



Contents lists available at ScienceDirect

## Ecological Economics

journal homepage: [www.elsevier.com/locate/ecolecon](http://www.elsevier.com/locate/ecolecon)

## Methods

## In defence of degrowth

Giorgos Kallis\*

ICREA and ICTA, Universidad Autonoma de Barcelona, ETSE, QC/3095, 08193 Bellaterra, Barcelona, Spain

## ARTICLE INFO

## Article history:

Received 21 May 2010

Received in revised form 7 December 2010

Accepted 8 December 2010

Available online xxx

## Keywords:

Sustainable degrowth

Economic crisis

Environmental taxes

Working hours

Politics

Sustainability

## ABSTRACT

This article defends the proposal of sustainable degrowth. A starting premise is that resource and CO2 limits render further growth of the economy unsustainable. If degrowth is inevitable, the question is how it can become socially sustainable, i.e. a prosperous and stable, rather than a catastrophic, descent. Pricing mechanisms alone are unlikely to secure smooth adaptation; a full ensemble of environmental and redistributive policies is required, including – among others – policies for a basic income, reduction of working hours, environmental and consumption taxes and controls on advertising. Policies like these, that threaten to “harm” the economy, are less and less likely to be implemented within existing market economies, whose basic institutions (financial, property, political, and redistributive) depend on and mandate continuous economic growth. An intertwined cultural and political change is needed that will embrace degrowth as a positive social development and reform those institutions that make growth an imperative. Sustainable degrowth is therefore not just a structuring concept; it is a radical political project that offers a new story and a rallying slogan for a social coalition built around the aspiration to construct a society that lives better with less.

© 2010 Elsevier B.V. All rights reserved.

## 1. Introduction

Martinez-Alier et al. (2010) offer a comprehensive review of the multiple streams, interpretations and approaches to sustainable degrowth. van den Bergh (this issue) identifies, scrutinizes and criticises different interpretations of degrowth. His criticism challenges those of us arguing for sustainable degrowth to “strive for greater coherence” (Martinez-Alier et al., 2010). In this article I argue that degrowth is less ambiguous than suggested by van den Bergh<sup>1</sup> and that anyways, some degree of ambiguity is common in many normative social science concepts without compromising their usefulness. My thesis is that sustainable degrowth is not only an inevitable hypothesis, but also a potent political vision that can be socially transformative.

van den Bergh's argument is multi-faceted. At its core is the criticism that there is no single defensible definition in the degrowth literature of what is it that has to degrow. It can't be GDP degrowth he argues, as this is a blunt policy goal, with possibly negative social and environmental effects. If degrowth refers to less production or consumption, then van den Bergh questions how are we to measure this (obviously not in total kg of materials)? And anyways, he asks, what is new about calling for less production or consumption, compared to debates about sustainable consumption or steady-state

economics? van den Bergh notes also a variant of degrowth literature that is critical of the market economy and capitalism in general, which he discards as too vague and radical to be relevant.

According to van den Bergh, this ambiguity in definition is mirrored in the lack of clear policy proposals with measurable goals, other than the proposal for degrowth of working hours, which he judges favourably. van den Bergh predicts that degrowth, being vague and radical, is unlikely to “influence the mainstream” and reach farther out than a marginal circle of already-convinced. Finally, van den Bergh notes that a degrowth of selected production and consumption activities is not implementable even in principle, since it would require either draconian state intervention (e.g. rationing, and prohibitions) unlikely to be accepted by people and/or unrealistic expectations of generalized voluntary self-restrictions.

Following this diagnosis van den Bergh suggests remaining “indifferent about GDP growth” (what he terms “a-growth”), and recommends his own policy package, its core being the “traditional policy perspective” of getting the prices right and capping and trading environmental bads. This he complements with specific sectoral policies such as global environmental agreements, reduced working hours, regulating advertising and education and technology policies. According to van den Bergh, the benefit of these policies compared to degrowth is that they are concrete and specific and have tangible goals.

