through loans. O'Neill (2019: 11) highlights the diversity of actors that facilitate these flows of money; among the "significant organizational forms in the infrastructure sector", O'Neill includes: direct investors, closed funds, open funds, platforms, vertically integrated corporations, merchant banks (savings aggregators), sovereign wealth funds (savings aggregators), and pension funds.

Water utilities/water supply and sanitation (WSS)

Globally, the WSS sector is characterised by an enormous heterogeneity. In the Global South in particular, the standard model of WSS has been characterised as 'unbundled'; there, diverse suppliers and forms of supply coexist, with generally blurry and shifting boundaries between formal and informal, and public and private suppliers (Coutard, 2008; Bakker, 2013). As Baron et al. (2019) argue, the significant heterogeneity of the WSS sector is also related to successive cycles over time of privatisation, remunicipalisation and other changes in ownership structures. They find that the "legacies" of public provision, private investment, and public-private partnerships (PPPs) have left water access without a dominant intervention, and that this has resulted in segmented markets based on consumers' purchasing abilities. There are thus different forms of financialisation in this sector, which follow different strategies and geographical patterns.

Water utilities as objects of financialisation have been the focus of numerous studies. This is particularly the case in England and Wales, where the privatisation of water utilities has been consolidated. March and Purcell (2014: 8) note that the entrance of financial actors into the water sector has been favoured by the fact that traditional water companies – reducing risks and separating ownership from management – leverage financialisation techniques and transfer majority equity holdings to new institutional investors. Loftus et al. (2016: 6) show that in England, company ownership has shifted to financial investors. The water sector's dominant ownership model evolved from stock exchange-listed groups to multinational models and now predominantly involves private equity consortia owning over half of the industry. Fine et al. (2016) point out how companies like Thames, Anglian, Yorkshire and Southern Water are now owned by asset managers, investment banks, pension funds and similar financial entities through opaque and complex ownership structures that are made possible by Special Purpose Vehicles. The financialisation of water utilities in Chile was studied by Pryke and Allen (2022); there, several utilities companies that had previously been owned by RWE and Thames were acquired by the Ontario Teachers' Pension Plan (OTPP). Reis and Sánchez Trujillo (2024) show how the water operator of the Mexican city of Puebla was acquired by large and transnationally operating Mexican financial institutions and banks.

As Klagge and Nweke-Eze (2020: 65) explain, SPVs are, "project companies with public and/or private shareholders, banks and other financial institutions providing debt capital, insurance companies dealing with some of the (insurable) risks, contractor(s) and engineers for the construction, an operator for

operation and maintenance (O&M) as well as suppliers and off-takers". SPVs have been relevant in takeovers of large utilities in England (Loftus et al., 2016; Fine et al., 2016: 37), where the water company is part of an ownership chain with some entities in tax havens that are used to move funds through the chain via dividends and interest payments on intra-group loans. Multiple holding companies, including those in the Cayman Islands, facilitate the addition of acquisition debt to the water company.

Sanitation infrastructure has also been identified as an object of water financialisation. Cousins and Hill (2021: 15) describe how in some cities new stormwater infrastructure, often designated as "green infrastructural upgrades", is being financed through different financial instruments including green bonds: these bonds are used in a way that "turns water quality and flood control problems into new underutilized resource frontiers". This is exemplified by the case of Washington, DC's investments in green water infrastructure (Christophers, 2018). There, the emission of an Environmental Impact Bond (EIB) links the level of return payable to bond investors to the degree of DC Water's success in reducing "combined sewer overflows" (the sum of wastewater and stormwater); this makes it, "the nation's (and perhaps the world's) first example of 'Pay for Success' financing in an environmental rather than social context" (Christophers, 2018: 3).

For financialisation to happen in the WSS sector, commercialisation, commodification and privatisation are mentioned as key prerequisites.³ Following Moore (2024: 6), commercialisation emphasises market orientation, while commodification focuses on quantification. Commodification is a precondition for privatisation and financialisation, and financialisation seeks profit through risk management, speculation and technocratic economic management. Some studies, however, show that privatisation is not always a prerequisite for the financialisation of water utilities. Almeida and Hungaro (2021: 2) show how large state-owned utilities in Brazil, such as COPASA and SABESP, can become investment objects for finance capital in "a mixed company mode of privatization with the Initial Public Offer (IPO) of its shares in the stock market". Klink et al. (2020: 17) show that in metropolitan São Paulo, municipalities have been pressured by accumulated debt to grant concessions to SABESP, thus "increasing penetration of shareholder governance". Williams (2021: 8) asserts that publicly owned utilities are being commercialised when utilities secure private debt to support operations or offer "equity in exchange for investment"; this observation is consistent with the findings of Almeida and Hungaro (2021) for Brazil and with what Furlong (2020) describes in Colombia. Fine et al. (2016: 11) notes that, even without privatisation, state water providers are increasingly compelled to transform into "independent water companies" and embrace financial management akin to the private sector. Legal decentralisation and commercialisation of water services has been linked to the increased presence of financial actors in countries such as Kenya (Williams, 2021) and Colombia (Tamayo-Álvarez, 2022). Similar 'grabbing' practices have been documented by Gibson (2021) in the case of Californian water districts.

Pryke and Allen (2019) argue that predictable flows of revenue are the main attraction of water utilities for financial actors. A key revenue stream is the water bill which can be securitised (packaged as a revenue stream and traded in financial markets), and new infrastructure is financially re-engineered to allow for the extraction of increasing service and management fees (ibid). Several authors refer to the repackaging and securitisation of revenue streams coming from household bill payments (Williams, 2021) and from loans related to infrastructure development (Ahlers and Merme, 2016).

