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The waterworks of money: making money and finance accessible

Martijn van der Linden ^a, Thomas Bollen^b and Carlijn Kingma^c

ABSTRACT

The Waterworks of Money is a novel approach to examine the complexities of money and finance and to increase systemic financial literacy. Visualisations have been produced to explain and critique the functioning of the current monetary, financial and fiscal system, as well as to explore alternatives. The work focuses on mechanisms that contribute to inequality and aligns with the view of economies as complex, evolving systems. In this non-neoclassical economic understanding, architectures matter and can be altered through the implementation of policies. It is argued that higher levels of systemic financial literacy, the capacity to envisage potential futures, and continuous political engagement are prerequisites for profound transformation.

KEYWORDS

Financial literacy; visualisation; monetary system; financial system; inequality; future scenarios

JEL G21; H26; A2; G1; E5; A1; B52

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1. INTRODUCTION

Although money and finance are integral to current society and contribute to several major problems, the functioning of the monetary, financial and fiscal systems and their multiple relationships with society are often not well understood. One impediment to knowledge and thus also democratic influence is the complex jargon used by insiders such as monetary and financial economists, fiscal specialists and central bankers (Taibbi, 2009). They speak a technical language that most citizens do not speak and consequently, the majority are outsiders and excluded from the societal and political debate about the future. Several have argued that a more comprehensible financial language is needed (e.g., van Meeteren & Bassens, 2024).

The Waterworks of Money employs a variety of techniques, including the use of metaphors, cartographies and animations,¹ to make the world of money and finance accessible to a wider audience. Financial literacy is typically associated with personal financial well-being (e.g., European Commission, 2023). We adopt a more expansive and ambitious definition,

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namely systemic financial literacy, which refers to the ability to understand the structures, flows and interconnections of monetary, financial and fiscal systems, as well as their relationships with society. It empowers individuals and communities to engage in informed critique, envision alternative architectures and drive systemic reform. To ensure the visualisations are as realistic and accurate as possible, a comprehensive review of economic academic literature, economic policy studies and financial journalism was conducted. A variety of metaphors were explored, hundreds of sketches were created, and over a hundred experts – including bankers, regulators, academics, policymakers, politicians, pension fund board members, fiscal specialists, researchers at NGOs and activists from Europe and the US – were interviewed. Finally, 2000 hours were spent on drawing the main map.

2. THE WATERWORKS OF MONEY

The Waterworks conceptualises money as water and the monetary, financial and fiscal systems are visualised as the irrigation system that provides liquidity to the different parts of the society. In [Figure 1](#), the tower at the centre of the map represents society. The largest corporations, including big retail, big pharma and big oil, are situated at the top, visualised by large reservoirs. At the bottom of the tower, a significant part of society experiences a severe shortage of liquidity.

3. MECHANISMS CONTRIBUTING TO INEQUALITY

The existing literature relates several significant problems to the monetary, financial and fiscal systems (e.g., Baradaran 2015; Gorton, 2012; Mellor, 2016; Piketty, 2014, 2015; Ricks, 2016; Seyfang & Longhurst, 2013; van der Linden, 2022; van Egmond & de Vries, 2024). Arguably,

