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THE GLOBAL POLITICAL ECONOMY OF GREEN FINANCE AND SOCIO-ECOLOGICAL TRANSFORMATION

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Johannes Jäger, Lukas Schmidt

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Elisabeth Springler

Financial Innovation, Macroeconomic Stability and Sustainability

Abstract *It is claimed that financial innovation meets the demanded changes in economic investment towards environmental sustainability and a transition towards low-carbon economies. While the underlying narrative for the proposed transition of economic structures highlights the necessity to search for an economic alternative to the profit-seeking resource-based production mode advocated by mainstream neoliberal economists, it becomes evident that the suggested tools of financial innovation to promote environmentally friendly investment, namely green finance, further promote neoliberal market forces to a large extent. After critically evaluating tools of green finance, this paper discusses the possibilities of strong institutional embeddedness of new green finance tools in order to mitigate the former's negative effects.*

Keywords *Financial Innovation, macroeconomic stability, sustainability, green finance*

1. Introduction

The financial crisis of 2008/2009 was largely caused by the shift towards innovative and structured financial products, such as mortgage-backed securities (MBS), which in the process of securitisation were bundled and sold off as seemingly low risk financial products. These mechanisms increased the inherent financial instability of capitalist economies and were driven by the neoliberal agenda of deregulation to unlock the advocated positive effects of (competitive markets in a globalised financial sector. These processes, which also entail a structural shift in the under-

lying financial system from so-called *bank-based* to *market-based financial systems* (Epstein 2005: 3), and promote *financial instability* as advocated by Minsky (1992), are defined as financialisation in this paper. Financialisation processes speed up when financial innovation enforces the increasing role of financial motives and spreads to areas which were up to then not incorporated into the global financial sector. In the case of the transformation of the banking sector, the development is described by Chick (1993) and Dow et al. (2008) as stages of banking. Liberal financial markets – mainly driven by capital markets – cause changes in timing, risk sharing and profit accumulation, which are summed up in the transformation from *bank-based to market-based* financial systems (for an overview see Sablowski 2008; Springler 2006). Building on that, this paper largely draws on the broad definition of financialisation as presented by, e.g. Epstein (2005: 3f.) and Heires/Nölke (2014: 19), applied, e.g. in Parenteau (2005: 111ff.) for the US bubble of the late 90s, and analysed in Stockhammer (2014: 40f.) as consequences for the financial markets themselves, with increases in the so-called shadow-banking system and other less regulated areas of the financial sector.

Focusing on these definitions, increased financial fragility and overall macroeconomic instability are the effects of financialisation, which are the center in the analysis below and build on the fundamental conflict of modern capitalistic societies between the aim of maximising economic profits and the search for a sustainable socio-economically determined society where the economic outcome would serve the needs of civil society and macroeconomic stability is actively promoted. While mainstream economists mostly advocate for the former, heterodox approaches embrace the latter. In the mid-2010s, the two contradictory views on the fundamental goals were seemingly coincided with the introduction of the *tools of green finance,* which were expected to serve the goals of both ideologies: environmental transformation and high profits of financial markets. The deeper conflict between the theoretical economic approaches certainly remained unresolved. These dynamics coincide with the search for new investment possibilities by international investors, who are confronted with over-liquidity on financial markets. While expansionary monetary policy to overcome the financial crisis of 2008/2009, that had aimed to redirect investments into the real economy, had failed and instead pumped

up financial markets, the question arises as to whether green finance tools redirect investments back to the real economy or heat up the process of financialisation even further and destabilize the economy.

To critically evaluate the prospects of green finance tools, the paper proceeds with the following. Firstly, the history of the Green Agenda is revised. Furthermore, tools of green finance are evaluated for their impact on promoting macroeconomic stability, which, according to our argument, can only be reached when financial tools are institutionally embedded within national financial intermediaries. In the third step, tools of green finance are discussed in an enlarged institutional setting. Drawing on the argument that processes of financialisation can be depicted within the shift from bank-based to market-based financial systems, this section of the paper follows the arguments of Sawyer (2014), which evaluate the links between *financial systems* and *varieties of capitalism* (Hall/Soskice 2004). These arguments are applied in this paper to the concepts of a 'Green State', in which the process of financialisation is kept to a minimum and macroeconomic stability is not hampered, whereas the implementation of tools of green finance into a liberal structure promote further financialisation processes and financial fragility.

