The Political Feasibility of Consumption-Based Carbon Accounting

Marco Grasso
This version is forthcoming in the journal *New Political Economy*

Abstract
A consumption-based inventory can represent a promising accounting method for more effective collective action against carbon emissions. However, the current scientific debate has not yet proposed comprehensive analyses of the political features of consumption-based accounting. In particular, the ultimate objective of this article is to investigate the political feasibility of consumption-based accounting.
The article argues that political feasibility is fundamental for gaining support and eventually fostering the development of widely acceptable, stable and effective consumption-based accounting systems. Specifically, the article first briefly investigates the potential of consumption-based carbon inventories. It then frames and scrutinizes political feasibility according to the normative and positive perspectives relevant to understanding the actual possibility of shifting from the current production- to consumption-based accounting. Finally the article, in light of the evidence provided by the analysis carried out, takes a prescriptive turn and indicates how politically feasible governance systems for consumption-based accounting may be forged and successfully put into practice.

1. Introduction

Consumption-based carbon accounting can reduce emissions embodied in net imports (Liu 2015; Peters and Hertwich 2008; Steininger et al. 2014), and it is generally considered fairer than the current production-based accounting (Pan et al. 2008; Peters and Hertwich 2008; Steckel et al. 2010; Steininger et al. 2014). In addition, consumption-based inventories can encourage participation in mitigation agreements (Grasso and Roberts 2014), increase their flexibility (Bows and Barrett 2010; Harris and Symons 2013; Peters and Hertwich 2008), and eventually favour the transition to a greener economy (Peters and Hertwich 2008). Nonetheless, there would very likely be resistance to a shift from production- to consumption-based accounting, given that the present accounting system seems too strongly and deeply embedded in domestic and international action and practice to be changed in the short term (Peters 2008).
In light of these considerations, let me bluntly state the research question that prompted this article: seen from the current national and international political order, is consumption-based carbon accounting capable of providing the basis for a politically feasible response to climate change, in particular to emissions abatements? This question, in fact, includes the main issues that this study aims to investigate: the potential of consumption-based carbon accounting for tackling emissions reductions, its political feasibility, and the actual realization of consumption-based inventories. While these issues form the core of the article and are examined in the ensuing sections, it is necessary first to specify and clarify the object and scope of the analysis of political feasibility, as well as the rationale for the choice of political feasibility as the foremost desideratum for (understanding the possibility of successfully shifting from production- to) consumption-based carbon accounting.
As regards the first point, following Page (2102: 936-938), the most important element of the object and scope of an analysis of political feasibility is the type of political phenomenon to which analyses of political feasibility can be applied. In this regard, governance systems, understood in the broadest and loosest possible sense as schemes of coordinated norms, procedures, processes, structures and instruments are the political phenomena whose political feasibility is investigable. In other words, it is governance systems themselves, and not the specific norms, procedures, processes, structures and instruments that governance systems propagate, which are the object of an analysis of political feasibility. Consumption-based inventories are, in fact, schemes of coordinated norms, procedures, processes, structures and instruments with which to govern the accounting of carbon emissions in a long

term, harmonized way. As such, they therefore ought to be understood as governance systems insofar as they 'coordinate the behaviour of different types of atmospheric user over extended time periods and jurisdictions' (Page, 2012: 937).

In relation to the second point —the rationale for the choice of political feasibility as the primary desideratum of consumption-based carbon accounting— to be stressed is that, in general terms, the possible establishment of new environmental governance systems initially requires analysis of political feasibility as the first form of a broader notion of political legitimacy (Swyngedouw 2013).

A growing body of scholarly literature investigates different desiderata and criteria for framing and/or evaluating climate policy (Crabbè and Leroy 2008; Huitema et al. 2012), international cooperation on mitigation (Stavins and Ji 2014), and, specifically, climate governance systems (Page 2012). By and large, such works use a number of partly overlapping and complementary evaluative dimensions. The most frequently employed of such dimensions, though they are understood in several different ways, are effectiveness, fairness and feasibility (Pickering et al. 2012: 425-429). Taking account of the usual standpoints of evaluation analyses —i.e. prospective and retrospective (Crabbè and Leroy 2008)— effectiveness and fairness are dimensions along which climate arrangements should preferably be retrospectively evaluated. But because of the intrinsic long-term, intergenerational nature of the climate crisis, and consequently of the governance systems for dealing with it, the prospective standpoint, too, makes a necessary contribution to the overall investigation of climate arrangements. Governance systems, in particular, might be not yet implemented or even conceived, as in the case of consumption-based accounting inventories, so that the prospective perspective is the only one viable. At the same time, political feasibility is the quintessential prospective desideratum in relation to governance systems that do not yet exist. In other words, the other desiderata/criteria apply only if such not yet existing systems can at some point in the future be put into practice, given their political feasibility.

Additionally, the article has a prescriptive objective: that of specifying how politically feasible consumption-based accounting systems can be forged. Consistently, political feasibility is the first and foremost normative desideratum for specifying the features of consumption-based carbon inventories that can favour a shift from production-based carbon inventories. It should also be noted that, among the normative desiderata of climate governance systems, such as distributive and procedural justice and political legitimacy (Page 2012), political feasibility is by far the least explored. Lawford-Smith (2013: 243), Light (2011: 557) and Pickering et al. (2012: 427), acknowledging such lack, call for the necessity of carrying out research on the political feasibility of proposals and outcomes in climate policy and ethics, if we want to successfully engage climate change. Similarly, limited work on the political feasibility of climate policy in a positive perspective has been carried out (e.g., Hovi et al. 2009; Skodvin et al. 2010).

These considerations, coupled with the still embryonic literature on the political issues entailed by consumption-based inventories (e.g., Eckersley 2010; Grasso and Roberts 2014; Harris and Symons 2013; Liu 2015; Steininger et al. 2014; Turner 2014), makes the analysis carried out in this article, so to speak, necessary. It, in fact, not only fills a manifest gap in the literature, but, most of all, it should have a sort of chronological priority over other investigations into the politics of consumption-based accounting, for which political feasibility may represent a sort of unavoidable foundational requirement.

