



LUND UNIVERSITY

Core tenets of the theory of ecologically unequal exchange

Oulu, Martin

Published in:
Journal of Political Ecology

2016

Document Version:
Publisher's PDF, also known as Version of record

[Link to publication](#)

Citation for published version (APA):
Oulu, M. (2016). Core tenets of the theory of ecologically unequal exchange. *Journal of Political Ecology*, 23(1), 446-466.

Total number of authors:
1

General rights

Unless other specific re-use rights are stated the following general rights apply:
Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal

Read more about Creative commons licenses: <https://creativecommons.org/licenses/>

Take down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

LUND UNIVERSITY

PO Box 117
221 00 Lund
+46 46-222 00 00

Core tenets of the theory of ecologically unequal exchange

Martin Oulu¹

Lund University, Sweden

Abstract

In this article, core tenets and claims of the theory of ecologically unequal exchange (EUE) are synthesized. EUE theory postulates a net flow of natural resources from peripheral developing to core industrialized countries through international trade, a situation which undermines the development of the periphery while enhancing that of the core. The key claims and EUE mechanisms are categorized and discussed under three topics: 1) the structure of the capitalist world-economy, 2) monetary valuation, and 3) equity and justice. The treadmill logic of capitalism in which capital extracts ecological resources and release waste in an endless pursuit of profits creates an expansionary dynamic which draws peripheral countries into exploitative market relations. This peripheralization is supported by 'free trade' economic policies, while nation-states and other political-economic institutions such as the WTO and IMF provide the regulations which ensure proper functioning of the system. Monetary valuation caps it by obscuring the inverse relationship between thermodynamics and economics, in which low-entropy energy and materials indispensable in economic production processes are lowly priced while processed goods which have dissipated most of their matter-energy are highly priced, ensuring that biophysical resources and profits accumulates in the industrialized Northern countries. This EUE framework is applied to the EU's Raw Materials Initiative from the vantage point of policy *as* implicit theory. By challenging mainstream policies and their underlying theories, the EUE perspective demonstrates that alternatives to neoliberal policy prescriptions exist and policy can play a crucial role in bringing about the necessary structural changes.

Key words: ecologically unequal exchange, environmental justice, EU, capitalism, free trade, policy

Résumé

Dans cet article, les principes et les revendications de la théorie de l'échange inégal sur le plan écologique (EUE) de base sont synthétisés. La théorie soutient que naturellement il y a un flux de ressources à partir de la périphérie vers les pays centraux, par le commerce international. La périphérie souffre tandis que le centre est améliorée. Les principales revendications de l'article, ainsi que les mécanismes impliqués en EUE, sont classées sous trois thèmes et discutées: 1) la structure globale de l'économie capitaliste, 2) la valeur monétaire, et 3) l'équité et la justice. La logique de tapis roulant du capitalisme - dans une poursuite sans fin de profits - extrait les ressources écologiques et puis un des déversements de déchets. Il y a une expansion dynamique; certains groupes de pays périphériques sont attirés dans les relations de marché d'exploitation. Cette périphérisation est soutenue par des politiques économiques «libre-échange». Les états-nations et d'autres institutions politico-économiques, telles que l'OMC et le FMI, garantissent le bon fonctionnement du système par la réglementation. L'évaluation monétaire obscurcit la relation inverse entre la thermodynamique et de l'économie, dont l'énergie et les matériaux indispensables dans les processus de production économique à faible entropie ne coûtent pas cher. Les produits transformés, qui ont la plus grande partie de leur matière-énergie dissipée, sont très cher. Cela garantit que les ressources biophysiques et les profits accumule dans les pays industrialisés du Nord. Ce cadre EUE est appliqué à Raw Materials Initiative de l'UE, en envisager la politique comme «théorie implicite». En remettant en question les politiques générales et leurs théories sous-jacentes, la perspective EUE démontre que les alternatives prescriptions politiques existent. La politique peut jouer un rôle crucial dans les changements structurels nécessaires.

Mots clés: Échange écologiquement inégal, la justice environnementale, l'UE, le capitalisme, le libre-échange, la politique

¹ Dr. Martin Oulu, Associate Researcher, Human Ecology Division, Lund University, Sweden and Inscape Research & Consulting, Nairobi, Kenya. E-mail: ochiengmoulu@gmail.com. Acknowledgements: Many thanks to Professors Alf Hornborg and Joan Martinez-Alier, editors of this Special Section, for their valuable comments. I extend similar gratitude to the two anonymous reviewers. Funding was provided by Lund University and EJOLT (Environmental Justice Organizations, Liabilities and Trade), an FP7 project supported by the European Commission, Grant number 266642, 2011-2015. This is the eighth article in Hornborg A. and Martinez-Alier J. (eds.) "Ecologically unequal exchange and ecological debt", special section of the *Journal of Political Ecology* 23: 328-491.

Resumen

En este artículo, resumimos las proposiciones básicas de la teoría del comercio ecológicamente desigual y las convertimos en criterios de evaluación para políticas públicas. La teoría postula que mediante el comercio internacional se establece un flujo neto de recursos naturales de los países en desarrollo a los países del centro, y que esta situación menoscaba el potencial de desarrollo de la periferia y por el contrario aumenta el del centro. Las proposiciones principales de la teoría del comercio ecológicamente desigual son clasificadas y discutidas en tres acápites: la estructura de la economía-mundo capitalista, los lenguajes de valoración, y la justicia y equidad. Esos criterios se aplican entonces a la Raw Materials Initiative (iniciativa de materias primas) de la Unión Europea, para mostrar que la teoría del comercio ecológicamente desigual desafía la teoría económica ortodoxa sobre la que descansan políticas tales como la Raw Materials Initiative. Hay otras opciones disponibles para las políticas públicas. Eso se ve si consideramos las políticas como expresiones de teorías. El análisis de políticas debe separar analíticamente las teorías y los supuestos en los que descansan las políticas de los intereses políticos u otros intereses. En los discursos públicos, hay que cuestionar cuán robustos son esas teorías y supuestos frente a otras perspectivas y evidencias científicas. La noción del comercio ecológicamente desigual indica que no podemos continuar como cada día, hay alternativas a la política neoliberal, y las políticas públicas tienen un papel crucial para conseguir los cambios estructurales necesarios.

Palabras clave: comercio ecológicamente desigual, justicia ambiental, Unión Europea, capitalismo, libre comercio, política

1. Introduction

Ecologically unequal exchange (EUE) refers to the empirically observed tendency toward an asymmetric flow of embodied materials and energy from peripheral countries largely located in the Global South to the core developed world, a consequence of the structure of international trade (cf. Bruckner *et al.* 2012; Dittich and Bringezu 2010; Dorninger and Hornborg 2015; Hornborg 1998; Oulu 2015; Pérez-Rincón 2006; Schaffartzik *et al.* 2014; Steen-Olsen *et al.* 2012). The Global South countries thus tend to serve as a source of raw materials and sink for waste products for industrialized countries (Rice 2009a). Such unequal material-ecological exchanges perpetuate global inequalities and uneven environmental impacts which disproportionately harm the people in developing countries but enhance the productive capacity of the developed (Jorgenson and Clark 2009). EUE theory is based on a world-systems perspective, according to which the capitalist world-economy is economically and geographically divided into an affluent core and less developed periphery, and in which surplus value flows from the periphery to the core (see Frank 1967, 2008; Wallerstein 1974). The core-periphery relationship can manifest within a country as well as across the entire world. While intra-country inequalities can be alleviated through redistributive policies or international trade by 'importing sustainability', weak global governance mechanisms combine with planetary limits and boundaries to make it difficult to address global inequalities brought about by EUE (cf. Rockström *et al.* 2009). The EUE perspective leads to the logical if radical claim that the North owes the South an 'ecological debt' (cf. Bond 2010; Paredis *et al.* 2004; Rice 2009b; Warlenius *et al.* 2015).

EUE theory challenges the theoretical rigor and pragmatism of neoliberalism and other hegemonic discourses such as ecological modernization, upon which conventional policy is largely premised. Neoliberalism, the theory of political-economic practices which believes that human welfare is best achieved through individual entrepreneurship, private property rights, and free market trade, is so pervasive a discourse that it has become commonsensical (Harvey 2005). Characterized by commodification, privatization, deregulation, financialization, and a drawback of the state, the 'neoliberal turn' witnessed since the mid-1970s is, however, wrought with various contradictions, conflicts, and crises (Brand 2012; Harvey 2014; Margheritis and Pereira 2007). Ecological modernization, which has emerged as the dominant ideology guiding contemporary environmental policy, posits that more economic growth and technological innovation will solve any social and environmental problems caused by capitalism and economic growth (cf. Asafu-Adjaye *et al.* 2015). Eco-modernism however does not call for any structural changes, instead arguing that environmental problems can be solved within existing institutional arrangements (Hajer 1995). Its ideological pillars, Hornborg (2011) contends, are a set of interconnected illusions which mask EUE. But with catchphrases such as "Trade, not Aid" gaining currency even in the Global South, it is increasingly becoming

difficult to persuade policymakers that under the current capitalist world-economy, international trade is unequal and imperils the long-term development of the Global South.

Discussions of EUE are mostly conducted within ecological economics and political ecology. A distinction can be made between political economy – the study of *economic distribution conflicts*, and political ecology – the study of *ecological distribution conflicts* (Martinez-Alier and O'Connor 1996). Ecological distribution conflicts refer to social conflicts which arise from unfair access to natural resources and the unjust burdens of environmental pollution, and can be viewed as describing the collective claims against environmental injustices. While ecological economics focuses on the clash between economy and environment, such economy-environment clash gives rise to 'environmentalism of the poor', i.e. how the poor, minorities, and the underdeveloped countries perceive, react, resist, or deal with the impacts of such a clash, a field which is studied by political ecology (Martinez-Alier 2002). EUE scholarship straddles the economy-environment clash and the implicit and resultant political implications. Political ecology "seeks to unravel the political forces at work in environmental access, management, and transformation" by highlighting how politics is inevitably ecological, and ecology inherently political (Robbins 2012:3).