In this essay I defend the proposal of degrowth against the criticism of van den Bergh. Along the way I counter-criticise his proposal for a-growth and his preference for pricing and for packages of sectoral policies. I argue that any policy package of reform, such as this proposed by van den Bergh, is unlikely to be implemented effectively within the current socio-political context. New policies need to be anchored and be

\* Tel.: +34 93 581 3749.

E-mail address: [Giorgoskallis@gmail.com](mailto:Giorgoskallis@gmail.com).<sup>1</sup> Hereinafter when I refer to “van den Bergh” without date, I refer to his article preceding mine in this issue of Ecological Economics. Uncited quotes are also from the same article, unless otherwise referenced.

part and parcel of a new overarching vision that does explicitly away with the imperative of growth, the main impediment to the type of policies advocated by van den Bergh. Sustainable degrowth is meant to offer such a vision; it is not meant to offer the single operational criterion, indicator or policy instrument that van den Bergh is looking for. It is an umbrella keyword, a multi-faceted framework that gives purpose and connects different policies and citizen initiatives. And it is a concept that builds on a deep and long philosophical, cultural, anthropological and institutional critique of the notions of growth and development (Castoriadis, 1985; Illich, 1973) that I am afraid is missed by van den Bergh, and as a result oversimplified into the gross category “radical”.

Sections 2 and 3 introduce the proposal of sustainable degrowth. Section 2 offers a – coherent – enough for the purposes of this essay – formulation of sustainable degrowth. There are multiple intellectual pathways to degrowth (Bayon et al., 2010; Martinez-Alier et al., 2010); for consistency I will follow an approach familiar with ecological economists, defining after Herman Daly and Joan Martinez-Alier degrowth as a socially sustainable reduction of society's throughput (or metabolism). Throughput reduction is incompatible with further economic growth, and will entail in all likelihood economic (GDP) degrowth. I will also explain “the new wine in the bottle”, i.e. where and how degrowth departs from (and adds to) steady-state economics. Next, Section 3 discusses “how do we get from here to there”, presenting some of the macro-policies put forward by the degrowth movement and explaining the logic behind them.

Sections 4–6 focus on particular elements of van den Bergh's argument. Section 4 discusses the issue of measurement, i.e. what is to degrow. My argument is that progress towards sustainable degrowth can be measured in different ways; there is no single undeniable indicator. This is not a reason to discard the idea; normative concepts such as liberty or equality are also not unequivocally measurable, but they are useful. Note that growth and welfare are also not measured “correctly”. GDP is a social convention fit for certain purposes and unfit for others; in the same way we can, if we wish, develop – imperfect – sustainable degrowth metrics as fit for purpose and context.

Section 5 argues contra van den Bergh, that we cannot afford to be agnostic to growth (i.e. a-growth). We need to take an active position and change the institutions that make GDP the natural goal of our societies. And Section 6 explains why serious caps and price changes are possible only within a society that has accepted sustainable degrowth as a desirable possibility and works to realise it.

Section 7 exposes a key difference between myself and van den Bergh. This concerns the way in which we perceive social we ascribe to. I propose that big social change does not take place by appealing to those in power, but by bottom-up movements that challenge established paradigms; scientists have a role to play as partners in these movements, offering – and problematizing – structuring concepts. Seen from this perspective, a radical idea, such as degrowth is not doomed to fail. Finally, Section 7 argues that the implementation of a degrowth transition is not as difficult as assessed by van den Bergh, and it is neither totalitarian nor romantically idealistic. All it takes is a little bit more belief on our collective capacity to plan social change.

## 2. Defining Degrowth

Sustainable degrowth can be defined from an ecological–economic perspective as a socially sustainable and equitable reduction (and eventually stabilisation) of society's throughput. Throughput refers to the materials and energy a society extracts, processes, transports and distributes, to consume and return back to the environment as waste (Daly, 1996). Throughput is the “food” of the social body's metabolism (Martinez-Alier, 2009b). In the process of this social metabolism, entropy is increasing, slower or faster (Georgescu-Roegen, 1973). Humanity and planet earth will eventually die, as each human body dies. This is an inescapable law of physics; the question is how fast and soon will this happen (Georgescu-Roegen, 1973). A de-grown steady-

state will not be steady for infinity, but will arrest the speed of entropic degradation (Kerschner, 2010). The steady-state concerns only material throughput; qualitative changes and innovations in the economic, social or cultural sphere will still take place (Daly, 1996).

