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Financialisation, industrial strategy and the challenges of climate change and environmental degradation

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Abstract: The paper discusses the nature of the present era of financialisation, outlining the changes in the financial sector and its relations with the real sector which are particularly relevant for the climate emergency. The relationship between growth of the financial sector ('financial development') and economic growth is reviewed, and the relevant of recent empirical findings for the role of the financial sector in addressing the climate emergency drawn out. It is argued that the policy approach to the climate emergency and environmental degradation should be embedded within an industrial strategy. Further, it is argued that the structures of the financial sector need to be changed to encourage financial institutions which are more favourably disposed towards to the allocation of funds to 'green investment'. It is also argued that the central bank should act in ways which are supportive of environmental policies but that their role is a rather limited one.

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1. Introduction

The challenges posed by climate change and environmental degradation are well-known, as are the needs for urgent actions to de-carbonise economies and address damage to the natural world and to bio-diversity. The major structural changes in shifts towards low (or no) carbon production and consumption will have to feature strongly. It would likely require not only de-coupling of environmental degradation from gross domestic product (GDP), but a much slower rate of growth of GDP, and shifts in the location of economic activity away from the market. The questions are then whether the financial system can adjust to a lower growth rate and what that implies, and whether the financial system can ensure the required industrial re-structuring with its present structures. Further questions involve the financial institutional arrangements which are required, and roles for government in terms of State Green/Development Bank, and regulations (e.g. classifying what is deemed to be 'green investment').

Financialisation, alongside globalisation and neo-liberalism, have been the major economic and social forces in the past four decades. Here, I seek to indicate the ways in which the processes of financialisation have impacted on climate change, and to understand the ways in which financialisation and the financial sector have to change in order to address the climate emergency. The paper is structured as follows. In the next section, the nature of the present era of financialisation is discussed, outlining the particular changes in the financial sector and its relations with the real sector which are particularly relevant for the climate emergency. Section 3 reviews the relationship between growth of the financial sector ('financial development') and economic growth, and draws out the relevant of recent empirical findings for the role of the financial sector in addressing the climate emergency. Section 4 argues that the policy approach to the climate emergency and environmental degradation should be embedded within an industrial strategy. Section 5 argues that the structures of the financial sector need to be changed to encourage financial institutions which are more favourably disposed towards to the allocation of funds to 'green investment'.

[1] I am grateful to the referee for the very helpful comments on the initial draft.

2. Features of financialisation

There is a reflection on the significance and consequences of financialisation for the design and implementation of policies to address climate change and environmental degradation. A widely quoted general perspective on financialization is provided by Epstein (2005, p.3) that "financialization means the increasing role of financial motives, financial markets, financial actors and financial institutions in the operation of the domestic and international economies". Financialisation in that broad sense has been a central feature of industrialised economies since the late 19th century, with a long pause in the 1930s and 1940s. In the present era of financialisation (broadly since the late 1970s), the processes of financialisation have involved the further expansion of the banking sector and of equity markets and the growth of what is often termed 'shadow banking', growth of a range of complex financial instruments with securitization and derivatives, the engagement of non-financial corporations in financial dealings, and the growth of consumer borrowing and household debts.

Van der Zwan (2014) identifies three themes within financialisation studies: the emergence of a new regime of accumulation, the 'pursuit of shareholder value' and the 'financialization of the everyday'. Financialisation has involved greater involvement of the general population with the financial sector, and has re-inforced financial motives – that is emphasis on undertaking decisions and actions based on monetary returns rather than on broader calculations such as the well-being of those affected as well as one's self.

The expansion of the financial system requires commodification of activities on the basis of financial calculations and the ability to trade in corresponding assets. The processes of financialisation were well exposed in the global financial crises 2007/09 where the financialisation of housing, sub-prime mortgages and the securitization of those mortgages was central to the financial crisis. Further, oil and food prices had displayed volatility and dramatic rises based on securitization, notably in the late 2000s.

There are many changes in the financial and banking system associated with the processes of financialisation, and two notable ones have been securitization and the growth of 'shadow banking'. Securitisation involves the pooling various types of contractual debt such as residential mortgages, commercial mortgages, loans, credit card debt obligations and other assets which generate receivables and selling their related cash flows to third party investors as securities. Shadow banking system is viewed as a collection of non-bank financial

intermediaries that provide a range of services which are similar to those of commercial banks but subject to different less demanding banking regulations and without the relationships with the central bank which commercial banks have, including the central bank being lender of last resort. The shadow banking system raises many concerns in association with financial instability and regulation of the financial system.