To cover the ground outlined, the article first briefly examines the main features of consumption-based carbon accounting. This is followed by a normative and positive analysis of the political feasibility of consumption-based inventories. The article then takes a prescriptive turn and delineates the elements of politically feasible consumption-based inventories, as well as a possibly successful route for their eventual implementation. Finally, the article synthesizes the main outcomes and puts forward some concluding remarks.

2. Consumptions-Based Carbon Accounting

Currently, carbon accounting under the United Nations Framework Convention on Climate Change (UNFCCC) system is based on 'emissions and removals taking place within national territory and offshore areas over which the country has jurisdiction' (IPCC 2006: 7). This dominant approach to carbon accounting is called 'production- (or territorial-) based'.[1] Alternatively, consumption-based accounting measures carbon emissions associated with the final consumption of goods and services, and is calculated by subtracting from production-based emissions those associated with exported goods and services and adding those generated to produce imported goods and services.

Production-based emissions accounting systems penalize economies where carbon-intensive stages in globalized production chains take place (Pan et al. 2008). Furthermore, such inventories encourage a shift in consumption of carbon-intensive products towards cheaper imported substitutes (van Asselt and Brewer 2010), and incentivize the off-shoring of carbon-intensive production stages from the regulated parts of the world economy (Steinberger et al. 2012). Davis and Caldeira (2010) estimated, for instance, that about twenty-five per cent of Chinese emissions are embodied in China's exports, and more generally that twenty-three per cent of global carbon emissions are embodied in goods and services traded internationally. Such net emissions transfers, known also as 'weak' or 'indirect' carbon leakage, have been shown, in fact, to be largely the result of the relocation of industry to the global South (Eckersley 2010; Kanemoto et al. 2014).

To put it differently, production-based accounting conceals the evidence that the relative decarbonization of richer countries is largely due to their emission transfers via international trade to poorer countries (Peters et al. 2011), whose emissions in the last twenty years, on the contrary, have roughly doubled (Hertwich and Peters 2009). Therefore, a key reason why the industrialized world has been able to consume such high levels of energy and materials has been its considerable import of them, embedded in goods and services, from the poorer countries, a trend that dates back to the colonial period (Clapp and Helleiner 2012).

Conversely, as anticipated, framing emissions in consumption- rather than production-based terms has potential advantages of effectiveness, fairness and flexibility (Bows and Barrett 2010; Harris and Symons 2013; Pan et al. 2008; Peters and Hertwich 2008; Steckel et al. 2010; Steininger et al. 2014) and can facilitate a widely agreed international agreement for effective and fair collective action against excessive emissions (Grasso and Roberts 2014).

Consumption-based carbon accounting involves some complexities, however. First and foremost, the off-shoring of carbon intensive production from industrialized to developing countries is not only a matter of carbon leakage, but also of trade emission balance (Serrano and Dietzenbacher 2010), economy-wide energy intensity, economy-wide carbon intensity of energy, and trade specialization (Jakob and Marschinski 2013). Among the drawbacks of consumption-based accounting, besides the difficulty of the calculations required and the exclusive blameworthiness of consumers (Liu 2015), is the necessity of extending political decision-making outside the traditional political boundaries, thus changing the political economy of emissions abatement (Peters 2008; Peters and Hertwich 2008).

However, larger producers of goods and services —China, for instance— should be very sensitive to the different carbon accounting approaches. John Ashton, former UK Special Representative for Climate Change, in oral evidence given to the UK Energy and Climate Change Committee in June 2012 stated that: '[t]his is a globally connected economy that we are all part of. I am surprised that those countries who might feel under less pressure in terms of the international commitments they are being asked to make if the carbon

[1] It should be more specifically noted that production- and territorial-based carbon accounting systems are different. The former includes also emissions produced by a country's residents abroad, and is the system adopted under the UNFCCC. However, in what follows we use, consistently with the relevant literature, 'production-based' as synonymous with 'territorial-based' for the greater efficacy of the former in this context of analysis.

accounting was done on a consumption-basis have not over the last few years made a stronger argument that we should shift to that frame of reference, if you like'.[2]
A possible further difficulty depends on the circumstance that, given the greater geographical concentration of fossil fuel resources than energy demand, in the current fossil fuel-driven economy all countries along the international fossil fuel supply chain gain a benefit, whether they extract fossil fuels, use them to produce goods and services, or consume these goods and services (Davis et al. 2011). Hence, apparently, consumption-based inventories artificially attribute the bulk of the burden of emissions from fossil fuel and of the related responsibility to consumers. However, consumption-based accounting can be considered a 'shadow indicator' (Peters 2008: 21) for its capacity to furnish insights on minimization of emissions embodied in net imports for the design of more effective emissions reductions policy.
In any case, the capacity of consumption-based accounting to further the needed coordinated international action against emissions should outweigh the possible fears and difficulties that such inventories might still involve (Grasso and Roberts 2014). In particular, as long as trade restrictions do not apply, the developing world should surrender its usual fears of carbon accounting: protectionism and penalization of productions, reverse leakage, shifting of the burden of responsibility from the developed world (Centre for Low Carbon Future 2012). Methodologies for the calculation of consumption-based emissions have existed for decades (Peters et al. 2011), and independent studies on their application show consistent results (Peters et al. 2012). Estimates of consumption-based emissions are already available for almost all the UNFCCC countries since 1990 (Davis and Caldeira 2010; Le Quéré et al. 2012), and are routinely measurable, reportable and verifiable (MRV). Indeed, consumption-based emissions are harder to calculate, especially for those low-capacity countries that do not yet have well-established MRV systems. It would therefore be useful to establish a transition period during which richer countries, in order to expand less developed countries' technical and institutional capacities to implement a robust consumption-based MRV system, report in both production- and consumption-based figures.