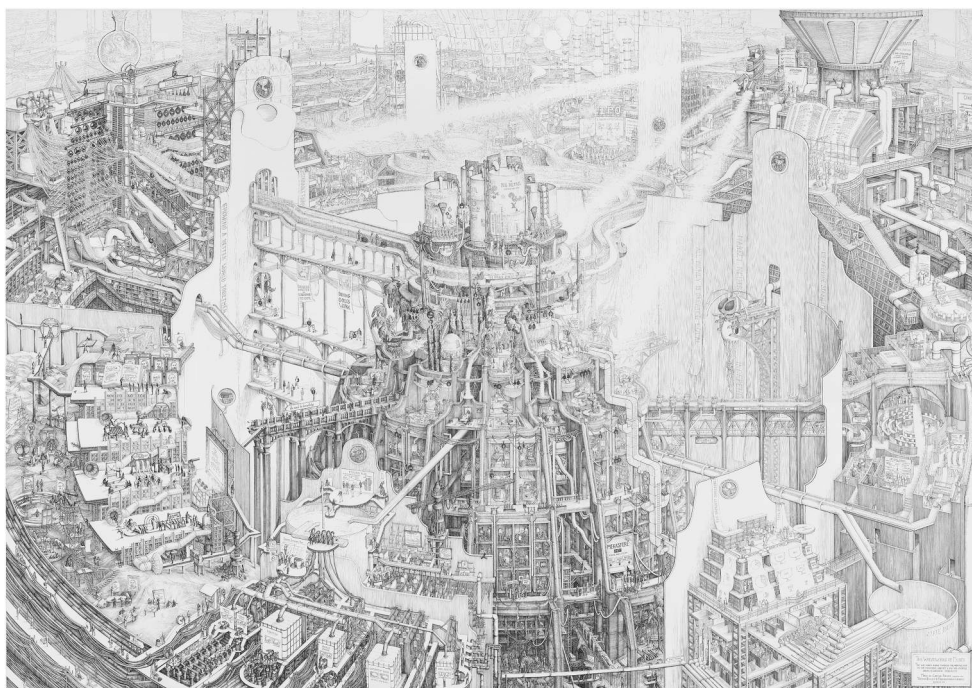


Figure 1. The Waterworks of Money.

Source: drawn by Carlijn Kingma in collaboration with financial economists Thomas Bollen and Martijn van der Linden.

the most prominent are recurrent systemic financial crises, the lack of funding for sustainable development and growing inequality. While *The Waterworks* touches on all these issues, its primary focus is on inequality. Eight mechanisms that contribute to inequality are visualised; several of these mechanisms reinforce each other.

The first mechanism, situated in the upper left-hand corner of [Figure 1](#), is about the unequal accessibility to new liquidity. The upper part of the tower is well-connected to the banking system. The rich have cash flow and collateral and receive, as a consequence, attractive, low interest rates. Conversely, in the middle, conditions are tougher and at the bottom, there is no connection to the banking system. The poor are not creditworthy and have no access to the tap of new liquidity.

The second mechanism, located at the top of the tower in the middle of [Figure 1](#), represents the generation of private profits during periods of stability at the expense of public expenditures in the event of a systemic financial crisis. Since the advent of banking, there have been numerous instances of systemic financial crises (Cencini & Rossi, 2015; Kindleberger, 1984; Kindleberger & Aliber, 2005; Reinhart & Rogoff, 2009, 2013). The practice of (shadow) banking is a high-reward but risky business model. Banks issue runnable liabilities to fund long-term loans (van der Linden, 2022). During stable periods, bankers and shareholders reap significant profits. However, in the event of a run on a bank, the loans are not sufficiently liquid, thereby placing the savings of ordinary citizens and the digital payment system at risk. If the run spreads to more banks, governments and central banks are compelled to deploy public money to avert the collapse of the payment system and safeguard savings.

The third mechanism, located in the upper right-hand corner of [Figure 1](#), is about monetary policy, which is represented by four pipelines emanating from the central bank. Two of these pipelines are currently operational: open market operations and access to standing facilities. These pipelines are indirect, i.e., dependent on monetary policy channels, and this gives opportunities for rent-seeking. The record profits of several banks as a consequence of high interest on deposit facilities are an example (De Grauwe & Li, 2024). The remaining two pipelines are direct and have been advocated by numerous economists: monetary financing (Turner, 2015) and helicopter money (Coppola, 2019; Dyson & Hodgson, 2016; Friedman, 1969; McMillan, 2014). Today, these instruments are however inactive.

The fourth mechanism, in the middle of [Figure 1](#), is the dominance of financial values over other values, visualised by the shareholder meetings (Lazonick & O'Sullivan, 2000). Corporations at the top increasingly use profits for paying out dividends and buying back shares, rather than investing in research and development, raising workers' wages or lowering prices.

The fifth mechanism is the fiscal system, situated in the bottom right-hand corner of [Figure 1](#). Those at the top have the option to use the tax optimisation opportunities, which are not accessible to those situated at lower levels (Propublica, 2021). An illustrative example is that of collateral-secured loans. When the wealthy purchase tangible assets, they seldom sell a portion of their financial assets. Instead, they often secure a low-cost collateral-backed loan by pledging assets such as a super yacht, as well as shares, as collateral. Because they do not sell shares and instead borrow, they are not liable to pay taxes. The fiscal system is generally the area of greatest concern when discussing inequality. We argue that while modifying the fiscal system is an important step in addressing growing inequality, it is not sufficient. The various constructs that the financial sector offers to optimise taxes as well as the other seven mechanisms are equally important.