Industrialisation and capitalism extended the logic of the market "from agricultural land to built environment and the biosphere in general, transforming nature from an end in itself to a mere instrument. In particular, the process of financialisation has captured since long the vital activity of energy production, distribution and consumption" (Vercelli, 2017), who notes the ways in energy resources and primary commodities have become subject to financial speculation. Clark and Hermele (2014) argue that "[o]nce commodified, environments are increasingly securitized, treated as pure financial assets, and, turned liquid, enter the orbit of rent-seeking financial capital: as potential sites for investment, or disinvestment, depending on their valuation in the calculations of financial capital (potential yield to shareholders). The penetration of financialisation into the fabric of socio-ecological systems works through – i.e. generates and subsequently builds upon—processes of commodification, privatization and securitisation of environments."

In a similar vein, Sullivan (2013) shows "how business and finance sectors, in collaboration with conservation organisation, conservation biologists and environmental economists, are engaging in an intensified financialisation of discourses and endeavours associated with financialisation more generally. This tendency permits capital accumulation to be generated through the movement of interest-bearing capital into new areas of social and economic (re)production, even as other areas of production are stagnating." (p.199). The financialisation of the everyday "extends into discourses of environmental conservation and sustainability and atmospheric change". As Gabbi and Ticci (2013) point out, there is a push from the proponents of financialisation to place monetary values on nature and environmental services. It is then argued that "pricing environmental resources (natural capital assets, environmental risks and environmental free-access or public goods and services) can mobilise financial resources and business practices towards investment in environmental conservation and towards incorporation of sustainability principles in economic and financial activities and decisions." Thus, financialisation is conducive to an agenda attempting to save nature through a commodification of its resources, services,

perceived values, but the complexity of ecosystems cannot be narrowed down, compressed and summarised in a single metric or in a single service." (Gabbi and Ticci, 2013).

The processes of financialisation raise many issues with respect to environmental degradation, and two are highlighted here. First, there are the need for changing the structures of the financial sector in ways which are conducive to the channelling of funds into 'green investment' and away from 'brown investment'. The evidence discussed in the next section indicates that the size of the financial sector is no longer positively correlated with economic growth, and the challenge is to focus the financial sector's funding activities on the transition to a sustainable economy. This is a theme which is picked up in section 5 below. Second, financialisation has involved financial calculations and motives being applied to a widening range of human activities, and notably to the environment. Addressing the climate emergency will require diminishing the role of financial calculations and focus on the reductions of environmental damage.

3. Financialisation, economic growth and the allocation of funds

There is a long-standing set of literature on the relationship between the size of the financial sector and the pace of economic growth (in terms of gross domestic product). The growth of the financial sector has often been evaluated under terms such as financial development, financial deepening, and the perceived role of financial development as a promoter of savings and investment.

Financial deepening, often measured by variables such as bank deposits to GDP, focuses on the growth of the formal financial sectors and is also to be viewed as a dimension of financialisation. The first phase of the literature had generally found a positive relationship between financial development and economic growth, though the causal relationships involved are matters of debate. A more recent literature has tended to find a much weaker relationship, and often finding an inverted U-shaped relationship such that industrialised countries are often operating on the negative part of the curve. For example, "up to a point, banks and markets both foster economic growth. Beyond that limit, expanded bank lending or market-based financing no longer adds to real growth" (Gambacorta, Yang, Tsatsaronis, 2014, p.21)[2]. Others, for example, Epstein and Crotty (2013), have argued that the financial sector has become too large and dysfunctional; and that the ways in which the financial sector

[2] I have reviewed the evidence in Sawyer (2016, 2017).

has expanded in recent times (through securitisation for example) have aided instability and have engaged in activities which will resource-using do not contribute to the financing and funding of investment.

The growth of the financial sector and financialisation being no longer (at least for industrialised countries) positively related with growth of GDP comes from a combination of two factors. First. the propensity to save (relative to GDP) has reached an upper limit and further increases are not facilitates by a larger financial sector. There have been changes in savings behaviour, notably the role played by retained profits and by demographic change. There may indeed be a sense in which saving propensities have become 'too high', a modern-day counterpart to an 'underconsumptionist approach'. The widespread existence of budget deficits (being the counterpart of private net savings) is suggestive of private savings exceeding private investment. A high portion of savings takes the form of retained earnings by corporations and not directly passing through the financial markets.

The 'pursuit of shareholder value', one of the key dimensions of financialisation (as identified by van Zwan, 2014 for example), has generally been viewed as placing emphasis on short-term profits and dividends at the expense of the re-investment of profits. Hein (2012) argues that "Financialization has been associated with increasing shareholder power vis-à-vis management and labourers, an increasing rate of return on equity and bonds held by rentiers, and decreasing managements' animal spirits with respect to real investment, which each have partially negative effects on firms' real investment" (p. 116). Hein (2012) summarises a range of arguments on the effects of 'shareholder value' under financialization on investment. It is argued that shareholders (most of whom are financial institutions) impose on corporations a larger distribution of profits and hence a higher dividend payment ratio. The lower retention of profits ratio, and on occasions share buybacks mean reduced internal finance for real investment. Hein labels this the "internal means of finance channel" A further channel, labelled "preference channel", arises from the weakening of the preference of managers for growth (which translates into firms pursuing growth) as managerial remuneration schemes are based on short-term profitability and share price. A lower rate of investment (which I would broaden to include research and development by firms) would tend to be associated with a lower rate of economic growth (in so far as the capital-output ratio does not change significantly). In that respect, financialisation may well be associated with lower growth,

rather than the positive relationship between financial development and economic growth which had once been postulated.