3. Political Feasibility: The Normative Perspective

Political feasibility seems a clear-cut concept: a state of affairs is considered feasible if there is some way to bring it about. Despite this apparent straightforwardness, however, it is almost impossible to give a univocal and uncontroversial definition of political feasibility, since it is a complex notion widely used across different scholarly traditions and contexts of analysis. Such different and concurrent perspectives and the nuanced understandings within them need therefore to be analysed in order to disentangle and eventually understand the political feasibility of consumption-based carbon accounting. In particular, there are two strictly intertwined perspectives relevant to framing and understanding it: the normative and the positive. The former will be analysed in this section, the latter in the next one.
Before proceeding, it should be noted that, consistently with the relevant literature, political feasibility is analysed at collective level, i.e. for sake of simplicity, at state level. In fact, despite the existence of various forms of local and supranational authority, states remain the main unitary rational actors in climate change (Biermann and Dingewerth 2004; Underdal et al. 2012).
At the same time, however, changes in environmental governance have a strong impact also on individuals, given the efforts required of them to adjust their lifestyles accordingly. Hence the political feasibility of cooperation against climate change depends also on individuals' willingness to actually change their lifestyles (Bechtel and Scheve 2013). Therefore the analysis of the individual's support for consumption-based carbon accounting is an important element in the ultimate comprehension of its political feasibility. It will now be briefly considered, before investigation begins of the normative (collective-level) perspective.

[2] Available from: http://www.publications.parliament.uk/pa/cm201213/cmselect/cmenergy/c392-i/c39201.htm [accessed 28 September 2015].

Political science unambiguously points out that the more policy making at any level and in any form is consistent with people's values and beliefs, the more it is likely to succeed in the long term, at least in democratic societies (see e.g., Dahl 1998), as Crompton argues specifically with regard to climate change (Crompton 2011). The political feasibility of institutions for dealing with climate change ultimately depends on the support of individuals, or, more closely, on their 'willingness to change their consumption patterns' (Bechtel and Scheve 2013: 1). Governments are in fact unlikely to take actions that will not be accepted domestically: climate-related actions directly affect individuals and may encounter significant resistance if they do not gain public support (Gampfer 2014).In particular, Bechtel and Scheve (2013) make it clear that, among the means to gain public support for climate action, the most important for consumption-based carbon accounting is a distribution of costs carried out according to prominent fairness principles. As shown below, since consumption-based accounting complies with Steininger et al.'s (2014) fundamental principle of moral desirability of carbon accounting bases, such inventories should at the same time satisfy Bechtel and Scheve's (2013) prominent requirements for political feasibility. Therefore consumption-based inventories would determine a novel account of responsibility for carbon emissions able to offer more stringent motivating reasons for effectively addressing carbon abatement at the individual level. This point is justified by the internalist perspective of metaethical analysis (Rosati 2009) required by the global and intertemporal nature of climate change and by the diversity of the subjects involved. These aspects of climate change require, in fact, a connection between moral judgment and individual motivation in order ultimately to gain political feasibility (Grasso 2012).

The (collective) normative standpoint, largely grounded in political theory, needs two specifications. First, the reason why it is useful to explore the political feasibility of consumption-based carbon accounting through the lens of political theory is that, according to this viewpoint, political feasibility can be used as a heuristic when the calculus needed by decision theory is impractical or impossible (Lawford-Smith 2013: 245-246). Indeed, for (not yet existing) carbon accounting inventories, the complete set of calculations required by decision theory is not available. Whence derives the usefulness of the heuristic role of political feasibility: if consumption-based accounting is politically feasible according to political theory, it is likely to be adopted. Second, the notion of political feasibility usually put forward by political theorists is rather a 'feasibility condition'. On this understanding, prompt implementation and the challenge to widespread moral opinions are irrelevant to the feasibility of social arrangements (Räikkä 1998). In other words, the social arrangements suggested by political theory can meet the feasibility condition without being practically feasible due to a lack of political will (Räikkä 1998). Therefore, in the normative perspective, although this article uses the term 'political feasibility' for the sake of consistency, it is ultimately concerned with a 'feasibility condition'.

With this specification, it is now possible to use the political theory notion of feasibility in support of judgment in political contexts. In particular, this article employs the three-stage approach developed by Gilabert and Lawford-Smith (2012: 818-823) to yield a judgment on the political feasibility of consumption-based carbon accounting. The first stage is the formulation and justification of the core moral principle/s for more just social arrangements. A moral principle that makes the application of consumption-based accounting necessary and possible can be borrowed from Steininger et al. (2014). Basically, this principle holds that a carbon accounting system is justified when it attributes the bulk of the onus of emissions to those who bear a lower burden than fairness demands (the richer countries). Consumption-based accounting shifts, in fact, the emissions burden from those who shoulder it more than fairness demands (the less developed countries) to those whose contribution is less than fairness demands (Grasso and Roberts 2014; Pan et al. 2008; Peters and Hertwich 2008; Steininger et al. 2014). Such accounting systems therefore satisfy stage one of Gilabert and Laword-Smith's (2012) approach to political feasibility, since it is grounded in the morally-desirable principle set out by Steininger et al. (2014).

The second and third stages directly involve the implementation of the moral principle of stage I. In stage II, which is mostly focused on the definition of the proposal of the desired

state of affairs, what is most important in relation to its political feasibility is stability, i.e. the maintainability of a state of affairs once it has been reached. Stage III is targeted instead on strategies for putting the chosen state of affairs in place, and the most important aspect of political feasibility is accessibility, understood as a practical route for going from the current state of affairs to the one that satisfies the core moral principle of stage I (Buchanan 2004: 61).

As for stage II, it seems possible to claim that consumption-based inventories are stable. Although these specific accounting systems have not yet been put into practice, their maintainability seems to be granted by the consistency of the results achieved by independent applications of consumption-based accounting (Peters et al. 2012), despite the different approaches —largely dependent on the allocation of intermediate consumption of imported products— used to construct such inventories (Peters 2008).

