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From Socialist Calculation to Political Ecology

Ted Benton in his chapter in this book provides an excellent account of environmental themes in Marx’s own work and the subsequent discussion of these. This chapter will not directly engage with Marx’s own writings in any detail. Rather, it will be concerned with the implications of Marx’s work for ongoing debates about the increasing monetisation, marketisation and financialisation of nature. The relation of Marx’s work to these debates is mediated by another line of argument whose centenary anniversary we will soon be observing - the socialist calculation debates. A central legacy of Marx’s work, which remains an area of dispute, concerns the nature and possibility of rational economic choices in a society beyond capitalism and commodity production. In an influential paper of 1920, Mises denied that rational economic choices were possible in a socialist society\(^1\). He was not the first to make that claim, but the paper was influential in opening the more widely known debates about socialist planning that followed. What has often been missed in the subsequent accounts of the debates was important environmental dimensions of the debates that were central to the development of later ecological economics. In this chapter I show why those often neglected dimensions of the debates retain their importance for current resistance to the increasing use of market modes of environmental governance. The first section of the chapter outlines the different dimensions of market modes of environmental governance and their problems. The second section traces the source of some of the central criticisms of these modes of governance in the socialist calculation debates.

I.

Market modes of environmental governance have been increasingly prevalent in response to environmental problems. The natural world is conceived of as ‘natural capital’: habitats, sites of biodiversity, natural and cultural landscapes and a variety of other environmental goods are understood assets that provide ‘benefit streams’ - ‘ecosystem services’ - for human beings. As assets that provide benefit streams, they are open to substitution. The loss of one environmental asset, such as a woodland, wetland or an urban nature reserve, can be compensated for by the creation or enhancement of another environmental asset that provides the same services. As such, development destructive of one particular environmental good can take place as long as it is
compensated for by a gain elsewhere, so that there is ‘no net loss’ or even ‘net gain’ to the ecosystem services.

The standard neo-classical account of the reason for the loss of environmental assets is that the assets are unpriced in markets (Arrow, 1984: 155). Preferences for environmental goods are not reflected in market prices. The solution is to ensure that they are priced. There are two main ways in which prices can be extended to environmental goods. First public authorities can use decision making procedures that mimic ideal markets by putting shadow prices on the goods which can then be entered into a cost-benefit analysis. These prices can be ascertained either by ‘revealed preference’ methods which infer a price from market behaviour – for example from differential house prices - or by ‘stated preference’ methods - asking people how much they would pay for the good if there were a market. Environmental goods and bads are thereby monetised. Second, the goods can more directly marketised. Prices can be put onto environmental goods through the construction of actual markets in those goods, for example, through the introduction of tradeable rights to pollute and through the creation of tradeable assets in offsets. Emissions trading and offset markets are notable examples. With emissions trading, polluters are given rights to emit pollutants – such as CO2 – within a total cap. These rights can be traded, the claim being that this produces the most efficient outcome by allowing pollution to be cut where it is cheapest to do so. Offset markets allow an environmentally damaging activity to be compensated by paying for a good or activity that offsets the effects of the damage. The emission of greenhouses gases can be offset by financing projects in areas such as forest and peatland protection, or the replacement of polluting factories in developing countries. Biodiversity offset markets work by giving environmental organisations or landowner credits for enhancing or protecting a site of biodiversity. Developers can buy these credits to offset the losses in biodiversity that they cause. There is no net loss of biodiversity.

The development of these markets in environmental goods and bads can in turn make possible a further independent development, the financialisation of nature. The new market mechanisms allow the goods become valued not simply as benefit streams but as financial income streams. Like any other good that provides a financial income stream – from student loan to mortgage repayments – carbon-offset markets, biodiversity offset markets and emissions trading offer an asset class that has an associated financial income stream (Sayer, 2015, p.199; O’Neill, 2017). As such it can be bundled with other income streams to create a financial asset with a particular level
of risk and rate of return. The use of financial instruments, such as derivatives, can and are used to manage such risks.