Although EUE is by definition the analysis and implications of the asymmetric flow of biophysical resources (matter-energy) between the periphery and core of the world system, underlying such unequal flows are systems of unequal political and power relations. The core element of an EUE theory is the exchange of more biophysical resources for less, but any EUE theory must also explain the *mechanisms* through which such unequal exchange occurs. Because ecological and environmental change reflect or are the products of political processes, analyzing EUE mechanisms helps expose their political nature. According to Bryant and Bailey (1997), political ecology posits that the costs and benefits of environmental change are unequally distributed among actors, a situation which reinforces or reduces existing socio-economic inequalities, and has political consequences due to the alteration of power relations. In such a zero-sum scenario, political ecology seeks to reveal the winners and losers and the unequal power relations at play by focusing on the root causes rather than symptoms. It focuses attention on broader systems of power and influence rather than *only* on proximate and local forces. The issue of scale is thus very important to political ecologists, as it influences the complex and contingent *interactions* of factors which produce environmental change (cf. Brown and Purcell 2005; Vayda and Walters 1999). By viewing ecological systems and environmental problems as inherently political, political ecology challenges "apolitical" approaches such as "ecoscarcity" and "modernization" which dominate contemporary global discourse on environment and sustainability (Robbins 2012).

A key challenge facing EUE theory is its apparent "under-utilization" (Roberts and Parks 2007:195). The causes of the under-utilization are varied. Some relate to criticisms of the empirical analysis and underlying theory. Foster and Holleman (2014) consider existing EUE approaches as "vague and roundabout" by drawing unwarranted generalizations about environmental load displacement. They nevertheless underscore that various studies "strongly point to the existence of EUE" (ibid. 210). Others consider the under-utilization as a product of dominant discourses which obscure the EUE phenomenon. Hornborg (2009), for example, identifies five interconnected "illusions" which make it difficult to conceptualize EUE: the fragmentation of scientific perspectives into bounded categories such as 'economy' and 'ecology', the assumption that exchange at market prices is tantamount to reciprocity, the representation of current global inequalities as developmental stages in historical time, and the belief that sustainable development is achievable through consensus. Yet others highlight the challenge of getting out of the comfort zone within which those who benefit from EUE find themselves. Industrial country growth has historically been dependent on raw materials from developing countries, hence the growth of core industrialized countries must contract in order to free up ecological space for the minimum growth needed in developing countries (Costanza *et al.* 1997). The under-utilization may also be a consequence of the very ontology of EUE theory which was developed by academics before becoming relevant for policymakers and environmental justice movements (Martinez-Alier *et al.* 2013). But as the theory risks remaining *scholastic* (Hornborg 2011:109-114), the challenge is translating and adapting EUE to fit the needs of social movements and policy makers, a key aim of this article.

Although EUE and arguments for the ecological debt are now well-documented (cf. Dorninger and Hornborg 2015; Krausmann *et al.* 2013; Oulu 2015; Perez-Rincon 2006; Steen-Olsen *et al.* 2012; Warlenius *et al.* 2015), how these concepts are used is as important as the ideas themselves. Not only are the actors and coalitions responsible for raising such issues and the channels they choose to promote them important, but equally so is developing and strategically promoting implementable policy proposals (Roberts and Parks 2009). The issues EUE raises are at the core of many global and local environment and development agendas. For example, the OECD (2008) urges its members to analyze and keep track of biophysical trade flows and to use them for policy and planning purposes. EUE research needs to translate the concept to make it more relevant to social movements and policy makers, a conviction fundamental to initiatives such as the EJOLT project of which this article is part (see EJOLT 2015). Policy making is not only about finding acceptable solutions to preconceived problems, it is also a process of latent social conflict resolution (Hajer 1995). The phenomenon of EUE is replete with different types of conflicts. In the next section, the relation between theory, policy (as implicit theory), and sustainability is discussed. Next, key EUE tenets or claims are discussed and translated into policy assessment criteria which are then applied to the EU's Raw Materials Initiative (RMI).

2. Theory, policy, and sustainability

Policy is often erroneously accused of being only focused on action (cf. Nyamsenda 2015). The conception of theory as the opposite of action is a consistent feature of scientific tradition (Schatzki 1996). But policy is as much theory as it is praxis. Theory means different things to different people, disciplines, and epistemologies. The Oxford Dictionary (2016) defines theory as a supposition or a system of ideas intended to explain something. This is the standard view of theory in both philosophies of science and natural science: a set of propositions, an empirically verifiable supposition or hypothesis (logical positivism), or falsifiable conjectures (Hallberg 2013). In *What is theory?*, Corvellec (2013:11) argues that "[t]heory is not the exclusive province of academics." Considering theory in terms of doxa, plot, stalemate, disappointment, personal matter, hope, or family concept, Corvellec questions the modernist opposition between theory and practice. The term *policy* suggests a wise course of action, the purposive process of identifying and/or selecting goals or 'problems' and the means of achieving or 'solving' them (cf. Portney 1992; Roberts 2004). While academia operates largely in the world of thought through research, writing, and teaching, Degeling and Colebatch (1984) argue that the work of decision makers is also founded in the world of thought since they perceive the organization as an instrument for the accomplishment of some purpose and of themselves as the controllers of that instrument. That policy is sometimes *based on* theory is a foregone conclusion. But policy *as* theory is a little-appreciated view. Zundel and Kokkalis (2010) consider theory *as* (engaged) practice. Through the concept of practice-theory, they argue that the activities that make up 'theorizing' are similar to those involved in policymaking. This leads them to conclude that theorizing "is thus not different in being from engaged organizational practice" (ibid. 1210). Corvellec (2013:22) has a similar view in stating that practice is not simply something that people do but also refers to "why, how, when, and with what intentions people do what they do." These perspectives consider theory as both an object and a product of practice and highlights the need to shift focus from the traditional separation of (academic) 'theory' and (organizational) 'practice' by appreciating policy and practice as theory.

Therefore, policies *are* theories in the sense that they are all founded on a basic conjecture or core hypothesis. Implicit in any policy statement is a policy theory, an analysis or understanding of the root cause of the problem and how the proposed policy will address it. In *Nothing as practical as a good theory*, Pawson (2003:472) writes that "evaluation seeks to discover whether programmes work [and] programmes are theories, therefore it follows that evaluation is theory-testing." A policy theory is thus the set of beliefs or assumptions that underlie action. It assumes that the existence of a policy represents a theory in the sense of a causal claim linking inputs to outputs (Smith and Larimer 2013; Chen 2004). Because policy is purposive, a policy represents some expectation that the activities it mandates will cause certain stated objectives to be met based on some understanding of the causal links between the problems and the proposed objectives and/or solutions. Therefore, analyzing policies has at least two goals; an *administrative* task of judging

failure or success, and a *research* goal of ascertaining why the policy (will) fail or succeed (Suchman 1969). By analyzing policies, we get the opportunity to interrogate their objectives, underlying assumptions, and program activities, and why we believe they can achieve the stated objectives. Policy may fail either because it failed to 'operationalize' the theory - program failure, or because the theory itself was defective - theory failure (Suchman 1969). Policy analysis should therefore be concerned with analytically separating and interrogating the 'theory' as well as 'operation' of policies. Some call this the 'theory of change' research strategy (cf. Anderson 2005).

Since the publication of *Our Common Future* (WCED 1987), there appears to be a general global consensus around the goal of sustainable development, subsequently translated into Agenda 21, the Millennium Development Goals (MDGs) and now Sustainable Development Goals (SDGs). However, its most basic requirement, that of raising the living standards of the world's poor, is far from being achieved. Despite an apparent unity behind the normative sustainability vision, there remain contrasting views on how to reach that goal. While genuine differences in definition and approaches cannot be wished away, I consider global inequality as being at the core of such differences. Developments in environmental politics critically depend on specific social constructions of environmental problems (Hajer 1995). While the Global South generally emphasizes poverty alleviation, the Global North is often portrayed as giving "substantial political attention to environmental issues that threaten ecological stability" (Axelrod and VanDeveer 2015:7). The North's self-representation as acting in the interest of future generations is not only an extension of the discredited environmental Kuznets curve (cf. Stern 2004), it is also a euphemism for maintaining the developed countries' lifestyle of high material throughput. Through the concept of "environmentalism of the poor", Martinez-Alier (2002) has forcefully argued that the poor are equally if not more concerned about conserving the environment.

Science for sustainability policy requires the handling of multi-dimensional, multi-scale analyses and integrated assessment in order to generate policy-relevant information (Giampietro *et al.* 2006). Evidence-based policy assessment provides reasonably objective yardsticks for policy performance as a way of addressing root causes of problems and documenting best practices (Smith and Larimer 2013). Sustainability science is thus 'post-normal' in that its organizing principle is *quality*, the management of irreducible uncertainties, ethical complexities, and democratization of knowledge (Funtowicz and Ravetz 1994). Unfortunately, conventional policymaking is largely guided by mainstream economics which has traditionally relegated the above principles and realities to the sidelines. The sustainability debate is fundamentally about ethics, yet economists take income distribution as a given and consequently prescribe policies that defend the status quo (Norgaard 2009). For science to be useful to decision-makers, it has to have *semiotic closure*, i.e. be socially and politically relevant yet scientifically sound (Giampietro *et al.* 2006). But ecological modernization (cf. Asafu-Adjaye *et al.* 2015) fails to acknowledge the distributive, political, and cultural dimensions of global environmental problems (Hajer 1995; Hornborg 2009). Neoclassical economics deals extensively with issues of (efficient) allocation but hardly with distribution (justice) and not at all with scale (Costanza *et al.* 1997). Through the scale effect or Jevons paradox, efficiency gains can result in the use of even more resources. Moreover, empirical evidence suggests that the correlation between measures of economic growth (e.g. GNP) and welfare are only positive up to a point, after which they become negative (Daly 1999). Many industrialized countries have reached the negative point. The objective of scientific investigation must be that of enhancing the process of social resolution of environmental conflicts rather than individuating a definite technological "solution" (Giampietro *et al.* 2006:63). The assumptions or 'theories' that underlie policy can arise from different sources. Within the EU and many developed countries, they are supposedly evidence-based, i.e. based on scientific knowledge (cf. Diaconescu 2009). But because sustainable development is clearly a political and social construct and not a scientific blueprint (Axelrod and VanDeveer 2015), Hajer's (1995) contention that a strong and well informed public is the appropriate response to an anti-realist understanding of the environmental problematic resonates with the aim of this article.