Sustainable degrowth departs from the sustainable development rhetoric since it postulates that throughput cannot be reduced with growing GDP, and even more, that throughput degrowth will inevitably entail a smaller – and qualitatively different – economy, i.e. GDP degrowth. The basis for this is evidence that further economic growth is bound to: i) exhaust non-renewable energy and material sources (Heinberg, 2010) and ii) pose unrealistic expectations of efficiency improvements or technological breakthroughs in order to stay with in IPCC's CO<sub>2</sub> thresholds (Jackson, 2009; Victor, 2010). Renewable energies also yield less of a surplus than conventionally thought if one takes into account the energy required for their (re)production (Murphy and Hall, 2010). The prophesied decoupling of economic growth from throughput (material or energy use or CO<sub>2</sub> emissions) is not happening (Jackson, 2009). And this may have to do with the fact that efficiency improvements tend to rebound to increased consumption as relative prices fall (Polimeni et al., 2008; Sorrell, 2007). We cannot rule out in theory the possibility of a dematerialized, service economy (see however Odum and Odum (2001) for a counter-argument given the high position of services in the embodied energy hierarchy). But if we are to opt for a precautionary approach, we should side with Daly (1996), who assumes a correlation of throughput and GDP, and argues for limits on the scale of the economy rather than hoping for technological, efficiency or dematerialization miracles.

van den Bergh (this issue) instead argues that the relationship between throughput, GDP and welfare is too complex for any definite statements. He says that history is no guide for the future and calls for persistence in the face of important negotiations for climate change (one of course can be more pessimistic given that negotiations did not start this year, but date back at least to the Rio 1992 conference). In his view, a throughput-reducing restructuring does not have by necessity to lead to less GDP, and anyways our focus should be on welfare, not income. If by “restructuring” he means a future with less income but more welfare, then we are talking about the same thing, captured well in my view under the term sustainable degrowth. If instead he envisages a future arrangement that through behavioural changes will maintain (or increase) incomes while cutting resource use dramatically, he has to outline how this will look like, because I cannot see any other option than what has been called in the literature as “dematerialization” or “absolute decoupling”.

The goal of sustainable degrowth is not to degrow GDP. GDP will inevitably decline as an outcome of sustainable degrowth, but the question is whether this can happen in a socially and environmentally sustainable way.<sup>2</sup> None in the degrowth research community has argued in normative terms for “striving for negative GDP growth” (van den Bergh). Many of us have welcomed the currently experienced GDP degrowth as a possible manifestation of ecological limits to growth (Kallis et al., 2009), with environmental benefits due to reduced CO<sub>2</sub> emissions (Martinez-Alier, 2009a) and as a window of opportunity for political changes that will make the inevitable degrowth of the economy socially sustainable (Schneider et al., 2010). But one thing is to welcome the crisis as a reality-check and an opportunity, and another one to say that this is the objective. Sustainable degrowth is not equivalent to negative GDP growth in a growth economy. This has its own name: recession, or if prolonged, depression. These cause a cascade of effects in

<sup>2</sup> van den Bergh has a lot to say about possible negative environmental and social impacts of degrowth, such as a shift to polluting activities. But note that negative effects are possible in any type of change. Even stringent climate change policies or emission caps can be environmentally harmful if they lead to renewed forest logging for fuel, nuclear energy or hydro-electric dams, more so if the same scale of economic activity is to be maintained. At least an overall reduction of the scale of the economy promises that the overall environmental impact will be reduced, beyond qualitative shifts.

terms of unemployment, economic insecurity, lack of credit and finally collapse of social peace (Spangenberg, 2010). Sustainable degrowth instead is the hypothesis that the inevitable – and desirable – economic (GDP) degrowth can be turned socially sustainable (Martinez-Alier et al., 2010; Schneider et al., 2010). It is a vision of a smooth process of downshifting the economy through institutional changes, managing collectively a “prosperous way down” (Odum and Odum, 2001).

