

Boldly boring: public banks and public water in the Nordic region

Petri S. Juuti, Riikka P. Juuti & David A. McDonald

To cite this article: Petri S. Juuti, Riikka P. Juuti & David A. McDonald (2022) Boldly boring: public banks and public water in the Nordic region, *Water International*, 47:5, 791-809, DOI: [10.1080/02508060.2022.2072149](https://doi.org/10.1080/02508060.2022.2072149)

To link to this article: <https://doi.org/10.1080/02508060.2022.2072149>



Published online: 07 Jun 2022.



Submit your article to this journal [↗](#)



Article views: 36



View related articles [↗](#)



View Crossmark data [↗](#)

RESEARCH ARTICLE



Boldly boring: public banks and public water in the Nordic region

Petri S. Juuti ^a, Riikka P. Juuti ^b and David A. McDonald ^c

^aDevelopment of Water Services and Municipal Infrastructure, Tampere University, Tampere, Finland; ^bBuilt Environment, Tampere University, Tampere, Finland; ^cGlobal Development Studies, Municipal Services Project, Queen's University, Kingston, ON, Canada

ABSTRACT

Public banks in Finland, Sweden, Norway and Denmark have played a critical role in financing the costs of public water services in the Nordic region for over a century. A pooled banking model, collectively owned and operated by municipal and/or national governments, has allowed public water operators to obtain financing at the lowest possible rates, improving services and protecting their public status. It is not without its challenges, including threats of privatization and commercialization of public water operators and public banks, but this Nordic model has much to offer global debates about public financing of public water services.

ARTICLE HISTORY

Received 13 January 2022
Accepted 20 April 2022

KEYWORDS

public banks; public water; financing; Finland; Norway; Sweden; Denmark; Nordic region

Introduction

‘May you live in interesting times’ is a meaningful, albeit apocryphal ‘Chinese proverb’, particularly when it comes to water services and public finance. Water-related disasters can make for interesting news, but most of us would prefer to avoid them, satisfied in the (uninteresting) knowledge that our water and sanitation networks are safe and reliable. The same applies to public finances. Bank collapses are the subject of breathless media coverage, but they can devastate people’s lives.

Our reference to public banks¹ and public water operators in the Nordic region as ‘boring’ in the title of this article is therefore intended as a compliment. This is not to say that public banks and public water operators in Finland, Sweden, Norway and Denmark are dull or overly cautious. They are in fact fascinating institutions with much to teach us about how we might better use public monies to fund public water (having provided cheap and reliable financing for safe and affordable public water services for more than 120 years). In a world where private finance continues to disrupt, commodify and financialize every facet of our lives, Nordic public banks and their public water counterparts have demonstrated the potential for bold public financial interventions that resist these corrosive trends (Ahlers & Merme, 2016; Almeida & Hungaro, 2021; Grafe, 2020; Loftus et al., 2019).

Nordic countries have created a virtuous loop of public financing where municipalities collectively own and manage a public bank which then provides them with the funding they need for their public services, backstopped by their national governments. With

shared ownership and governance, small and large municipalities have access to affordable credit to help finance their water and sanitation services (WSS). The task of the public bank is to coordinate the raising of capital and to allocate lending to municipal water and sanitation providers (typically on terms that private banks are unable to compete with). Testament to the effectiveness of this system is universal coverage of high-quality and affordable public water and sanitation in the region, as well as the fact that there has not been a single loan default since these public banks first began operating in 1899.

But lest the situation seem too good to be true we conclude our paper with a discussion of three challenges that public banks and public water operators in the region face in the future. The first relates to the long-term sustainability and affordability of water supplies and how this could be affected by economic growth and demographic diversity. The second is a network of ageing infrastructure requiring massive investments that individual municipalities seem unwilling or unable to make on their own, raising questions about the need for better coordination of WSS spending at the national level. Finally, the legendary Nordic commitment to public ownership of essential services such as water and sanitation is not impervious to the threats of privatization or the commercializing tendencies of corporatized public utilities, with additional confusion around the role that public banks are allowed to play in financing public water.

There is also the question of whether the Nordic model can be replicated in other parts of the world given the distinct socio-economic and political conditions of the region. We nevertheless hope to illustrate the potential for learning from the Nordic public banking framework by highlighting positive elements of their water–finance nexus and discussing how some of these political and institutional features might be reproduced elsewhere.

Research for this paper consisted of extensive reviews of primary and secondary literature on public banks and public water operators in the region, complemented by interviews with nine senior managers from public banks and public water operators in Finland, Norway, Sweden and Denmark (see Appendix A).

Nordic public water

As with many countries in the world, ‘modern’ water services in the Nordic region began as private enterprises but were quickly municipalized due to concerns ranging from public health to the private control of critical resources (Helgertz & Önnersfors, 2019; Juuti & Katko, 2005). In Finland, for example, the first urban water and sewerage system was established in Helsinki in 1876 as a private concession (the only one in Finnish history), but quickly shifted to municipal ownership a few years later (Katko, 2016, p. 44).

Today, virtually all WSS in the Nordic region are publicly owned and operated.² The vast majority are owned by municipalities, with a small but important proportion being owned and operated by community cooperatives, notably in Finland and Denmark. This tradition of water cooperatives is a ‘special feature of Finland’s water management’ in particular, with more than 1400 organizations representing about 10% of the population (Katko, 2016, pp. 44, 131). It is also worth noting that knowledge-sharing and networking on WSS in the region is strong and long-established – beginning as early as 1866 – reinforcing the notion of a pan-Nordic public water model (Katko, 2016, p. 53).

This public nature of WSS is supported by legislation. In Denmark, for example, municipalities are legally obligated to own and operate WSS (in some rural areas water supply can be owned by an association of private households but these water ‘companies’ are under supervision of the municipality with regards to water quality and supply (interview 8)). In Finland, municipalities can decide if they want private participation in water services, but municipal governments must retain some degree of ownership and control (as outlined in the Water Act 587/2011). The private sector has been involved in planning and construction, and also supplying goods and services to WSS operators, but long-term contracts for operation have been rare (Katko, 2016, pp. 210–212). In Sweden, water supply and sewage disposal are by law a municipal responsibility under the Public Water and Wastewater Plant Act (McConville et al., 2017), with similar legislation in Norway (Government of Norway, 2012).

So too is there broad public support for publicly owned and operated WSS in the region amongst citizens and a broad cross section of political parties (Pérard, 2009; Hukka & Vinnari, 2007; Kimberley & Bieler, 2021). This public backing creates a self-reinforcing loop, with successful public water services begetting further public support. In all four of these Nordic countries WSS operate at exceptionally high standards on virtually every key performance indicator: access to water services is universal and affordable (in Finland it is mandated that ‘everybody should have access to water services [and] if a citizen is unable to pay for the services, the social security system foots the bill’; Katko, 2016, p. 153); water services are generally reliable and water quality is high (though not without problems in the past) (Katko, 2016, p. 148);³ and unaccounted for water losses are relatively low and water operations are financially efficient (Rajala et al., 2019, pp. 149–154).