³ *Commercialisation* refers to the introduction of market principles or profit-oriented strategies into goods or services that were previously considered public or non-commercial. In the context of water, marketing refers to the transformation of water services or resources into for-profit entities. *Commodification* is the process of transforming goods or services into commodities. In the context of water, it makes water into a tradable commodity through, for example, the establishment of private property rights or water licenses. *Privatisation* refers to the legal change to private ownership, control or management of a good or service that was previously public or collective. In the case of water, it refers to the transfer of ownership of public goods and services to private entities.

O'Neill (2019: 3) views the relationship between an urban flow and a revenue flow as the driver of the financialisation of an infrastructure asset. This revenue flow is derived from turning an urban population with an inelastic demand for water into captive ratepayers for monopoly-holding utilities, making it highly attractive to certain financial investors (Williams, 2021: 7; March and Purcell, 2014: 4). Since the revenue stream can be repackaged and traded, it allows "returns to be generated via financial engineering rather than operational change" (Bayliss et al., 2023b: 5). The predictability of these revenues and the monopolistic terms in which they are appropriated have led several authors to link them to value-extracting strategies by financial agents (Loftus et al., 2019: 4) or to the pursue of rent by fictitious capital (Purcell et al., 2020).

In general, the available research on the financialisation of WSS provides evidence that the profits of financial investors derive from increased public debt and the shifting of financial risks to the state. Reis and Sánchez Trujillo (2024) show how indebteding Puebla's public water utility was a deliberate strategy for its later privatisation and appropriation by financial actors, and how public debt has served as a vehicle for the profitability of WSS for financial investors. In England and Wales, water utilities have raised loans that are backed by securitised future bill payments; in such cases, the stream of payments acts as a warranty and allows for the creation of financial instruments. This is feasible for stable-revenue firms, particularly privatised water utilities (Fine et al., 2016: 38). Bayliss et al. (2023b: 8) explain that this practice allows for a higher debt load on the balance sheet while maintaining a credit rating within regulatory bounds, often involving Cayman Island-registered subsidiaries to circumvent UK legislation.

Several authors describe this business strategy for financialised utilities as the, "choosing of debt over equity" (Bertomeu, 2019); it is also referred to as 'debt loading' or 'gearing' (Fine et al., 2016; Purcell et al., 2020). This is related to tariff regulations, which in a number of countries have incentivised companies to incur in higher gearing, as well as to engage in accounting manoeuvres that push regulators to allow increases in tariffs (Klink et al., 2020). Bayliss et al. (2023b: 9) found that in Britain, "the [new] regulatory measures resulted in a downgrading of the credit ratings of water companies on account of what Moody's considered 'political interference', given their interpretation as 'departures from long-standing regulatory practice'" (Bayliss et al., 2023b: 10).

Bertomeu (2019: 15) also notes that regulatory agencies play a central role in the strategy of choosing debt over equity as a method of financing that takes advantage of regulatory frameworks. The advantage of this strategy is that increasing debt for the water company prompts regulators to raise consumer prices, enabling companies to boost profits without reducing costs. These incentives to "mislead the regulator" have been noted by Hall and Lobina (2008: 24) and seem to show "a systemic bias towards investors in the regulatory architecture, resulting from uncertainty as well as corporate lobbying" (Bayliss et al., 2023b: 9).

Pryke and Allen (2022: 3), in Chile, show the importance of financial and accounting techniques in the case of water utilities that are owned by institutional investors. They highlight "the ability to reduce the cost of debt and defer its payment" through financial techniques as a key factor in increasing dividend payments. As Klink et al. (2020: 6) show, in the case of SABESP's role as concessionaire, such financial and legal practices enable the accumulation of intergovernmental debt that allows for the expansion of its operation and the seizure of new fixed-revenue streams.

Furlong (2021: 4) outlines two effects of the 'debt-tariff financing model' in water financialisation that is described above; these two effects are: 1) escalating tariffs, leading to unpaid bills and service suspension; and 2) a preference for large infrastructure over smaller, more suitable solutions for low-income consumers, which exacerbates the gap between developed 'upstream' and underdeveloped 'downstream' infrastructure. Cousins and Hill (2021: 14) and Reis (2022) make a similar point; they emphasise that the use of public debt for large WSS infrastructure can lead to a deepening of the existing socio-spatial inequalities in access to WSS. Hall and Lobina (2008: 17) show that build-operate-transfer (BOT) contracts require the government to prioritise debt repayment over using the income from the

infrastructure for other investments. The consequences of market-based capital sourcing also become apparent when re-engineered balance sheets result in over-leveraged entities that become constrained by their debt burdens (Grafe and Hilbrandt, 2019). These pressures can exacerbate existing financial vulnerabilities and restrict the operational capacities of water management entities, often to the detriment of the consumers and communities who rely on these services. Reis and Sánchez Trujillo (2024), in Puebla, Mexico, argue that public debt is indirectly shouldered by those without water access, that is, urban poor and rural residents who are affected by dried-up water sources. They bear this burden through, "taxes, fees, state austerity, and increased rates of exploitation". Investors prioritise returns over infrastructure productivity due to incongruent timelines; for instance, a desalination plant that is designed for speculative gains prioritises inflation-protected returns, with water production for the population being secondary (Ahlers and Merme, 2016).

Finally, water consumption metering technologies have emerged as an important instrument that allows companies to influence consumer behaviour. It aligns stable flows of income with demand predictions (Loftus et al., 2016: 2) and has the added effect of disciplining consumers (Furlong, 2020). Metering technologies play a key role in full-cost recovery policies. Furlong identifies this as a way for utilities to address infrastructure debt, which often leads to increased user indebtedness. This approach also shifts the focus of utility governance towards debt-servicing (Furlong, 2021: 3).