Second, the growth of financial sector has been particularly pronounced in terms of the developments in securitization and derivatives. Securitization involves the creation of financial assets whose value depends on other financial assets. Such creation of financial assets and the trading in those financial assets are not (directly) related with savings nor with the funding of investment.

There is the general requirement for a banking and financial system which serves the rest of the economy rather than the rest of the economy serving the interests of the financial sector. Apart from the provision of a well-functioning payments technology, the key requirements which for a socially beneficial financial system are that it develops in ways which are consistent with the environmentally sustainable rate of growth, and that it channels funds into the socially desirable types of investment. This requires social and State intervention, as ”there is no clear evidence from experience that the investment policy which is socially advantageous coincides with that which is most profitable” (Keynes, 1936, p. 157)

The first part of such requirements includes seeking to construct a stable banking and financial system. A more significant element is that the financing of investment, initial and final in the terminology of the circuitist approach (Graziani, 2003), is channelled towards socially desirable and environmentally friendly investment, and not towards financial asset accumulation and speculation. The thrust of the operations of the banking and financial system should be on the financing and funding of real investment, and not financial investments.

The transition to a low carbon sustainable economy would involve a shift of resources including capital equipment from carbon-intensive industries into low carbon industries. Lewney (2020) argues that “because the net zero technologies are more capital-intensive, the overall scale of investment in the energy system would be higher, especially in the period to 2050 when the entire new system needs to be put in place”. However, he points out that the estimates of the level of investment which would be required vary quite widely and depend on the ways by which the emissions reductions are achieved. For example, investment in energy efficiency may have lower investment requirements than investment in alternative energy sources. “For a 1.5°C pathway, IPCC (2018) draws on existing studies to present an average estimate that annual global investment in the energy system amounting to $2.4

trillion (at 2010 prices) would be needed between 2016 and 2035, equivalent to 2.5% of world GDP. This is a gross figure, meaning that the energy system would in any case require substantial investment in a current-policies baseline case (about 1.8% of global GDP (IPCC, op. cit., p. 373), but the additional investment is still substantial."

Although significant investment is likely to be required to enable a transition to low carbon economy, it is a matter of conjecture what the overall level of investment would need to be and how that compares with the potential level of savings. A tendency for slower growth of GDP in industrialised countries has already been occurring would suggest that the requirements of investment (relative to GDP) may well be lower than in the past. Further, The lower growth and indeed decline of carbon emissions regarded as vital to avoid global warming above 1.5^0C, which requires a combination of slower growth of GDP and the de-coupling of carbon emissions from GDP (Jackson and Victor, 2020).

The simple formula that the ratio of increase of capital stock (=net investment) to GDP is equal to capital-output ratio times growth rate of GDP is an indicator of the degree to which the net investment (to GDP) would be lower. The average capital-output ratio may, of course, change. Further, this formula relates to net investment whereas the use of resources for investment purposes relates to gross investment. The depreciation allowances can potentially provide funds for investment in the transition. In terms of the overall availability of funds, it is necessary to think in terms of the balance between the potential level of savings and the requirements for investment. The major requirement is not likely to be the stimulation of the levels of savings and investment expenditure in total, but rather to ensure that investment is environmentally friendly and is not promoting economic activities which are, for example, carbon-intensive.

4. An industrial strategy approach to the climate emergency

It can be readily agreed that a structural transformation of economic activities is required to address the climate emergency and environmental degradation. A structural transformation requires appropriate funding as investment and economic activity shift between sectors. In order to enable such a transformation, what may be termed an industrial strategic approach is required. The major component of an industrial strategy approach to map out the broad contours of the development path of the economy, which in the context of the climate emergency, is the transformation to a low carbon economy. However, a green industrial

strategy would need to be much more encompassing confronting the use of nature, the destruction of bio-diversity.

There was a short-lived burst of interest in industrial strategy in the UK in 2017/2018, which was rather overwhelmed by negotiating Brexit (and now the COVID 19 pandemic). The UK government stated the approach to industrial strategy was, in the words of the then Prime Minister, Theresa May, in her introduction to HM Government (2017), "a new approach to how government and business can work together to shape a stronger, fairer economy. At its heart it epitomises my belief in a strong strategic state that intervenes decisively wherever it can make a difference. It is rooted in the conviction that a successful free-market economy must be built on firm foundations: the skills of its workers, the quality of the infrastructure, and a fair and predictable business environment" (p.4). It is rather questionable that an economy can be labelled as free market when there is a strong strategic state, and also highly doubtful whether there has ever been or could be a free market economy. The essential vision here is of an industrial strategy approach which ensures the construction and delivery of an environmental sustainable economy (and society) which addresses issues of the climate emergency, development of a low carbon economy, confronting environmental degradation and preserving bio-diversity.