Water operators are also respected professionals, stemming in part from high levels of vocational and tertiary training in the sector and extensive localized research on WSS. Front line staff and managers take pride in the work they do and engage in a significant amount of public education and outreach, even publishing books in connection with their utility’s anniversaries (Katko, 2016, p. 155).

It should also be noted that water operators in the region are all ‘corporatized’, by which we mean they are owned by the municipality in which they are located, but have separate legal status and some degree of financial and managerial autonomy from elected officials and other municipal entities (McDonald, 2016a). This form of ringfencing is common with water services throughout the world but it is legislatively mandated in the Nordic region (Torsteinson, 2019; Berge & Torsteinsen, 2021).

There are two primary reasons for this corporatization directive. The first is to provide a degree of independence on the part of professional utility managers, allowing them to make day-to-day decisions about operations without political interference (although major policy decisions must be approved or initiated by elected officials). The second is to create stand-alone revenue and expense accounts that are separate from general municipal finances with the aim of creating full transparency on operating costs (Andrews et al., 2020; Bel et al., 2021). As Katko (2016, p. 133) notes with regards to Finnish water operators, ‘The aim has been to improve financial transparency, promote long-term economic planning, and improve operational efficiency.’

(Almost) covering their costs

As a result of their corporatized status, water operators in the region are required to cover their own *operating costs* via user fees (i.e., fixed and volumetric charges paid by end users for the consumption of WSS) and are generally barred from using general municipal taxes to cover their operating expenditures (interviews 2, 7 and 9). Expectations for *capital expenditures* vary, however. In Finland, the Water Services Act ‘requires charges for services to be such that it is possible to cover both [operating] costs and [capital] investments in the long term’ (Katko, 2016, pp. 133, 141). In Sweden, surplus from user fees can be directed towards capital investments, but this is limited to depreciation costs and borrowing costs (interview 9). In Norway user fees cannot be applied towards capital costs; while in Denmark, capital expenditures can only be financing by borrowing.

In practice, however, there is much ambiguity as to what these cost recovery laws mean, particularly when it comes to long-term infrastructure investments. In Finland, for example, water operators are allowed to make a ‘reasonable profit’ on the fees they charge in an effort to cover capital expenses, but the legislation does not adequately explain what is meant by ‘reasonable’ (interview 1). And since Finnish water operators are reluctant to raise prices to the levels required for adequate capital expenditures most are unable to ‘fully cover their economic costs, let alone take into account future replacement and rehabilitation’ (Katko, 2016, pp. 133, 140). Cost recovery legislation in Sweden is also unclear, resulting in a situation where most water operators are unable to consider the full cost of future replacement and new investments, creating chronic underfunding in WSS infrastructure (interview 9). In Norway, legislation requires municipalities to follow the principle of cost recovery on both operating and capital costs, but since ‘fees cannot exceed the necessary costs’ incurred in these sectors the actual charges tend to be much lower than what is required to finance long-term infrastructure investments, creating major funding gaps (EDMS, 2007, p. 15-2). Denmark, which has one of the most comprehensive volumetric cost recovery policies in Europe (European Environment Agency (EEA), 2013), also struggles to raise sufficient funds for capital investments through tariffs (DANVA, 2019).

As a result, end-user charges for WSS in the Nordic region are inadequate for the long-term financing needs of public water operators, with the vast majority of capital expenditures coming from long-term borrowing. The good news is that this borrowing is relatively cheap and easy to obtain, with water operators or their municipal owners seemingly able to access whatever level of funds they require. The process is slightly different in each country, but WSS managers simply determine their financing needs and submit these requests to a lending institution (in Denmark this is done directly by water operators, while in the other three countries borrowing requests are made by the municipalities, which bundle WSS financing together with all other municipal financing requirements).

As we shall see, the vast majority of this borrowing is done through public banks, but most municipalities in the region also have the option of seeking funds from private financial institutions. In fact, Norwegian municipalities are obliged by public procurement laws to obtain comparative quotes from public and private banks, with Norway’s Kommunalbanken also recommending that municipalities seek multiple quotes ‘to

ensure that public money is spent in an efficient way' (interview 6). In Denmark, water operators have the option of seeking funds from public or private banks, but private banks typically refrain from bidding on a loan if they know that KommuneKredit is involved because it is difficult for them to compete given the public bank's high credit rating and long history of engagement in the WSS sector (interview 7). In Finland, it is common practice for municipalities to seek quotes from several banks (including MuniFin), but this is not required legislatively (interviews 1 and 3). In Sweden, Kommuninvest 'facilitates the comparison of its quotes with those of other lenders [but] it is a well-known fact that the interest rates offered by Kommuninvest are normally markedly lower than the rates that most municipalities can get from commercial banks' (interview 5).

Nordic municipal public banks

Public banking has a long history in the Nordic region, particularly for municipal borrowing activities (Schmit et al., 2011). The four banks reviewed in this paper are KommuneKredit in Denmark (founded in 1899), Kommunalbanken in Norway (1927), Kommuninvest in Sweden (1986) and MuniFin in Finland (1989) (see Table 1). They can all be described as 'municipal credit institutions' that specialize in providing financial services to municipalities (Schmit et al., 2011, p. 8). Kommuninvest and KommuneKredit are collectively owned by the municipalities in their countries, while Norway's Kommunalbanken is fully owned by the national government. Finland's MuniFin is a hybrid model (53% owned by all the municipalities in the country, 16% by national government and 31% by Keva, Finland's local government pension fund).

Table 1. Key statistics for the Nordic municipal public banks.

	MuniFin (Finland)	Kommunalbanken (Norway)	Kommuninvest (Sweden)	KommuneKredit (Denmark)
Year created	1989	1927	1986	1899
Ownership structure	53% municipalities, 16% national government, 31% local government pension fund	National government	All municipalities in the country	All municipalities in the country
Total assets, 2020 (€ billions)	44.0	47.1	51.2	31.4
Credit ratings, 2020	Standard & Poor's (AA+) Moody's (Aa1)	Standard & Poor's (AAA) Moody's (AAA)	Standard & Poor's (AAA) Moody's (Aaa)	Standard & Poor's (AAA) Moody's (Aaa)
Total lending/ leasing portfolio, 2020 (€ billions)	28.0	30.1	43.0	25.8
Total green financing portfolio, 2020 (€ billions)	1.8	3.9	7.3	2.9

Sources: Kommunalbanken (2020), Kommuninvest (2020), KommuneKredit (2020), MuniFin (2020).

Ownership structures aside, all four banks operate in essentially the same manner, raising funds on international capital markets and lending this on to member municipalities. It is therefore a pooled banking model, with a central institution acting as a knowledgeable financial mediator for all the municipalities in their respective countries.