These technologies are increasingly relevant in well-established markets where consumers have a proven ability to pay and to thus generate stable flows of revenue. A similar strategy was attempted in 'off-grid areas' in Kenya through the use of pay-as-you-go (PAYGo) water dispensers that "combine prepaid smart cards and mobile payment systems"; this has been presented as a financially sustainable water supply solution (Tristl, 2023: 3).

As stated above, a key determinant of the way financialisation occurs is the capacity of consumers to pay for the varying ability to pay results in "a multiplicity of segmented water markets" (Baron et al., 2019: 9). In well-established urban markets, the certainty of revenue flows allows for strategies such as whole-business securitisation. In more precarious contexts, pay-as-you-go methods such as the ones mentioned above are implemented, together with microfinance, and can also be signs of financialisation. Water microcredit models can be seen as a dimension of the financialisation of social reproduction and poverty. This is based on the idea of the poor as investors in their own water inclusion, often through alternative systems of provision and off-grid solutions (Mader, 2011; Reis and Mollinga, 2012; Baron et al., 2019).

Water trading markets

There is considerably less literature on the financialisation of water itself than on the financialisation of water infrastructure and services. As pointed out by Moore, however, water trading markets (WTMs) are gaining ground globally and are enabling water resources to be brought into the orbit of financial logics (Moore, 2024). WTMs have been implemented in various countries on the basis of the idea that, "the trading of water licenses will encourage water savings and efficiency as license holders have an economic incentive to trade their water savings on the market" (WaterFind, 2018). In the case of WTMs, the investment objects are tradable water property rights, that is, the right to use a given amount of water for a specific amount of time. This is an instrument of water management that has been promoted since the 1990s (Rosegrant and Gazmuri, 1995).

In the US, where water rights are tied to land ownership, real estate has become a strategic investment object for municipalities and utilities linked to urban water provision (Gibson, 2021). Bayliss (2014) underscores the nexus between agricultural production and water trading by stating that what is traded is virtual water that is used to grow the crops that are being sold. Since water rights are tied to land ownership, "in the context of financialisation, this puts a premium on the value of the land rather than the water" (Bayliss, 2014: 11).

Legal regulation surrounding water rights is a key enabler for WTM; in the case of Australia, it makes possible the separation of land and water rights, "thereby enabling the transformation of water into a commodity form" (Iles, 2022: 3). The separation of land and water rights can be seen as an enabler of the financialisation of water; in and of itself, however, it is not a sufficient cause as there are contexts in which this separation of rights is prevalent but has not led to the commodification or financialisation of water, as for example in some Andean irrigation systems (Hendriks, 2010). Moore (2024: 4) points out that different operations have been deployed to restructure WTM and allow the entrance of financial actors; these include: deregulation (in Australia), lack of regulation (in Chile) and speculative futures markets (in California). The importance of property rights is not limited to WTM. Pryke and Allen (2022: 2) note that in Chile, a regulatory framework with strong private property rights, including over water, facilitates the investment criteria of national and global investors. This framework offers investors predictability in income flows; it also enables ongoing evaluation, which can maximise the value of those flows through corporate financial structures.

Moore (2024: 4), however, points out that, "although historically connected to land and riparian rights, there is a global trend towards unbundling water and land property rights, so that water entitlements become their own commodity". This is most notably the case in Chile (Bauer, 2005), Mexico (Reis, 2014), and Australia (Hamilton and Kells, 2021). There are currently 37 countries that have water rights regimes, that is, allocation systems in water-scarce regions that are centered on the issuance of water rights. With the right enabling conditions, these could evolve into water trading markets. 'Enabling conditions', in such cases, include water-saving and accounting mechanisms for allocation efficiency, as well as the legal enabling of water rights trading. According to Richter (2016), this "could result in annual water trades worth US\$13.4 billion and water assets (primarily water licenses) of US\$331 billion".

The complexity associated with the conditions that enable financial transactions involving water rights and futures has opened new investment opportunities. Bresnihan (2016: 3) mentions contracts and research-based investment opportunities as a growing area of interest for corporations and investors focused on water. These can come in the form of new business opportunities for information and communication technology (ICT) companies around the measuring of infrastructure efficiency and water/energy consumption. The most extreme example of the importance of these ICT companies is the case of water futures trading in Chicago. Water futures contracts are now allowing, "farmers, hedge funds, and municipalities to bet against the price of water" (Orobello and Cirella, 2021: 5). For these contracts, the company in charge of the index monitors the trading in California's WTM and sets a benchmark price (Moore, 2024: 4). This process involves firms that are specialised in water-related consulting and development, such as Veles Water Limited and WestWater Research. In the Australian water trading market, asset management firms such as Blue Sky Alternative Investments Limited and Kilter Rural act as key intermediaries in the trading of water entitlements (Larder et al., 2018: 15). Regulation and 'institutional frameworks' in the form of water licensing and cap-and-trade regimes emerge as important preconditions for the transformation of water rights into financial assets, as in the case of futures markets (Moore, 2024: 5).

THE BLENDED FINANCE AGENDA: A DRIVER OF FINANCIALISATION IN THE WSS SECTOR?