3. Ecologically Unequal Exchange: core tenets and claims

Eco-Marxists trace the development of EUE theory to Karl Marx's concept of 'metabolic rift,' i.e. his concern with how in 19th-century Europe, large-scale industry and agriculture under capitalism combined to impoverish the soil (environment) and the worker through the growing asymmetric exchange of nutrients and other material resources between town and countryside (Foster 1999; Foster and Holleman 2014). In the 1940's and while working for the United Nations Economic Commission for Latin America (CEPAL in Spanish), Raul Prebisch observed a hierarchy in the global economic system and deteriorating terms of trade for primary products (cf. Foster and Holleman 2014; Love 1980; Kohler and Tausch 2002; Pérez-Rincón 2006; Prebisch 1950, 1963). In presenting a core-periphery hypothesis of the world economic system, Prebisch rejected David Ricardo's theory of comparative advantage. Arghiri Emmanuel (1972) elaborated the theory of unequal exchange by arguing that developing countries always exchange a larger amount of their labor for less foreign labor. Stephen Bunker (1985) argued that there was unequal transfer of labor *as well as* energy and matter from the periphery to the core, and that this affects the subsequent developmental potential of the periphery. Bunker introduced ecological aspects (energy and matter) to Emmanuel's labor-based unequal exchange, and can thus be seen as having formulated the first concept of *ecological* unequal exchange. Alf Hornborg (1998) conceptually enhanced EUE theory by arguing for the assessment of net flows of matter-energy (productive potential) but without equating it to economic 'value', later exemplifying EUE in terms of time-space appropriation (cf. Hornborg 2011, 2003a). The claims of EUE theory challenge mainstream economics, environmental, and social thought, and are discussed in the next section.

The structure of the capitalist world-economy is hierarchical

A central and recurring claim of EUE is that the asymmetric flow of resources from the periphery to the core is attributed to the structure of international trade under capitalism. The structural foundation of EUE theory can be traced back to Raul Prebisch's analytical understanding of trade relations (Love 1980; Pérez-Rincón 2006). The structure of the world-economy significantly influences social metabolism and impacts development by determining who among the core and periphery receive the profits from processing natural resources (Costanza *et al.* 1997:35). Development studies have also drawn attention to the 'exogenous' nature of global inequality (Greig *et al.* 2007). The structural foundation of EUE theory is thus not in doubt. What remains imprecise is a specification of the *structural factors* or *aspects*. Criticism has been directed at EUE and dependency theories in general for the alleged failure to specify the structural foundation of unequal exchange (cf. Foster and Holleman 2014; Hornborg 2003b). Identifying the structural aspects of the world-economy which tilt the balance in favor of the core is one way to conceptually enhance EUE theory and help policy-makers counteract the negative consequences of EUE. Anthony Giddens (1984:17) defines structure as "the structuring properties allowing the 'binding' of time-space in social systems, the properties which make it possible for discernably similar social practices to exist across varying spans of time and space and which lend them 'systemic' form." As reproduced social practices, he explains, social systems do not have 'structures' as such but rather exhibit 'structural properties', the most deeply embedded being *structural principles* while those practices which extend over the longest time and greatest space are called *institutions*. Because rules cannot be conceptualized apart from resources, structural properties express forms of domination and power. Social power is the control that one party has over the environment of another, the powerful being those able to control energy and matter by structuring the environments of others (Adams 1975). I have considered the structural aspects of EUE theory as primarily comprised of:

- (1) the *structuring principles* of 'treadmill' logic of capitalism and 'free-market' ideology, and
- (2) *institutions*, including nation-states and other international political-economic institutions.

The treadmill logic of capitalism

The defining characteristic of capitalism is that it gives priority to the endless accumulation of capital. People and firms are accumulating capital in order to accumulate still more capital, a process that is continual and endless. If a system 'gives priority' to endless accumulation, "it means that there exist structural

mechanisms by which those who act with other motivations are penalized in some way, and are eventually eliminated from the [system], whereas those who act with the appropriate motivations are rewarded and, if successful, enriched" (Wallerstein 2004:24). According to Sassen (2014), anything or anybody that gets in the way of profits, be it law or a civic effort, is ultimately pushed aside. The pursuit of profits, therefore, is not necessarily driven by personal greed. Rather, there are structural mechanisms, what Sassen calls "predatory formations" through which any other incentives are discouraged and eventually discarded by the system. This is what Schnaiberg (1980) terms the "treadmill" inner logic of capitalism.

This fundamental inner logic has consequences for the environment and, ultimately, people. In *Seventeen contradictions and the end of capitalism*, David Harvey (2014) discusses at depth the internal contradictions of capital and their consequences. Capital engages in extraction of ecological resources and release of wastes in the pursuit of profits. Praised as efficient by Adam Smith but castigated as 'savage sorting' by others (cf. Sassen 2014), the transnational organization of production is driven by the treadmill logic and predicated upon the asymmetrical appropriation of natural resources and sink capacities of global ecological systems through market exchange (Rice 2009a). The relentless search for higher rates of profits is therefore at the core of uneven development, the systematic geographical expression of the contradictions inherent in the very constitution and structure of capitalism (Harvey 2014; Smith 2008). The politics of capitalism and of nation states is a geopolitics, a politics of space in which the 'management' of Marx's surplus populations and accumulated capital becomes key (Beilharz 2010; Harvey 2014). So severe has uneven development become that Sassen (2014) considers *inequality* as incapable of describing the pathologies of contemporary capitalism. To her, the concept of *expulsions* – of the poor from their life space and of the rich from their social responsibilities – is more fitting. Though a logical thing for the individual capitalist, the constant search for higher profits is a disaster for capitalism as a whole because if all capitalists produce more goods at cheaper prices and with fewer workers, eventually there will be a lack of demand for their products resulting in a crisis of overproduction. Therefore, in order to ensure constant profits, capital needs to integrate non-capitalist spaces in an outward expansionary dynamic (Bieler and Morton 2014). This creates the exploitative core-periphery relation based on the degree of profitability of production processes (Wallerstein 2004). Historically, as Amin (1976) pointed out, the geographical extension of capitalism into peripheral spaces was established through primitive accumulation, the characteristic feature of which is unequal exchange.

The treadmill logic has inspired the reign of materialist policies of economic 'growth' at the expense of more qualitative and inclusive 'development.' Capitalism is intrinsically geared to the maximum possible accumulation and throughput of matter and energy, regardless of human needs or natural limits (Foster 2015). Sources of welfare include services of natural capital as well as man-made capital (Daly 1999). Improvement in human welfare can come about by pushing more matter and energy through the economy or by squeezing more human satisfaction out of each unit of matter-energy (Costanza *et al.* 1997). Economic development, according to Georgescu-Roegen (1971: 294), has two elements: *development proper* (ability to use existing resources in a manner that minimizes waste) and *pure growth* (intensifying the utilization of the existing resources). While addressing poverty in developing countries may require some level of economic growth, the same cannot be said of most developed countries. Traditional macroeconomics fails to address questions regarding the real purpose of production and is only concerned with aggregates of prices, employment, and throughput (Spash 2007). Although materialism and its relation to moral behavior is among the many factors affecting environmental degradation, it is rarely seriously discussed in scientific and public discourse (Costanza *et al.* 1997). Instead there has been a discursive shift seeking to disengage concerns about environment and development from the criticism of industrial capitalism (Hornborg 2003b). The negative impacts of the imperative of endless growth has inspired various challenges to capital accumulation such as degrowth, circular economy, and steady state economics (Daly 1999). Because we cannot 'grow' our way into sustainability, environmental ethicists and justice crusaders are challenging the vacuity of individual material progress for its own sake, focusing instead on quality of life or welfare rather than material growth (cf. Costanza *et al.* 1997; Daly 1999; Norgaard 2009; Martinez-Alier *et al.* 2014). It is argued that we have fallen under the sway of a dangerously narrow conception of economic growth, one only focused on serving corporate profits rather than public interest or welfare (Harvey 2005; Sassen 2014). Economic liberalism misreads the history of the Industrial Revolution because it insists on assessing social events exclusively

from an economic viewpoint (Polanyi 1944). Making the necessary socio-ecological transition to sustainability requires radical reforms that challenge the treadmill logic of capitalism (Foster 2015). There exist several alternatives of, and to, capitalism such as *Buen vivir*, degrowth, and ecological Swaraj (cf. Kothari *et al.* 2014). Overcoming capitalism requires a shift in how we view progress (Roth 2015), from a focus on growth to that of welfare, happiness, and quality.