There are multiple benefits to this pooled structure. First, by combining resources within a single entity, municipalities can ‘attain the “critical mass” required to bring attractive market financing within reach’ (Schmit et al., 2011, p. 87). This is particularly important for small and rural municipalities that might otherwise struggle to access affordable credit. Second, because risks are shared equally by every member (by dint of ownership as well as legislation) there is peer pressure between municipalities to be responsible borrowers. Third, because municipalities are prohibited by law from going bankrupt, and because they have the implicit or explicit financial backing of their national governments, credit ratings for the municipal banks’ are remarkably strong (effectively mirroring that of their national state) (Kommunalbanken, 2020; KommuneKredit, 2020; Kommuninvest, 2020; MuniFin, 2020; Schmit et al., 2011). And finally, because management is centralized within a single institution, with a single type of well-established client, the banks are notably efficient in their operations, further lowering lending costs.

Given these characteristics, all four Nordic municipal public banks are effectively seen as ‘zero risk’ institutions, and as a result are able to easily raise capital on international credit markets at the cheapest possible rates for their member municipalities (although it must be kept in mind that a similar banking model in a country with lower national credit scores would not benefit from the same high credit ratings). The fact that these Nordic banks have not experienced a single loan default in more than 120 years of operations serves to back up this reputation, essentially allowing them to raise as much money as they want (interviews 1 and 5–8).

Accessing these funds on the part of municipalities is equally stress free. In Norway, Sweden and Finland, municipal authorities simply submit requests to their respective public bank for general financing needs (including water services). As long as the municipality is not in arrears, they are granted the loan, with relatively little information required from the municipalities as to how the financing will be allocated. According to Kommuninvest (2020, p. 12):

our lending is not tied to any specific purpose and, in accordance with the Swedish principle of local self-government, borrowers need not account for how the money will be used. Since we have usually known our members well for many years, we generally have a good knowledge of their financial situation. Kommuninvest performs regular checks to determine customers’ credit capacity and, in connection with each lending decision a check is made to ascertain whether the loan to be granted is in line with the customer’s credit capacity. Together we find a solution that both meets the needs of the borrower and takes into account the combined loan debt of the Society’s members.

One potential downside of this model is that public banks in these three countries are not experts on any particular type of public service or infrastructure, including water and sanitation. Most cannot even say with certainty how much of their lending goes towards WSS, with only rough estimates of how loans are allocated within municipalities (with water and sanitation making up approximately 15–25% of their portfolios according to our interviewees). The real service and infrastructure expertise resides in the

municipalities themselves. The lending system works because the banks trust the municipalities to make the right financing choices, due in part to their long-standing working relationships and lived experiences. Peer expectations amongst member municipalities help to bolster this trust because no municipality wants to put other municipalities at risk if they default on their loan.

Denmark's situation is slightly different insofar as municipally owned water operators borrow directly from KommuneKredit, negotiating their own loans. As a result, KommuneKredit has stronger direct knowledge of their WSS portfolio than the other Nordic banks, with a more precise sense of lending allocations (6% for water supply and 7% for wastewater in 2020) (interviews 7 and 8). Nevertheless, the borrowing process in Denmark is also relatively stress-free for water operators given the explicit guarantees of municipal and national governments for the public water utilities that are borrowing the money, as well as the long history of institutional linkages and reciprocal trust with KommuneKredit.

It should come as little surprise, then, to learn that Nordic public banks hold a major share of the municipal financing market in their respective countries. Even where municipalities or water operators have the option of borrowing from private banks, public banks dominate because private banks often cannot compete with their lending terms or their long history of engagement in the municipal sector. As a result, Kommuninvest (2020, p. 15) holds about 58% of the municipal lending market in Sweden and Kommunalbanken (2020, p. 3) has about 47% of the market in Norway. These market shares also appear to be growing, with Kommuninvest's (2020, p. 12) portion of the local government sector's funding having 'risen sharply' since the 2008–09 financial crisis. In Denmark, KommuneKredit essentially controls 100% of the lending to water operators (largely because private banks are unable to compete with their lending terms and institutional linkages). MuniFin does not publicly disclose its share of the Finnish municipal lending market but indicated that it is 'aligned with our Nordic peers' (interview 1).

There are also cases of public banks jointly funding WSS projects with other public banks, with municipalities sometimes accessing capital from their national public bank and/or a multilateral financial institution (typically the European Investment Bank or the Nordic Investment Bank). This is not a common practice, according to our interviewees, but the municipal public banks have no objection in principle to this type of multilateral collaboration.

All this lending activity has made the Nordic public banks some of the largest and most important financial organizations in their respective countries. Assessed by asset holdings in 2020 (and excluding foreign multinational private banks), Kommunalbanken is the second largest financial institution in Norway, MuniFin is the third largest in Finland, Kommuninvest is the sixth largest in Sweden and KommuneKredit is the third largest in Denmark (interviews 1 and 5–8). These institutions are also sizeable compared with other European public banks, ranking in the top 30 of the more than 180 public banks in the European Union (although tiny when compared with the largest public banks in the world, such as China's state-owned behemoths which cumulatively hold close to US\$15 trillion in assets) (Orbis, 2020).

And yet, despite their size and significance most people in the region appear to be unaware of the activities of these banks. According to David Ljung of Kommuninvest in Sweden, 'Nobody really knows who we are. Only a very small part of the Swedish

public are aware of Kommuninvest and what we do' (interview 5). Similar comments were made by interviewees in the other three countries. Perhaps this is the price of being 'boring'.

Exporting the Nordic model?

Can this Nordic model of public banking be reproduced elsewhere? Yes and no. Yes, by virtue of the fact that practically every country in the world has a network of municipalities responsible for WSS. If the political will exists, there is no reason some version of the Nordic public banking model could not be recreated elsewhere (as it already exists in countries such as France, Turkey, the Netherlands and Germany) (Butzbach & Spronk, *Forthcoming*, in this issue; Gungen, *Forthcoming*, in this issue; Schwartz & Marois, 2022, in this issue). But institutional capacity and political commitment to public financing are not built overnight. Expertise in municipal finance must be combined with a commitment to public service networking, founded on a strong web of institutional interfaces and trusted lines of communication. Robust due diligence and clear legislative guidelines on municipal spending are also required, as are professional and transparent utilities committed to affordable and universal WSS. Financial backstopping from national government is also critical, as is simplicity of purpose (the Nordic public banks only have one type of client and no retail operations). Finally, strong political backing for public services helps bolster support for (if not public awareness of) the benefits of public financing. In other words, the creation of effective and progressive municipal public banks is dependent on a combination of political, economic, legislative and institutional factors, making their reproduction a multifaceted challenge (for a comparable discussion of the public banking system in Germany, see Cassell, 2021).