Turning to the accessibility (stage III) of consumption-based carbon accounting, this article has already stressed that there are well-established calculation methodologies for these inventories (Peters et al. 2011) that, as a matter of fact, have produced reliable estimates since 1990 for almost all the UNFCCC countries (Davis and Caldeira 2010; Le Quéré et al. 2012). Such consolidated calculation methodologies are therefore the practical route that makes it possible to shift from production-based accounting —the current state of affairs— to consumption-based accounting —the desirable state of affairs that satisfies the moral principle of stage I. Indeed, as already noted, consumption-based carbon inventories can be more difficult to calculate in poorer countries, which lack the institutional capacity for implementing MRV systems. However, less developed countries' institutional capacities to implement a robust consumption-based MRV system should be supported by richer countries through financial and technological transfers (Grasso and Roberts 2014).

Overall, given the consistency with the requirements of Gilabert and Lawford-Smith's (2012) feasibility assessment, it seems safe to claim that such fulfilment of their three-stage approach provides an affirmative heuristic validation of the feasibility condition in support of consumption-based accounting. Therefore, consumption-based accounting is political feasibility according to the adopted normative purview of political theory.

4. Political Feasibility: The Positive Perspective

The scope of the positive analysis of political feasibility of consumption-based accounting is twofold. On the one hand, it is domestic, i.e. it analyses the internal factors that favour the governmental decision to switch to consumption-based carbon inventories. On the other hand, it adopts an international standpoint and scrutinizes the interstate dynamics that might influence the endorsement of consumption-based accounting and the eventual adoption of such inventories in a single country.

The domestic positive perspective on the political feasibility of consumption-based accounting entails a very broad approach that affects the choice of actions, plans, projects and initiatives (Bennear and Stavins 2007; Felder and Schleiniger 2002). This viewpoint focuses on the relationships among ideas, power and resources, and it involves national cultures and sensitivities, the role of science, as well as political, institutional and economic systems (Tanner and Allouche 2011). Consequently, a realistic and useful approach to assessing the domestic political feasibility of consumption-based accounting consists in scrutinizing how related ideas, power and resources are conceptualized, negotiated and agreed: in short, it consists in investigating the domestic political economy of climate change. To this end, the article provides a concise overview of the major factors that are likely to play a role in such a context.

According to the emerging literature on the political economy of climate change (see e.g., de Serres et al. 2011; Steves et al. 2011), which largely draws on experiences of structural reforms around the world, such main factors are: i) burdens, ii) democracy and institutional capacity, and iii) interest groups (Grasso 2015).

In regard to the first feature, as consistently shown by the political science literature (see e.g., Dahl 1998: 145-165), the lower the cost of bringing about a state of affairs, the more it is likely to be feasible in the long term, at least in democratic societies. For instance, Posner

(2006: 490) maintains that maximization of welfare can greatly enhance the institutional plausibility of socio-economic arrangements. It should be noted that sensitivity to the cost of climate change-related actions has been strengthened in the past few years by the global economic and financial crisis, by the post-Copenhagen sense of disillusion, and by a certain loss of credibility of climate science and policy. The main burden of climate change relates to mitigation (Nemet 2010). Indeed, consumption-based accounting is crucial in relation to emissions abatements, especially because it fairly shifts the burden of emissions (Steininger et al. 2014) from poorer developing countries to richer developed ones, as emphasized above. In other words, under the current production-based accounting system, net emissions transfers have benefitted richer countries (Eckersley 2010; Peters and Hertwich 2008) despite their rhetoric on the risks to international competitiveness imposed by the unregulated economies of the developing world (van Hasselt & Brewer 2010). Consumption-based inventories, instead, make it possible to internalize the carbon embodied in international trade. Therefore they would in principle be more politically feasible in carbon-exporting countries —largely belonging to the developing world— which would have their export-related emissions accounted for by carbon-importing countries —the industrialized ones— where such inventories should therefore conversely be less feasible (Grasso and Roberts 2014). All in all, for larger producers of goods and services —China, for instance— consumption-based accounting should be very convenient. Consequently, its political feasibility should be quite high, as underlined by Ashton's words quoted above.[3]

The second factor —the level of democracy and institutional capacity— can have an ambivalent effect on climate change action (Steves et al. 2011). However, as the relevant literature highlights, democracies are more likely to provide environment-related public goods like emissions accounting systems (see e.g., Bernauer and Böhmelt 2013; Bernauer and Koubi 2009; Burnell 2012; Fredrikson et al. 2005; McGuire and Olson 1996); and, also by virtue of their greater institutional capacity, they can better contribute to and participate in international environmental regime-making (see e.g., Bernauer et al. 2010; Neumayer 2002; Ward 2008). Close to these considerations is the role of the third factor, i.e., interest groups, and in particular the power of the carbon-intensive industry and consumers lobbies. On this ground, since the carbon lobby, for evident reasons of responsibility and actions transfer to consumers, is assumed to favour a switch to consumption-based accounting, the easier should be the adoption of such inventories in countries with a larger carbon-intensive industry (e.g., China and Russia, the largest carbon exporters). On the other hand, the capacity of the European industry lobby to manipulate the structure of the EU Emission Trading Scheme (EU-ETS) in order to maximize the allocations of permits (Skjærseth and Wettestad 2008: 175-176), coupled with the industry lobby's above-mentioned favour of consumption-based accounting and the relative greater weakness of the consumers lobby, seem to suggest that these inventories would have high political feasibility also in richer carbon importing regions like the EU.

In sum, if it seems possible to claim that the switch from production- to consumption-based carbon accounting is more feasible in democratic and institutionally solid countries, the role of lobbies in carbon-importing and -exporting countries is controversial, and much research on it is needed.