The free market ideology

The treadmill logic is linked to and advanced by the free market ideology. This has emerged as a key principle of the capitalist world-economy. Its theoretical anchor is as contested as the empirical evidence of its win-win claims. Neoliberalism's distrust of state interventions is not consistent with its dependence on a strong state to safeguard private property, individual liberties, and entrepreneurial freedoms (Harvey 2005). The liberal doctrine of market exchange, articulated by Adam Smith more than two centuries ago, posits that when two parties who are free to choose decide to enter into an exchange, they do so because it makes each one of them better off. This logic was later extended to international trade by David Ricardo's theory of comparative advantage: that as long as cost ratios differ between countries, trade is mutually beneficial even for the country which has no absolute advantage (Suranovic 2010). Ricardo's theory is based on several assumptions such as international immobility of capital and labor, perfect information, and an absence of effects beyond the two trading partners. Today, however, capital moves internationally at the touch of a button, making comparative advantage theory irrelevant (Daly 1999). Moreover, it is often ignored that in presenting his theory, Ricardo saw international trade as determining production rather than the other way around, and he recognized that the reality behind the theory of comparative advantage was one of unequal exchange linked to different productivities in different countries (Foster and Holleman 2014). All that the theory states is that "at a given moment, the distribution of levels of productivity being what it is [i.e. different], it is to the interest of the two countries to effect an exchange, *even though it is unequal*" (Amin 1976:134, emphasis added). This inherently unequal nature of open market exchange explains why neoliberalism and its free trade doctrine have primarily served to reproduce class power (Harvey 2005). Despite its inherent inequality and unrealistic assumptions, Ricardo's theory is generally what economists and policymakers rely on to make policy decisions and in organizing the world-economy. The question is, if free trade is indeed beneficial to all, why should nations *not* be "free to choose" (see Friedman and Friedman 1980) whether to restrict trade or not? In any case, permanent sovereignty over natural resources, a well-established principle of international law, includes the right of nation states to exclude other states or non-state actors from accessing their resources.

The answer to the above rhetorical question lies in the fact that the free market functions as an ideology, a myth (Wallerstein 2004). The many special assumptions required for a truly free market to function make it "belong to the realm of inspirational visions rather than to that of scientific analysis" (Funtowicz and Ravetz 1994:199). Were it ever to exist, it would contradict the fundamental treadmill logic of capitalism. Capitalists need monopolies, quasi-monopolies, or oligopolies rather than truly free markets which would require a free flow of factors of production, a very large number of buyers and sellers, and perfect information (Wallerstein 2004). This is because in such a hypothetical free market, buyers could bargain with the sellers to a minuscule level of profit which would remove the basic incentive and structural underpinning of the capitalist system (Bieler and Morton 2014). Although ideologically depicted as the best way to foster competition and innovation, the 'free' market is a vehicle for the consolidation of monopoly power (Harvey 2005). It plays an important role in the outward expansion of capitalism, opening up peripheral countries and integrating them into relations of unequal exchange (Bieler and Morton 2014). Not only does it hinder the periphery's development, some consider it a war being waged by the West against the rest of the world as it fans violence by creating wars over markets and resources (Tandon 2015). The false win-win promises of free trade have only exposed the weak to the competition of the strong, externalized environmental costs to the periphery, undermined just distribution, and promoted *undemocracy* by increasing the physical and social distance between decision-makers and those affected by the decisions (Shaikh 2007; Pérez-Rincón 2006; Bunker 1985; Costanza *et al.* 1997). It is worth remembering that protectionism was historically pursued by the now developed nations who generally championed free trade only when it was to

their economic advantage. Why policy-makers from the Global South would today accept such distorted 'free trade' prescriptions is puzzling but not entirely difficult to understand given the powerful institutions at play. These institutions are the focus of the next section.

States and other political-economic institutions

The capitalist world-economy is a collection of many intertwined institutions including multiple states acting within an interstate system, modern political-economic institutions, markets, firms, households, and status-groups (Wallerstein 2004). Capitalism's treadmill logic combines with these institutions in a self-reinforcing manner whereby resource exploitation is driven by the market while states respond to environmental pollution and resource depletion by enacting policies that encourage further economic growth as the solution to the growth-induced environmental problems (Rice 2009a). The multiplicity of political systems is precisely why capitalism has survived and flourished for 500 years without transforming into a world-empire. This is the political side of capitalism which is based on the constant absorption of economic loss by political entities while distributing economic gain to private hands (Wallerstein 1974, 2004). The world-economy is not bounded by a unitary political structure but by the efficacy of the international division of labor organized by the global market, circuits of production, and a set of national and supranational institutions. This new form of global sovereignty, characterized by a lack of boundaries, is what Hardt and Negri (2000) call *Empire* (with a capital E).

While the sovereignty of nation-states has progressively declined under the Empire (what others call *globalization*), political controls, state functions, and regulatory mechanisms have continued to rule socio-economic production and exchange (Hardt and Negri 2000). The Empire is a complex interaction of actors and systems that "constitute a partly global condition, though one that often functions through the specifics of countries, their political economies, their laws, and their governments" (Sassen 2014:13-14). No world government or global political authority exists, and states are reluctant to relinquish their sovereignty, which is part of the reason why international resource governance remains weak and ineffective (Axelrod and VanDeveer 2015). This seeming contradiction or tension between international actors on the one hand and the nation state on the other is an important arrangement as it allows the treadmill logic of capitalism and the expansionist imperatives of 'free trade' to proceed smoothly and protects it against potential disruptions. A capitalist system requires a very special relationship between economic producers and the holders of political power because if the latter are too strong, as in a world-empire, their interests will override those of the economic producers and the endless accumulation of capital will cease to be a priority (Wallerstein 2004). On the other hand, capitalists need a large market, but they also need a multiplicity of nation-states in order to gain the advantage of working with friendly states and to circumvent hostile ones.

The role of the state under neoliberalism is to create, preserve and guarantee the proper functioning of strong private property rights, free markets, and trade (Harvey 2005). The modalities by which states interfere with the 'free' market are so extensive that they constitute a fundamental factor in determining prices and profits (Wallerstein 2004). For example, agricultural subsidies in the developed countries contribute to the deterioration of the prices of primary products (Perez-Rincon 2006). It would be impossible for the capitalist system to survive and thrive without such state interferences (Wallerstein 2004). On the other hand, the absence of a global political mechanism makes it very difficult to counteract the maldistribution of rewards (Wallerstein 1974:350). Therefore, any theory of development must acknowledge how modern nation-states facilitate the exploitation of peasants and workers (Bunker 1985:51). Yet nation-states remain the basic social unit capable of politically intervening in the socio-metabolic processes generated by capital accumulation (Costanza *et al.* 1997; Hornborg 2011). Sassen (2014) is optimistic that a liberal state can potentially secure a measure of socio-economic redistribution by enabling the disadvantaged to fight for their rights.

The control of international political-economic institutions such as the International Monetary Fund (IMF), World Bank, World Trade Organization (WTO), and the United Nations (UN) by the core, and their deployment to serve its interests, is quite well documented (cf. Biermann and Pattberg 2012; Clapp and Dauvergne 2011; Shaikh 2007; South Centre 1996, 2006; Tandon 2015). Through their programs, they serve advanced capitalism by reconditioning national frameworks in ways that enable the insertion of national

territory into global corporate circuits (Sassen 2014). Feichtner (2014) convincingly shows that while distribution conflicts over natural resources were central to the debates on a New International Economic Order (NIEO) after WWII, during the last three decades they have no longer been at the core of international law. NIEO favored the *political* resolution of resource distribution conflicts through international institutions and legal procedures, but this was surpassed by a different order that relies on the market as a mechanism for distributing raw materials. This new market-led order was facilitated by international institutions and international law which promoted the privatization of resource exploitation and the protection of foreign direct investment (FDI) and trade. The neoliberal "counterrevolution" swept away both Keynesianism and NIEO dreams, opening the world to an even tougher brand of capitalism (Hornborg 2003b). This became clear in the aftermath of the 1980s structural adjustment programs (SAPs) initiated by the IMF and World Bank and implemented in many developing countries. The inequality of power between nations to dictate global trade remains one of the most contentious issues in global politics (Greig *et al.* 2007). Raul Prebisch's suggestion and the role of the proposed International Trade Organization (ITO) to stabilize the prices of primary products were rejected by the US who wished to safeguard their ability to control prices (Love 1980). International agreements such as GATT and NAFTA seek to facilitate increased production, consumption, and corporate access to natural resources. GATT's Uruguay round significantly expanded the free trade agenda by establishing the WTO in 1995. The WTO's rules dominate the enforcement mechanisms of multilateral environmental agreements (MEAs) and trade objectives frequently trump environmental ones (Rice 2009a; Clapp and Dauvergne 2011; Bieler and Morton 2014). The free trade expansion strategy has continued unabated through bilateral agreements despite the stalling of WTO's Doha round of negotiations.

Monetary valuation is a fetish

The notion of 'value' and how it is conceived and applied in socio-economic policy has immense impact on the environment and quest for sustainability. Valuation can be viewed as the relative weight we give to various aspects of a decision problem (Costanza *et al.* 1997). Value here thus refers to what one considers important or attractive. In any policy issue, there exist different and potentially conflicting dimensions of value - value incommensurability. The different value systems cannot be reconciled or reduced to a single standard measure. For some people, unobtrusive or 'ugly' species with no market value whatsoever have value to them simply by existing, irrespective of markets or even human civilization (Funtowicz and Ravetz 1994). Value incommensurability means that any decision affects different groups differently (Martinez-Alier *et al.* 1998). Valuation, therefore, should reflect a plurality of legitimate perspectives. Monetary price is just a measure of one aspect of value reflecting one particular type of interest mainly expressed through the market (Funtowicz and Ravetz 1994). In using money or prices as a measure of 'value', economic valuation assumes, unjustifiably, commensurability of values (Spash 2007). Through the concept of commodity *fetishism*, Karl Marx (1867[1990]: 163-165) argued that as soon as a commodity (e.g. a table) is connected to money as the universal equivalent of exchange, its connection to its biophysical properties (matter-energy, including labor) is severed. "A commodity appears, at first sight, a very trivial thing, and is easily understood, ...but, as soon as it steps forth as a commodity, it is changed into something transcendent" (ibid. 163). Monetary valuation, Marx argued, converts social relations between people into "the fantastic form of a relation between things" (ibid., 165):

There is a physical relation between physical things. But it is different with commodities. There, the existence of the things qua commodities, and the value relation between the products of labour which stamps them as commodities, have absolutely no connection with their physical properties and with the material relations arising therefrom. There it is a definite social relation between men, that assumes, in their eyes, the fantastic form of a relation between things (Marx 1867[1990]:165).