In Sawyer (2000), I wrote that what I termed the industrial strategy approach "does not lead to the advocacy of central planning: in part because of the informational and incentive requirements for successful planning are impossible to achieve. Instead, the government accepts a strategic role under which a broad view on future developments is evolved, and in which public support is forthcoming for productive activities (rather than exchange or financial ones). Much of the co-ordination of economic activity is undertaken through the market, though it is recognized that substantial parts of such co-ordination take place within firms and within households." The industrial strategy approach does not see a sharp dichotomy to be drawn between allocation through markets and allocation through planning. In the present context, the particularly significant element of what may be termed a climate emergency industrial strategy is that the re-structuring of the economy in an environmentally sustainable direction becomes the centre piece. This requires, *inter alia*, mapping out the shifts in the structures of economic activity which would be required, the identification of the types of investment which are consistent with addressing the climate emergency and environmental degradation (and which may be labelled 'green investments') etc. An

important feature of a climate emergency industrial strategy would be setting out what is regarded as 'green', and what is not, and the degrees of 'greenness'. A government formulated and transparent assessment of what would constitute 'green investment' is required to inform the government's own funding policies, the central bank's asset purchase policies and also as guidance for those seeking to support 'green investments' through their own savings. Pollin (2020) sets out a green industrial strategy focused on dramatic improvements in energy efficiency and the development of renewable energy sources.

An industrial strategy approach stands in some contrast with the (mainstream) industrial policy approach and an Austrian economics industrial policy approach. The mainstream industrial approach can be simply perceived in terms of the correction of market failure, based on the presumed allocative and technical efficiency of perfect competition. From that perspective, industrial policy focuses on monopoly and mergers policy and the correction of externalities – the classic policy approach to environmental issues being the use of taxes and subsidies to correct for externalities (e.g. pollution). The Austrian approach promotes the market mechanisms and property ownership – and specifically in the context of environmental issues on the "Coase theorem". The 'Coase theorem' describes the economic efficiency of an economic outcome in the presence of externalities. The theorem states that if trade in an externality is possible and there are sufficiently low transaction costs, bargaining will lead to a Pareto efficient outcome regardless of the initial allocation of property. In practice, obstacles to bargaining or poorly defined property rights can prevent Coasean bargaining.

The mainstream perspective has addressed environmental issues in terms of externalities imposed by production and consumption and the correction of those externalities through taxes and subsidies. This may have some usefulness in the context of, for example, localised pollution, where the negative externality of pollution can potentially be addressed by tax on the generators of pollution. But this type of approach is not capable of addressing the gravity of the climate emergency.

Lewney (2020) argues that the neo-liberal agenda in principle "does not preclude the adoption of policies intended to meet ambitious targets to prevent and reverse environmental degradation, but it does circumscribe tightly the permissible policy tools used to pursue those targets (limited essentially to market-based instruments)." He further argues that there are two reasons why neoliberal economics ends up with a very limited policy

intervention for environmental goals. These are first "its philosophical standpoint gives primacy to the individual as the arbiter of value" and second "it places a very high priority on individual freedom as against state action that limits such freedom, even if the action itself uses a market-based instrument rather than, say, regulation as the tool." Lewney (2020) argues that mainstream approaches seek to value climate and environmental damages on the same metric as consumption and then they can be traded off against each other. In contrast, an alternative approach treats them as incommensurable, and sets targets for climate change mitigation and then explores the required "time profile of net emissions and [ranks] alternative pathways to achieve that objective according to their economic and social impacts"

Chang and Andreoni (2020) provide a discussion of industrial policy in the 21st century, in a way which fits with what I would have termed industrial strategy. The particularly significant feature of industrial strategy is that it goes far beyond the market failure, control monopoly and promote competition approaches of neo-classical industrial policy.[3] Chang and Andreoni (2020) first point to industrial policy tools which "reduce uncertainty by guaranteeing demand". These include infant industry protection which enables infant firms to survive and learn, and restrict competition from foreign producers, limiting competition among domestic firms and government procurement policies. Further, "the government can provide a clear platform for technological evolution of an industry by taking a lead in the development of the basic technologies …. Second, the government can push firms to form research consortia to develop basic technologies, which they will share and use in developing more applied technologies…. Third, during the early stage in the development of an emerging industry, where different technological standards compete with each other, the government can reduce uncertainty about the path of future technological evolution by imposing a technological standard…. Fourth, the government can subsidize or directly provide technology-related 'public goods' (such as data, metrology, prototyping and testing facilities". These arguments can be applied to a 'green industrial strategy' with regard to, for example, the emergence of alternative energy supplies. Lewney (2020) notes the importance of fundamental uncertainty, which is particularly acute in the context of climate change. "If there is an uncertainty penalty for new, clean technologies, we can no longer interpret low

[3] For further elaboration on this see Sawyer (2000).

responses to carbon price signals as indicating the preferences of fully informed, rational individuals. In other words, what looks like a high mitigation cost in a world of perfect information (agents will not act unless the price signal is very high) becomes a case of herding behaviour (agents will not act until they see other agents doing so)".