2. A global perspective of macroeconomic stability and sustainability: The Green Agenda

Global macroeconomic developments of the last decade can be summed up in three lines of arguments, which seem to be mutually dependent:

Firstly, the history of *uneven recovery between developed and emerging/developing economies* and within these countries; secondly, the *focus on monetary policy* to overcome the economic slump of 2008/2009, which resulted in the *hierarchical preference of financial markets of the real economy* and led to asset market price increases, e.g. the housing sector; and, thirdly, the *global agreement to incorporate the Green Agenda into the capitalistic structure* of developed economies.

Emerging Markets and Developing Economies, which were mostly hit by the Global Financial Crisis of 2008/2009 – due to the downturn in

international trade – had to overcome a slump in economic growth and a setback in their aim to create national stable and sustainable development frameworks (Kose/Ohnsorge 2019). The promotion of global value chains in boosting international trade in the aftermath of the financial crisis upheld the macroeconomic recovery of developed economies on the back of emerging and developing economies. Emerging and developing economies in particular had witnessed an increase in capital inflows (private investment) which speeded up again immediately after 2009, but ultimately could not reach the volume seen in 2007, and an opposite effect in foreign direct investment inflows, which were gradually decreasing (Koh/Yu 2019: Table 3.1.C.). Despite these differences in the economic recovery path between nations, the economic policy measures applied differed only marginally, as *easy money* to ensure liquidity, in combination with mechanisms to foster financial stability and soundness via macroprudential regulation, were promoted as main instruments to ensure sustainable economic development. The immediate role of the Central Banks during the financial downturn of 2008/2009 concentrated on the re-establishment of the interbank market, and the boost of liquidity in the banking sector to help the banks' balance sheets. The European Central Bank continued with its ultra-expansionary monetary policy via quantitative easing (and its asset purchase programme; ECB 2015: 15–18; ECB n. Y.) until December 2018. However, as there was the need for further liquidity to limit inflation to the 2 per cent goal, the European Central Bank returned to this programme as early as in the third quarter of 2019. In this situation of *easy money,* green investments were not explicitly promoted within the existing framework, so that some economists even called this situation a *high carbon financial lock-in* (Campiglio et al. 2017: 333f.).

The third line of argumentation refers to the global agreement on a Green Agenda. International organisations had already started to discuss environmental sustainability in the early 1970s. However, not only the process of implementation, but the discussion itself were only incorporated into concrete programmes in the 1990s (Berrou et al. 2019: 8). The situation does not look different when focusing on the European Union. Although the General Directorate for the Environment was also established in the mid-1970s, action plans became important, in line with the implementation of the Kyoto Protocol. Currently the 7th European Action Program

to 2020, "Living well, within the limits of our planet" (Official journal of the European Union 2013) is on the way and goals up to 2050.

Joining these three lines of development of the last decade, it can be stated that while economies worldwide were struggling to re-boost economic growth, development paths diverged. While the fear of speculative bubbles on asset markets increased, the search for new investment opportunities in the real sector seems to have found a new agenda with the Paris Agreement in the Conference of the Parties in 2015. For the first time, the term *green finance* was introduced at international conferences (Berrou et al. 2019: 9). The investment volume required to satisfy the financial needs of restructuring current economic processes in emerging markets amounts to US$ 23 trillion in the period from 2016 to 2030 (Stein et al 2018: 3). However, estimates of financial needs vary significantly among reports and studies, e.g. see Dorfleitner and Braun (2019: 207) who argue for an annual need of, on average, US$ 2.5–3.5 trillion until 2050 for both developed and less developed nations. To meet these needs, international organisations argue for the necessity to use financial innovative products and tools to direct private financial funds towards green investment (Sommer 2017). However, proposed strategies and tools to meet these investment levels vary significantly in their institutional set up and societal embeddedness.