The international-level positive analysis of the political feasibility of consumption-based accounting requires clarification. As underlined above, its focus is on the international dynamics that might favour the diffusion of consumption-based accounting at national level. In this regard, it is assumed that states pursue, in relation to the coordinated international climate action most pertinent to consumption-based accounting, i.e., emissions abatements, interests mainly to do with material objectives (Nordhaus 2008; Stern 2007). In particular, this article espouses a neoclassical realist perspective on the politics of international emissions abatements (Purdon 2014; Terhalle and Depledge 2013). One of the central tenets of neoclassical realism is the role of relative gains (Grundig 2006; Vezirgiannidou 2008). In the international politics of emissions reductions, these gains originate from the modified

[3] See Note 2.

distribution of abatement burdens determined by a switch from a production to a consumption basis. This switch, in fact, produces a resource shift since, apart from a shrinking 'no regret budget' (Shue 1994: 343) reducing emissions has a cost. According to the neoclassical realist perspective (see e.g., Grieco 1990; Powell 1991; Snidal 1991), the relative gains produced by the resource transfer generated by such a shift in abatements burdens is a fundamental issue for international cooperation on emissions reductions. Cooperation on emissions reductions can in fact make states worry that some partners may achieve relative greater gains and thus, strengthened by the possible conversion of such gains into different capabilities, can achieve a dominant position (Grieco 1990: 161; Grieco, Powell and Snidal 1993; Rowlands 2001). Grasso and Roberts (2014) calculated in both production- and consumption-based terms the shares of the remaining carbon budget distributed to major emitters according to their responsibility and their capability. This work shows that, by and large, consumption-based accounting would give substantial headroom and ultimately somewhat less stringent abatement targets between now and 2050 to China, while the US would not be excessively penalized. Furthermore, consumption-based accounting does not seem to disproportionally penalize anyone. The main difference concerns the EU, whose relatively successful recent de-carbonization seems largely due to the off-shoring of carbon-intensive productions (Davis and Caldeira 2010; Peters et al. 2011), and which seems more likely to undertake structural emission reductions initiatives to maintain its leadership in global climate policy (Bäckstrand and Elgström 2013). In fact, bold emission reductions initiatives to maintain the EU's leadership in global climate policy seem less costly in terms of loss of power than its current subordinate role (Grasso and Roberts 2014). This is clearly testified by the recent EU 2030 Framework,[4] which disposes that EU members reduce domestic emissions by at least 40 per cent and increase energy efficiency and renewable energy use by at least 27 per cent by 2030, the world's most ambitious abatements objective.

Such evidence shows that cooperation between China and the US on emissions reductions is possible. This, in particular, would imply that the two superpowers could be ready to shift to consumption-based accounting (Grasso and Roberts 2014). Furthermore, as the relevant literature on regime building shows (Underdal 1994; Young 1991), including that on climate change (Andresen and Agrawala 2002; Grundig and Ward 2013), the structural power exerted by China and the US, and their high level of social capital embedded in inter-state networks, could induce other countries to join collective action for international emissions reductions, and, most importantly for the issues at stake here, to adopt consumption-based inventories as the common accounting systems.

5. Politically Feasible Governance Systems for Consumption-Based Carbon Accounting

The analysis carried out in the previous sections furnishes a nuanced understanding of the political feasibility of consumption-based carbon accounting. However, it makes it possible to delineate the elements of politically feasible consumption-based inventories, as well as a possible successful route for their eventual realization.

As regards the first point, the processes for establishing a consumption-based accounting system should be based on three strictly interdependent foundations. The first is fairness (Albin 2003): it is in fact 'moral disagreement and differing perceptions of justice' (Jamieson 2013: 443) that most imperil action against climate change. Specifically, what matters for the political feasibility of consumption-based accounting in terms of justice is the achievement of a fair distribution of costs —the second foundation— of emissions reductions arising from the shift from production-based inventories. A shift that, as stressed, is in fact morally sound in distributive terms since it would relieve the less developed countries and burden more the industrialized ones, consistently with Steininger et al.'s (2014) principle of moral desirability. However, given the centrality of fairness in its various forms and understandings, distributive

[4] Available from: http://ec.europa.eu/energy/en/topics/energy-strategy/2030-energy-strategy [accessed 28 September 2015].

justice, especially in the countries penalized by consumption-based accounting, should be usefully supplemented by procedural justice; and consumption-based inventories should take account of the basic principles of procedural justice, such as recognition, participation and distribution of power, put forward by the relevant literature (see e.g., Grasso 2010; Grasso and Sacchi forthcoming 2015; Paavola and Adger 2006; Page 2012). It should be noted that cost, besides referring merely to emissions reductions, has another aspect as well. In fact, especially amidst the current global economic and financial crisis, the lower the transaction costs for switching from production- to consumption-based inventories, the more feasible such a shift becomes.

However, both the above-mentioned bases for a smoother transition to consumption-based accounting need to be grounded in, and propagated by, the third foundation: institutional capacity. Institutions are understood here in both formal and informal terms, adopting North's (1993) definition of them as the rules that guide the actions and interactions of subjects in societies. In this sense, institutional capacity becomes crucial when we consider the contribution made by institutions to the switch from production- to consumption-based inventories. All in all, it is well-functioning institutions that make it possible to achieve just and efficient consumption-based accounting systems, and therefore ultimately to increase their political feasibility.

In regard to the second point —the possible strategy for changing the accounting basis— successful transitions from production- to consumption-based carbon accounting are necessary to develop consensus on carbon inventories internationally, in order to stimulate and aggregate the support of policy-makers, practitioners and scholars. The great powers should indeed take the lead, as already stressed, since given the likelihood of their shift to consumption-based inventories and their structural power, they can act as first-movers and induce other countries to follow (Grasso and Roberts 2014). Furthermore, the great powers should also support poorer developing countries in realizing their equitable access to sustainable development through green technology transfer, sufficient and predictable financial assistance, and technical and institutional support, also in terms of capacity building. In this perspective, given the already mentioned difficulties of putting effective MRV consumption-based accounting systems in place, particularly in more deprived countries by and large characterized by low institutional capacity and in some cases also by poor democracy, richer countries have a further obligation to provide transition assistance —tools, methodologies, training and knowledge— for collecting and calculating consumption-based figures: as, for instance, the UN-REDD Programme with the support of world's major players in remote sensing currently does in regard to MRV systems of REDD+ activities.

6. Conclusions

The arguments put forward in this article provide a helpful basis both for further research on the political feasibility of consumption-based inventories and to start thinking to their actual realization.