The development of new products and processes which can aid the transformation to a low carbon, nature friendly economy will often have features which have been long known to require State involvement. The overall social benefits from the new processes will often be in excess of private benefits. The pay-offs from the new products and processes will often be long-term (measured in decades) and subject to fundamental uncertainty. There will be path dependency "implied by technological lock-in [which] is strengthened by the endogenous nature of technological change and the role played by radical uncertainty in decisions to invest in innovation and to adopt new technologies" (Lewney, 2020).

Chang and Andreoni (2020) observe that "the industrial policy debate has historically had a supply-side bias". I argued in Arestis and Sawyer (1999) that an industrial strategy needs to be supported by appropriate macroeconomic policies (fiscal and monetary). Chang and Andreaoni (2020) specifically mention interest rate policy in this regard working through the effects of interest rate on investment. In the context of the climate emergency a rather different perspective is adopted. I continue to acknowledge the role of fiscal policy in securing high levels of employment. The importance of fiscal policy though is much more about ensuring that the structure of public expenditure, and particularly public investment, is supportive of the climate emergency industrial strategy.In the area of central bank policies, the operations of the central bank should be co-ordinated with the government and its environmental policies. The mandate of a central bank should be formulated along the lines of that of the European Central Bank– that is to "support the general economic policies in the [European] Union with a view to contributing to the achievement of the objectives of the Union", where it is particularly important is that the general economic policies and objectives strongly feature addressing the climate emergency and environmental degradation.

There have been suggestions that central banks should pay regard to the 'green' credentials of the financial assets in their portfolio. Christine Lagarde, then incoming President of European Central Bank, for example, said that a "move to a gradual transition to eliminate

this type [carbon] of assets" was "something which needs to be done"[4]. The implementation of such a policy requires a clear definition of what constitutes a 'green investment', particularly in terms of financial assets, and that should come from the general government policies.

The operations of the central bank should be pursued in ways consistent with the broader political and social objectives of the government – in this context, that is it should be a decision of government as to what is regarded as 'green investment' and the degree of 'greenness'. In effect, a central bank being willing to purchase/hold some financial assets but not others shifts the composition of demand for the financial assets, and to that extent the price of 'green' financial assets is somewhat higher than otherwise, and the price of 'brown' financial assets somewhat lower. The effects could be similar those of the disinvest movement (which then raises the question of who decides which type of assets are to be favoured and which not). Dafermos et alia (2020) provides an example from the Bank of England of how the present arrangements can have adverse effects in respect of climate change. "[I]n its present guise [in 2020], the CBPS [Corporate Bond Purchase Scheme] is mis-aligned with the government's climate goals and implicitly creates better financing conditions for carbon-intensive economic activities. The CBPS biases the allocation of capital towards carbon-intensive sectors, while at the same time failing to reflect climate-related financial risks."

Chang and Andeoni (2020) further consider industrial policy in terms of conflict management. "It has to be admitted that industrial policy may be most prone to open conflicts, as it tends to be more explicitly selective than other poliices; it inevitably chooses between secvtors, technological, or even individual firms in the same industry. Therefore, conflict management is more important for industrial policy than for other policies." As Lewney (2020) notes, "the transition would therefore create both losers and winners. The restructuring impact is made more severe by the fact that the activities that would be phased out tend to be geographically concentrated (regionally and internationally) either as a consequence of geology or because they are subject to economies of scale and so tend to have large plants that are major local employers." This again emphasises the need for an industrial strategy which includes the

[4] Reported in Euractiv 22nd September 2019, "European Central Bank should 'gradually eliminate' carbon assets, Lagarde says"

development alternative employment in the areas with specialisation in the vulnerable sectors.

A major part of an environmental ndustrial strategy has to be conceptualising what is to be regarded as 'green investment', 'green consumption patterns' etc. The central purpose is to shift resources into environmentally sustainable sectors and away from the environmentally damaging. This is intended to extend beyond issues of carbon-intensity. It would also seek to take a vertically integrated approach – to avoid encouraging an investment which appears 'green' in relation to one part of the production process but not in other parts of the production process.

5. Roles for a re-structured financial sector

The financial sector has in many respects grown too large, and perhaps paradoxically may well have tended to reduce the rate of growth of GDP, as mentioned above. The climate emergency and environmental degradation requires dramatic shifts in the composition of economic activity, and the funding of those shifts. It is largely not a matter of more investment (and more saving) but rather the composition of investment; and indeed, slower economic growth could well involve lower levels of overall investment. Thus, the focus here is on the role of financial institutions in the allocation of funds in ways consistent with averting the climate emergency, and not in raising higher levels of funds.