3. Financial Innovation and the tools of Green Finance

Financial innovation can be understood as disruptive finance, in the sense that it transforms the functions of financial intermediaries. These changes in the financial sector, which can be attached to *product* and *process innovations* as well as new *institutional settings* are mainly driven by changes in the institutional, regulatory and policy framework of the banking sector on national and international level (Dabrowski 2017: 6f.). Milestones for regulatory changes, e.g. the banking directive in the mid-1970s and the free movement of capital, enabled the creation and deepening of innovative financial products.

Similarly, the institutional structure of the underlying national financial system deserves attention. As discussed above, national financial

systems can be classified as a stronger *market-based* or a stronger *bank-based structure,* from a macroeconomic point of view. Despite the financing structure (flow of funds) for the investment financing of companies, which might rather rely more strongly on bank loans or on the stock exchange, the relation between creditor and debtor, as well as the resulting institutional embeddedness of the system, differs (Springler 2006). While numerous studies of the International Monetary Fund and the World Bank emphasise the growth potential of market-based financial structure, it can be shown that higher *financial fragility* is inherent in market-based financial systems, compared to bank-based financial structures (Demirgüc-Kunt/Levine 2001: 11). Innovative financial products enable higher growth rates, butat the same time promote financial fragility, and, within the institutional structure of the national financial system, the shift towards a market-based financial system. The question arises whether financial innovation that uses elements of green finance will similarly change the existing structure of financial intermediaries. Firstly, focus is laid upon the impact of financial innovation on national financial systems, while secondly, green finance tools are integrated into features of financial innovation.

• A new financial system driven by financial innovation is strongly built on decentralised structures where financial intermediaries, but neither commercial banks nor the stock exchange, are important actors, and leads to a so-called *ultra market-based situation*. Financial innovation might not only serve as a necessary tool to top up the existing structure of financial intermediaries, but also to work as a *decentralised alternative* promoting the transformation of the existing national financial system. However, surveys show that green products have already been implemented by banks in emerging economies, e.g. 94 per cent of Latin American Banks offer Green Credit (Stein et al. 2018: 9), as soon as technical assistance for implementation (e.g. identifying risks) is offered. Potential obstacles to green commercial bank lending refer to environmental investments as a public good, the duration of investment, as well as the fact that private companies might not capture all the benefits arising from an environmental investment (Anger/Barker 2015: 178f.). According to mainstream economists, these factors might cause market failures and, subsequently, could lead to weak innovation and too little demand for credit to

enhance the shift towards a low carbon economy. Conversely, the structural shift towards an *ultra market-based situation* is argued for to promote economic growth and development.

• Given this situation of a theoretically high demand for financial means for the transition of economies towards low-carbon production, in combination with a potential lack in demand for finance as long-term green investment involves higher risk and obstacles for established intermediaries, forms of *green finance use financial innovation*. These innovative tools aim to address these obstacles from various angles, leading to opposing results: rather a stronger neoliberal market approach outcome, with an *ultra market-based system* that is decentralised from existing institutional financial settings, or the situation whereby these tools embed new technology within the pre-set structure of financial intermediaries and are turned into a structured bank-based system.

Figure 1 links tools of green finance to categories of financial innovation (see among others Tufano 2002: 5f; Berrou et al 2019; Dorfleitner/Braun 2019; Clarke 2019; Hyung/Baral 2019) and presents them on a continuum from neoliberal use towards a strong institutional use of financial innovation.