There are a number of critical observations that can be made of the world of monetised, marketised and financialised nature that has developed as the dominant form of environmental governance. The assumption that environmental problems are primarily a matter of environmental preference not being reflected in market transactions fails to address the underlying structural causes of environmental damage. In particular it is blind to the systemic growth imperatives of capitalist society (Marx, 1970, ch.4). The financialised world of debt exacerbates this growth imperative: the very possibility of systematic repayment of debt with interest requires economic growth (Hayward, forthcoming, ch.4). There are also more specific problems with offset markets (O’Neill, 2017, Sullivan, 2013). Offsets create a perverse asset class. The economic value of an environmental good as an offset depends upon the continuing existence of environmentally damaging activities. Without excessive carbon emission, a forest as a carbon offset is economically worthless. Without the loss of a site of biodiversity, a habitat as a biodiversity offset has no economic value. The result is a perverse structural dependence of nature conservation on environmentally damaging projects. Environmental organization such as Conservation International, Flora and Fauna International, Kew Gardens, BirdLife International and the International Union for Conservation of Nature become financial beneficiaries of the ‘no net loss’ transfers from companies engaged in environmental damage.² Environmentalists appear as consultants to a new runway on the promise of money to offset emissions through peatland protection (Heathrow Airport Limited, 2018, Webster, 2017). Such dependencies are not a result of individual failings, but are a structural feature of offset markets (O’Neill, 2017).

In addition to these arguments, there are arguments against the very possibility of using monetary exchange values to capture the value of environmental goods. One of the clearest skeptical statements about the possibility is that of K. William Kapp, one of the founders of modern ecological economics:

The formulation of environmental policies, the evaluation of environmental goals and the establishment of priorities require a substantive economic calculus in terms of social use values (politically evaluated) for which the formal calculus in monetary exchange values fails to provide a real measure – not only in socialist societies but also in capitalist economies. Hence the ‘revolutionary’ aspect of the environmental issue both as a
theoretical and a practical problem. In short, we suggest that environmental values are social use values for which markets provide neither a direct measure nor an adequate indirect indicator. (Kapp, 1974, p.38)

The reference to ‘social use values’ points back to the origins of this perspective in the work of Marx and Engels. Kapp’s starting point is the environmental chapters in the socialist calculation debates that have been neglected, but now have renewed importance in the current context of market modes of environmental governance. The starting point to those debates is the claim that, as Marx put it in the *Grundrisse*, that the end of capitalist society is the ‘[d]issolution of the mode of production and form of society based on exchange value’. (Marx, 1973, p.264). The distribution of labour and productive resources within capitalism is determined through exchange values in the market. Given that every society must distribute labour and productive resources, this raises the question of the form this must take in a socialist society in which their distribution no longer takes place through exchange-values. Marx and Engels both addressed the question primarily in terms of the distribution of social labour (Marx, 1868; 1970 ch.1 section 4; Engels, 1878, p. 294-5). The question about whether and how decisions and priorities can be made in a mode of production that is not based on exchange value lies at the centre of the socialist calculation debates. For Kapp, the trajectory of those debates from that starting point into neo-classical models of market socialism involved a loss of insights central to the original debates that have come back to the fore with ecological problems. It is when one considers environmental decision making that the limits of monetary exchange values come into sharp focus.

II.