The sixth mechanism is the dominance of neoclassical economic theory in economic education (de Muijnck & Tieleman, 2021; de Muijnck & Tieleman, 2024; Tieleman et al., 2017), visualised in the left-bottom corner of [Figure 1](#). Neoclassical economics focuses on numbers and models, and is often positioned as neutral. However, its focus on markets rather than, for example, social challenges such as inequality is a normative choice. Last decade, many have

advocated for much more pluralism in theories and methodologies and a focus on real world issues in economics and finance education and research (e.g., de Muijnck & Tieleman, 2021; Wójcik et al., 2023).

The seventh mechanism is financialisation, visualised by the composition of the map. The tower looks small compared to the world of money and finance, and at the top, there are many connections with the financial institutions surrounding the tower. In particular the financial sector itself, non-financial multinationals and the very wealthiest benefit from further financialisation, as they possess more financial assets and are most active in financial transactions (Braun, 2021; van der Zwan, 2014).

The eighth mechanism is responsibility and accountability, visualised by the political scenes in the right-middle of Figure 1, e.g., a revolving door, a suggestion box in the form of a drawer and an empty parliament. In the interviews in the research phase and the dozens of workshops we (co-)organised later in the valorisation phase, the different actors in the system pointed to each other in the search for solutions (e.g., van Leeuwen & van der Linden, 2024). One difficulty is that political systems are national, while the monetary and financial systems are largely international. Another problem is that most politicians have a limited understanding of complex financial jargon and often lack systemic financial literacy. Finally, the lobbying power of the top of the tower is significant (Haar, 2024).

4. ALTERNATIVE ARCHITECTURES

The existing architecture thus has at least eight mechanisms that contribute to growing inequality. To address these mechanisms, we argue that, besides systemic financial literacy, the ability to imagine ‘fundamental’ alternative architectures is pivotal. As the number of individuals capable of envisioning alternative futures increases, the probability of change also rises. To avoid advocating one solution and to encourage debate, we have visualised three different scenarios.

4.1. The valley of debt-free money

In this scenario, visualised in Figure 2, society is no longer reliant on corporate banking institutions for the creation of money, savings and payments. An independent Monetary Authority is responsible for the creation and registration of the public money supply. The digital ledger provides a secure and reliable means of payment and store of value for all citizens and corporations. New money is introduced directly into the economy via public channels, and an excess liquidity tax is employed to prevent the excessive accumulation of public money. A flourishing private investment market coexists with the public money system, wherein risks and rewards are aligned. To limit the size of the financial system and financialisation, a financial transaction tax is implemented (Tobin, 1972). Public safety nets for financial institutions do not exist. There is a distinct demarcation between the public and private domain, as advocated by, among others, the International Movement for Monetary Reform², the *Chicago Plan for Monetary Reform* (Knight et al., 1933), and scholars such as Soddy (1926), Fisher (1935), Benes and Kumhof (2012), McMillan (2014, 2024), Cochrane (2014), Ricks (2016), Kotlikoff (2018) and Fernández-Ordóñez (2024), and as a consequence the generation of private profits in periods of stability at the expense of public costs in the case of a systemic financial crisis is no longer possible.

4.2. The agora of democratic money

In this scenario, visualised in Figure 3, the power over capital and corporations has been democratised. The monetary and financial systems are organised as a common good. Citizens councils assess investments and base their decisions on a project's value for society, rather than an