In the category of *product innovation,* green finance offers, among other things, green loans and green bonds, and also enables the set up of securitised products such as Green Asset Backed Securities (see figure 1). Financial technology is understood in this case as an enabler to attract new investment by tracing scarce investment volumes to green projects. Green bonds are considered the most important innovation in this category (Berrou et al 2019:15; Nassiry 2019: 327). Issuance of the green bond markets increased continuously from 2013 to 2019, and outperformed in 2019, with an increase of 43 per cent compared to 2018 (Nielsen 2020: 6). The market of green securitised bonds, asset backed securities and mortgage backed securities (MBS) have gained importance, especially since 2017, driven by the United States and the issuance of MBS by Fannie Mae (Nielsen 2020:7), which is the pioneer and the largest issuer of green MBS (Climate Bonds 2020: 2). Despite the highly speculative features of financial markets experienced during the global financial crisis, not only

Product	Strong focus on market structure: e.g. securitisation	Moderate focus on market structure, embedded in existing intermediaries: e.g. Green bonds, Green Loans, Green funds	Strong focus on financial intermediaries in product placement: e.g. Green bonds offered by investment banks, Green Loans
Process	Strong implementation of new processes, which work in a decentralised way: e.g. Robo adviser, Blockchain technology	Implementation of new processes within structure of intermediaries: e.g. Commercial banks incorporate Fintech modes to ease information – apps	
Institutional frame	Decentralisation – disruptive institutional setting: e.g. peer-to-peer platforms	Weak use of decentralised platforms: e.g. peer-to-peer platforms	Strong focus on National Investment Funds: e.g. Green Investment Funds; "Green only" Financial Institutions
	Neoliberal use of financialation » institutional use of financial innovation		

Figure 1: Financial innovations and tools of green finance
Source: own elaboration

the USA, but also the European Union fostered the implementation of green MBS, with the establishment of securitisation within the capital markets union (Lovells 2020: 24). Despite this, a global shift towards neoliberal market-based structures can also be observed when taking the total outstanding volume into account. The globally outstanding volume of Green Bonds already exceeds US$ 100 trillion, compared to a global stock-market capitalisation of US$ 63 trillion (Guttman 2018: 176). This means that green finance products will be sold off by commercial banks, and then bundled and resold as financial derivatives. Following the experience of 2008/2009, where financial fragility was increased and created a situation as described by Hyman Minsky (1992) as heading towards a *Ponzi finance*, the implementation of green finance tools into a neoliberal structure could also create another round of the *Minskian supercycle* (Palley 2013: 132f.). Palley (2013: 126-142) shows, applying Minsky, that low institutional embeddedness and a light regulatory frame encourages a

deep economic downturn when a turning point (Minsky Moment) in the economic business cycle applies.

In the category of *process innovation*, decentralisation and therefore the strengthening of neoliberal processes concentrates on the use of e.g. robo advisers and blockchain technology for green finance. The main aim is to actively disrupt the existing financial structures and to involve the public. Minimum investment requirements are lower compared to traditional forms of asset management, and additionally robo advisers charge lower fees (Dorfleitner/Braun 2019: 211). This segment experienced a recent boom from 2017 to 2019, especially in Europe, which amounted to an increase of more than 400 per cent in 2019 compared to the volume of 2017 (Dorfleitner/Braun 2019: 212). According to the neoliberal argumentation, this should enable a broader participation rate among households and should serve as a tool for *financial inclusion*, attracting people with lower wealth levels to participate in financial markets (Nassiry 2019: 322). However, on the other hand, this seeming enrichment of possibilities for households to participate in economic development enables financial capital to flow freely, while allowing the consequences of systemic risk to be transferred to consumers precariously positioned at the "bankable frontier" (Gabor/Brooks 2017: 433), and increases financialisation for households.

As with developments within process innovation, *innovations in the institutional frame* also produce a strong focus on neoliberal market approaches when decentralisation is fostered, e.g. by peer-to-peer platforms and crowdfunding. Conversely, an institutional frame for green finance that focuses more strongly on traditional intermediaries and involves the public sector can be found in Green investment funds. In this case, a strong commitment from the national commercial banking sector and the public sector is required. Hyung and Baral (2019) outline different modes of Green Funds, which differ in the way the public sector is involved – namely, via state guarantees or income tax reductions – but with a focus on a strong state commitment. Alternatively, the establishment of *Green only Financial Institutions,* as introduced by Noh (2019: 51f), aims to directly support small and medium businesses, a form of funding which might not only consist of loans, but also focuses on subsidies and joint investment.