There is a standard story that is told of the socialist calculation debates. The story runs as follows. In his paper of 1920 Mises argued that rational economic choices would not be possible in a socialist society since socialist society would lack market prices in higher order production goods. In a complex modern economy with its ‘bewildering mass of intermediate products and potentialities of production’ (Mises, 1920/1935, p.103) there must be a single measure on the basis of which the relative value of different uses of productive resources in comparison with alternative uses could be calculated. In market economies the exchange value of productive resources provides that common unit of measurement for comparing options: ‘calculations based upon exchange values enable us to reduce values to a common unit’ (Mises, 1922/1981 p.99 cf. Mises, 1920/1935, p.98). In the absence of private ownership of the means of production and
hence a market in higher order production goods, there would exist no such market prices on the different factors of production. Rational calculation would be impossible. In the standard narrative, the central response to this argument is taken to be that of Lange (1936-7/1964) and Taylor (1928/1964). On their account, while a planning agency is not able to use actual market prices, it is able to mimic the ideal market of neo-classical theory through the use of shadow accounting prices. A socialist economy would have a market in consumer goods and free movement of labour, but lack a market in capital goods. However, using accounting prices, the central planning board, by a process of trial and error, would be able to mimic the textbook ideal neo-classical market to arrive at a set of equilibrium prices. On the standard narrative, the next chapter is provided by Hayek and epistemic arguments against central planning, which turn on the importance of dispersed knowledge local to time and space and practical knowledge, knowledge that cannot be passed onto a central planning board. This in turn generates responses. So goes the standard story, with different sides being assigned victory in the debate.

This standard narrative loses a number of dimensions of the debate and protagonists in the debates that have become increasingly relevant as market modes of environmental governance fail. One central dimension that is lost is the questioning the presupposition on both sides of the standard debate that monetary values are both necessary and adequate for a rational economic choice. The standard debate revolves the Austrian scepticism about shadow accounting prices as an alternative to actual market prices and the neo-classical acceptance of the practice. That division has survived into more recent debates about shadow pricing.³ The central question that Kapp raises – as to whether markets could provide either a direct or indirect measure of environmental values – is lost in this debate in the shift with the contributions of Lange and Taylor (Kapp, 1974, 36-37). Yet this was the central question in the earlier discussions – in particular in the contributions of Neurath and Weber (1974, p.38). Hence, Kapp’s earlier comment on the debates:

the controversy initiated by O. Neurath, von Mises and Max Weber got sidetracked in various attempts to calculate the prices of productive factors by means of Walras' and Cassel's systems of equations and O. Lange's later elaboration of a theoretical model of "competitive socialism". (Kapp, 1955, 682)

Why does Kapp pick out the contributions of Neurath and Weber here? There are at least three dimensions of their contributions that matter to the question as to how far monetary measures
are adequate for environmental governance: incommensurability of values; intergenerational impacts of economics decisions; the nature of rational economic decision making.

Otto Neurath’s 1919 address to the Munich Worker’s Council, ‘The Character and Course of Socialization’ (Neurath 1919/1973), which he gave as the director of socialisation during the Bavarian revolution, was the occasion for Mises’ 1920 paper on the impossibility of rational choice in a socialist economy. Neurath’s address had defended plans for total socialisation that would form an 'economy in kind' – and economy in natura - in which money-values would no longer form the basis for economic calculation:

We must at last free ourselves from outmoded prejudices and regard a large-scale economy in kind as a fully valid form of economy which is the more important today in that any completely planned economy amounts to an economy in kind. To socialize therefore means to further an economy in kind. To hold on to the split and uncontrollable monetary order and at the same time to want to socialize is an inner contradiction.’ (Neurath, 1919/1973 p.145)

It was this radical plan for an economy in natura that Mises responded to in his 1920 contribution. It is an illusion to imagine that in a socialist state calculation in natura can take the place of monetary calculation. Calculation in natura, in an economy without exchange, can embrace consumption goods only; it completely fails when it comes to dealing with goods of a higher order. And as soon as one gives up the conception of a freely established monetary price for goods of a higher order, rational production becomes completely impossible.