The recent discourse of relevant organisations such as the Organisation for Economic Co-operation and Development (OECD) and the World Bank around 'financing SDG 6 water' shows that blended finance – the tapping of private finance for achieving SDG 6 – has recently arisen as a key element of global water policy. Many authors in critical water studies see blended finance as an important driver of the financialisation of water. This section thus reviews the literature on that topic. Our aim here is to analyse the characteristics of the blended finance discourse and associated policies, as well as to assess to what extent it can actually be considered a driver of financialisation in the water sector. While the review shows

that there is a series of discourses, actors and institutions driving the blended finance agenda, there is little actual evidence that blended finance is a key driver of water financialisation.

Blended finance and the finance gap narrative

This section shows that at the level of international water policy there has been a discursive and policy shift from full privatisation to blended finance. This goes back to a broader shift in hegemonic global macroeconomic thinking from neoliberalism to what some authors describe as post-neoliberalism (cf. Ruckert et al., 2017). The latter is characterised by a continued neoliberal – that is, decidedly anti-Keynesian and pro-market – stance in public policy-making, but with a recognition of so-called 'market failures'. In a pragmatic way, rather than in a way that is neatly theoretically elaborated, these market failures legitimise a certain level of state intervention in the economy in order to close an allegedly existing 'finance gap'. In a vein similar to that of the 1990s agenda of full privatisation, the 'finance gap' is supposed to be addressed by channelling private finance capital into the provision of public infrastructure and services through 'blended finance'.

The paradigm of including nontraditional financial actors in the financing of water infrastructure and services, as manifested in the blended finance agenda, has been a widely disseminated discourse in international development since 2015, when the UN General Assembly adopted the notion (OECD, 2018; WB, 2015; IDB, 2021; Masters et al., 2021). The finance gap narrative holds that, "the water and sanitation sector is seriously under-financed in many countries, leading to the deterioration and potential collapse of the infrastructure" (OECD, 2010: 3). One of the main actors in this respect is the OECD. According to it, while structural sector reforms are needed in the long term to address this challenge, "in the short to medium term, access to repayable finance (such as loans, bonds and equity) will be critical so as to bridge the financing gap" (ibid). According to its most recent report on the topic, more than US\$1 trillion per year is necessary to achieve SDG 6 (OECD, 2022). The OECD and other key actors in global water policy such as the World Bank thus promote the idea that the investment deficit should be addressed through "innovative financial solutions"; these are defined as a combination of "PPP, municipal bonds, loan guarantees, low-interest loans and credit options available to all sphere of governmental projects" (Dithebe et al., 2019). Innovative financial solutions include a broad set of instruments which require a new water governance model that makes investments in infrastructure attractive and sustainable. Also required is a fundamental regulatory scheme that is based on market mechanisms such as tariffs and schemes that ensure the long-term permanence of rights over resources (Pegon, 2022; World Water Council, 2022).

Oberholzer (2023) argued that the finance gap narrative departs from an "exogenous money" approach derived from neoclassical economics, which reasons in terms of an absolute scarcity of money. Here, private finance is seen as a kind of technical fix to solve the problems of money scarcity in the public sector. Oberholzer points out that the current mainstream approach to development finance is based on three core assumptions, but that these are mostly not explicit: 1) strong fiscal restriction of states, 2) the assumption that private companies will generate more-efficient outcomes, and 3) the assumption that financial markets, once deregulated, will provide the missing capital without introducing any type of allocation bias. Research on money endogeneity from a heterodox economics perspective, however, shows that money is produced as banks issue credits and that thus, in principle, money is able to accommodate any level of demand (Kaldor 1982; Wray, 2014; McLeay et al., 2014). Oberholzer thus argues that the problem of developing countries is not a scarcity of money per se, but rather is due to their lack of monetary sovereignty and a scarcity of foreign exchange (Oberholzer, 2023).

Bayliss nevertheless points out that the finance gap narrative is an element of the financialisation of water in the Global South, "as the failure to deliver a basic service (something dependent on a complex array of institutions, history, geography, requiring staffing as well as social practices) is reduced to a financial value". As Bayliss further argues, this, "is to strip service delivery of all complicating elements

and replace them with the need for money" (Bayliss, 2014: 5). This is a view that has taken shape in the SDG field and in the development cooperation field in general (Tristl, 2022). As Moore (2024: 7) points out, the discourse around financial investment-oriented solutions to water provision further "rests on an assumption that environmental, social, and economic values are compatible". In the Global North as well, the finance gap narrative appears as a driver of water financialisation as, in some countries, it is pushed in the context of state austerity and fiscal crises. As argued by Grafe (2020), in the cases of UK and India the shift in infrastructure capital supply from state- or bank-based approaches to market-oriented approaches results from an economic context that is marked by austerity policies and liberalisation (Grafe, 2020: 16). In the context of fiscal constraints and state austerity in post-2008 Ireland, for instance, "the imperative to access external finance converges with new environmental demands to 'modernize' the water infrastructure" (Bresnihan, 2016: 3). Allen and Pryke (2013: 15) argue that the solutions to England's social and environmental challenges are framed in such a way that they can only be provided by private investment.

The finance gap narrative is not new. It was already being used in the 1990s to justify the full privatisation of water utilities (Hall and Lobina, 2008). It is increasingly mobilised, however, to implement the blended finance agenda. Our review of the publications on blended finance by the global players in international infrastructural policy and the mainstream literature took us from the Monterrey Consensus 2002 to the "From Billions to Trillions" agenda post-2015. In the process, there was an observable discursive shift from full privatisation to blended finance and PPP mechanisms that was based on a broader post-2008 shift in dominant global macroeconomic thinking (Mediavilla and Garcia-Arias, 2019). The privatisation agenda of the 1990s was based on the idea that public spending cannot generate economic growth and that economic policy thus had to be limited to stability policies in the assumption that private markets would generate investment. This perspective built the scientific basis for state austerity policies; according to it, more public saving would automatically generate more private investment, whereas public investment would only 'crowd out' private investment.