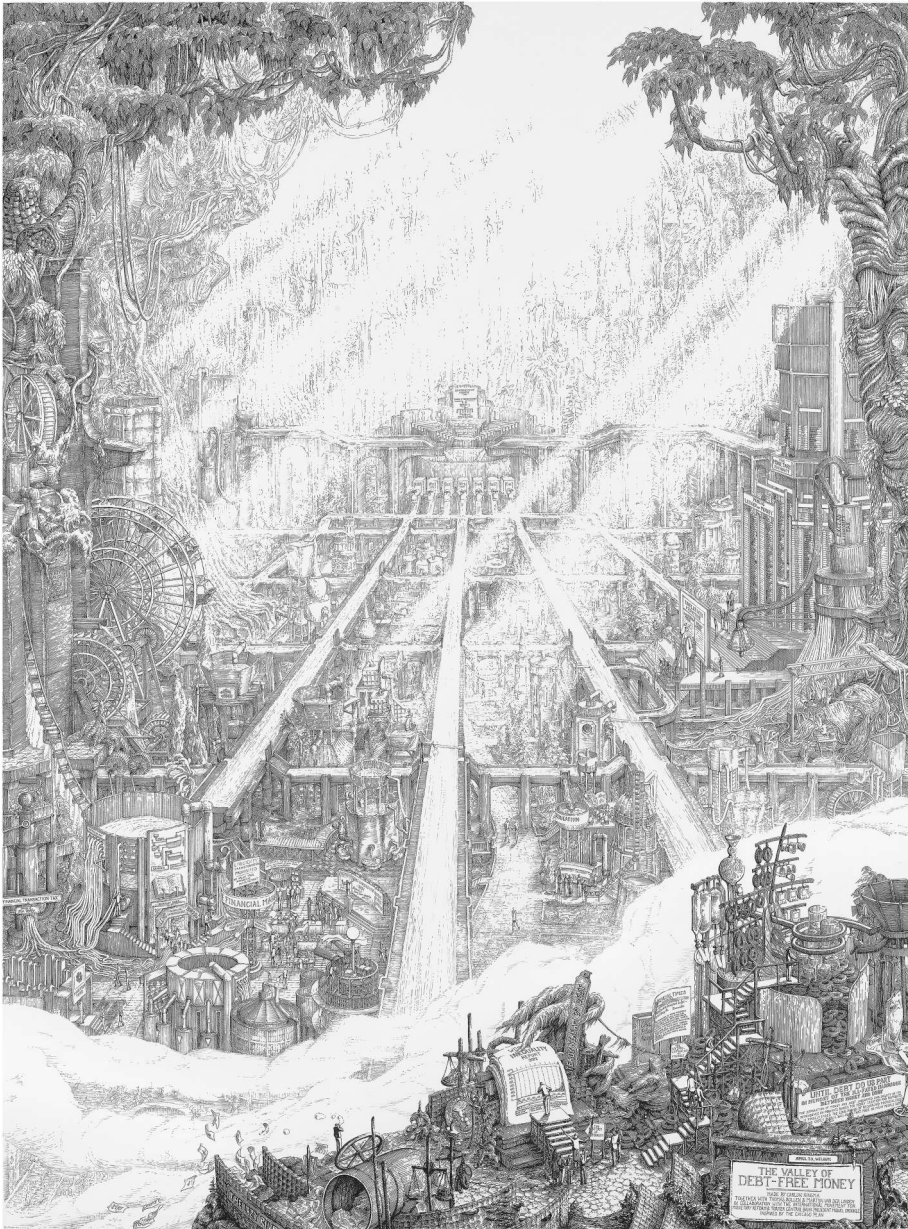


Figure 2. The Valley of Debt-Free Money.

Source: drawn by Carlijn Kingma in collaboration with financial economists Thomas Bollen and Martijn van der Linden.

applicant's creditworthiness, i.e., financial values no longer dominate. The basic rule for the governance of corporations is 'one employee, one share, one vote'. When corporations reach a size of 500 employees, they are split to avoid concentration of power. Because shares are non-tradeable financial markets do not exist and, by extension, financialisation is absent. The tax system is characterised by simplicity, with only a corporate tax and a land tax in place. This scenario was developed in collaboration with Yanis Varoufakis and draws inspiration from his book *Another Now* (Varoufakis, 2020) and more generally from the commons movement.