(Mises 1922/1981, p.13)

Lange, in defending his own neo-classical model of socialism, similarly rejected Neurath’s proposals, endorsing Kautsky’s criticisms of these plans, along with criticism of Marx and Engels own account of planning in a socialist economy (Lange, 1936-7/1964, p.135; Kautsky 1925/2012 pp.255-261). The debate between Lange and Mises becomes one only about the nature of prices to be extended to all productive resources. Should they be prices determined by actual market transactions or could shadow accounting prices be employed to guide the use of productive resources? In narrowing the scope of the debate, important arguments developed in the earlier stages of the debates about the limits of monetary valuation are lost in the subsequent exchanges between Mises and Lange. These are the arguments about the incommensurability of values, about the intergenerational impacts of economics decisions and about the nature of rational economic decision making. It is these arguments that have become important in later ecological economics, in part through the work of Kapp.
The first set of arguments concerns the incommensurability of different dimensions of well-being and the variety and non-substitutability of goods required for their realisation. Thus as Neurath notes in a later contribution to the journal of the Frankfurt School, Zeitschrift for Sozialforschung, in 1937, welfare concepts, such as the standard of living, are multidimensional: 'The attempts to characterize the standard of living are like those which try to characterize the “state of health”. Both are multidimensional structures' (1937/2004 p. 520). ⁴ There is no single measure of value, monetary or non-monetary, that is able capture those different dimensions of well-being. At the same time the goods required to meet the different dimensions of well-being are heterogeneous and not substitutable for each other. The central claim being made here is a general one that will hold for any multi-dimensional approach to well-being that recognises the existence of thresholds in each dimension of well-being, be this a needs-based approach or one that appeals to capabilities (O'Neill, 2010). Any such approach will entail forms of non-substitutability. If an agent suffers a loss in one dimension of well-being that takes her below a certain minimal threshold, it will not necessarily be the case that there will a gain to had in some other dimension of well-being that compensates for that loss and maintains the same aggregate level of well-being. A person suffering from severe malnutrition requires specific nutritional goods to meet that need. Goods in some other dimension of well-being - say of education or leisure - will not be substitutes. To make this point is not to deny considerable causal relations between losses in different dimensions of well-being. The existence of compound inequalities is witness to the ways in which deficiencies in one dimension of well-being can lead to losses in others. However, remedies to those compounded inequalities must ultimately address deficiencies in each dimension of well-being with the goods required to meet needs within that dimension. This point has implications for how we think about resource decisions across generations. If different dimensions of human flourishing require different goods for their realisation, then choices across generation that aim to maintain or improve the well-being of those in the future require each generation to pass on a bundle of goods that is disaggregated across the different dimensions of well-being (O’Neill, 2010).

The early socialist calculation debate had an intergenerational dimension that was missed in the later debate between different market based approaches. Neurath’s criticism of the use any single unit of measurement of value over different plans was aimed not just at criticizing the market and monetary measures, but also other suggested single units, be it labour time defended by some socialists or the energy units associated by the early precursors of an energy economics such as...
Popper-Lynkeus and Ballod-Atlanticus. All had problems in considering intergenerational uses of resources. Market based approaches fail since the needs and wants of future generation cannot be expressed in behaviour in current markets. Labour time measures fail to address the effects of the use of energy and resources in current labour time saving for future generations. However, energy units fail to consider the effects of energy saving on the quality of labour in current conditions:

The question might arise, should one protect coal mines or put greater strain on men? The answer depends for example on whether one thinks that hydraulic power may be sufficiently developed or that solar heat might come to be better used, etc. If one believes the latter, one may ‘spend’ coal more freely and will hardly waste human effort where coal can be used. If however one is afraid that when one generation uses too much coal thousands will freeze to death in the future, one might use more human power and save coal. Such and many other non-technical matters determine the choice of a technically calculable plan ... we can see no possibility of reducing the production plan to some kind of unit and then to compare the various plans in terms of such units... (Neurath, 1928/1973, p.263)

Measures of inter-generational well-being and the resources required to meet them had themselves to be multi-dimensional.