Cognizant of the fetishism of money and market prices, EUE draws attention to biophysical measurements of exchange, focusing on the amounts of materials, energy, labor, or land embodied in different commodities through which it is possible to reveal that market prices mask unequal biophysical

exchange. There exists an asymmetry between the productive potential of natural resources and their monetary value or prices, an *inverse* relationship in which raw materials and energy are of low economic value while processed goods which have already dissipated much of their energy and materials have a high monetary value (cf. Hornborg 1998; Pérez-Rincón 2006). Production processes necessarily and inevitably increase total *entropy* (material and energetic disorder), a paradoxical relationship between economics and thermodynamics well illuminated by Georgescu-Roegen (1971). From a thermodynamics perspective, energy and materials are spent or *dissipated* in the production process. Because a product dissipates the energy and matter used to produce it, there is more useful (low entropy) energy and matter in raw materials than in the final product. Yet the processed final product is priced higher than the raw material or primary product required for its production.

A common pitfall in understanding the above inverse relationship has been to erroneously conflate the biophysical (material and energetic) and cultural (monetary) through the notion of 'value' (Hornborg 2009, 2015). Even though there is no link between an item's *material* contribution to a production process and its *symbolic* value, the various components of production processes are reduced to a common symbolic standard called *money* by which they are evaluated and exchanged vis-à-vis each other (Hornborg 2003a). The 'value' or beauty of a commodity depends on the cultural preferences of a particular consumer rather than on the amount of labor, energy, or matter invested in its production (Hornborg 2011). To acknowledge the incommensurability of values is to reject not just monetary reductionism but also any physical reductionism (Martinez-Alier *et al.* 1998). Any accumulation and exchange system presupposes a *cultural* demand for the commodity and the *material* basis of its production (Hornborg 2011). While most economists and policymakers would readily acknowledge the cultural dimension, the preoccupation of mainstream economics with 'utility' tends to neglect the material (biophysical) dimension, thereby reproducing the illusory image of market forces as promoting reciprocity (Hornborg 2003a). Given the planet's finite biocapacity, we need to shift the focus of analysis from marketed resources to the biophysical basis of interdependent ecological and economic systems (Costanza *et al.* 1997). Money means little if not cashed by acquiring material goods. That is why an exchange system based only on money and the pursuit of profits is not only in direct opposition to ecological sustainability, it leads to unequal exchange.

Because peripheral developing countries largely produce primary resources and the industrialized core processed goods, it is not difficult to see how the apparently harmless 'paradox' between economics and thermodynamics contributes to ecologically unequal exchange. Buying the periphery's raw materials cheaply and selling the processed final product expensively generates profits and capital accumulation in the core, some of which is used to buy ever more primary products from the periphery and the extraction and accumulation continues. An intensification of industrial production generally means expanding market shares and rising profits, which means more purchasing power used to buy and appropriate even greater amounts of biophysical resources from peripheral sectors or countries, i.e., what economists call 'growth' (Hornborg 2003a). To satisfy the increased demand, peripheral countries are forced to intensify natural resource extraction which ultimately leads to local resource exhaustion, ecological degradation, and socio-economic decline. This process is facilitated by the recursive relations between the profit-maximizing logic of capitalism, the 'free trade' ideology, and the very idea of money or market prices. The greater the difference between the prices of processed products from the global North and the prices of natural resources from the South, the greater the potential profit and accumulation of matter-energy in the North (Muradian and Martinez-Alier 2001). The implication for policy is therefore to recognize that market prices obscure EUE by excluding other possible measures of exchange. It is crucial to incorporate biophysical measures in assessments of international trade while seeking to transform the operation of markets and money (cf. Harvey 1996 and Hornborg 2011 for some ideas). The reductionism of money and the market system undermines the social legitimacy of values such as human rights, collective territorial rights, sacredness, livelihood, indigenous rights, and ecological and aesthetic concerns (Martinez-Alier 2009). The power to impose a particular standard and method of valuation is reflective of the unequal power distribution in the world-economy. Economic policies intending to internalize externalities are not enough to resolve environmental conflicts because valuation depends on income and power (Muradian and Martinez-Alier 2001; Feichtner 2014). Huge income and power disparities mean that economically efficient policies may not be satisfactory from an equity perspective.

Ethics, equity and justice should be at the core of policy

If, as EUE theory claims, there is a consistent net transfer of resources from the periphery to the core which diminishes the developmental potential of the periphery while augmenting that of the core, issues of equity and justice become central to the discourse. While EUE theory is not intrinsically a moral argument since it is based on an asymmetric transfer in *material* terms, it does inspire a moral argument considering that such asymmetric transfers are the basis of accumulation of technological superiority and power by one group at the expense of others (Hornborg 2003a). Sustainability requires policy solutions that are based on a fair distribution of resources and opportunities within and between generations. The term 'environmental justice' is often used in relation to the unequal environmental burdens that are the hallmark of capitalist processes. It is concerned with why the poor, minorities, and indigenous people bear a heavy share of the environmental costs of 'development' (Brand 2012; Bullard 1990; Costanza *et al.* 1997; Martinez-Alier *et al.* 2014). It demands that public policy be based on mutual respect and justice for all, free from any form of discrimination or bias, and the right of victims of environmental injustice to receive full compensation and reparations (see Ejnet 1991). Has conventional policy lived up to this principle?

The field of policy analysis can be distinguished into two generic approaches (Smith and Larimer 2013). Rationalists believe that policy should be based on 'facts' rather than values. They rely heavily on 'efficiency' as opposed to more democratic values such as equity. Post-positivists, on the other hand, seek to put other values and perspectives on an equal footing with efficiency and science in the process of deciding what should be done. They argue that policies should uphold democratic rather than market values, dismissing welfare economics as anchoring policy in a market framework that pays little attention to distributional issues. Obviously, a middle ground incorporating aspects of both these approaches would be desirable. Apart from measurable and tangible dimensions, policy also has to deal with more abstract dimensions such as power relations, hidden interests, participation and cultural constraints (Martinez-Alier *et al.* 1998). Unfortunately, neoclassical, resource and environmental economics tend to address issues of efficient resource allocation but not the initial distribution of resources, which is treated as a given, not to be questioned (Costanza *et al.* 1997). As a result, economists reach conclusions and prescribe policies which defend the status quo, making mainstream economics almost an "advocacy science" (Norgaard 2009:81). The optimistic belief that economic growth will automatically resolve inequalities through trickle-down economics has been questioned even by some staff of the IMF (cf. Dabbla-Norris *et al.* 2015; Ostry *et al.* 2016). Global inequality and poverty can only be addressed through direct attention to social, economic, and political constraints and not hopes of trickledown economics from general increases in material throughput regardless of purpose or place (Spash 2007). The tradition of not considering global equity issues seems firmly rooted in public practice and can be challenged only by invoking moral criteria through political decisions. Social justice presupposes social solidarity and a willingness to limit individual wants, needs, and desires in the struggle for social equality or environmental justice (Harvey 2005). Unfortunately, political decision making is typically driven by the existing distribution of power rather than by moral discourse (Costanza *et al.* 1997). The more complex a system is, Sassen (2014) notes, the harder it is to pinpoint accountability or for anyone to feel accountable.

Two concepts, ecological debt and the principle of common but differentiated responsibility (CBDR), serve to illustrate the global discourse around the need to consider equity and justice in public policy. Ecological debt is premised on the EUE claim that wealthy core nations have been running up a huge debt by historically and presently exploiting the raw materials and ecosystems of poor nations and the excessive use of 'environmental space' (Bond 2010; Martinez-Alier 2002; Martinez-Alier *et al.* 2014; Paredis *et al.* 2004; Rice 2009b; Roberts and Parks 2009;). One part of ecological debt, the *climate debt*, has been invoked by the Global South in climate change negotiations. Even the UN recognizes ecological debt and calls for its repayment, deeper emission cuts, and support to developing countries by the developed (cf. UNDP 2007).² This call is an operationalization of the CBDR principle. Central to a regime's commitment to fairness is its ability to differentiate between different actors and to tailor commitments to their different responsibilities and capacities (Winkler and Rajamani 2013). Used as a biophysical measure, legal instrument, and distributional principle (Warlenius *et al.* 2015), compensation for ecological debt can serve as an alternative

² See Knox (2009) and Johl and Duyck (2012) on the link between climate change and human rights.

development finance strategy for developing countries grappling with climate change and other development challenges resulting from historical and contemporary EUE (Bond 2010). Ecological debt thus instantiates EUE and seamlessly links it with environmental justice.

EUE Aspect	Criteria
Political economy	Does the policy recognize and consider the impacts of the "treadmill" logic of capitalism? Does it acknowledge the power differences between states, e.g., in terms of control of global political-economic institutions, and how this influences international trade?
Exposure of ideology	Does it appreciate that the 'free market' ideology is a myth? Does it recognize that market prices obscure EUE? Does it incorporate biophysical measures of exchange in assessments of international trade? Does it acknowledge the incommensurability of values?
Ethics	Does it consider and address issues of global equity and justice? Does it acknowledge an ecological or climate debt and attempt to address it? Does it recognize its moral duty to reduce material throughput by reducing production and consumption and cutting emissions?

Source: Author

Table 1: Criteria for acknowledging Ecologically Unequal Exchange in public policy.

4. EUE in context: the EU's Raw Materials Initiative

In considering the European Union (EU)'s Raw Materials Initiative (RMI), I focus attention on how issues at the core of EUE are treated in a manner that reinterprets them to fit mainstream economics and dominant political myth. I applied the above EUE assessment criteria to the RMI through critical text analysis. Text analysis goes beyond mere linguistic analysis and considers texts as articulating different discourses, genres and styles, while staying connected to relevant theoretical questions (Fairclough 2003). The RMI is the EU's strategy to access non-energy raw materials to ensure competitiveness and growth of the EU economy (EC 2008). It notes that the EU is highly dependent on imports of strategically important raw materials such as "high-tech" metals which lack substitutes and are concentrated in a few countries. It is based on three pillars: accessing raw materials from international markets, fostering supply from European sources, and reducing EU's consumption of primary raw materials.