Financial institutions can be viewed as intermediaries between savings and investment, and in the simplest form between households as savers and firms, though it has to be recognized that a large element of investment is funded by retained profits and that much lending takes the form of household debt (including mortgages). Commercial banks provide loans through which bank deposits (and thereby money) are created. The central issue is to whom the financial institutions provide finance and funds and on what terms. Credit rationing is a pervasive feature of the behaviour of banks and other financial institutions in the sense that financial institutions have to assess the risks of non-payment and default of loans, and the interest rate charged and the other conditions of any loan will reflect that risk assessment. The credit allocation processes depend on risk assessments which in an uncertain world can only be perceptions of frequency of default etc., rather than based on well-established probability distributions. Financial institutions, as all of us, operate in a world of fundamental uncertainty and path dependence. The assessments of credit risk etc. are inevitably fraught with difficulties in these circumstances, and those assessments have to be influenced by the

needs in addressing the climate emergency. The influences can range over policy measures such as selective credit allocation whereby government lays down requirements for the flow of credit. It can also come from the construction and development of the types of financial institution which are designed to foster certain types of funding. The structure of the financial system and the legal framework must be such as to ensure that credit rationing practices do not operate against 'green investment', and more generally environmentally friendly investment.

Policies of selective credit allocation may provide one route through which 'green investment' can be encouraged. Many countries operated policies of selective credit allocation in the first decades after World War II, though such policies have fallen out of favour in recent decades. Selective credit allocation requires banks to allocate finance and funds towards specified priority sectors – at the limit only to those sectors, and at other times requiring a high proportion of lending to the priority sectors. "Virtually all central banks have engaged in "industrial policy" or "selective targeting". The difference lies in which industries they have promoted. Significantly, the whole tenor of economic development can be fundamentally affected by which of these industries the central bank and associated institutions promote." (Epstein, 2007). Epstein further indicate the wide range of ways in which credit controls have been operated.

A similar route could come from considers a "differentiation of reserve requirements according to the destination of lending" (Campiglio, 2016), and specifically that lending credit creation directed towards low carbon activities would attract lower reserve requirements for the banks – this may be in the form of lower reserves held with the central bank (though many countries do not operate with such reserve requirements) or in the form of capital requirements.

These types of policies face the formidable difficulty of defining and then monitoring those investments which may be considered 'green', low carbon, preserving nature and bio-diversity etc.. EU (2020) provides an example of seeking to draw up a taxonomy of 'green investments'. It also has to recognized that the assessment of whether an investment should be deemed 'green' has to take into account not just the parts of a production process to which the investment relates but also to other parts of the overall chain of production. It is then highly relevant that the pursuit of selective credit policies be undertaken within the context

of a “climate emergency industrial strategy” which formulates the criteria on which ‘green investment’ etc is to be judged, and which sets up arrangements to monitor the application of the criteria. There are though weaknesses from labelling bonds as ‘green bonds’. “The current system of green bond labels does not necessarily guarantee a material reduction in carbon emissions. Indeed, these labels would signal emission reductions only if the relevant projects were to transform the activities of the bond issuer radically enough for its carbon emissions to fall.” However, the authors show that “green bond labels are not associated with falling or even comparatively low carbon emissions at the firm level” (Ehlers et alai, 2020, p.31)

Pollin (1998), writing in the context of financial structures and egalitarian policies, noted that “finance is the conduit for all economic activity in market economies. Because nothing happens unless it is financed, exerting control over the financial system is an efficient way to influence the widest possible range of activity with a set of relatively small and simple policy tools.” (p.163). In respect of financial institutions, he argues that “bank-based systems are better equipped [than market-based systems] to promote longer time horizons and a stable financial environment. Their structures also create more favourable conditions for activist government interventions, including both traditional macro policies and public credit allocation policies.” (p.164). This line of argument can be broadened out in a number of respects. It has to be recognised that the differences between bank-based and market-based systems are one of degree in that most financial systems have banks and financial markets. Indeed, banks are the major routes through which money is created (and destroyed) in the process of loans being provided. The term ‘banks’ though covers a wide range of financial institutions including what may be termed commercial banks, some of whose liabilities (bank deposits) are treated as money with close relationships with the central bank. There are also savings banks, investment banks etc., which are deposit accepting and in general regulated. Within the banking sector, the patterns of ownership vary from the private profit-seeking, mutual and co-operatives through to the State owned. Mutual financial institutions have often been more focused on households—for example housing finance (as in the UK’s building societies) and credit unions.