This changed after the 2008 crisis when institutions such as the IMF, the World Bank and the OECD began to recognise that under some conditions fiscal policy could be used to promote private investment (see, for example, Clift, 2018). This transformation is manifested in the blended finance agenda. While there are different definitions of blended finance (Bayliss et al., 2021: 3), the EU⁴ defines blended finance as, "the strategic use of a limited amount of grants to mobilise financing from partner financial institutions and the private sector to enhance the development impact of investment projects" (EC, 2015: 3). As Bayliss et al., point out with reference to Attridge and Engen (2019: 17), blended finance, "is increasingly oriented around the use of public resources to leverage private commercial finance" (Bayliss et al., 2021: 4). The mainstream literature points out, however, that there are certain limitations to blended finance for private investors. Bertzky et al. (2023), for instance, identified factors such as high real or perceived risks (including macroeconomic, political, corporate, liquidity and viability risks), high transaction costs due to long learning curves and small operational scales, inefficient and illiquid capital markets, low financial depth and underdeveloped financial institutions, and limited mandates to invest in high development-impact markets and sectors. International financial institutions therefore promote 'de-risking' policies, whose aim is to attract investments of global finance capital into infrastructure in the Global South by redesigning state institutions to create new de-risked asset classes (Gabor, 2021a).

The previous neoliberal logic of full privatisation was based on the conviction that only private investment can generate economic growth. This idea is reflected in the extensive literature on how private finance can address the development problem. The literature, however, yields no clear picture of how blended finance will generate the anticipated development effects. The prevailing consensus, instead, appears as an ambiguous and pragmatic programme (Pegon, 2023; Christiansen, 2021; Oberholzer, 2023; Fine, Santos and van Waeyenberge, 2016; Bernards, 2024). In 2017, for example, the

⁴ Blended finance is at the forefront of the EU's financial strategy and its role has continued to expand (Bayliss et al., 2021: 1).

World Bank launched its *Maximizing Finance for Development platform*; it seeks to introduce a new financing model for infrastructure in the Global South by "unlocking private sector investment" through guarantees and risk-sharing instruments (World Bank, 2020a). Its 2020 report on "Principles of MDBs [multilateral development banks] strategy for crowding-in Private Sector Finance for growth and sustainability development" (World Bank, 2020b; Rowden, 2018) promotes the idea that the state must create an environment conducive to investment and should only intervene fiscally in activities where 'negative externalities' are so large that they do not attract sufficient private investment. Ameyaw et al. (2017) and Machete and Marques (2021), as examples in the case of water, point out the need for greater private participation due to the low fiscal capacity of the states, the lack of profitability of certain business models, and the possibility of complementing current funds through blended finance. They do not, however, offer any precise theoretical model of the mechanisms linking blended finance to sustainable development. Both texts point out that the water sector is particularly difficult because it is complicated, risky and requires a lot of investment, and that the state must thus generate the appropriate contexts and incentives to attract the necessary investments.

Mazzucato and Penna argue that one of the theoretical bases of the post-2008 approach is the concept of market failures (Mazzucato and Penna, 2016). They point out that in the presence of market failures, markets do not allocate resources efficiently and that government can conduct an efficient intervention if it does so under criteria that incorporate market rationality. This implies that state intervention is exclusively required when markets fail and that their role, then, is to create incentives that revive growth trajectories. State fiscal, monetary and regulatory instruments are thus promoted primarily as a way to remove risk for private investors, which is a notion that contradicts neoliberal theory (Gabor, 2021b). The blended finance agenda, at the same time, clearly maintains a pro-market bias and is heavily oriented towards promoting the private sector (Bayliss et al., 2021: ix).

Blended finance, in that sense, could be interpreted as being part of a post-neoliberal policy agenda in that it breaks with certain aspects of neoliberal policy prescriptions but does not represent a set of strict policies or a clearly identifiable new policy regime (Ruckert et al., 2017). In the following section, we explore how blended finance has materialised in the water sector.

PPPs as instruments for tapping private finance for the water sector

In our literature review, public-private partnership (PPP) projects emerged as the most significant instrument within the blended finance approach to water supply and sanitation (WSS) infrastructure financing. McDonald et al. (2018) point out that the vast majority of private sector involvement in WSS is based on PPPs, with over 1900 contracts signed in the last 4 decades (McDonald et al., 2021: 118). PPPs have emerged as the primary avenue for private investment in WSS, particularly in the aftermath of the 1990s wave of privatisation and its shortcomings (Bieler and Moore, 2023). Bayliss and van Waeyenberge (2018) assert that increased global financial capital drives the current support for PPPs. This fosters a financialised infrastructure approach, restructuring policies such that they are framed around investment opportunities for financial investors, in order to "facilitate their entry into the sector".

PPPs do not always imply a process of financialisation; however, the literature highlights two main connections between water financialisation and the widespread adoption of PPPs for the development and operation of water infrastructure.

First, PPPs have been instrumental in facilitating the access of private finance to water infrastructure projects, achieving this by reframing the infrastructure as a financial asset. This can be understood as allowing for their liberalisation and (some form of) privatisation as a precondition to financialisation. This process is described by Klagge and Nweke-Eze (2020) as a shift from public to private investment and from the non-financial to the financial sector. Moore (2024: 2) and Pryke and Allen (2022: 197-8), resorting to Chiapello (2015), show that the production of financial assets rests on a process of financial valuation that has three stages: 1) problematisation reframes operations in terms of investment, 2)

tangibilisation realises promises in accounting systems (for example, through water licenses), and 3) financial structuring reorganises operations for profit-seeking.