Admittedly, Nordic countries are notable (though not unique) in this combination of characteristics, but there are concrete lessons to be drawn from the Nordic public banking model that can be applied elsewhere, particularly as they relate to the financing of public water. The first is the benefit of pooled risk. Having a single financial institution raising capital for all municipalities within a country (or region) can reduce costs, attract financing, promote equitable access, advance institutional memory, develop expertise, and encourage peer support and monitoring. Second, state guarantees on loans can lower borrowing costs. Third, a clear division of labour (banks raise money and municipalities decide how to spend it) can develop trust between different public institutions. Finally, a strong sense of public purpose can help to establish public banks as part of the broader public sphere, enhancing communication across what can otherwise be very disparate silos of public activity. The officials we interviewed see their banks as public agencies working for the public good, committed to the principle of financing publicly owned and publicly managed water utilities. The fact that the Nordic banks have long-standing working relationships amongst themselves for knowledge sharing and technical assistance further helps to expand this public footprint, as does their membership in the larger European Association of Public Banks (EAPB), of which they are all active participants.⁴

There are two additional features of the Nordic bank model that deserve highlighting. The first relates to their transparency. Financial institutions can be exceptionally opaque and impenetrable institutions (whether public or private) (Flannery et al., 2013; Howe &

Stephen Haggard, 2012). Our experience with the Nordic public banks for this research was quite the opposite. A simple email introduction from the EAPB garnered a fast and welcome response from a representative at MuniFin, who then provided additional and equally engaging connections with officials at their counterparts in the region. All interviewees were generous with their time and expressed a sincere interest in the study. The annual reports of the Nordic banks are also readily available online and relatively accessible for non-experts, providing detailed information on successes and failures.

The Nordic banks also have a complex system of checks and balances in their organizational structure as well as diverse representation at all layers of governance and operation, including political parties, unions, and a strong mix of age and gender (although visible minorities are notably absent from the ranks of senior management). The banks also see themselves as models of sustainable living in their own right, with Kommuninvest (2020, p. 22), for example, noting that ‘We are working actively with the health concept Sustainable Daily Life, seeking to promote a healthy lifestyle, with a balance between work, leisure and parenting.

A second noteworthy feature is the Nordic banks’ commitment to ‘green finance’, which they broadly define as funding which ‘promotes investments that combat climate change and are sustainable for the environment’ (to borrow MuniFin’s, 2020, p. 5, phrasing). It is beyond the scope of this paper to discuss these policies in detail, but the Nordic banks appear to have avoided the most pointed accusations of ‘greenwashing’ that have undermined the credibility of many other green financing initiatives (public and private) (Jones et al., 2020; Talbot, 2017), and they have some of the earliest and most developed sustainable lending policies, with socially credible roots in Nordic society (Marois, 2021). This is due in part to the relatively small green portfolios of the banks (less than 10% of their long-term lending in 2020), but also the careful and cautious approach they have taken in rolling out their green financing programmes, with many having begun on a small scale in 2015. Most importantly, virtually all green financing is going towards obvious green projects such as improving sanitation, retrofitting municipal buildings, or expanding electrified public transportation systems, much of which is highly visible and easily certifiable.

The banks have also indicated that they intend to expand their green financing initiatives, with most making a commitment to ‘mainstreaming’ green lending. KommuneKredit (2020, p. 22), for example, sees ‘green funding as a strategic priority in our Strategy 2025 in which we aim to integrate sustainability in all parts of our business model’. For Kommunalbanken (2020, p. 8), green financing is ‘a central pillar in our long-term work on corporate social responsibility and sustainability’, with a ‘significant proportion’ of their lending growth in 2020 coming from green loans. They plan to ‘have the market’s best green loan products and be one of the leading players in the area of green finance’ (p. 7). MuniFin, for its part, aims to make green and social financing 20% of its long-term lending portfolio by 2024 (MuniFin, 2020, p. 38).

Some of the Nordic banks also offer a discount on green lending to encourage green investment, making them ‘internationally exceptional’ in this regard (MuniFin, 2019, p. 8). MuniFin’s markdown is determined by how green the project is, with projects assessed as ‘light/medium/darker green’, qualifying for progressively larger margin discounts (Nassiry, 2018, p. 11).

The banks see their green lending objectives as part and parcel of their national governments' plans to decarbonize and clean their economies, with Nordic states having some of the most aggressive sustainability goals in the world (Joas & Hermanson, 2019). For Kommunistinvest (2020, p. 12):

if the investment for which a municipality or region is borrowing money is compatible with Sweden's environmental objectives or those of the region and contributes to a more resource-efficient and climate-resistant society, the borrower has the opportunity to apply for a Green Loan.

KommuneKredit (2020, 7) notes that they 'support the green transition ambitions of the Danish local governments by providing funding at the lowest possible cost'.

The Nordic public banks also provide clear (and publicly accessible) guidelines on how they make their green lending decisions, developed by their own 'green bond committees', often involving external advisors and developed in consultation with 'an independent evaluation team of environmental experts' (MuniFin, 2020, p. 39). The banks adhere to international green financing models, such as the Green Bond Principles of the International Capital Markets Association (KommuneKredit, 2020, p. 24). *Post facto* third-party verification of environmental outcomes serve as a check on investment decisions, which are also provided in their annual reports and sustainable impact reports, including such details as CO₂ emission reductions related to green projects. MuniFin, for example, uses CICERO (a third-party evaluator of green bonds) rankings on their performance, in cooperation with the Stockholm Environment Institute (MuniFin, 2019, p. 8).

Finally, the Nordic banks work with other regional and international organizations to develop green financing guidelines, such as their participation in the European Commission's consultations on the EU Green Bond Standard and the EU Taxonomy (MuniFin, 2020, p. 8) and their involvement in the Nordic Position Paper on Green Bonds Impact Reporting (Kommunistinvest, 2020, p. 19). Direct collaboration and exchange of ideas amongst the Nordic public banks around green financing is also common (as well as what would appear to be friendly competition between them as to which bank is 'greenest').

It is easy, of course, to make green claims on paper, and with so many competing third-party definitions of what constitutes meaningful green finance it is difficult to know for sure how effective any particular bank's policies have been (Berrou et al., 2019). Nevertheless, the Nordic public banks have won numerous green financing awards (such as MuniFin's Green Bond of the Year award from Environmental Finance in 2022)⁵, and taken at face value their goals and methods are notably transparent, all of which have made them particularly attractive to investors seeking defensible green investments (demonstrated in part by the enormous demand for these bonds in an already crowded market, such as MuniFin's 10-year €500 million green bonds issued in late 2020 which were oversubscribed by 700% within two hours of their release; MuniFin, 2020, p. 18).

One of the interesting side-effects of this green financing is that it has forced the banks to become more aware of the sectors they lend to, partly because most green loans must be applied for directly by the utility or municipality, with a detailed description of what the funds will be used for (unlike the general loan procedures outlined earlier). Several of

our interviewees noted that their bank has begun to develop more expertise in their portfolios as a result, notably in energy (where the bulk of green financing has been funnelled), but also in water and sanitation (which ranges from 5.6% of green financing at MuniFin (2019, p. 6) to 31% at Kommuninvest (interview 5)).