Access to raw materials is to be realized through 'raw materials diplomacy', a set of strategies that include harnessing EU external policies (foreign relations, trade, and development aid) and managing strategic partnerships with partner states under the principle of 'mutual interest.' These strategies deploy a free-market ideology heavily, and rely on states and other political-economic institutions to create and/or expand the market for raw materials. For example, the location of some raw materials in parts of the world that "do not have a market-based system" (EC 2008: 3) is viewed as posing particular risks and these areas should therefore be integrated into the international market. For Africa, this is accomplished through the Joint Africa-EU Strategy, a set of eight agreements covering trade, energy, and environment (Europafrica n.d.). It declares that "we will develop this partnership of equals" to "make globalization work for all." The equal partnership is at best aspirational, and the aim of making globalization work for all is, from a EUE perspective, a euphemism for market expansion. The Joint Strategy declares that:

The development of domestic markets and regional integration are key in creating larger and more integrated markets that, in conjunction with enhanced regulatory convergence, will help to attract investment, increase productive capacities and therefore foster sustainable economic growth and development (Europafrica n.d.: 9).

We now know that those who have benefited most from such expanded markets are the EU and other developed countries. Moreover, FDIs are not only a key EUE mechanism; they have been shown to make developing countries more vulnerable to global political-economic conditions, pollution, and income inequality (cf. Jorgenson 2010).

Another strategy is the removal of 'market distortions' such as the industrial strategies pursued by some developing countries aimed at protecting their resource base, and which are routinely applied by the EU itself (e.g., agricultural subsidies and intellectual property rights). Their removal is thus aimed at opening up these 'resource depots' for powerful European and other trans-national corporations (TNCs). The prohibition of trade restrictions complements FDIs (see below) as an instrument to secure access to natural resources (cf. Feichtner 2014).³ However, this strategy is presented as an "opportunity" to benefit from exposure to global markets: "this [opening up] creates new opportunities for these resource-rich developing countries, particularly in Africa, to significantly increase their national income since many of them are still facing poverty or slow growth" (EC 2008:5). The unequal exchange inherent in 'free trade' is thus made invisible by invoking the need for growth and 'win-win' benefits of participating in the world market. Modern political-economic institutions are used to promote this agenda. The RMI is explicit in its intention to use the WTO rules and other Free Trade Agreements to eliminate so-called market-distorting measures and procure compliance with international commitments. Contrary to the conventional view, trade barriers rather than "free trade" are positively and significantly associated with growth, especially in developing countries where some level of economic growth is still necessary (Wade 2009; Yanikkaya 2003). Where followed, such free trade export-led prescriptions by the IMF, World Bank and WTO have neither delivered economic development nor strong democratic government (Muradian and Martinez-Alier 2001; Sassen 2014). The incontrovertible evidence of EUE remains the best argument in favor of trade restrictions. If EUE is tantamount to environmental cost-shifting, freer trade promotes increasing environmental load displacement from the core to the periphery.

One of the objectives of the Joint Africa-EU Strategy is to promote reform of the UN system and other key international institutions. Not much has happened in this regard. The South Centre (2006) identifies three broad "issues and tensions" surrounding reform of the UN:

- the sovereignty of states (e.g. increasing countries' "policy space" to create policies befitting their development needs),
- the North-South divide (e.g. the North's "power of the purse," the South's power of numbers and share of global resources, composition and veto powers of the UN Security Council),
- and growing inequality (within and between the North and South).

For industrialized countries whose economies depend on resource imports, the privatization of resource exploitation, trade liberalization, and promotion of strong international investment laws proved more effective means to access extractive resources than the establishment of political conflict resolution mechanisms under the UN framework (Feichtner 2014). Reforming the UN would mean dismantling these neo-liberal free trade strategies which have proved so beneficial to the core. Little wonder, then, that the UN Draft Code of Conduct on TNCs and other such proposals have never been adopted, largely because of opposition from TNCs and Northern governments (see UNCTC 1983; Muradian and Martinez-Alier 2001). The EU has no wish to reform the UN and other international institutions which propagate the eco-modernist 'green growth' and 'free trade' ideologies from which they benefit.

Part of the RMI's strategy is to link EU development policy with its quest for raw materials. This admission is welcome, but the real intention is then presented in terms of diffuse objectives such as enhancing 'good governance,' 'transparency,' and 'leveling the playing field.' The EU is to deliver 'aid' to 'strengthen' developing country states and 'build capacity' in areas such as 'sustainable management' of

³ Feichtner (2014) explains how the EU has used the removal of so-called trade restrictions, aided by the WTO rules, to access Chinese raw materials, especially rare earth minerals.

natural resources and public finances, negotiations with mining companies, provision of loans to mining projects, and building of transport infrastructure. But development 'aid', unless explicitly recognized as repayment of ecological debt, is, like the emperor's generosity in past societies, a well-known strategy to obscure ongoing relations of unequal exchange (cf. Godelier 1986).

The bid to 'strengthen' developing nation-states is also a well-informed EUE strategy. Veltmeyer (2013) reports how, with the support of Canadian state capital, Canadian companies achieved a virtual monopoly in gold and silver mining in Latin America as well as gold and other minerals in Africa. The EU thus pursues the same strategy as the extractive *Imperial Canada Inc.* (Deneault and Sacher 2012). The Global South has seen a sharp decline of FDI in manufacturing, a sector that can generate jobs and contribute to the growth of a middle class, and a sharp rise of FDI in the primary extractive sector, so-called "resource-seeking FDI" (Sassen 2014; Veltmeyer 2013). The EU strategy, as Feichtner (2014) notes, is to secure raw materials through state-sponsored private investment in the periphery and liberalized trade while relying on international law to protect, and international institutions to promote, FDI. A reasonable demand from the Global South is that policy-makers from the EU and other core countries refrain from linking technical and financial assistance to specific means of natural resource exploitation.

Helping developing countries to improve their social and environmental standards and human rights conditions, reducing resource conflicts and combating child labor in the extractive industries are other objectives of the RMI, which attributes such unwanted conditions to lack of 'governance.' Such analyses imply a superficial view of the root causes of the challenges facing resource-rich developing countries. The 'lack of governance' language is similar to that of 'failed states' in misrepresenting these countries' decay as endogenous, a function of their own weaknesses and corruption (Sassen 2014). Since the 1980s, the neoliberal 'counterrevolution' led by Milton Friedman, the IMF and World Bank redefined poverty as *mismanagement* (Hornborg 2003b). Such language conveniently forgets that the capitalist logic and national interests of core governments and TNCs has enabled the corruption and weakening of these states, while peripheral leaders who resist are less likely to survive (e.g. the assassination of Congo's Patrice Lumumba or Chile's Salvador Allende).

5. Conclusion

The theory of ecologically unequal exchange (EUE) remains marginalized in relation to mainstream economic and environmental doctrine and policy. Criticism of conventional policies is justified in the sense that they fail to address the root cause of global inequality, poverty, and sustainability challenges. Conventional policies such as the EU's Raw Materials Initiative (RMI) resemble *ad hoc* humanitarianism which mobilizes empathy rather than recognize the rights and root causes, hence only superficially address the contradictions and inequalities of our world (cf. Fassin 2012). In failing to address political contexts, humanitarian organizations "despite themselves, maintain a secret solidarity with the very powers they ought to fight" (Agamben 1998:133). Although globalization has meant that the executive branch of government to a large extent is becoming aligned with corporate capital, both in the global South and North, states need to reorient their goals toward global environment, human rights, and social justice agendas, from 'exploiting comparative advantages' to 'changing comparative advantages' (Muradian and Martinez-Alier 2001; Sassen 2014).

The EUE perspective can support such a change by unequivocally showing that business-as-usual is no longer justifiable, alternatives are possible, and policy has a crucial role to play in bringing about the necessary reforms. If values are incommensurable and we regard EUE not as 'market failure' but as 'cost-shifting success', conflict might help sustainability, with the environmental justice movement being a crucial force, particularly where conspicuous asymmetries exist in the distribution of income or power (cf. Martinez-Alier *et al.* 1998; Foster 2015; Muradian and Martinez-Alier 2001). Such a re-politicization of international resource access and distribution requires new, non-market ways of arriving at global political compromises and sustainability. There may be reasons to be pessimistic about the probability of a majority of people in the wealthier countries, out of a pure quest for truth and solidarity with the global South, to choose an interpretation of reality that goes against their current privileged positions. Perhaps the core's affluence and

influence would first have to be seriously jeopardized in order for such a paradigm shift to occur at any substantial scale (Hornborg 2003b). One can only hope that by exposing the discursive filters that obscure the truth, global solidarity can be achieved not by disaster - ecological or civil - but by design.