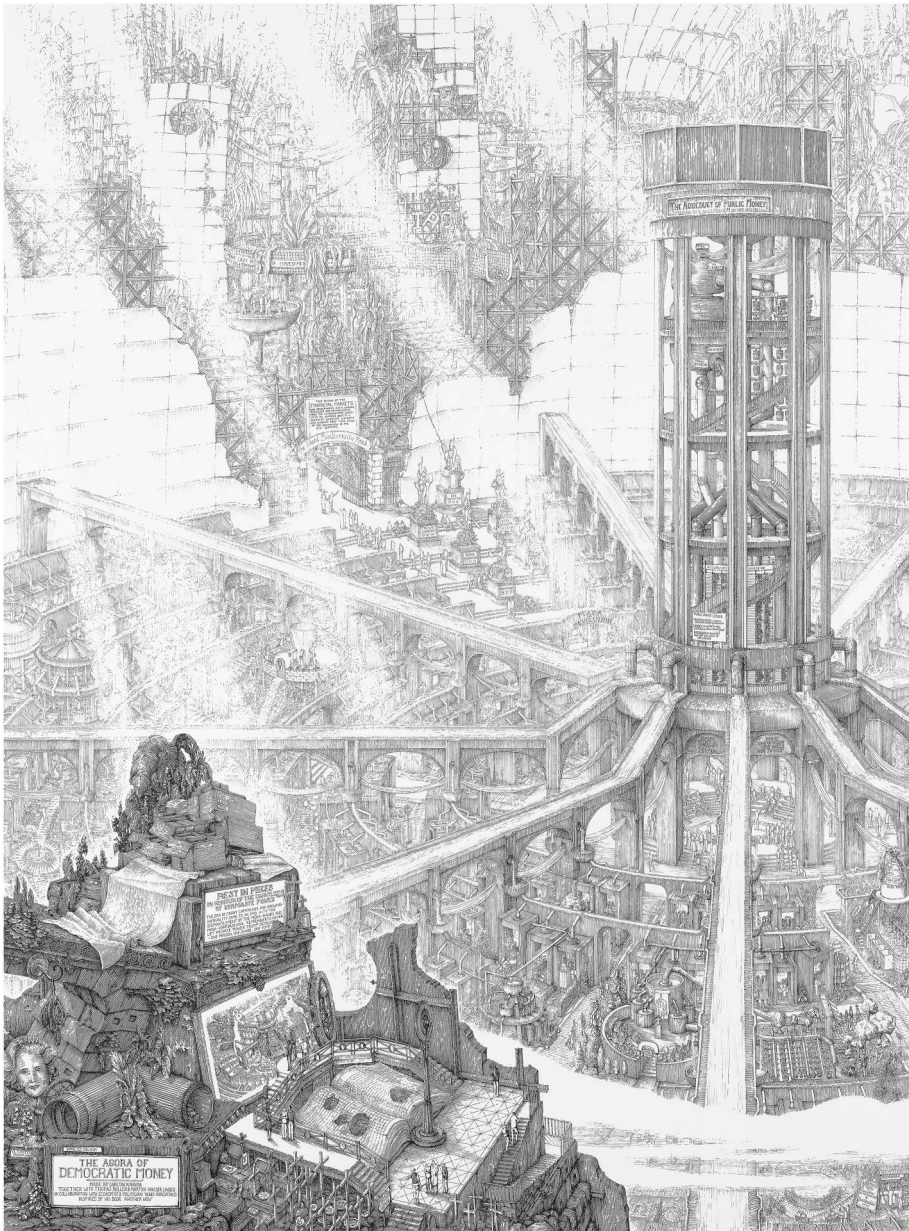


Figure 3. The Agora of Democratic Money.

Source: drawn by Carlijn Kingma in collaboration with financial economists Thomas Bollen and Martijn van der Linden.

4.3. The republic of a thousand coins

In this scenario, visualised in [Figure 4](#), the ability to create one's own currency is a universal possibility. All citizens enjoy the freedom to use a variety of currencies that all have their own designs, values and risk profiles. Digital technologies are used to program social and ecological values into currencies, and this has eliminated the need for excessive government control or monitoring. Central banks managing public currencies do not exist and consequently, losses can no longer