The third set of arguments in the early socialist calculation debate that got lost in later versions concern the nature of rational economic decision making as such. Kapp’s reference to the importance of Weber’s contribution is concerned with this aspect of the debate.⁵ The importance of Weber’s contribution to the debate, in contrast to that of Mises, is that Weber is much more careful than Mises in distinguishing the different senses in which economic decisions can be described as rational. Specifically, in responding to Neurath’s socialisation plans (Weber, 1921-22/1978, ch.2, sections 12-14), he draws a distinction between formal and substantive rationality:

The term ‘formal rationality of economic action’ is used to designate the extent of quantitative calculation or accounting which is technically possible and which is actually applied. The ‘substantive rationality’, on the other hand, is the degree to which the provisioning of a given group of persons (no matter how delimited) with goods is shaped by economically orientated social action under some criterion ... of ultimate values, regardless of the nature of these ends’ (Weber, 1921-22/1978, p. 85)
Weber does take formal rationality to be best realised through monetary calculations based on exchange values:

From a purely technical point of view, money is the most "perfect" means of economic calculation. That is, it is formally the most rational means of orienting economic activity. Calculation in terms of money, and not its actual use, is thus the specific means of instrumentally rational economic provision. (Weber, 1921-22/1978, p. 86)

Hence, he argues that Neurath’s socialist economy in kind would be less formally rational than a capitalist economy. However, unlike Mises, Weber does not identify formal rationality with rationality as such. Economies could still be open to judgement in terms of their substantive rationality according to some ends where “"purely formal" rationality of calculation in monetary terms is of quite secondary importance or even is fundamentally inimical to their respective ultimate ends…” (Weber, 1921-22/1978, p.86) The reason Weber’s contribution is so important for early ecological economists like Kapp lies in his recognition of the importance of substantive rationality. Monetary measures might improve calculability in economic choices. They do not thereby make them more rational in the substantive sense. Thinking about environmental goods requires the exercise of substantive rationality. Hence, Kapp’s claim quoted above:

The formulation of environmental policies, the evaluation of environmental goals and the establishment of priorities require a substantive economic calculus in terms of social use values (politically evaluated) for which the formal calculus in monetary exchange values fails to provide a real measure – not only in socialist societies but also in capitalist economies. (Kapp, 1974, p.38)

The distinctions are redeployed by Kapp and Polanyi in developing central themes in the criticism of standard approaches to economics generally and to the limits of markets with respect to environmental goods in particular.

Kapp retains the original Weberian distinction between formal and substantive rationality. Formal rationality refers to accounting in numerical terms as exemplified in capital accounting. Substantive rationality is concerned with the economy in so far as it is concerned with meeting human needs by the physical and social resources available. It requires democratic deliberation about our needs, not simply calculation. And insofar as it requires calculation, it requires ‘calculation in real terms rather than in terms of prices’ (Kapp, 1963, p.195):
As far as social benefits are concerned the criteria available are social minima based upon a substantive and democratic evaluation of social needs and requirements and their comparison in real (physical) terms. (Kapp, 1963, p.195)\(^7\)

The appeal here is to ‘quantitative input-output analysis’, work taken up in subsequent in ecological economics in the analysis of the material and energy flows through the economy.

Polanyi, while he starts from Weber in making his distinction between formal and substantive economics, reworks the concept of formal rationality.\(^8\) It is transformed from its Weberian sense of rationality concerned with calculability and is taken to refer to economic rationality in the sense that Robbins introduces the concept, as a process of choice between different ends in conditions in which the means are not sufficient to realise them all, but rather have alternative uses. Substantive economics, in contrast, is concerned with the provisioning of goods to meet human needs and wants. Formal economic rationality is tied to market economy. Outside of market economy it loses its relevance. One is concerned rather with the substantive economy, the economy understood as ‘an instituted process of interaction between man and his environment, which results in a continuous supply of want-satisfying material means’ (Polanyi, 1957, p.248).

The argument again is that it is an error to treat the forms of formal rationality found within market economics to define the nature of rational economic behaviour: ‘the substantive definition of “economic”... permits a redefinition of the main economic institutions that does not take as its frame of reference the market.’ (Polanyi 1950, p.61, emphasis in the original).