References

- Adams, R. 1975. *Energy and structure: a theory of social power*. Austin: University of Texas Press.
- Agamben, G. 1998. *Homo sacer: sovereign power and bare life*. Stanford California: Stanford University Press.
- Amin, S. 1976. *Unequal development: an essay on the social formations of peripheral capitalism*. New York: Monthly Review Press.
- Anderson, A. 2005. [An introduction to theory of change](#). *The Evaluation Exchange* XI(2):12 and 19.
- Asafu-Adjaye, J., L. Blomqvist, S. Brand, B. Brook, R. DeFries, E. Ellis, C. Foreman, D. Keith, M. Lewis, M. Lynas, T. Nordhaus, J. Roger Pielke, R. Pritzker, J. Roy, M. Sagoff, M. Shellenberger, R. Stone, and P. Teague. 2015. [An ecomodernist manifesto](#). ecomodernism.org.
- Axelrod, R. and VanDeveer, S. 2015. Introduction: governing the global environment. In Axelrod, R. and VanDeveer, S. (eds.). *The global environment: institutions, law, and policy*. Los Angeles: Sage Publications. Pp. 1-25.
- Beilharz, P. 2010. Zygmunt Bauman. In Simons, J. (ed.). *From Agamben to Žižek: contemporary critical theorists*. Edinburgh: Edinburgh University Press. Pp. 45-59.
- Bieler, A. and A. Morton. 2014. Uneven and combined development and unequal exchange: the second wind of neoliberal 'free trade'? *Globalizations* 11(1):35-45.
- Biermann, F. and P. Pattberg (eds.). 2012. *Global environmental governance reconsidered*. Cambridge: MIT Press.
- Bond, P. 2010. Repaying Africa for climate crisis: 'ecological debt' as a development finance alternative to emissions trading. In Böhm, S. and S. Dabhi (eds.) *Upsetting the offset: the political economy of carbon trading*. London: MayFlyBooks. Pp. 275-291.
- Brand, U. 2012. Contradictions and crises of neoliberal-imperial globalization and the political opportunity structures for the global justice movements. *Innovation: The European Journal of Social Science Research* 25(3): 283-298.
- Brown, J. C. and M. Purcell. 2005. [There's nothing inherent about scale: political ecology, the local trap, and the politics of development in the Brazilian Amazon](#). *Geoforum* 36: 607-624.
- Bruckner, M., S. Giljum, C. Lutz and K.S. Wiebe. 2012. Materials embodied in international trade – global material extraction and consumption between 1995 and 2005. *Global Environmental Change* 22: 568-576.
- Bryant, R.L. and S. Bailey. 1997. *Third world political ecology*. New York: Routledge.
- Bullard, R.D. 1990. *Dumping in Dixie: race, class, and environmental quality*. Boulder: Westview Press.
- Bunker, S.G. 1985. *Underdeveloping the Amazon: extraction, unequal exchange and the failure of the modern state*. Chicago: The University of Chicago Press.
- Chen, H. 2004. The roots of theory-driven evaluation: current views and origins. In Alkin, M. (ed.) *Evaluation roots: tracing theorists' views and influences*. California: Sage Publications. Pp 132-152.
- Clapp, J. and P. Dauvergne. 2011. *Paths to a green world: the political economy of the global environment*. Cambridge: MIT Press.
- Corvellec, H. (ed.). 2013. *What is theory? Answers from the social and cultural sciences*. Copenhagen: CBS Press.
- Costanza, R., J. Cumberland, H. Daly, R. Goodland and R. Norgaard. 1997. *An introduction to ecological economics*. Florida: St. Lucie Press.

- Dabla-Norris, E., Kochhar, K., Ricka, F., Suphaphiphat, N. and Tsounta, E. 2015. Causes and consequences of income inequality: a global perspective. Accessed June 20, 2015. <https://www.imf.org/external/pubs/ft/sdn/2015/sdn1513.pdf>
- Daly, H. E. 1999. *Ecological economics and ecology of economics: essays in criticism*. Cheltenham: Edward Elgar.
- Degeling, P. and H.K. Colebatch. 1984. Structure and action as constructs in the practice of public administration. *Australian Journal of Public Administration* Vol. XLIII, No. 4: 320-331.
- Deneault, A. and W. Sacher. 2012. *Imperial Canada Inc: legal haven of choice for the world's mining industries*. Vancouver: Talonbooks.
- Diaconescu, M. 2009. Building a knowledge society in the European Union. *Buletinul Universității Petrol – Gaze din Ploiești* Vol. LXI, No. 1: 50-59.
- Dittrich, M. and S. Bringezu. 2010. The physical dimensions of international trade, part 1: direct global flows between 1962 and 2005. *Ecological Economics* 69: 1838-1847.
- Dorning, C. and A. Hornborg. 2015. Can EEMRIO analyses establish the occurrence of ecologically unequal exchange? *Ecological Economics* 119:414-418.
- EC (European Commission). 2008. The raw materials initiative - meeting our critical needs for growth and jobs in Europe. Accessed July 18, 2015. <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52008DC0699&from=EN>
- Ejnet. 1991. Principles of environmental justice. Accessed August 14, 2015. <http://www.ejnet.org/ej/principles.pdf>
- EJOLT. 2015. Environmental justice organizations, liabilities and trade: mapping environmental justice. Accessed November 3 2015. <http://www.ejolt.org/>
- Emmanuel, A. 1972. *Unequal exchange: a study of the imperialism of trade*. New York: Monthly Review Press.
- Europafrica, n.d. News and resources on the joint Africa-EU Strategy. Accessed October 5, 2015. <http://europafrica.net/jointstrategy/>
- Fairclough, N. 2003. *Analysing discourse: textual analysis for social research*. London: Routledge
- Fassin, D. 2012. *Humanitarian reason: a moral history of the present*. Berkeley: University of California Press.
- Feichtner, I. 2014. International (investment) law and distribution conflicts over natural resources. [Draft](#)
- Foster, J.B. 1999. [Marx's theory of metabolic rift: classical foundations for environmental sociology](#). *The American Journal of Sociology* 105(2):366-405.
- Foster, J.B. 2015. Marxism and ecology: common fonts of a great transition. Accessed November 26, 2015. http://www.greattransition.org/images/GTI_publications/Foster-Marxism-and-Ecology.pdf
- Foster, J. B. and H. Holleman. 2014. [The theory of unequal ecological exchange: a Marx-Odum dialectic](#). *The Journal of Peasant Studies* 41(2): 199-233.
- Frank, A.G. 1967. *Capitalism and underdevelopment in Latin America: historical studies of Chile and Brazil*. New York: Monthly Review Press.
- Frank, A.G. 2008. The development of underdevelopment. In Seligson, M.A. and J.T. Passe-Smith. (eds.). *Development and underdevelopment: the political economy of global inequality*. London: Lynne Rienner Publishers. Pp. 257-268. [Original](#) [1966]
- Friedman, M. and R. Friedman. 1980. [Free to choose: a personal statement](#). New York: Harcourt Brace Jovanovich.
- Funtowicz, S. and Ravetz, J. 1994. [The worth of a songbird: ecological economics as a post-normal science](#). *Ecological Economics* 10:19-207.
- Georgescu-Roegen, N.1971. *The entropy law and the economic process*. Cambridge: Harvard University Press.

- Giampietro, M., K. Mayumi and G. Munda. 2006. Integrated assessment and energy analysis: quality assurance in multi-criteria analysis of sustainability. *Energy* 31(1):59–86
- Giddens, A. 1984. *The constitution of society: outline of the theory of structuration*. Cambridge: Polity Press.
- Godelier, M. 1986. *The mental and the material*. London: Verso.
- Greig, A., D. Hulme and M. Turner. 2007. *Challenging global inequality: development theory and practice in the 21st century*. Basingstoke: Palgrave Macmillan.
- Hajer, M.A. 1995. *The politics of environmental discourse: ecological modernization and the policy process*. Oxford: Oxford University Press.
- Hallberg, M. 2013. Looking at theory in theory of science. In Corvellec, H. (ed.). *What is theory? Answers from the social and cultural sciences*. Copenhagen: Liber. Pp. 65-87.
- Hardt, M. and A. Negri. 2000. *Empire*. Cambridge: Harvard University Press.
- Harvey, D. 1996. *Justice, nature and the geography of difference*. Oxford: Blackwell Publishers. Or [here](#)
- Harvey, D. 2005. *A brief history of neoliberalism*. Oxford: Oxford University Press.
- Harvey, D. 2014. *Seventeen contradictions and the end of capitalism*. London: Profile Books.
- Hornborg, A. 1998. [Towards an ecological theory of unequal exchange: articulating world system theory and ecological economics](#). *Ecological Economics* 25: 127-136.
- Hornborg, A. 2003a. [The unequal exchange of time and space: Toward a non-normative ecological theory of exploitation](#). *Journal of Ecological Anthropology* 7: 4-10.
- Hornborg, A. 2003b. [Cornucopia or zero-sum game? The epistemology of sustainability](#). *Journal of World-systems Research* 9(2): 205–216.
- Hornborg, A. 2009. Zero-sum world: challenges in conceptualizing environmental load displacement and ecologically unequal exchange in the world system. *International Journal of Comparative Sociology* 50(3-4): 237-262.
- Hornborg, A. 2011. *Global ecology and unequal exchange: fetishism in a zero-sum world*. New York: Routledge.
- Hornborg, A. 2015. Why economics needs to be distinguished from physics, and why economists need to talk to physicists: A response to Foster and Holleman. *The Journal of Peasant Studies* 42(1): 187–192.
- Johl, A. and S. Duyck. 2012. [Promoting human rights in a future climate regime](#). *Ethics, Policy and Environment* 15(3):298-302.
- Jorgenson, A.K. 2010. World-economic integration, supply depots, and environmental degradation: a study of ecologically unequal exchange, foreign investment dependence, and deforestation in less developed countries. *Critical Sociology* 36(3):453-477.
- Jorgenson, A.K. and B. Clark. 2009. [Ecologically unequal exchange in comparative perspective](#). *International Journal of Comparative Sociology* 50(3-4): 211-214.
- Knox, J. 2009. [Linking human rights and climate change at the United Nations](#). *Harvard Environmental Law Review* 33:477-498.
- Kohler, G. and A. Tausch. 2002. *Global Keynesianism: unequal exchange and global exploitation*. New York: Nova Science Publishers.
- Kothari, A., F. Demaria and A. Acosta. 2014. Buen vivir, degrowth and ecological swaraj: alternatives to sustainable development and the green economy. *Development* 57(3-4):362-375.
- Krausmann, F., K.H. Erb, S. Gingrich, H. Haberl, A. Bondeau, V. Gaube, C. Lauk, C. Plutzer and T.D. Searchinger. 2013. [Global human appropriation of net primary production doubled in the 20th century](#). *Proceedings of the National Academy of Sciences* 110(25): 10324-10329.
- Love, J. 1980. [Raul Prebisch and the origins of the doctrine of unequal exchange](#). *Latin American Research Review* 15(3): 45-72.
- Margheritis, A. and A. Pereira. 2007. The neoliberal turn in Latin America: the cycle of ideas and the search for an alternative. *Latin American Perspectives* 34(3): 25-48.