Challenges for the future

Despite their successes, Nordic public banks face significant challenges when it comes to their long-term funding of WSS, three of which are highlighted here. The first relates to the sustainability and quality of water supplies. All four countries have enough surface and ground water for current rates of consumption, but these will be affected by climate change as well as population and economic growth. The impacts of climate change are not fully understood but could pose a risk to water reliability, and water quality, with significant financial implications for infrastructure (Fletcher et al., 2019; Hallema et al., 2018; Skaland et al., 2022). A growing and more diverse population will also put pressure on water supplies and systems, and although per capital residential water consumption has decreased in the region over the past decade due to better technology, water metering and public education, it is not clear that this can be sustained (Katko, 2016, pp. 68–71), particularly with regards to affordability in lower-income and marginalized neighbourhoods as pressures for higher levels of cost recovery mount.

Industrial and commercial growth will also be a challenge, with economic expansion underpinning much of the region's post-Covid recovery strategies (although widespread calls for a 'green transition' may temper some of the environmental impacts). A robust economy underpins access to international credit markets on the part of public banks, but it also runs the risk of threatening the carrying capacity of the region's water ecosystems, creating a potentially irresolvable growth paradox at the heart of the Nordic public water financing model.

A second major challenge will be the costs of replacing ageing infrastructure. The bulk of Nordic WSS infrastructure was constructed in the mid-20th century during rapid urban growth and is in dire need of replacement and repair (Rajala et al., 2019). Katko (2016, pp. 142–146) considers this to be the biggest single challenge for water operators in Finland, and points to a number of technical and political reasons for lack of adequate investment to date, including 'non-viable water services pricing' (i.e., prices that are too low to cover capital costs) and a significant decrease in central government funding for WSS since the early 2000s.

Similar dynamics have unfolded in Sweden. Swedish Water has calculated that, on average, water operators in the country would need to double their tariff rates to meet the capital expenditures required over the next 20 years. They advocate for a 'national dialogue' on the topic, with a focus on equalization payments to deal with 'large and increasing regional differences' and better mechanisms for inter-municipal cooperation across watershed boundaries (interview 9).

Ironically, access to money is not the problem. All the banks interviewed for this research indicated that they could raise as much capital as they want for WSS infrastructure in international markets, particularly if there is a green component to the project. But without a coordinated effort to address infrastructure gaps at the national level it will be difficult to convince individual municipalities (and local politicians seeking

re-election) to take on the additional debt loads required, particularly with competing infrastructure needs in ‘sexier’ and more visible areas such as renewable energy and transportation. Water and sanitation, by contrast, is largely buried (literally and figuratively) below the surface, away from the public gaze. Slow decay below ground is less likely to attract the same degree of political urgency and attention as more visible projects such as windmills and electric buses. And with public banks acting largely as financial mediators – with little or no expertise in the WSS sector – it is unclear where the impetus for such funding will come from other than at a national (and even regional) level. In other words, the *municipal* orientation of Nordic public banks will require more *national* processes if long-term investments are to be made at scale.

But even with increased borrowing there are concerns that more money creates additional problems down the road. As the Danish Water and Waste Water Association (DANVA, 2019, p. 8) notes with regards to that country’s tenfold increase in debt on the part of public water operators over the past decade (Figure 1):

increased loans rather than cash (by tariffs) financed investments will reduce the price in the short term and give water consumers cheaper prices in the first few years. However, this will also mean that the price, which includes compound interest, is passed on to the next generation.

In other words, borrowing money is not a panacea for municipal water operators who will struggle to pay this debt down in the future without significant financial assistance from higher levels of government.

A third challenge that Nordic public banks and public water operators face is the ongoing threat of privatization. Support for public ownership of WSS is strong in the region, but all the countries discussed in this paper are generally market-friendly, and privatization has taken place in other essential services (such as electricity in Denmark, social services in Sweden, and public broadcasting in Finland) (Ratinen & Lund, 2012; Stolt et al., 2011). The peak of water privatization in the EU may be over, but local and transnational capital are constantly seeking new investment opportunities (particularly in subsectors such as water recycling and desalination) and various European agencies continue to try to pry open the WSS sector to further private sector engagement (such as European multilateral bank lending that can include water privatization conditionalities) (Cassell, 2021; Clifton et al., 2014). Contemporary advocates of privatization in the region

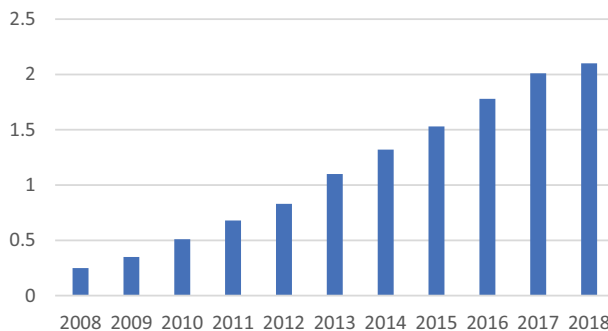


Figure 1. Outstanding debt on loans to Danish water operators (€ billions). Source: DANVA (2019, p. 8).

point to the ‘profitable investment opportunities’ in countries such as Finland, noting that ‘previous public sector divestments’ have been ‘extraordinarily profitable for investors’ (Halinoja, 2018, n.p.).

There is also something of a double-standard when it comes to public water in the region. As Hall (2004, p. 2) has argued, Nordic countries ‘are famous for their strong welfare state and public services [at home but] the agencies responsible for aid to developing countries are financing and supporting programmes that are promoting water privatization’ elsewhere (see also Gustafsson,). Private companies in the region are involved in water privatization projects in other places that ‘would never be allowed’ in their own country (Webreck, 2005, p. 30), while influential regional water agencies such as the Stockholm International Water Institute regularly host pro-privatization conferences and work with private water operators on high profile events such as the World Water Forum (under the banner of being ‘neutral’⁶). Similar criticisms have been made of Norway’s foreign aid, where it has been argued that:

a disharmony exists between official Norwegian development policy, with its stated goals of safeguarding the rights of the poor and finding new ways to subsidise their water needs, and the reality of its support to international institutions that choose to work differently [i.e., by promoting privatization]. (Magdahl et al., 2006, p. 19)

Privatization has also morphed into less easily recognizable forms, as the financialization of market-based economies means that private investments have taken on new characteristics. Broadly defined as the growing power of financial actors and a shift in the locus of profitmaking from the ‘real’ to the ‘financial’ economy, financialization in the water sector has become an increasingly significant component of private sector involvement in WSS through complex (and often opaque) vehicles such as private equity funds and the securitization of WSS revenue flows (Ahlers & Merme, 2016; Loftus et al., 2019). Even more problematic has been the involvement of other public financial institutions in this financialization wave, with public pension funds and sovereign wealth funds aggressively expanding their holdings in public service infrastructure such as water and sanitation as a new ‘asset class’, serving to obfuscate the very nature of what constitutes ‘public’ ownership (Skerrett et al., 2018).