The above propositions are “old wine” for ecological economists familiar with steady-state economics. There shouldn't be any surprise also with the logical extension that if we were to reach a steady state in the 1970s, then we have to degrow back to it forty years later. However, sustainable degrowth goes further:

First, there is a concern whether the descent to a steady-state can be achieved primarily by economic reforms, such as cap-and-trade mechanisms, the preferred policy instrument in steady-state economics. This is discussed more extensively in Section 5.

Second, beyond investments in natural capital (Daly, 1996), degrowth opens up the discussion of selective downscaling of man-made capital. It seems intuitive that if as a society we are to stay within ecological limits we will have to do with less high-speed transport infrastructures, space missions for tourists, new airports, or factories producing unnecessary gadgets, faster cars or better televisions (Latouche, 2009). We may still need more renewable energy infrastructures, better social (education, and health) services, more public squares or theatres, and localised organic food production and retailing centres. We need therefore a “selective degrowth” (Latouche, 2009), redistributing resources between public and private consumption and within and between generations.<sup>3</sup> Selective degrowth opens up a political debate about which extraction–production–consumption activities need to degrow and which ones need to grow. This choice cannot be left to market forces alone, because markets often bring havoc rather than gradual adaptation (the current crisis an example), and because markets discriminate in favour of the “haves” and against the “have nots”. This is not only an ethical consideration, but also a politically pragmatic one, as popular support is required for a transition of that magnitude.

Are such selective outcomes possible within an economy whose overall scale is to shrink? van den Bergh raises the prospect of declining investments in renewable energies and declining social services under a degrowth scenario. However, essential public services do not need growth to be sustained. Cuba, the only country in the world which according to the WWF combines a high UNDP Human Development Index with a low ecological footprint (Latouche, 2009, 10) has maintained a high quality of health and education services (comparable to those of the U.S.) despite its poor and degrowing economy.<sup>4</sup> And preliminary models suggest that investment in renewable energy needs not suffer under a degrowth scenario, given certain reallocations of public investments (D'Alessandro et al., 2010). All these suggest that, at least, we should consider and study the possibility of sustainable degrowth, rather than rush to reject it.

The third, and most important, extension of the steady-state argument is the recognition that there is a possible incompatibility between foundational institutions of market economies and the goal of degrowth to a steady-state. In a general sense, that is not missed by politicians, the press or the population at large, degrowth, even if

socially sustainable, is likely to shrink the surpluses and profits of private enterprises, redistribute costs between capital and labour and hence meet the resistance of those who have economic and political power (Spangenberg, 2010). This is not only because corporations have disproportional power in politics and media and can stop environmental or social reforms that harm their interests; there is a growing literature that suggests that the quest for growth is a structural feature of capitalism in all its varieties (Harvey, 2007). From this perspective, the problem is not the psychology of individual “greedy capitalists”, but a system that structurally asks for greedy behaviours. Growth is not an option, but an imperative stemming from the structure of basic institutions, such as the use of private property as a collateral (van Griethuysen, 2010), debt, interest rate and credit (Loehr, 2010; Douthwaite, 2010), and the grow-or-die competition of private enterprises for profit and market share (firms opting for a steady-state in their profits, will be eliminated out by competitors) (Kovel, 2002). Under capitalism as we know it, the whole ensemble of economic institutions causes to reinvest any surplus accumulated back into production and further accumulation (Harvey, 2007). When growth stops as is currently the case, the edifice starts trembling. Debts cannot be paid, credit runs out and unemployment sky-rockets.

It is in this sense that some people writing on degrowth recognize the need for systemic political, institutional and cultural change (what van den Bergh frames and dismisses as “radical degrowth”) in order to create a different system where expansion will no longer be a necessity and where economic rationality and goals of efficiency and maximization will not dominate all other social rationalities and goals (Gorz, 1994; Latouche, 2009; Polanyi, 1944).