Ayadi et alia (2010) and others have drawn the distinction between *Stakeholder Value* (STV) banks and *Shareholder Value* (SHV) banks. They “conceptualise SHV banks as those whose primary (and almost exclusive) business focus is maximizing shareholder interests, while STV

banks in general (and cooperative banks in particular) have a broader focus on the interests of a wider group of stakeholders (notably customer-members in the case of cooperative banks, the regional economy and the society in the case of savings and public banks)" (p. 7).

Block (2014) views a good way forward is the introduction of "significant competition from financial intermediaries who are not seeking to generate profits. These could take the form of credit unions, community banks, nonprofit loan funds, or banks that are owned by government entities; but the key is that their mission is defined as facilitating economic development in a particular geographical area. With this mission, they have a reason to employ loan officers who develop the skill set needed to provide credit to individuals and firms who fall outside the parameters of the standard lending algorithms" (p. 16). He advocates a "a combination of governmental supports and grassroots entrepreneurialism to create an expanding network of non-profit financial institutions that would redirect household savings to finance clean energy, growth of small and medium-sized enterprises, and infrastructure" (p.3).

A major form of stakeholder value institutions is mutual and co-operative banking. Groenweld (2015) advocates such retail banking as one which "demonstrably results in a moderate risk profile and close links with the real economy and local communities" (p. 6). In a similar vein, the argument is put that "empirical evidence in this study suggests that no radical differences exist between cooperative banks and their peers in terms of performance and efficiency. More important, there are economic, systemic and welfare benefits to be derived from a successful cooperative sector in the banking systems in Europe. A financial system populated by a diversity of ownership and governance structures, and alternative business models, is likely to be more competitive, systemically less risky and conducive to more regional growth than one populated by a single model" (Ayadi et alai, 2010, p. vi).

The development of more localised banking can come from regional banking. Klagge and Martin (2005) put a case for regional banking in terms of three advantages. "First, the presence of a local critical mass of financial institutions and agents—that is of a regionally identifiable, coherent and functioning market—enables local institutions, SMEs, and local investors to exploit the benefits of being in close spatial proximity. … Second, the existence of regional capital markets specialising in local firms may help to keep capital within the regions, as local investors direct their funds into local companies— and hence into local economic development—rather than investing on the central market. …Third, in a nationally

integrated financial system, the case can be made for a regionally decentralized structure on the grounds that it increases the efficiency of allocation of investment between the centre and the regions" (p. 414).

These arguments would echo those of Epstein (2018) when he wrote that "by reducing the size of 'too big to fail' banks, imposing financial transactions taxes, implementing asset-based reserve requirements, establishing 'Green Banks' and other initiatives, a restructured finance could help to make the green transition and generate jobs and sustainable growth as well. This is just one—but one very important—example of how restructuring finance can be a much better alternative to roaring banking and bubble finance for job creation and socially useful investment." (Epstein, 2018, p. 348)

Davis and Cartwright (2019) have considered the suitability of crowdfunding (through small contributions for a large number of sources) for the public sector. They note that crowdfunding is rarely used by the public sector whfor which two main reasons were identidied: lack of knowledge and expertise within public bodies and a concern that higher costs (including administrative) would be involved.

In the project of Davis and Cartwright, six case studies were undertaken with three UK local authories and three NHS bodies to conduct feasibility studies on using crowdfunding to finance specified infrastruture project including green energy initiastive, community regeneration schemes. "Our research found that investment-based crowdfunding provides a viable and significant opportunity for public bodies seeking additional models of finance whilst also growing local engagement between the public sector and their community. This opportunity is not without its challenges (both real and perceived) …" (Davis and Cartwright, 2019, p. 5)

The developments of these alternative (to single bottom line of profits) financial institutions would help to create a more diverse financial system. But more importantly would be the impacts on the ways in which funds are allocated, and the potential for savers to have some influence on the ways in which their savings are deployed. An individual seeking ethical investments can make that choice, and another seeking to support local producers may likewise be able to make that decision.

The roles of State development banks (with names such as Green Investment Bank) are of particular importance. As Griffith-Jones and Cozzi (2016) argue, "the existence of development banks is justified by the existence of sectors and investment projects that

require funding for the future development of the economy, but have high uncertainty as to their future success." These projects may find difficulty in securing private funding because of the uncertainties involved. The long time horizons, the fundamental uncertainty of investment projects, and the path dependence involved are often particularly important with the climate emergency[5].

There are projects which would be environmentally friendly and socially beneficial but which do not readily generate financial returns. There are activities which need to be de-commodified and taken outside of the market (e.g. provision of universal basic services). Finance Watch (2020) argue for the role of what they term public finance as "being especially useful for projects that provide public value without being financially bankable themselves", in particular with regard to protection of nature and bio-diversity. It points out that "the nature of private investment is to focus on financial risks and returns and revenue streams, but **many nature-related projects have no revenue source.** Indeed, nature tends to benefit when there is less economic activity. Conversely, it can be easier to finance businesses that keep their costs low by harming nature" (bold in original). It argues that "**Nature projects are often too small for institutional investors to invest in directly.** They are complex to understand, illiquid and take a long time to mature. …. the [finance] industry's reliance on CAPM and other structural factors mean that fund managers have little appetite for alternative or long-term investments."