- Martinez-Alier, J. 2002. *The environmentalism of the poor: a study of ecological conflicts and valuation*. Cheltenham: Edward Elgar. [Ch.1,2](#)
- Martinez-Alier, J. 2009. Social metabolism, ecological distribution conflicts, and languages of valuation. *Capitalism Nature Socialism* 20(1): 58-87.
- Martinez-Alier, J., H. Healy, L. Temper, M. Walter, B. Rodriguez-Labajos, J. Gerber and M. Conde. 2013. Between science and activism: learning and teaching ecological economics and political ecology with EJOs. In Healy, H., J. Martinez-Alier, L. Temper, M. Walter and J. Gerber (eds.). *Ecological economics from the ground up*. London: Routledge. Pp. 513-538.
- Martinez-Alier, J., I. Anguelovski, P. Bond, D. Del Bene, F. Demaria, J.F. Gerber, L. Greyl, W. Haas, H. Healy, V. Marín-Burgos, G. Ojo, M.F. Porto, L. Rijnhout, B. Rodríguez-Labajos, J. Spangenberg, L. Temper, R. Warlenius and I. Yáñez. 2014. [Between activism and science: grassroots concepts for sustainability coined by environmental justice organizations](#). *Journal of Political Ecology* 21: 19-60.
- Martinez-Alier, J., G. Munda and J. O'Neill. 1998. [Weak comparability of values as a foundation for ecological economics](#). *Ecological Economics* 26: 277-286.
- Martinez-Alier, J. and M. O'Connor. 1996. Ecological and economic distribution conflicts. In Costanza, R. and O. Segura. (eds.). *Getting down to earth: practical applications of ecological economics*. Washington: Island Press.
- Marx, K. 1867[1990]. [Capital: a critique of political economy. Vol. I](#). Harmondsworth: Penguin
- Muradian, R. and Martinez-Alier, J. 2001. Trade and the environment: from a 'Southern' perspective. *Ecological Economics* 36: 281-297.
- Norgaard, R. 2009. The environmental case for a collective assessment of economism. In Holt, R., Pressman, S. and Spash, Clive (eds.) *Post Keynesian and ecological economics: confronting environmental issues*. Cheltenham: Edward Elgar. Pp. 77-98.
- Nyamsenda, S. 2015. A life of critical engagement: an interview with Issa Shivji. *Global Dialogue* 5(1):10-12. Accessed March 29, 2016. <http://isa-global-dialogue.net/wp-content/uploads/2015/04/v5i1-english.pdf>
- OECD, 2008. Recommendation of the Council on Resource Productivity. Accessed July 6, 2015. <http://www.oecd.org/environment/ministerial/40564462.pdf>
- Ostry, J.D., P. Loungani, and D. Furceri. 2016. Neoliberalism: oversold? *Finance and Development* 53(2). Accessed June 3, 2016. <https://www.imf.org/external/pubs/ft/fandd/2016/06/pdf/ostry.pdf>
- Oulu, M. 2015. The unequal exchange of Dutch cheese and Kenyan roses: introducing and testing an LCA-based methodology for estimating ecologically unequal exchange. *Ecological Economics* 119: 372-383.
- Oxford Dictionaries. 2016. Theory. Accessed March 12 2016. <http://www.oxforddictionaries.com/definition/english/theory>
- Paredis, E., Lambrecht, J., Goeminne, G. and Vanhove, W. 2004. Elaboration of the concept of ecological debt. Accessed July 2, 2015. <http://www.ecologicaldebt.org/What-is-Ecological-Debt/Elaboration-of-the-concept-of-ecological-debt.html>
- Pawson, R. 2003. Nothing as practical as a good theory. *Evaluation* 9(4):471-490.
- Pérez-Rincón, M.A. 2006. Colombian international trade from a physical perspective: towards an ecological "Prebisch thesis." *Ecological Economics* 59: 519-529.
- Polanyi, K. 1944. [The great transformation: the political and economic origins of our time](#). Boston: Beacon Press.
- Portney, K.E. 1992. *Controversial issues in environmental policy: science vs. economics vs. politics*. California: Sage Publications.
- Prebisch, R. 1950. [The economic development of Latin America and its principal problems](#). New York: Economic Commission for Latin America (ECLA).
- Prebisch, R. 1963. [Towards a dynamic development policy for Latin America](#). New York: UN.

- Rice, J. 2009a. The transnational organization of production and uneven environmental degradation and change in the world economy. *International Journal of Comparative Sociology* 50(3-4):215–236.
- Rice, J. 2009b. North–South relations and the ecological debt: asserting a counter-hegemonic discourse. *Critical Sociology* 35(2): 225–252
- Robbins, P. 2012 (2nd. Ed.). *Political ecology: a critical introduction*. Chichester: Wiley-Blackwell Publishing.
- Roberts, J. 2004. *Environmental policy*. London: Routledge.
- Roberts, J.T. and C.B Parks. 2007. Fuelling injustice: globalization, ecologically unequal exchange and climate change. *Globalizations* 4(2): 193-210.
- Roberts, J. T. and C.B Parks. 2009. Ecologically unequal exchange, ecological debt, and climate justice: the history and implications of three related ideas for a new social movement. *International Journal of Comparative Sociology* 50(3-4): 385-409.
- Rockström, J., W. Steffen, K. Noone, Å. Persson, F. Stuart Chapin III, E.F. Lambin, T.M. Lenton, M. Scheffer, C. Folke, H.J. Schellnhuber, B. Nykvist, C.A. de Wit, T. Hughes, S. van der Leeuw, H. Rodhe, S. Sörlin, P.K. Snyder, P.K. R. Costanza, U. Svedin, M. Falkenmark, L. Karlberg, R.W. Corell, V.J. Fabry, J. Hansen, B. Walker, D. Liverman, K. Richardson, P. Crutzen, and J.A. Foley. 2009. [A safe operating space for humanity](#). *Nature* 461: 472-475.
- Roth, S. 2015. [Free economy! on 3628800 alternatives of and to capitalism](#). *Journal of Interdisciplinary Economics* 27(2): 107-128.
- Sassen, S. 2014. *Expulsions: brutality and complexity in the global economy*. Cambridge: Harvard University Press.
- Schaffartzik, A., A. Mayer, S. Gingrich, N. Eisenmenger, C. Loy and F. Krausmann. 2014. The global metabolic transition: regional patterns and trends of global material flows, 1950–2010. *Global Environmental Change* 26: 87–97. [draft](#)
- Schatzki, T.R. 1996 *Social practices: a Wittgensteinian approach to human activity and the social*. Cambridge: Cambridge University Press.
- Schnaiberg, A. 1980. *The environment: from surplus to scarcity*. New York: Oxford University Press.
- Shaikh, A. 2007. Globalization and the myth of free trade. In A. Shaikh (ed.). *Globalization and the myths of free trade: history, theory, and empirical evidence*. New York: Routledge. Pp. 50–68.
- Smith, K. and Larimer, C. 2013. *The public policy theory primer*. Colorado: Westview Press.
- Smith, N. 2008. *Uneven development: nature, capital, and the production of space*. London: The University of Georgia Press.
- South Centre. 2006. Meeting the challenges of UN reform: a South perspective. Geneva: South Centre. Accessed January 17, 2016. http://www.southcentre.int/wp-content/uploads/2013/07/AN_GPG1_UN-Reform-South-Perspective_EN.pdf
- Spash, C. 2007. [The economics of climate change impacts a la Stern: novel and nuanced or rhetorically restricted?](#) *Ecological Economics* 63: 706-713.
- Steen-Olsen, K., J. Weinzettel, G. Cranston, A.E. Ercin and E.G. Hertwich. 2012. Carbon, land, and water footprint accounts for the European Union: consumption, production, and displacements through international trade. *Environmental Science and Technology* 46: 10883–10891.
- Stern, D. 2004. [The rise and fall of the environmental Kuznets curve](#). *World Development* 32(8): 1419–1439.
- Suchman, E. 1969. Evaluating educational programs. *Urban Review* 3(4): 15-17.
- Suranovic, S.M. 2010. *International trade theory and practice*. Washington DC: Flat World Knowledge Inc.
- Tandon, Y. 2015. *Trade is war: the West's war against the world*. New York: OR Books.
- UNCTC. 1983. Draft U.N. code of conduct on transnational corporations. *International Legal Materials* 22(1): 192-206. Accessed November 20, 2015. <http://www.jstor.org/stable/20692549>
- UNDP. 2007. [Human development report 2007/2008. Fighting climate change: human solidarity in a divided world](#). New York: UNDP.

- Vayda, A.P. and B.B. Walters. 1999. [Against political ecology](#). *Human Ecology* 27(1): 167-179.
- Veltmeyer, H. 2013. The political economy of natural resource extraction: a new model or extractive imperialism? *Canadian Journal of Development Studies* 34(1): 79-95.
- Wade, R. 2009. Rethinking industrial policy for low income countries. *African Development Review* 21(2): 352-366.
- Warlenius, R., G. Pierce, and V. Ramasar. 2015. Reversing the arrow of arrears: the concept of "ecological debt" and its value for environmental justice. *Global Environmental Change* 30: 21–30.
- Wallerstein, I. 2004. *World systems analysis: an introduction*. London: Duke University Press.
- Wallerstein, I. 1974. *The modern world system I: capitalist agriculture and the origins of the European world-economy in the sixteenth century*. New York: Academic Press.
- WCED. 1987. [Our common future: report of the World Commission on Environment and Development](#). Geneva: WCED.
- Winkler, H. and L. Rajamani. 2013. CBDR&RC in a regime applicable to all. *Climate Policy*: 1-20. [Researchgate](#)
- Yanikkaya, H. 2003. Trade openness and economic growth: a cross-country empirical investigation. *Journal of Development Economics* 72(1): 57–89. [Researchgate](#)
- Zundel, M. and P. Kokkalis. 2010. Theorizing as engaged practice. *Organization Studies* 31(9-10):1209-1227. [Researchgate](#)