Rendering infrastructures as financial assets makes possible the utilisation of more complex financial instruments and operations. In countries like England with consolidated privatisation of water infrastructures, PPP schemes have allowed the use of Special Purpose Vehicles (SPVs) for the takeover of utilities by financial actors, enabling the aggregation of diverse financial investors within intricate ownership structures. As described by Fine et al. (2016), the project structure is a key determinant because "finance is raised [on behalf of the] strength of the project or investment", not on behalf of the assets of the investors.

The second important connection between water financialisation and the widespread adoption of PPPs is that PPPs facilitate water financialisation as they build the basis for shifting risks from the private to the public sector. PPP contracts are characterised by the inclusion of long-term warranties, which guarantee stable revenue streams and shift risk from the private to the public sector. This risk transfer allows financial investors to profit further through mechanisms such as whole-business securitisation (WBS) (Merme et al., 2014; Muehlebach, 2017). WBS is a transaction in which a company issues debt that is backed by its operating revenue as a warranty. Government warranties, employed as part of de-risking policies, have become widespread in water infrastructure projects, serving as a crucial factor in attracting financial actors to these investments (Klagge and Nweke-Eze, 2020; O'Neill, 2020). These government warranties often have the added effect of improving the credit rating of the debt issued for the development of these projects, as exemplified by Tamayo-Álvarez (2022: 9) in the case of Colombia. These warranties represent a tangible manifestation of de-risking strategies through blended finance. Contractual arrangements in the operation phase are of key importance for the investor because the main source of revenue often does not come from user fees but from fixed or minimum payments that are guaranteed by the government entity. Particularly in cases where fee payments are low or unreliable, the risk is in this way shifted entirely to the public (Reis, 2022: 826).

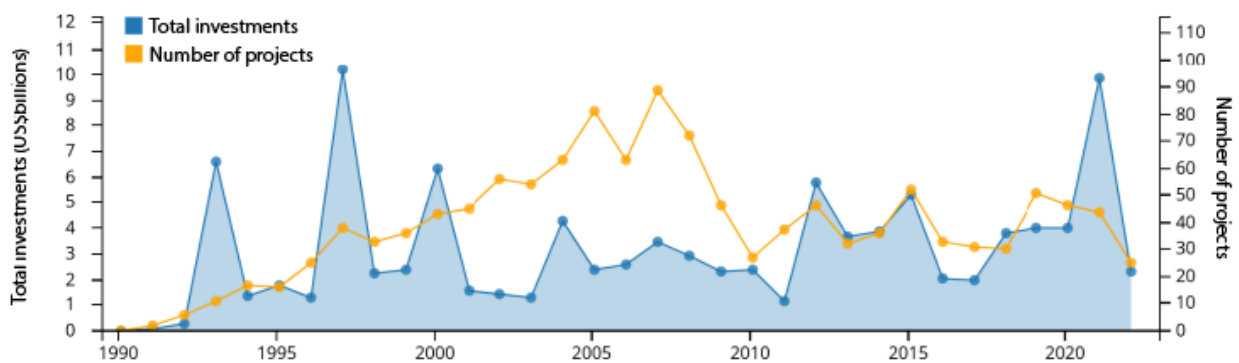
Critical literature argues that private funds flowing into water-related PPPs result from collaborative efforts by influential transnational actors; these include multilateral financial institutions, water-related corporations, and foreign aid agencies. Alongside the blended finance narrative, these actors advocate for the expansion of infrastructure PPPs and the framing of 'infrastructure as an asset class'. The World Bank, through initiatives such as the Global Infrastructure Facility (GIF), actively promotes private sector involvement which is supported by entities like Citibank and Blackrock (Murray and Spronk, 2019: 8). The International Finance Corporation (IFC), a part of the World Bank, fosters crucial ties with the private sector, encouraging increased investment in water infrastructure. Organisations such as the Water Resources Group (WRG), which is sponsored by multinational corporations such as Nestlé and Coca-Cola, also play a vital role in promoting private sector participation in water infrastructure that goes beyond mere funding (Bayliss, 2014). The World Water Council (WWC), endorsed by the OECD, further facilitates this network, with influential entities like Blackstone and major corporations like Nestlé and Veolia being part of its oversight panel (Ahlers and Merme, 2016).

What evidence is there to support the claim that these processes are in fact leading to the increased participation of private finance in WSS, giving rise to financialisation in the water sector? It is important not to overstate the extent of private finance in the water sector. Several authors argue that finance for WSS continues to be dominated by public budgets (Alaerts, 2019: 21; Haughton, 2002: 4). McDonald asserts that even if privatisation in the sector has proceeded, private investment is highly skewed geographically and tends to focus on the wealthiest countries and locations (McDonald et al., 2021: 119). Studies also show that, contrary to the full-cost recovery paradigm in global water policy, investments into the WSS sector are almost never profitable without continuous government transfers. This implies that: 1) much institutional and de-risking work is needed in order for private investors and even public banks to be able to invest in the WSS sector; and 2) that investments are more likely to concentrate on large infrastructure such as water treatment plants, the reason being that large amounts of resources

must be accommodated by investors and this often stands in contrast to the actual problematic of WSS access in the Global South (Alaerts, 2019: 15; Libey et al., 2020; Reis, 2022).