4. Privatisation of risk vs. institutional embeddedness

As described above, instruments of green finance vary substantially in their relation to traditional financial intermediaries. It becomes evident that the majority of instruments with significant importance for the dynamic acceleration of the market are clearly disruptive for traditional financial intermediaries, especially in developing and emerging markets (e.g. Clarke 2019: 865), while financial innovation applied for green finance is said to increase financial inclusion for investment and financing (e.g. Nassiry 2019: 322), according to the neoliberal argumentation. Besides these neoliberal arguments to curb investment and open up new markets with aid of financial innovation, heterodox economists refer to the increasing volatility and financial fragility of the economy, applying a Post Keynesian framework of Hyman Minsky or Regulationist approach, referring to the instability of financial integration and capital mobility within a post-Fordist capitalistic structure (Janicko 2015). To evaluate the options of integrating green finance successfully, which means promoting the transitory shift towards low carbon economies without enhancing financial fragility, structures of institutional embeddedness are presented that follow up on the concept of *varieties of capitalism* of Hall and Soskice (2004). Within the notion of *varieties of capitalism*, a continuum of liberal and coordinated states is framed, in which *bank-based* and *market-based* financial structures can be incorporated (Beck/Scherrer 2013:155f.). However, the shift towards market-based financial systems, which is also manifested by the increase in financialisation, would signal a convergence towards liberal capitalistic structures. Especially after the financial crisis of 2008/2009, critique regarding the applicability of the typology, which is based mostly on an ahistorical analysis (see among others, May/Nölke 2013: 109f.) and the numerous neglected aspects, as among others, of power relations between actors and the distribution effects of different capitalistic structures (see among others Bruff et al. 2013: 15), increased. In this sense, the typology of varieties of capitalism needs not only to be reframed, but focus has to be placed on the existing dynamic fault lines and fragilities in capitalism (see among others Bruff/Hartmann 2013: 50). Joining these fundamental elements of criticism from the perspective of critical political economy towards varieties of

capitalism with the core elements of Post-Keynesian economics (see among other Hoffmann 1987: 27), which focus on the need for an implementation within the *historical frame (historical time),* the *active role of the state* as an economic actor in the institutional setting as an essential element to promote aggregate demand within an ergodic system of uncertainty, and the impact of money for the real economy, which includes the *acceptance of capitalistic fragility*, a structural set-up for the effects of integrating green finance tools is presented along these lines.

The view of the public sector as an *entrepreneurial state* (Mazzucato 2016) fits into the scheme of the state as an active economic actor, and allows for an alternative monetary theory and economic innovation, but only if it can be shown that modes of green finance are applied only indirectly. Mazzucato defines it as "a willingness to invest in, and sometimes imagine from the beginning, new high-risk areas before the private sector does. Business has tended to enter new sectors only after the high risk and uncertainty has been absorbed by the public sector, especially in areas of high capital intensity" (2016: 149). In this sense, innovation towards an ecological shift in capitalism and green investment would be institutionally embedded and strongly and actively supported by the state. Then, applying this active role of the state in a broader sense to the capitalist structure (see figure 2), the term 'Green State' is introduced and stands for the "belief in de-privileging Gross Domestic product (GDP) growth as a political objective and the utilization of the state to ensure environmental protection" (Bailey 2020:5).