But perhaps the most immediate threat to public water in the region is its commercialization, by which we mean an ideological and institutional predisposition towards market-oriented forms of operation and performance mandates. The corporatization model outlined earlier has tended to push water operators in the region in a market direction due to a silo effect that forces managers to think in narrow organizational terms, often focused on their financial bottom line while limiting communication and cooperation with other municipal agencies and departments. It has also dampened the potential for cross-subsidization across different public services (Katko, 2016, p. 133). As such, corporatization in the region has contributed to a more marketized mindset amongst Nordic water operators, with unit-based cost recovery sometimes overshadowing larger questions of the public good – a trend that has affected water operators across Europe in the neoliberal era (Lobina & Hall, 2014; Wollmann & Marcou, 2010).

There is nothing inherently commercial about corporatization, but in an increasingly financialized climate institutional ringfencing can push other social and environmental priorities to the side, leading to what Katko (2016, p. 143) refers to as ‘creative’ forms of

public accounting and ‘secret’ decisions that may not be in the best interests of residents in terms of pricing, accountability and long-term planning (see also Vinnari & Näsi, 2008). Such was the case with the City of Jyväskylä, in Finland, which sold its water utility to its own energy company for internal financial reasons, resulting in a situation where the city’s residents now pay ‘the highest water rates in Finland’ (although the experience did cause political controversy in the country and has forced a re-examination of the corporatization model) (Kimberley & Bieler, 2021). This narrow financial focus has also forced some smaller public water operators to amalgamate in the name of ‘efficiency’, with the risk of diminishing local oversight and control of water services (Katko, 2016, p. 125; interviews 7 and 8).

International benchmarking systems for assessing water operator performance tend to reinforce this financial bias, with indicators such as ‘the number of employees per connection’ and ‘cost recovery ratios’ often acting as proxy for overall utility efficacy. Derived largely from the private sector, benchmarking indicators in water and sanitation are dominated by a handful of rating agencies and methodologies, all of which reproduce the same econometric focus at the expense of more qualitative factors such as equity and environmental sustainability (McDonald, 2016b). This is not to suggest that public water managers in the Nordic region are unable to see beyond these limitations, but it does serve to highlight the increasingly commercialized milieus in which they operate, many of which can have (unintended) market influence.

Public banks in the Nordic region are not immune from these pressures of privatization and commercialization either. As corporatized entities in a sector that judges itself largely on narrow market-based criteria (such as third-party credit ratings from Moody’s and Standard & Poor’s – S&P) Nordic public banks are regularly compared with their private sector counterparts locally and internationally, potentially influencing short-term managerial decisions and long-term political mandates (Marois, 2021). They are also at the mercy of European Union state aid rules which stipulate that public banks cannot operate in sectors where there is private competition. If, for example, the government of Denmark were to open the water sector to private companies, KommuneKredit would no longer be allowed to provide finance, with all lending being done by private banks (as is the case in the privatized electricity sector) (interviews 7 and 8). In other words, if political support for public services were to erode in the Nordic region so too could the legal basis for the existence of public banks. And with relatively little public awareness of the work being done by these public banks (let alone their very existence), their healthy shares of financing in the public sector will inevitably attract the attention of more profit-oriented financial actors.

Conclusions

Although largely ignored in the global literature on financing WSS, public banks have played a long and often important role in supporting the expansion and improvement of public WSS around the world (Marois, 2021; McDonald et al., 2021). The public banks of Finland, Sweden, Norway and Denmark are emblematic in this regard, having operated collectively for 241 years to support a dynamic and effective public water system in each of their respective countries without a single loan default. They are also trailblazers in terms of

shaping a more environmentally and socially oriented financing model, both within their own ranks and with the institutions they lend to. They may be exceptional – given their social, economic and political context – but they are not irreproducible, at least in part.

And yet it must not be forgotten that these public banks are embedded within a much larger web of global finance. Investors buying bonds from these banks may not share the same public sector values, and are notoriously fickle in their commitments. So too are global investors constantly seeking new forms of investment, exposing public banks and public water operators in the Nordic region to the twin hazards of privatization and commercialization. The former may not be immanent, but the latter is an insidious and ongoing danger, potentially undermining the public–public financing model that has worked so effectively in the past. ‘False’ partnerships with profit-seeking public financial institutions such as sovereign wealth funds and public pension funds have not yet eroded this synergy in the Nordic region, but as these financial institutions continue to expand their investment portfolios into public infrastructure assets they cannot be discounted as potential threats.

Sometimes we do not realize what we have until it is gone. Perhaps a more concerted effort on the part of public water operators and public banks in the region to showcase – and critically discuss – the strengths and weaknesses of the Nordic public banking model would help to secure and improve this financing option, locally and internationally.

Notes

1. We define public banks here as banking institutions that are majority owned and controlled by the state or some other public entity, governed under public law or by public authorities, or which function according to a public mandate, which can operate at a municipal, national and international level, and can have a variety of different mandates (Marois, 2021).
2. A handful of WSS contracts with private firms exist in Finland, but these are ‘mainly in industrial wastewater treatment’ and are co-owned by municipalities (Katko, 2016, p. 210). Many private sector firms are also involved in consulting, construction and the provision of materials to the water sector.
3. On the effect of tap water on stomach illness in Norway, see <https://www.fhi.no/studier/drikkevannsstudien/datainnsamlingen-er-na-avsluttet/>.
4. See www.eapb.eu/.
5. See <https://www.environmental-finance.com/content/awards/environmental-finances-bond-awards-2022/winners/green-bond-of-the-year-local-authority/municipality-munifin.html/>.
- 6 For example, see www.sivi.org/what-we-do/business/.

Disclosure statement

No potential conflict of interest was reported by the authors.

Funding

This work was supported by the Social Sciences and Humanities Research Council of Canada [grant number 435-2017-0434].