There is little data available to make a comprehensive estimation. Bertomeu (2019: 3) asserts that, "for water and sanitation utilities, the governments of 80 out of 177 developed and developing economies have entered some form of private participation in the sector". The World Bank's PPI database holds information about public-private partnership investments in infrastructure for 137 low- and middle-income countries. Although it does not cover all countries and investment objects, this source has been used in the literature to provide an approximation of the actual volume of private investment into WSS infrastructures as well as its geographical distribution (Lima et al., 2021; Rahman et al., 2022). According to the World Bank (2023), between 1990 and 2022, investment in 1186 water utility, water and sewage, and treatment plant PPP projects amounted to a total of US\$104 billion. This investment has increased during the last decade and is now approximately at the level of the 1990s (see Figure 1); however, it is still only a fraction of the estimated 'finance gap', since the World Bank has estimated the annual investment needs to be as much as US\$114 billion (McCoy and Schwartz, 2022).

Figure 1. Number of water-related PPP projects and total investment in low- and middle-income countries (1990-2022).



Source: World Bank (2023).

To summarise, while there is some data on specific investment instruments and assets associated with the water industry – such as PPPs or ETFs – the broader financial landscape surrounding the new modes of financing water infrastructures remains relatively uncharted. Beyond the case studies presented in the critical literature, for example, it remains unclear how significant the role of private investment is in overall investment within the water sector. It is also not clear how much of it can be associated with financialisation. We conclude from this review that blended finance is a driver of financialisation, but only under very specific conditions, that is, where investment in water is already attractive and where the regulatory framework allows for the implementation of the respective financial instruments.

IMPACTS OF THE FINANCIALISATION OF WATER ON SOCIO-SPATIAL EQUITY OUTCOMES OF WATER ACCESS

Critical literature identifies several different impacts of financialisation on socio-spatial equity, though they are often not presented in a systematic manner. Available evidence indicates, however, that the financialisation of water has profound socio-spatial consequences on various scales, and that these consequences derive specifically from shifts in global investment patterns, preferences for specific investment targets, and attempts to exert control over strategic locations and resources. Overall, the literature points to the probability that the financialisation of water is leading to increasing spatial fragmentation

and to the orientation of water flow towards spaces where it can reap the highest economic benefits. This is however accompanied by a tendency to include more and more formerly peripheral spaces into the circuits of finance capital.

The literature indicates that the financialisation of water transforms spaces on various scales. At the local and regional levels, the financialisation of water infrastructure involves a particular production of space, in that it favours (often large-scale) projects that maximise the ability to capture rents (Loftus et al., 2019); this has a huge spatial impact (Ahlers and Merme, 2016: 5). Reis and Sánchez Trujillo (2024) posit that the financialisation of WSS in Puebla, Mexico, has produced a specific spatiality that becomes manifest as 'landscapes of debt', with finance capital producing new forms of highly heterogeneous urban space in the form of residential segregation between rich areas with water and poor areas without. Muehlebach (2017: 3) similarly highlights that the widespread water shut-offs in southern Italy signal to global investors that water is viewed as a commodity by the government. This behaviour underscores the administration's readiness to limit access to water, reserving it predominantly for those who can afford to pay. Such a policy reinforces socio-spatial inequalities, as it disproportionately impacts lower-income communities and exacerbates existing disparities in local access to an essential resource like water. Merme et al. (2014: 8) highlight the social and environmental tensions that emerge from the exclusivity over water rights that comes with concession agreements of BOT contracts for large water infrastructures like dams. They argue that this exclusivity could be in conflict with other uses of water related to traditional livelihood strategies such as fishing. The exclusive use of land and water for these large infrastructures could displace traditional uses and thus force traditional inhabitants to adapt and even relocate. In the case of the Mekong River basin, the authors highlight that the legal framework gives the private consortium in charge of dam construction and operation a high degree of decision-making power over water management, while leaving to the government the responsibility of dealing with, "the negative consequences of the dams such as involuntary resettlements, loss of fisheries, changing flood regimes, and the general disruption of socio-economic and ecosystemic processes" (Merme et al., 2014: 27).

On a global scale, Murray and Spronk (2019: 2) argue that blended finance shifts development aid, "away from the poorest countries and [from] the services the poor need the most (e.g. health, education, water, and sanitation) and towards more profitable investment in finance, energy, and industry in middle-income countries". This shift in resource allocation has implications for the spatial distribution of development projects and their benefits. Drawing on OECD data, they show that 77% of Overseas Development Assistance (ODA) that is dedicated to blending finance goes to middle-income countries while only 7% of ODA flows to least developed countries (ibid: 277). Showing striking parallels to large-scale PPPs in water infrastructure, evidence on WSS microfinance for Vietnam and India presented by Mader (2011) and Reis and Mollinga (2012) shows that the projects mainly subsidised better-off households, as they were not able to solve the structural issues underlying lower-income households' lack of access to WSS. Ultimately, WSS microcredit schemes thus, "threaten to deepen the marketisation and depoliticisation of the water access question, exacerbate inequalities, and effectively undermine rights-based approaches" (Baron et al., 2019: 3).

The literature on WTMs also provides evidence that water financialisation makes water flow towards spaces where it can reap the highest economic benefits. It describes possible, but still uncertain, effects on socio-economic sustainability, water security for urban users, agricultural markets and food security. Hamilton and Kells (2021) show that, in the context of Australian WTMs, water redirection to previously less-farmed areas that are now used for large plantations prioritises water holdings in those areas over their farmland value, thus mirroring California's Central Valley. Traders exploit price differences; this impacts farmers who are reliant on constant watering for trees or livestock, but who are outbid by other users (Iles, 2022: 3). In the case of Californian WTMs, where demand has already exceeded water supply, speculation by outside traders is also impacting water prices for farmers and urban consumers (Orobello and Cirella, 2021: 5). Moore (2024: 4) points out that "cities and urban water users are increasingly

entering the market and buying up water rights from agricultural users", while corporations involved in mining and fracking are also out-bidding farmers for the purchase of water licenses.