What both Kapp and Polanyi retain from the earlier debates is a recognition of the rational limits of monetary valuation, in particular when it comes to environmental goods. Modern neo-classical economics starts from the assumption that rational choice requires pricing. Its Austrian critics share the same assumption, but reject the claim that shadow prices are an alternative to actual prices in the market place. Hence, their appeal to free market solutions to environmental problems. Hence, their appeal to free market solutions to environmental problems. The response to the failure of and resistance to those market based approaches reveal is the deep problems with both perspectives. The response to the failure of market modes of governance can take a variety of forms. Some, like Kapp, call for social and democratic modes of decision-making using not monetary measures but direct physical, environmental and social measures of both welfare and resources. More radical versions of this view aim ultimately, as did Neurath, at a generalized decommodification of goods, replacing markets with non-market economic institutions (Neurath, 1920; O’Neill, 2011). Other responses, such as that of Polanyi, are critical not
of markets as such, but the disembedding of markets from the constraints of social and environmental norms in market societies through the creation of the fictitious commodities in labour, land and money (Polanyi, 1957; Dale, 2010, ch.5).

What these views and the later forms of ecological economics influenced by them share as an inheritance from the early socialist calculation debates is the view that monetary values cannot capture the ways in which environmental goods matter to human well-being. There is no single monetary measure of well-being. There is no single measure of the value of resources that meet human needs. The attempt to treat social relationships and relationships to nature simply as form of social and natural capital fails to understand their role in flourishing human lives. Relationships to particular people and places that are constitutive of well-being block their substitutability (O’Neill, 2017). Marketisation compounds those problems. Losses of goods central to human well-being cannot be offset by gains elsewhere that compensate for those losses. Financialisation distances economic decisions still further from the real material and social conditions for the goods of human life. The limits of market valuation and market modes of governance become still clearer in the context of environmental limits to economics activity. Such limits can only be specified in terms of real physical and biophysical indicators. How we are to respond to them requires a specification of the physical and bio-physical throughput of the economy and the rich set of needs that this must satisfy and plans to meet these. In the context of climate change the need for a shift from market modes of governance has never been more pressing. What I have tried to show here is both the influence of the early contributions to the socialist calculation debates to the development of these ecological criticisms of market governance and of their continuing relevance.
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1 See Mises 1920 and 1922.


3 Mark Sagoff in particular has combined criticism of the practice of shadow pricing environmental goods for the purposes of cost-benefit analysis with an endorsement of an Austrian approach to markets and the environment. See Sagoff, 2008, pp.80-81 and passim. For a discussion see O’Neill, 2012.

4 The same edition contained Horkheimer’s influential criticism of the left Vienna Circle of which Neurath was a leading member, ‘The Latest Attack on Metaphysics’ (Horkheimer, 1937/1974). The subsequent fall out led to a bifurcation of political ecology between the physicalist and
materialist tradition represented by Neurath and the criticisms of science, scientism and instrumental reason that developed within the Frankfurt School. For a discussion and suggestion for a partial reconciliation, see O’Neill and Uebel, 2018.

5 For a discussion see Uebel, 2018,

6 In the English translation by Talcott Parsons the word ‘instrumental’ is absent undermining the actual meaning of the statement. In the original German version Weber speaks explicitly of “Zweckrationalität” (instrumental rationality) (1921-22/1972, 45). My thanks to Christian Scholz for pointing this out.

7 Kapp refers specifically back to Neurath’s work and Weber’s critical commentary on it in developing this point (Kapp, 1963, p.196).

8 The important influence in this transformation is the second edition of Menger’s Grundsätze der Volkswirtschaftslehre. For a discussion see Dale 2010 pp.103-114. See also Berger, 2008, on the correspondence between Kapp and Polanyi on substantive economics.

9 Polanyi’s own early contribution to the socialist calculation debate had rejected Neurath’s marketless socialism (Polanyi 1922/2016 p. 398) and defended a form of ‘functionally organised socialist economy’ influenced by Cole’s guild socialism. For a discussion see Dale 2016, ch.3.

10 See Martinez-Alier 1990.