A common response to the above is that capitalism is the best that we have, and that all other alternatives tried in the 20th century did worse. Indeed, experienced communist regimes also sought continuous – state rather than private – accumulation and growth (Latouche, 2009). Experienced communism failed to create an alternative individual and collective imaginary to the capitalist one of material affluence and economic growth (Castoriadis, 1985). The professionalization of expertise and the bureaucratization and centralization of government characterised communist and capitalist countries alike (Illich, 1973). Fotopoulos (2009) on the other hand, argues that whereas a planned (socialist or communist) economy chooses to grow, or is indirectly forced to by the dynamics of geopolitical competition (arm races), a market/capitalist economy “has to” “grow or die” given the dynamics of its foundational institutions of wage labour, private property, competition and allocation – mostly – by prices.

While this is a complicated debate, the crucial question here is whether the capitalist, market economies in which the majority of us live today can conceivably degrow voluntarily and stabilise into a steady-state. I think not. More than likely this will only be possible with such a radical change in the basic institutions of property, work, credit and allocation, that the system that will result will no longer be identifiable as capitalism (Gorz, 1994; Jackson, 2009; Latouche, 2009). van den Bergh (this issue) has a point though: there is a problematic vagueness in the degrowth proposal in so far as the post-capitalist alternative to which it hints is not specified. However this is not a reason for discarding the diagnosis: i.e. that growth is unsustainable and that the institutions of what came to be known as “capitalism” that mandate it, have to change. In fact, it might be better to remain agnostic and pluralistic at this stage about what a post-capitalist alternative could look like and let it emerge organically from the ground, rather than dictate it from any intellectual or political height.

In conclusion I propose a reformulation and alternative assemblage of the interpretations of degrowth that van den Bergh separated and criticised. Sustainable degrowth is defined as a socially sustainable process of downscaling society's metabolism and throughput, i.e. a degrowth of material production and consumption in van den Bergh's terms. This will inevitably lead to a decline in GDP, but this is

<sup>3</sup> It is socially irrational for example to waste scarce resources with high potential, such as oil, in luxuries and conspicuous consumption, and not conserve them for the priority uses of future generations, such as health care or the preservation of information (see Odum and Odum, 2001).

<sup>4</sup> There is no reason to assume that this success has been bought at the expense of democracy and individual freedoms (i.e. that there is a link between the undemocratic character of the Cuban regime and the success of its social policies), unless one believes that if people are left free to choose they will always vote against their own interest of good public services. This indeed would be a heavy blow to the idea of democracy.

not the objective *per se*. The hypothesis is that degrowth can, under certain conditions and policies, increase welfare and improve environmental conditions. Policies are proposed towards this end, including – but not only – a decrease of working hours (see Section 7). Finally, since capitalism needs growth, a fundamental reworking of its institutions and imaginaries is necessary for sustainable degrowth (van den Bergh termed “radical degrowth”).

### 3. Policies for Sustainable Degrowth

Proposals on “how to degrow” are still fragmented and diverse, including a wide range of ideas ranging from radical “exit from the economy” alternatives (e.g. eco-villages, co-housing and urban squats, consumer-producer cooperatives, permaculture and subsistence organic farming, and alternative non-monetary exchange systems) to proposals about a different type of associated, multi-level confederational direct democracy (Fotopoulos, 2009) to more reformist institutional and policy changes at the State level (Fournier, 2008, see also [www.degrowth.eu](http://www.degrowth.eu)). A sort of consensus emerges concerning the latter (e.g. Victor, 2010; Jackson, 2009; Latouche, 2009; Speth, 2009). Reforms emphasise redistribution (of work and leisure, natural resources and wealth), social security and gradual decentralization and relocalisation of the economy, as a way to reduce throughput and manage a stable adaptation to a smaller economy.