As for the first point —further research— before summarizing the evidence related to the political feasibility of consumption-based accounting suggested by the normative and positive perspectives adopted, it is first necessary to recall that at the individual level fairness in the distribution of costs arising from a switch from production- to consumption-based accounting is crucial for increasing the political feasibility of the latter. Indeed fairness and cost seem to be also the most important elements in the analysis of normative and positive political feasibility. In particular, the normative perspective adopted basically boils down to the formulation, justification and application of the core moral principle put forward by Steininger et al. (2014) to stable and accessible consumption-based accounting systems. In this regard, such governance systems would in fact satisfy the feasibility assessment proposed by Gilabert and Lawford-Smith (2012, 818-823). Therefore, the analysis conducted quite unequivocally gives an affirmative heuristic account of the normative political feasibility of consumption-based accounting.

On the other hand, the positive analysis performed seems to relate the political feasibility of consumption-based accounting closely to the cost dimension. At the domestic level,

however, it is very difficult to appreciate the differences in political feasibility between carbon-exporting countries, largely belonging to the developing world, and the richer carbon-importing countries. Nonetheless, worries about the political feasibility of consumption-based accounting in the industrialized world could be somewhat lessened by considerations arising from the international level positive analysis carried out. In fact, the relative gains dynamics prompted by a shift to consumption-based accounting seems to increase its political feasibility among major emitters, i.e. among the most industrialized countries, and ultimately counterbalance their dubious expected domestic enthusiasm.

A further element that could increase the political feasibility of consumption-based carbon accounting is the quality of democracy and institutions: the better such quality, the more likely becomes, in principle, the transition to consumption-based accounting.

Therefore, in light of these considerations, a deeper understanding and investigation in this context of analysis of fairness and cost, as well as of institutional capacity, represent the main foci for future research on the political feasibility of consumption-based carbon accounting.

In regard to the second point —the eventual realization of consumption-based inventories— it should be pointed out that the ability of this accounting system to resolve delicate issues related to international trade, regional flexibility, and lesser reliance on poorer countries' commitments (Peters and Hertwich 2008), and to the possible introduction of other related incentives such as assistance to developing countries in meeting reductions pledges or of other compensation mechanisms like permit trading schemes which allow them to sell permits, can encourage wider participation in a new inclusive regime for international emissions abatements. This, as well as the likely effectiveness of emissions reductions brought about by consumption-based inventories, can gradually strengthen the legitimacy of such an accounting system once it has been put in place (Bodansky 1999, 2008; Scharpf 1999). This circumstance can eventually overcome the diffidence of some parties —who by and large already realize that the urgency of the climate crisis demands a similarly urgent global response— and foster their engagement in mitigation actions.

References

Albin, C. (2003). Negotiating International Cooperation: Global Public Goods and Fairness. *Review of International Studies,* 29: 365-385.

Andresen, S., Agrawala, S. (2002). Leaders, Pushers and Laggards in the Making of the Climate Regime. *Global Environmental Change* 12: 41-51.

Bäckstrand, K., Elgström, O. (2013). The EU's Role in Climate Change Negotiations: from Leader to 'Leadiator'. *Journal of European Public Policy* 20 (10): 1369-1386.

Bechtel, M.M. Scheve, K.F. (2013). Mass Support for Global Climate Agreements Depends on Institutional Design. *PNAS* 110 (34): 13763-13768.

Bennear, L.S., Stavins R.N. (2007). Second-Best Theory and the Use of Multiple Policy Instruments. *Environmental and Resource Economics* 37 (1): 111-129.

Bernauer, T., Böhmelt, T. (2013). National Climate Policies in International Comparison. The climate change cooperation index. *Environmental Science & Policy* 25: 196-206.

Bernauer, T., Kalbhenn, A., Koubi, V. Spilker, G. (2010). A Comparison of International and Domestic Sources of Global Governance Dynamics. *British Journal of Political Science* 40 (3): 509-538.

Bernauer, T., Koubi, V. (2009). Effects of Political Institutions on Air Quality. *Ecological Economics*, 68 (5): 1355-1365.

Biermann, F. Dingwerth, K. (2004). Global Environmental Change and the Nation State. *Global Environmental Politics* 4 (1): 1-22.

Bodansky, D. (1999). The Legitimacy of International Governance: A Coming Challange for International Environmental Law? *American Journal of International Law* 93 (3): 596-624.

Bodansky, D. (2007). Legitimacy. In *The Oxford Handbook of International Environmental Law*, edited by D. Bodansky, J. Brunnée, E. Hey, 704-723. (Oxford: Oxford University Press).

Bows, A., Barrett, J. (2010). Cumulative emission scenarios using a consumption-based approach: a glimmer of hope? *Carbon Manage*ment 1 (1): 161-175.

Buchanan, A. (2004). *Justice, Legitimacy, and Self-Determination* (Oxford: Oxford University Press).

Burnell, P. (2012). Democracy, Democratization and Climate Change: Complex Relationships. *Democratization* 19 (5): 813-842.

Centre for Low Carbon Future. (2012). GHG Emissions Embodied in Trade. Is Border Adjustment an Appropriate and Effective Response? Available from: http://www.lowcarbonfutures.org/sites/default/files/GHG%20Emissions%20Embodied%20in%20Trade.pdf [accessed 28 September 2015].

Clapp, J., Helleiner, E. (2012). International Political Economy and the Environment: Back to the Basic? *International Affairs* 88 (3): 485-501.

Crabbè, A., Leroy, P. (2008) *The Handbook of Environmental Policy Evaluation* (London: Earthscan).

Crompton, T. (2011). Values Matter. *Nature Climate Change* 1: 276-277.

Dahl, R.A. (1998). *On Democracy* (New Haven, CT: Yale University Press).

Davis, S.J., Caldeira, K. (2010). Consumption-Based Accounting of CO_2 Emissions. *PNAS* 107: 5687-5682.

Davis, S.J., Caldeira, K., Peters, G.P. (2011). The Supply Chain of CO_2 Emissions. *PNAS* 108: 18554-18559.

de Serres, A., Llewellyn, J., Llewellyn, P. (2011). The Political Economy of Climate Change Mitigation Policies: How to Build a Constituency to Address Global Warming? Paris: OECD, Economics Department Working Papers No. 887.