ORCID

Petri S. Juuti  <http://orcid.org/0000-0002-1387-7237>

Riikka P. Juuti  <http://orcid.org/0000-0002-9106-248X>

David A. McDonald  <http://orcid.org/0000-0003-1971-0427>

References

- Ahlers, R., & Merme, V. (2016). Financialization, water governance, and uneven development. *WIREs Water*, 3(6), 766–774. doi:10.1002/wat2.1166
- Almeida, R. P., & Hungaro, L. (2021). Water and sanitation governance between austerity and financialization. *Utilities Policy*, 71, 101229. doi:10.1016/j.jup.2021.101229
- Andrews, R., Ferry, L., Skelcher, C., & Wegorowski, P. (2020). Corporatization in the public sector: explaining the growth of local government companies. *Public Administration Review*, 80(3), 482–493. doi:10.1111/puar.13052
- Bel, G., Esteve, M., Garrido, J. C., & Zafra-Gómez, J. L. (2021). The costs of corporatization: Analysing the effects of forms of governance. *Public Administration*. doi:10.1111/padm.12713
- Berge, D. M., & Torsteinsen, H. (2021). Governance challenges of different institutional logics and modes of organising: A Norwegian case study of municipal water supply. *Local Government Studies*, 1–21. doi:10.1080/03003930.2021.1942853
- Berrou, R., Ciampoli, N., & Marini, V. (2019). Defining green finance: Existing standards and main challenges. In M. Migliorelli & P. Dessertine (Eds.), *The rise of green finance in Europe: Opportunities and challenges for issuers, investors and marketplaces* (pp. 31–51). Palgrave Macmillan.
- Butzbach, O. & Spronk, S. (Forthcoming). Eau de Paris: Democratic governance and the financial ecosystem for public water providers in France. *Water International*.
- Cassell, M. K. (2021). *Banking on the state: The political economy of public savings banks*. Agenda Publishing.
- Clifton, J., Díaz-Fuentes, D., & Revuelta, J. (2014). Financing utilities: How the role of the European Investment Bank shifted from regional development to making markets. *Utilities Policy*, 29, 63–71. doi:10.1016/j.jup.2013.10.004
- DANVA. (2019). *Water in figures: DANVA statistics and benchmarking*. DANVA. https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=2ahUKEwiH5OmVwbjzAhVDIHIEHQxqAfgQFnoECAsQAQ&url=https%3A%2F%2Fwww.danva.dk%2Fmedia%2F6355%2F2019_water-in-figures_web.pdf&usg=AOvVaw1JvtZcDSMBJdHuDxSyCp06
- EDMS. (2007). “Review of the International Water Resources Management Policies and Actions and the Latest Practice in their Environmental Evaluation and Strategic Environmental Assessment: Norway”. https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahUKEwj9xq6VoMDyAhX0EFkFHhSmBoMQFnoECAIQAAQ&url=https%3A%2F%2Fwww.epd.gov.hk%2Fepd%2FSEA%2Feng%2Ffile%2Fwater_index%2Fnorway.pdf&usg=AOvVaw1WbvEBG_PXfrHyiC0PoicY
- EEA [European Environment Agency]. (2013). *Assessment of cost recovery through water pricing*. EEA technical report No16/2013. <https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=2ahUKEwjs3-n5vLjzAhUXkniEHSP1A84QFnoECAMQAQ&url=https%3A%2F%2Fwww.eea.europa.eu%2Fpublications%2Fassessment-of-full-cost-recovery%2Fdownload&usg=AOvVaw2N1R7ztgt4GbY4GZF0VkhL>
- Flannery, M. J., Kwan, S. H., & Nimalendran, M. (2013). The 2007–2009 financial crisis and bank opaqueness. *Journal of Financial Intermediation*, 22(1), 55–84. doi:10.1016/j.jfi.2012.08.001
- Fletcher, S., Lickley, M., & Strzepek, K. (2019). Learning about climate change uncertainty enables flexible water infrastructure planning. *Nature communications*, 10(1), 1–11. doi:10.1038/s41467-019-09677-x

- Government of Norway. (2012). Act on municipal reed and drainage systems (vass-og avløpsanleggslova), LOV-2012-03-16-12. Department Ministry of Climate and Environment. <https://lovdata.no/dokument/NL/lov/2012-03-16-12>
- Grafe, F. J. (2020). Finance, water infrastructure, and the city: comparing impacts of financialization in London and Mumbai. *Regional Studies, Regional Science*, 7(1), 214–231. doi:10.1080/21681376.2020.1778515
- Güngen, A. R. (Forthcoming). No one can compete since no one dares to lend more cheaply!": Ilbank's role in the water sector and public water finance in Turkey. *Water International*.
- Gustafsson, J. E. (). *Public water utilities and privatisation in Sweden*. Working paper presented at EPSU Public Service Conference, Brussels. https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahUKEwjzxa64zLLwAhVUHs0KHcQfCt8QFjAANegQIFRAD&url=http%3A%2F%2Fwww.psi.ru.org%2Fsites%2Fdefault%2Ffiles%2FJan-ErikPresentationPaper.doc&usq=AOvVaw0UMwOrjiF5Y-G_K-tcQcDx
- Halinoja, M. (2018). "Privatisation offers profitable investment opportunities in Finland". Cross Border Associates.<https://cba.associates/privatisation-offers-profitable-investment-opportunities-in-finland/>
- Hall, D. (2004). *Privatising other people's water: The contradictory policies of Netherlands, Norway and Sweden*. PSIRU. https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahUKEwjzxa64zLLwAhVUHs0KHcQfCt8QFjACegQIAxAD&url=https%3A%2F%2Fgala.gre.ac.uk%2Fid%2Fepprint%2F3767%2F1%2FPSIRU_9252_-_2004-07-W-Contradictory.pdf&usq=AOvVaw1TOR3ZxpVvKFF19fwLZK4E
- Hallema, D. W., Sun, G., Caldwell, P. V., Norman, S. P., Cohen, E. C., Liu, Y., Bladon, K. D., & McNulty, S. G. (2018). Burned forests impact water supplies. *Nature communications*, 9(1), 1–8. doi:10.1038/s41467-018-03735-6
- Helgertz, J., & Önnersfors, M. (2019). Public water and sewerage investments and the urban mortality decline in Sweden 1875–1930. *The History of the Family*, 24(2), 307–338. doi:10.1080/1081602X.2018.1558411
- Howe, J. S., & Stephen Haggard, K. (2012). Are banks opaque?. *International Review of Accounting, Banking & Finance*, 4(1), 17–30. http://www.irabf.org/upload/journal/prog/2012v4n1_3.pdf
- Hukka, J. J., & Vinnari, E. M. (2007). Public–public partnerships in the Finnish water services sector. *Utilities Policy*, 15(2), 86–92. doi:10.1016/j.jup.2007.01.002
- Joas, M., & Hermanson, A. S. (Eds.). (2019). *The Nordic environments: Comparing political, administrative and policy aspects*. Routledge.
- Jones, R., Baker, T., Huet, K., Murphy, L., & Lewis, N. (2020). Treating ecological deficit with debt: The practical and political concerns with green bonds. *Geoforum*, 114, 49–58. doi:10.1016/j.geoforum.2020.05.014
- Juuti, P. S., & Katko, T. S. (2005). *Water, time and European cities: History matters for the futures*. Tampere University Press.
- Katko, T. S. (2016). *Finnish water services: Experiences in global perspective* (pp. 288). Finnish Water Utilities Association.
- Kimberley, D. B., & Bieler, A. (2021). "Water privatisation? Finland says no!". European Water Movement. <http://europeanwater.org/actions/country-city-focus/951-water-privatisation-finland-says-no>
- Kommunalbanken. (2020). Annual Report 2020. The Norwegian Agency for Local Governments. https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahUKEwj8_abIr8DyAhWpGFkFHUNvBSkQFnoECAUQAQ&url=https%3A%2F%2Fwww.annualreports.com%2FClick%2F30163&usq=AOvVaw0WY8oNi7HkvHLGA-r_Bbj5
- KommuneKredit. (2020). Annual Report 2020. https://www.kommunekredit.dk/wp-content/uploads/filebase/en/annual/KommuneKredit_AR20_UK_web-003.pdf
- Kommuninvest. (2020). Annual Report 2020. https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=2ahUKEwiuxqL0sMDyAhVnF1kFHRlxDfYQFnoECAIQAQ&url=https%3A%2F%2Fkommuninvest.se%2Fkiab_ar2020_eng%2F&usq=AOvVaw05bH7bYKjbm9ngKltxpgNv