Concrete policies discussed in this vein include a reduction of working hours (Gorz, 1994; Victor, 2010), including the proposal of a 21-hour working week ([www.neweconomics.org](http://www.neweconomics.org)), institutions guaranteeing minimum health and economic security to all, such as a basic income (Raventós, 2007), labour policies that allow for less productivity and more employment in sectors where human contact adds value, such as health or education (Jackson, 2009) and salary caps (Latouche, 2009). Redistributive taxation, taxes on international capital movement and a tightened control on tax havens, is hoped to secure enough funds to finance low economic cost-high welfare public investments, e.g. in community education or health and in convivial goods, such as new public squares, open spaces, community gardens, etc (Latouche, 2009). The reduction of working hours is also expected to increase welfare.

Policy instruments discussed for the strengthening of local economies (re-localisation) include the circulation of locally-based complementary currencies that keep wealth within the communities (Seyfang, 2001) and the breaking-down and decentralization of banks and financial institutions (Korten, 2008).

Taxes on environmental damages, CO2 and nuclear energy are other systemic interventions proposed and so are caps (limits) on CO2, energy and resource uses and pollution (Alcott, 2010). Caps can also take the form of moratoria on resource extraction and new infrastructures (nuclear plants, highways or dam infrastructures), or commitments to leave resources in the ground (Kallis and Martinez-Alier, 2010). Regulatory bans are foreseen for very harmful activities (e.g. resource extraction in frontier areas, and nuclear energy), including advertising (Latouche, 2009; see also [www.degrowth.eu](http://www.degrowth.eu)).

These policies are not always new, and may have been proposed in the past and in different contexts. In fact, they are not incompatible with part of the policy package of van den Bergh. The crucial difference here is however that the degrowth package is seen as part of an overall change in direction; not only the means but also the ends change. In Sections 6 and 7 I explain why this is important.

### 4. Measuring Degrowth

A central criticism in van den Bergh's article is that degrowth definitions are imprecise since they cannot be expressed in a clear goal and associated metric. For example, assuming that we propose GDP degrowth (which we do not), van den Bergh argues that GDP does not distinguish between dirty and clean economic activity, hence

a GDP decline can be environmentally harmful. Equally he criticises consumption or production degrowth because aggregate consumption in monetary terms or physical degrowth in kg hides composition and baskets together important with un-important parameters. van den Bergh's criticism is fair: there is no single material, energy, value or other aggregate parameter that measures progress in the direction of sustainable degrowth. But is this a problem?

van den Bergh implies that in so far as sustainable degrowth cannot be measured, it remains imprecise and therefore not very useful, scientifically or politically, more so since in this way there is no yardstick to evaluate policy effectiveness. However, precision is not equivalent to measurability, and more importantly, usefulness is not necessarily related to definitional precision. There are many concepts in the social sciences that help us structure reality, understand social patterns or imagine and shape a new direction, but they cannot be captured in indicators or expressed in numbers. For example, there are conflicting interpretations of “liberty” or “equality”, and no undisputed variables to measure them. Still we can intuitively sense what a breach of liberty is.

Furthermore as Martinez-Alier et al. (2010) note “the validity of concepts ... not only hold by their intellectual framing but also by their capacity to contribute to the social changes they advocate”. Philosophers are still scribbling over the meaning of “liberty” or “equality”, but this did not stop the French revolution from changing the world, probably for the better. Likewise, degrowth will be politically useful if it mobilises people to bring beneficial social change and this will not be determined by whether it can be expressed in a single indicator or not. van den Bergh is right that political change requires also concrete proposals, or even rallying slogans with specific (measurable) demands. The call for equality for example was expressed in concrete demands to end slavery, give women equal rights or provide full employment and social security. These were indeed clear and unequivocal goals unlike sustainable degrowth. But sustainable degrowth is not meant to be a call in itself but an umbrella vision, like equality, that brings together under a common framework a number of specific demands: 21-hour working week, basic income for all, leave oil in the ground, cap CO2, cap salaries, etc (see [www.degrowth.eu](http://www.degrowth.eu) and <http://www.neweconomics.org/>). Any of these specific demands can act as an entry points towards a degrowth transition. Importantly, these demands can create broader social coalitions, including not only environmentally-concerned groups, but also trade unions, precarious workers and the unemployed or environmental justice movements in the Global South (Gorz, 1994; Martinez-Alier, 2010).