Eckersley, R. (2010). The Politics of Carbon Leakage and the Fairness of Border Measures. *Ethics and International Affairs* 20 (4), 367-393.

Felder, S., Schleiniger, R. (2002). Environmental Tax Reform: Efficiency and Political Feasibility. *Ecological Economics* 42 (1-2): 107-116.

Fredriksson, P.G., Neumayer, E., Damania, R., Gates, S. (2005). Environmentalism, Democracy, and Pollution Control. *Journal of Environmental Economics and Management* 49 (2): 343-365.

Gampfer, R. (2014). Do Individuals Care about Fairness in Burden Sharing for Climate Change Mitigation? Evidence from a Lab Experiment. *Climatic Change* 124 (1): 65-77.

Gilabert, P., Lawford-Smith, H. (2012). Political Feasibility: A Conceptual Exploration. *Political Studies* 60: 809-825.

Grasso, M. (2010). An Ethical Approach to Climate Adaptation Finance. *Global Environmental Change* 20: 74-81.

Grasso, M. (2012). Climate Ethics: With a Little Help from Moral Cognitive Neuroscience. *Environmental Politics* 22 (3): 377-394

Grasso, M. (2015). The Social Dimension of Sustainable Development in the Top Emitting Countries' Climate Change Policy. In *Handbook on Sustainable Development* edited by M.R. Redclift and D. Springett (Eds.). London: Routledge.

Grasso, M., Roberts J.T. (2014). A Compromise to Break the Climate Impasse. *Nature Climate Change* 4: 543-549.

Grasso, M., Sacchi, S. (2015, forthcoming). Impure Procedural Justice in Climate Governance Systems. *Environmental Values*.

Grieco, J.M. (1990). *Cooperation Among Nations* (Ithaca, NY: Cornell University Press).

Grieco, J.M., Powell, R., Snidal, D. (1993). The Relative-Gains Problem for International Cooperation. *American Political Science Review* 87 (3): 729-743.

Grundig, F. (2006). Patterns of International Cooperation and the Explanatory Power of Relative Gains: An Analysis of Cooperation on Global Climate Change, Ozone Depletion, and International Trade. *International Studies Quarterly* 50: 781-801.

Grundig, F., Ward, H. (2013). Structural Group Leadership and Regime Effectiveness. *Political Studies*, doi: 10.1111/1467-9248.12056.

Harris, P.G., Symons, J. (2013). Norm Conflict in Climate Governance: Greenhouse Gas Accounting and the Problem of Consumption. *Global Environmental Politics* 13 (1): 9-29.

Hertwich, E.G., Peters, G.P. (2009). Carbon Footprint of Nations: A Global, Trade-Linked Analysis. *Environmental Science and Technology* 43 (16): 6414-6420.

Hovi, J., Sprinz, D.F., Underdal, A. (2009). Implementing Long-Term Climate Policy: Time Inconsistency, Domestic Politics, International Anarchy. *Global Environmental Politics*, *9* (3), 20-39.

Huitema, D., Jordan, A., Massey, E., Rayner, T. van Asselt, H., Haug, C. Hildingsson, R., Monni, S., Stripple, J. (2011). The Evaluation of Climate Policy: Theory and Emerging Practice in Europe. *Policy Sciences* 44: 179-198.

IPCC (Intergovernmental Panel on Climate Change) (2006). *IPCC guidelines for national greenhouse gas inventories*, prepared by the National Greenhouse Gas Inventories Programme. Tokyo: Institute for Global Environmental Strategies.

Jakob, M., Marschinski, R. (2013). Interpreting Trade-Related CO_2 Emission Transfers. *Nature Climate Change*, *3* (1): 19-23.

Jamieson D. (2013). Consequentialism, Climate Change, and the Road Ahead. *Chicago Journal of International Law* 13: 439-468.

Kanemoto, K., Moran, D.M., Lenzen, M., Geschke, A. (2014). International Trade Undermines National Emission Reduction Targets: New Evidence from Air Pollution. *Global Environmental Change* 24: 52-59.

Lawford-Smith, H. (2013). Understanding Political Feasibility. *Journal of Political Philosophy* 21 (3): 243-259.

Le Quéré, C. et al. (2012). The Global Carbon Budget 1959-2011. *Earth System Science Data Discussions* 5: 1107-1157.

Light, A. (2011). Climate Ethics for Climate Action. In *Environmental Ethics: What Really Matters? What Really Works?*, edited by D. Schmidtz and E. Willott, 557-566. Oxford: Oxford University Press.

Liu, L. (2015). A Critical Examination of the Consumption-Based Accounting Approach: Has the Blaming of Consumers Gone Too Far? *WIREs Climate Change* 6: 1-8.

McGuire, M.C., Olson, M. (1996). The Economics of Autocracy and Majority Rule: The Invisible Hand and the Use of Force. *Journal of Economic Literature* 34 (2): 72-96.

Nemet, G.F. (2010). Cost Containment in Climate Policy and Incentives for Technology Development. *Climatic Change* 103: 423-443.

Neumayer E. (2002). Do Democracies Exhibit Stronger International Environmental Commitment? A Cross-Country Analysis. *Journal of Peace Research* 39 (2): 139-164.

Nordhaus, W.D. (2008). *Question of Balance: Weighing the Options on Global Warming Policy* (New Haven, CT: Yale University Press).

North, D.C. (1993). *The New Institutional Economics and Developments*. Mimeo, Washington University.

Paavola, J. and Adger, W.N. (2006). Fair Adaptation to Climate Change. *Ecological Economics* 56: 594-609.

Page, E.A. (2012). The Hidden Cost of Carbon Commodification: Emissions Trading, Political Legitimacy and Procedural Justice. *Democratization* 19 (5): 932-950.

Pan, J., Phillips, J., Chen Y. (2008). China's Balance of Emissions Embodied in Trade: Approaches to Measurement and Allocating International Responsibility. *Oxford Review of Economic Policy* 24: 354-376.