It is well recognized that climate change itself impacts on the financial system through two main channels of risks which serve to reduce asset values. One can be described in terms of the physical risks from damage to property, infrastructure, and land. The other set of risks come from "changes in climate policy, technology, and consumer and market sentiment during the adjustment to a lower-carbon economy." (Grippa, Schmittmann and Suntheim, 2019, p.26). "Financial stability concerns arise when asset prices adjust rapidly to reflect unexpected realizations of transition or physical risks, there is some evidence that markets are partly pricing in climate change risks, but asset prices may not fully reflect the extent of potential damage and policy action required to limit global warming to 2^{o}C or less" (Grippa, Schmittmann and Suntheim, 2019,p.27-8). More generally, "Financial institutions could incur

[5] See See Spratt, Griffith-Jones, and Ocampo (2013), Griffith-Jones (2016) for more discussion.

losses on exposures to such firms with business models not built around the economics of low carbon emissions. These firms could see their earnings decline, businesses disrupted, and funding costs increase due to policy action, technological change, and shifts consumer and investor behavior. Risks can materialize especially if the shift to a low-carbon economy is abrupt (as a consequence of prior inaction), poorly designed, or uncoordinated globally. Going forward, a key next step in developing stress tests for transition risks will be to capture "second-round" effects—in which a decline in asset prices leads to fire sales, which further depress asset prices, generating a vicious cycle and an amplifying mechanism for an initial shock."

There are issues of financial instability arising from the challenge of climate change. There is recognition that there is what has been termed 'transition risks' arising from the re-valuation of carbon-intensive assets arising from shifts to a low-carbon economy[6]. The change in asset values (assumed to be downwards though the valuation of carbon unintensive assets could well rise) have implications for the range of financial institutions and households who own the corresponding assets. This may well be another example of financial markets mis-pricing financial assets – why has the risks involved not been incorporated into the financial asset prices? While it may be relevant for the central banks and others to warn about the likely shifts in asset prices, it is far from clear what actions would follow for monetary policy.

Reduced global demand for fossil fuels is likely to lead to "stranded assets" with loss of profits on the underlying assets and falls in market valuation of the assets. Mercure et alai (2018) analyse the macroeconomic impact of stranded fossil fuel assets. "Our analysis suggests that part of the SAFA [stranded fossil fuel assets] would occur as a result of an already ongoing trajectory, irrespective of whether or not new climate policies are adopted; the loss would be amplified if new climate policies to reach the 2^{o} target of the Paris Agreement are adopted and/or if low-cost producers … maintain their level of production … despite declining demand; the magnitude of the loss from SFFA may amount to a discounted global wealth loss of US$1-4 trillion."

Warren (2020) argued that many of the largest banks and asset managers have actually *increased* their holdings of fossil fuel assets after the Paris Agreement was adopted, the six

[6] For example, Breeden, (2019), Dafermos, et alai (2018).

largest U.S. bank investors in fossil fuel companies loaned, underwrote, or otherwise financed over $700 billion for fossil fuel companies. Wall Street banks are making a quick buck accelerating climate change, all while communities across the country are suffering from the lasting impacts of industrial pollution and the increasingly devasting effects of climate change." (Warren, 2020, p.2). "We will not defeat the climate crisis if we have to wait for the financial industry to self-regulate or come forward with piecemeal voluntary commitments. Winning a Green New Deal and achieving 100% clean energy for our global economy … will be near impossible so long as large financial institutions are allowed to freely underwrite investments in dirty fossil fuels." (Warren, 2020).

The clear dangers here are that financial institutions and others continue to own financial assets of carbon-intensive companies, and the value of those financial assets will decline as the underlying assets become stranded. The financial institutions and the owners of the stranded assets then seek bail-outs for their mistaken investment decisions.

6. Concluding comments

The processes of financialisation have involved the growth of the financial sector and its institutions, which from a number of perspectives have become too large (individually and collectively). The climate emergency, environmental damage and loss of bio-diversity will require, inter alia, major re-structure of economic activity and much lower rates of its growth. I have argued for environmental policies to be embedded within what may be termed a climate emergency industrial strategy which seeks to map out 'green scenarios' and which would help to identify sectors and activities which are to be developed. The focus on short-term shareholder value maximisation runs into conflict with a longer term perspective of research and development and investment directed towards sustainability (Brett et alia 2020). The direction of funds towards 'green investment' (broadly viewed to include all policies which seek to address environmental degradation, destruction of bio-diversity) will be aided by support for and development of a much more diverse financial system with different types of ownership. It also requires funding arrangements which are capable of supporting activities and investments which do not yield a monetary return, and promote de-commodification of the environment.

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