- Lobina, E., & Hall, D. (2014). Corporatization in the European water sector: lessons for the global South, In D. A. McDonald (Ed.), *Rethinking corporatization and public services in the global south* (pp. 185–206). Zed Books Ltd.
- Loftus, A., March, H., & Purcell, T. F. (2019). The political economy of water infrastructure: An introduction to financialization. *Wiley Interdisciplinary Reviews: Water*, 6(1), e1326 doi:10.1002/wat2.1326.
- Magdahl, J., Sørreim, H., Christensen, E., Preston, A., Kronen, T., & Berg, O. (2006). *Privatisation of water and public-private partnerships: do they deliver to the poor?* The Norwegian Forum for Environment and Development. http://www.forumfor.no/v_bibliotek/264.pdf
- Marois, T. (2021). *Public banks: decarbonisation, definancialisation and democratisation*. Cambridge University Press.
- McConville, J., Kvarnström, E., Jönsson, H., Kärrman, E., & Johansson, M. (2017). Is the Swedish wastewater sector ready for a transition to source separation?. *Desalination and Water Treatment*, 91, 320–328. doi:10.5004/dwt.2017.20881
- McDonald, D. A. (2016a). To corporatize or not to corporatize (and if so, how?). *Utilities Policy*, 40, 107–114. doi:10.1016/j.jup.2016.01.002
- McDonald, D. A. (2016b). The weight of water: Benchmarking for public water services. *Environment and Planning A: Economy and Space*, 48(11), 2181–2200. doi:10.1177/0308518X16654913
- McDonald, D. A., Marois, T., & Spronk, S. (2021). Public banks+ public water= SDG 6?. *Water Alternatives*, 14(1), 117–134. <https://www.water-alternatives.org/index.php/alldoc/articles/vol14/v14issue1/606-a14-1-1>.
- Munifin. (2019). *Green bonds impact report 2019*. <https://www.munifin.fi/whats-new/year-2019-in-figures-munifins-annual-report-and-green-bonds-impact-report-for-2019-are-published/>
- MuniFin. (2020). *Annual Report 2020*. https://www.kuntarahoitus.fi/app/uploads/sites/2/2021/03/MuniFin_Annual_Report_2020_SECURE.pdf
- Nassiry, D. (2018). *Green bond experiences in the Nordic countries*. ABDI Working Paper No. 816. ABD Institute. <https://www.adb.org/publications/green-bond-experience-nordic-countries>
- Orbis. (2020). *Orbis BankFocus*. Data update: 24/06/2020 (n° 1843).
- Pérard, E. (2009). Water supply: Public or private?: An approach based on cost of funds, transaction costs, efficiency and political costs. *Policy and Society*, 27(3), 193–219. doi:10.1016/j.polsoc.2008.10.004
- Rajala, R., Juuti, P., & Nealer, E. (2019). Nature and extent of potable water consumption in Tampere (Finland) and Carletonville (South Africa). In P. Juuti, H. Mattila, R. Rajala, K. Schwartz, & C. Staddon (Eds.), *Resilient water services and systems: The foundation of well-being* (pp. 149–162). IWA Publishing.
- Ratinen, M., & Lund, P. (2012). Analysing changes in electricity industries against actors and technologies: Utility to business transformations in Denmark, Germany, Finland and Spain. *Journal of Technology Management & Innovation*, 7(2), 87–101. doi:10.4067/S0718-27242012000200008
- Schmit, M., Gheeraert, L., Denuit, T., & Warny, C. (2011). *Public financial institutions in Europe*. European Association of Public Banking.
- Schwartz, K. & Marois, T. (2022). Untapping the sustainable water bank's public financing for Dutch drinking water companies. *Water International*, 47(5), 691–710. <https://doi.org/10.1080/02508060.2022.2080518>.
- Skaland, R. G., Herrador, B. G., Hisdal, H., Hygen, H. O., Hyllestad, S., Lund, V., White, R., Wong, W. K., & Nygård, K. (2022). Impacts of climate change on drinking water quality in Norway. *Journal of Water and Health*, 20(3), 539–550. doi:10.2166/wh.2022.264
- Skerrett, K., Weststar, J., Archer, S., & Robert, C. (Eds.). (2018). *The contradictions of pension fund capitalism*. Cornell University Press.
- Stolt, R., Blomqvist, P., & Winblad, U. (2011). Privatization of social services: Quality differences in Swedish elderly care. *Social science & medicine*, 72(4), 560–567. doi:10.1016/j.socscimed.2010.11.012

- Talbot, K. M. (2017). What does green really mean: how increased transparency and standardization can grow the green bond market. *Villanova Environmental Law Journal*, 28(1), 127. <https://digitalcommons.law.villanova.edu/elj/vol28/iss1/5/>
- Torsteinsen, H. (2019). Debate: Corporatization in local government—the need for a comparative and multi-disciplinary research approach. *Public Money & Management*, 39(1), 5–8. doi:10.1080/09540962.2019.1537702
- Vinnari, E. M., & Näsi, S. (2008). Creative accrual accounting in the public sector: 'milking' water utilities to balance municipal budgets and accounts. *Financial Accountability & Management*, 24(2), 97–116. doi:10.1111/j.1468-0408.2008.00448.x
- Webreck, E. (2005). The Challenge of Battling Privatization: A Case Study of Swedish Water Companies. *Sustainable Development Law & Policy*, 5(1), 30 <https://digitalcommons.wcl.american.edu/sdlp/vol5/iss1/8/>
- Wollmann, H., & Marcou, G. (Eds). (2010). *The provision of public services in Europe: Between state, local government and market*. Edward Elgar Publishing.

Appendix A: Interviews conducted (via videoconference due to Covid-19 constraints)

- Mari Tyster, Executive Vice President, Legal and Communications and Deputy to the chief executive officer (CEO), MuniFin, 7 April 2021.
- Jouni Vähäkyyttä, Managing Director, Ylöjärven Vesi Oy (Finland), 19 April 2021.
- Jukka Meriluoto, Managing Director, Hämeenlinnan Seudun Vesi Oy (Finland), 24 April 2021.
- Rami Erkkilä, Account Manager, Responsible Finance, MuniFin, 28 April 2021.
- David Ljung, Head of Communications, Kommuninvest, 6 May 2021.
- Kia Kriens Haavi, Head of Green Lending Program, Kommunalbanken, 7 May 2021.
- Henrik Andersen, Managing Director, KommuneKredit, 11 May 2021.
- Jens Christian Schmidt, Senior Customer Advisor, Lending and Leasing Department, KommuneKredit, 11 May 2021.
- Mikael Larrson, Head of Water Services, Swedish Water (Svenskt Vatten), June 1, 2021.