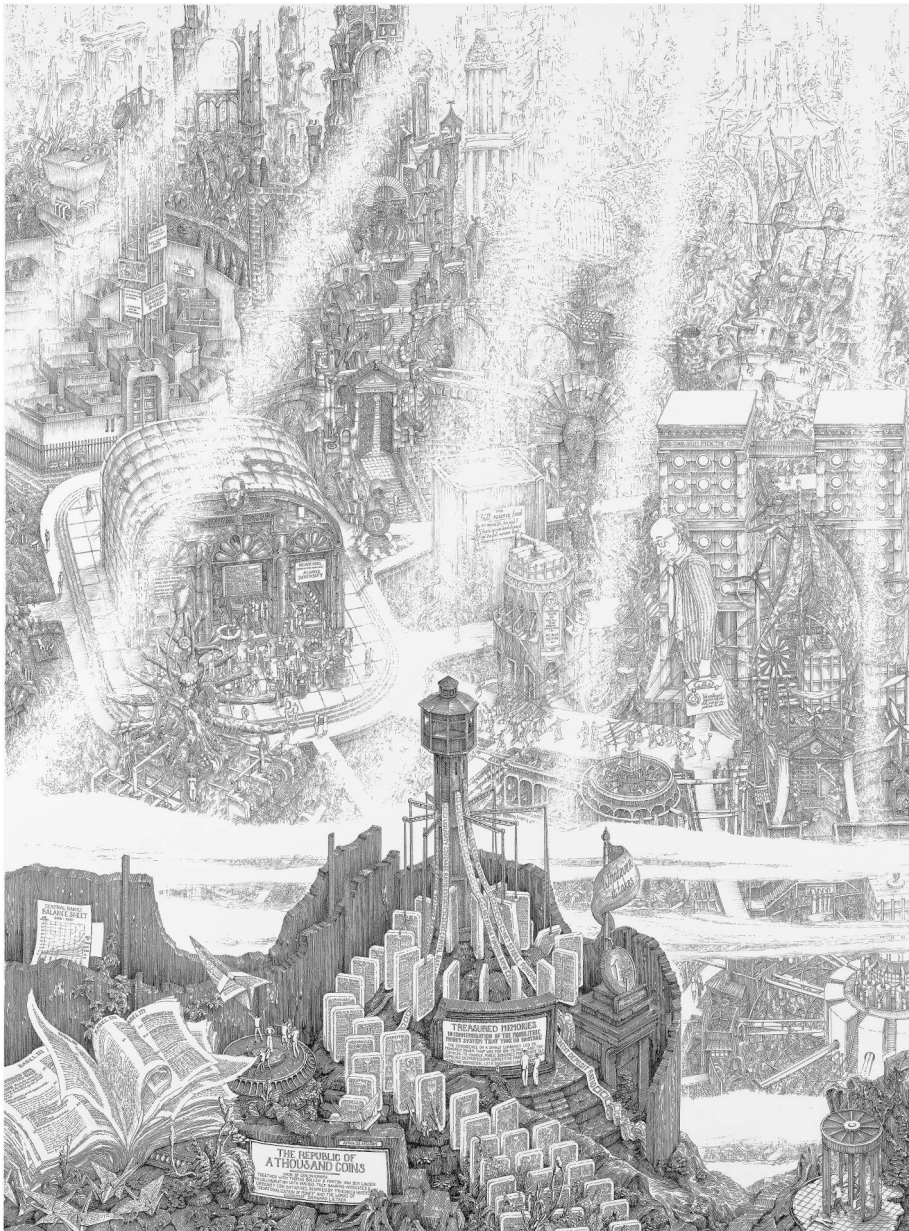


Figure 4. The Republic of a Thousand Coins.

Source: drawn by Carlijn Kingma in collaboration with financial economists Thomas Bollen and Martijn van der Linden.

be socialised. The competitive dynamic of different currencies has resulted in the emergence of local and international communities with a range of governance structures and underlying ideologies. This scenario was developed in collaboration with supporters of free banking, initiators and managers of community currency projects, and based on the writings of Hayek (1990), White (1995) and Lietaer (Lietaer et al., 2012; Lietaer & Belgin, 2011).

5. REFLECTION

The Waterworks of Money presents a complex system approach to money, finance and the economy, whereby all constituent parts are shown to be interconnected in a variety of ways. Prior to the 2008 crisis and arguably still today, most neoclassical economic models view economies as simple, deterministic systems. There is an increasing awareness that economies are complex adaptive systems (e.g., Arthur, 2015, 2021; Holt et al., 2011; Witt, 2017). The field of complexity science offers two key insights that are particularly relevant to the study of monetary, financial and fiscal systems. First, architectures matter, and second, architectures can be changed through policy implementation. The architecture of the Waterworks is not a natural phenomenon but is ultimately the outcome of political choices. Change is feasible, so that the monetary, financial and fiscal systems serve all parts of society, and function as effective instruments for addressing societal challenges, such as growing inequality. In democratic societies, the prerequisites for more profound transformation are a high level of systemic financial literacy, a widespread capacity to envisage alternative architectures and continuous political engagement.

Enhancing systemic financial literacy necessitates a fundamental restructuring of economics curricula across all educational levels, aiming to equip future generations with analytical skills and a clear, shared language to critically engage with monetary, financial and fiscal systems in the context of pressing societal challenges. This effort could be further supported by public engagement initiatives and the creation of accessible visual tools. The Waterworks of Money exemplifies such an approach, utilising visualisations and metaphors to render the complexities of money and finance more comprehensible.

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No data is associated with this paper.

DISCLOSURE STATEMENT

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NOTES

1. The two animations are available online:

The Waterworks of Money: https://www.youtube.com/watch?v=IszXpzIo_ZQ

The Waterworks of Money: private profits, public costs: <https://www.youtube.com/watch?v=Ycit4WbJuwE>

More information about the project is available at <https://www.waterworksofmoney.com/> (in English) and <https://www.ftm.nl/waterwerk> (in Dutch).

2. <https://internationalmoneyreform.org/>

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