Developing the argumentation introduced in this paper, this implies that a heterodox perspective on a socio-economically sustainable society is the focus. Applying this approach, figure 2 builds on Bailey's discussion of Peter Christoff's typology of environmental states (Bailey 2020), which can be viewed as a modified the setting of varieties of capitalism. A so-called Green State would therefore prioritise green goals over other macroeconomic indicators, national budgets are strongly devoted to eco-modernisation. Modes of green finance complementing the institutional frame and public sector commitment are attached to the typology of the Green State. A Green State asks for a strong public sector commitment in terms of finance, which can most closely be identified with a focus on the institutional frame National Green investment funds, or 'Green only' institutions are discussed in figure 2. This follows the frame of a Post-

Keynesian setting, in which financial innovation has to be accompanied by strong institutional embeddedness in order to reduce financial fragility and the speculative moment as seen in the economic and financial crisis of 2008/2009. When moving through the typology, as presented in figure 2, towards an environmental neoliberal state, market forces of green finance which apply financial innovation maximise their importance. Decentralised structures should help to mobilise financial means via the financial inclusion of households at the cost of higher indebtedness (Clarke 2019: 866). This means that within this structure, investment risks and environmental restructuring are highly privatised, while profits are concentrated in new decentralised actors/groups in the economy, which furthermore are only indirectly covered by a national or supranational regulatory frame.

Types of Nation States	Defining features	Forms of Green Finance – Financial innovation	
Green State	Strong eco-modernisation through: • High levels of state environmental capacity • Strong cultural and political institutionalisation of ecological values • High commitment • Strong budgetary commitment	Strong state commitment in finance: • Entrepreneurial state • Moderate use of international organisations in finance • Moderate use of bond markets	Continuum from an active role of the state and institutional use of green finance towards a neoliberal use of green financial tools.
Environmental neoliberal state	Very weak eco-modernisation through: • weak state environmental capacity and intervention • strong market orientation • weak to moderate budgetary commitment to social and environmental welfare	Strong market finance • strong use of securitisation products • strong use of decentralised forms of investment • weak use of financial structure of international organisations	

Figure 2: Types of Nation States and the Forms of Green Finance
Source: Based on Bailey (2020) Table 1, own presentation; (enlarged by forms of financial innovation.

5. Conclusion

Green finance serves as a roadmap for the ecological transformation of capitalist structures. However, this new market source incorporates, on the one hand, financial risks for individuals and leads, on the other hand, to the even stronger dependency of long-term investment and innovation strategies on financial markets, which are mainly interested in short-term profits. An adequate structure with strong state commitment could empower certain tools and modes of green finance to promote a sustainable and stable shift in economic structure. Whenever this form of Green State is developed, close coordination between actors and institutions in the economy is required and the financial sector is only a minor player in this change. From a macroeconomic perspective, stability can be enhanced whenever the institutional embeddedness of financial tools is given. So far, empirical evidence of the last years seems to prove the opposite – not a Green Finance tool with strong state commitment, as embraced by heterodox economists gain momentum – but ultramarket-based positions. Securitisation gets back on stage within the frame of Green Finance, with additional, strongly decentralised products. Applying the question of economic growth versus financial stability, as it is used in the analysis of national financial systems, to the current situation, it can be concluded that the ultra market-based path of capital accumulation would lead to high financial fragility, with economic profit as the major goal.

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Abstract *Auf der Suche nach der Finanzierung von Investitionen, die eine ökologische Transformation der ökonomischen Produktionsweise ermöglichen, gewinnt die Anwendung von Finanzinnovationen an Bedeutung. In Zuge dessen wird der ökonomische Widerspruch zwischen der Notwendigkeit einer Systemveränderung in der ökonomischen Produktionsweise und die Anwendung des neoliberalen Paradigmas zur Steigerung der Profite und Bedeutung von Finanzmärkten deutlich. Finanzinnovationen, die ressourcenschonenden Investitionen finanzieren sollen – grüne Finanzierung genannt –*

sind oft als hochspekulative und risikoreiche Produkte strukturiert. Auf Basis dieses paradigmatischen Konflikts, diskutiert der vorliegende Beitrag institutionelle Rahmenbedingungen, die zu einer Verringerung der negativen Effekte dieser Finanzierungsmaßnahmen beitragen können.

Elisabeth Springler
Fachhochschule des BFI Wien, Österreich
elisabeth.springler@fh-vie.ac.at