Moore (ibid) identifies two contradictions in the financialised water model. First, it relies on increasing water prices, which limits access for water-poor households; this goes against the premise of these models, namely the idea that profit-maximising models can equally address environmental and social interests. The second contradiction in the financialised water model is that increasing investment depends on rising prices and revenue streams, which, in turn, rely on increasing scarcity. This creates a contradiction where economic models encourage water savings but simultaneously depend on scarcity to be profitable.

Despite initial excitement, Moore notes the "sluggishness" of the water futures market stemming from challenges in defining and predicting water quantity and quality. Unpredictable precipitation undermines the market's assumption that it can determine prices and manage risks. While global water futures markets based on physical settlement is improbable due to the localised nature of water use and the high cost of its transport, futures markets with cash settlement trade the promise of future water settled with cash, "abstracting water from the particularities of its hydro-social cycle" (Moore, 2024: 6). The impact of water future markets does not yet seem to be clear. However, the case of agricultural future markets shows that the entry of financial speculators – even if the deals are not settled in physical terms – can have impacts on global food prices and security. In the case of water, it is thus also possible that financial speculation on future price increases could have negative socio-environmental impacts as less economically efficient (but not socially or environmentally efficient) water users are priced out.

Another aspect highlighted in the literature is that financialisation also involves a tendency to incorporate formerly peripheral areas into capital circuits. Tristl (2023: 15) observes that in off-grid water provision in Kenya, digital technologies aim to render previously hard-to-reach populations "legible" by capturing data from newly "included" individuals and "securitizing income streams". This trend could be understood as an inclusion of peripheral areas of the world economy into an extractivist accumulation model through financialised schemes of water provision. Financial agents play an important role in this expansion to peripheral areas, as is the case with rating agencies that act as "financial gatekeepers" (Gibson, 2021). These agencies can be vital to the channelling of investment and can validate and set in motion new spaces of accumulation, as was shown by Tamayo-Álvarez (2022: 21) in the case of municipal water bonds in Colombia.

CONCLUSION

In our review, we identified three main categories of financialised investment objects in the water sector: large water infrastructures (such as dams and desalination plants), water utilities/WSS, and water trading markets. Although these sectors are not separate from each other, we found that financialisation in these three areas occurs through different investment vehicles and instruments and with different preconditions. Large water infrastructures are particularly attractive to financial capital due to the possibility of absorbing large quantities of over-accumulated capital. In the WSS sector, investment by financial actors aims to capture very heterogeneous income streams that are differentiated by consumers' ability to pay; this investment is facilitated by securitisation and other complex instruments, as well as by accumulation through public debt. Water trading markets increasingly allow for the commodification and financialisation of water itself. The literature indicates that the financialisation of water leads to increasing socio-spatial inequality as water is diverted to spaces where it can reap the highest economic benefits. At the same time, there is also a tendency to include more and more spaces that formerly were peripheral into the circuits of finance capital.

The review shows that there are cases of financialisation in all water sectors and many world regions, but in none of them does it seem to be the general rule. Instead, the large majority of water systems are run by public money. There is clear evidence of financialisation in the WSS sector in the UK and in a number of cities in the Global North and Global South; so far, however, it does not seem to be a

characteristic of the majority of WSS systems in the world. Our analysis of blended finance for water policy is a case in point. The review shows that the role of blended finance in the process of water financialisation is complex. In contrast to the 1990s privatisation agenda, blended finance as it is advocated in the mainstream literature lacks a clear scientific logic. It can be understood as a 'post-neoliberal', ambiguous and pragmatic political programme that is oriented towards promoting private sector involvement in WSS financing. Its impact is seen in the de-risking of water investments by states; there, it shapes infrastructure as an attractive investment for financial actors that is facilitated mainly by public-private partnerships (PPPs). There is little evidence, however, that blended finance is really a major driver of the financialisation of water. We thus conclude that blended finance can act as a catalyst for the financialisation of water, but that this is the case only under specific conditions where investment is already attractive to finance capital, such as in large infrastructures and where governments are willing and able to take over financial risks. Rather than the blended finance agenda, the primary impetus behind the financialisation of water lies in the broader economic trend towards the financialisation of the economy in general and of sectors closely linked to water such as electricity, agriculture and construction.

While we found little or no quantitative evidence that the amount of private finance in water has increased since the 1990s, there is also considerable uncertainty with regard to the implications of some broader trends identified in the literature. This is especially the case with regard to the financialisation of transnational water companies and the entry of new financial actors into the sector. The literature points out that financialisation in the water sector does not always, or even primarily, happen through direct ownership, but rather through complex financial instruments linking the water sector to financial actors. This involves the use of complex instruments that create intricate global financial flows such as water-focused investment funds, ETFs, and structured water products. These processes make it very difficult to assess the impact of financial capital in the water sector, and research that sheds light on the 'black box' of financial markets in the water sector (Christophers, 2015) is still in its infancy. Among the most relevant, yet largely unexplored, questions are: how is money moved between sectors (both within the water sector, but also among different sectors of the economy while flowing in and out of the water sector); how is water commodified and rents captured; and what effects do these processes have in socio-spatial and environmental terms. In contrast to other sectors, financialisation in the water sector is additionally driven by discourses of water scarcity and water security; these amplify the potential value of investments and thus also the potential control that powerful financial actors may have over the allocation of water resources.

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