Peters G.P., Minx, J.C., Weber, C.L., Edenhofer, O. (2011). Growth in Emission Transfers Via International Trade from 1990 to 2008. *Proceedings of the National Academy of Sciences* 108: 8903-8908.

Peters, G.P. (2008). From Production-Based to Consumption-Based National Emission Inventories. *Ecological Economics* 65, 13-23.

Peters, G.P., Davis, S.J., Andrew R. (2012). A Synthesis of Carbon in International Trade. *Biogeosciences* 9, 3247-3276.

Peters, G.P., Hertwich E.G. (2008). Post-Kyoto Greenhouse Gas Inventories: Production versus Consumption. *Climatic Change* 86: 51-66.

Pickering, J., Vanderheiden, S., Miller, S. (2012). If Equity's In, We're Out: Scope for Fairness in the Next Climate Agreement. *Ethics & International Affairs* 26 (4): 423-443.

Posner, E.A. (2006). International Law: A Welfarist Approach. *The University of Chicago Law Review* 73 (2): 487-583.

Powell, R. (1991). Absolute and Relative Gains in International Relations. *American Political Science Review* 85 (4): 1303-1320.

Purdon, M. (2014). Neoclassical Realism and International Climate Change Politics: Moral Imperative and Political Constraint in International Climate Finance. *Journal of International Relations and Development* 17, 301-338.

Räikkä, J. (1998). The Feasibility Condition in Political Theory. *Journal of Political Philosophy* 6 (1): 27-40.

Rosati, C.S. (2009). Moral Motivation. In *The Stanford Encyclopedia of Philosophy* (Spring 2009 Edition), edited by Edward N. Zalta. Available from: http://plato.stanford.edu/archives/spr2009/entries/moral-motivation [accessed 28 September 2015].

Rowlands, I.H. (2001). Classical Theory of International Relations. In *International Relations and Global Climate Change*, edited by U. Luterbacher and D.F. Sprinz, 43-65. (Cambridge, Ma: MIT Press).

Scharpf, F. (1999), *Governing in Europe: Effective and Democratic?* (Oxford: Oxford University Press).

Serrano, M., Dietzenbacher, E. (2010). Responsibility and Trade Emission Balances: An Evaluation of Approaches. *Ecological Economics*, *69* (11), 2224-2232.

Shue, H. (1994). After You: May Action by the Rich Be Contingent upon Action by the Poor? *Indiana Journal of Global Legal Studies* 1: 343-66.

Skjærseth, J.B., Wettestad, J. (2008), *EU Emissions Trading: Initiation, Decision-making and Implementation* (Aldershot: Ashgate).

Skodvin, T., Gullberg, A.T., Aakre, S. (2010). Target-Group Influence and Political Feasibility: The Case of Climate Policy Design in Europe. *Journal of European Public Policy 17* (6): 854-873.

Snidal, D. (1991). International Cooperation among Relative Gains Maximizers. *International Studies Quarterly* 35: 387-402.

Stavins, R.N., Ji, Z. (2014). International Cooperation: Agreements & Instruments. *Chapter 13 of IPCC, Climate Change 2014: Mitigation of Climate Change.* Contribution of Working Group III to the Intergovernmental Panel on Climate Change Fifth Assessment Report.

Steckel J.C., Kalkuhl, M., Marschinski, R. (2010). Should Carbon Exporting Countries Strive for Consumption-Based Accounting in a Global Cap-and-Trade Regime? *Climatic Change* 100: 779–786.

Steinberger, J.K., Roberts, J.T., Peters, G.P., Baiocchi, G. (2012). Pathways of Human Development and Carbon Emissions Embodied in Trade. *Nature Climate Change* 2: 81-85.

Steininger, K. et al. (2014). Justice and Cost Effectiveness of Consumption-Based Versus Production-Based Approaches in the Case of Unilateral Climate Policies. *Global Environmental Change* 24: 75-87.

Stern, N. (ed). (2007). *The Economics of Climate Change* [*The Stern Review*] (Cambridge: Cambridge University Press).

Steves, F., Treisman, D., Teytelboym, A. (2011). Political Economy of Climate Change Policy in the Transition Region. In The *Low Carbon Transition*, Chapter 4, edited by Alex Chirmiciu and Samuel Fankhauser London: European Bank for Reconstruction and Development (EBRD).

Swyngedouw, E. (2013). The Non-Political Politics of Climate Change. *ACME: An International E-Journal for Critical Geographies* 12 (1): 1-8.

Tanner, T., Allouche J. (2011). Towards a New Political Economy of Climate Change and Development. *IDS Bulletin*, 42 (3): 1-14.

Terhalle, M., Depledge, J. (2013). Great-Power Politics, Order Transition, and Climate Governance: Insights from International Relations Theory. *Climate Policy* 13 (5): 572-588.

Turner, J.M. (2014). Counting Carbon: The Politics of Carbon Footprints and Climate Governance from the Individual to the Global. *Global Environmental Politics* 14 (1): 59-76.

Underdal, A. (1994). Leadership Theory: Rediscovering the Arts of Management. In *International Multilateral Negotiation: Approaches to the Management of Complexity*, edited by I.W. Zartman, 178-197. San Francisco, Ca: Jossey-Bass.

Underdal, A., Hovi, J., Kallbekken, S., Skodvin, T. (2012). Can Conditional Commitments Break the Climate Change Negotiations Deadlock? *International Political Science Review* 33 (4): 475-493.

van Asselt, H., Brewer, T. (2010). Addressing Competitiveness and Leakage Concerns in Climate Policy: An Analysis of Border Adjustment Measures in the US and the EU. *Energy Policy* 38: 42-51.

Vezirgiannidou, S-E. (2008). The Kyoto Agreement and the Pursuit of Relative Gains. *Environmental Politics* 17 (1): 40-57.

Ward, H. (2008). Liberal Democracy and Sustainability. *Environmental Politics* 17 (3): 386-409.

Young, O. (1991). Political Leadership and Regime Formation: On the Development of Institutions in International Society. *International Organizations* 45 (3): 281-308.