Despite my argument against the importance of measurability, I do not mean that we cannot work out indicators to capture different aspects of sustainable degrowth. We can think for example of possible variables that capture socially sustainable degrowth, such as throughput-related ones (e.g.: CO2 emissions, percentage of land that is urbanized, hazardous waste in kg per capita, and total km travelled by food from source to consumption) and/or welfare ones (poverty levels, equality indicators, self-reported happiness, etc). Disaggregated information may be more valuable in some analytical or policy contexts, and aggregated indexes, with due recognition of their caveats, in other, more communicative contexts. Decrease of throughput variables and increase of welfare variables (or an aggregate of them) may indicate progress in the direction of sustainable degrowth. Of course there are problems in aggregating different environmental indices or material flows (van den Bergh, this issue), but I am confident that the fact that kgs of gravel cannot be aggregated with kgs of gold will not come as news to researchers of the Wuppertal Institute in Germany who have been working with material flow indicators. Of course any indicator system is imperfect, entailing incommensurable value claims and choices on what to measure, ad hoc weighing for aggregation or problems of empirical measurement. But this is not particular to degrowth and it cannot be an argument against it.

## 5. Agrowth or Degrowth?

van den Bergh calls for a-growth, i.e. indifference to the question of growth, in its positive or negative (“degrowth”) formulation. There is indeed some contradiction in attacking growth with a term, “degrowth”, that maintains it as its reference point (Latouche, 2009). Unfortunately, there is no way round this; atheists too have to refer to and position themselves with respect to “Theos” (God in Greek) God, in order to deny God’s existence.

Furthermore I disagree with van den Bergh when he focuses the whole problematic about growth upon the question of the metric, GDP. Ignoring GDP is an important first step but it alone is not enough because, unlike what van den Bergh thinks, economists’ and politicians’ fixation with GDP is a manifestation, not a cause of society’s “growth fetishism” (Hamilton, 2003).<sup>5</sup> It is here that the culturalist and institutional critiques of growth that are an essential part of the degrowth debate become relevant (e.g. Castoriadis, 1985). The striving for more and more money and material wealth at the personal and national level precedes the notions of “growth” or “GDP”. The fetishism of growth is broader than the fetishism of GDP and has deep structural (political-economic) and cultural roots that interconnect the macro level of financial, property or labour institutions to the micro level of individualistic, utilitarian values and imaginaries (Castoriadis, 1985). While economists and their tools have played an important role in structuring and legitimating the idea of growth (Mitchell, 2002), we are fetishizing their power if we don’t see behind them the structures that have made economic growth the dominant social, political and individual objective. The social imaginary of “growth” plays in capitalist societies the role that religion played in pre-capitalist ones (Castoriadis, 1985). Economists may well be the priests of the religion of growth (Nelson, 2001). van den Bergh’s (2009) battle to convince mainstream economists to ignore growth is admirable, but I am afraid he is trying to convert priests to agnostics.

Serge Latouche, one of the primer exponents of degrowth, has also called for a-growth. But his is not a call for ignoring a particular indicator (GDP), or convincing economists about its faults. Latouche’s “a” is an active “a” as in atheism, not one of indifference, as in “agnostic”.<sup>6</sup> Latouche means escaping culturally, materially and politically from the dominant mode of thinking of “economism” (Kallis et al., 2009). Latouche calls for a “decolonization of the imaginary”, an active process of liberating thought, desires and institutions from the logic of growth, productivism and accumulation for accumulation’s sake. In fact, in my view the English prefix “de” represents better the active nature of this liberation process: we have to get rid of the imperative of growth, institutionally and mentally, it won’t go away just by ignoring it. The “de” in degrowth is therefore not only a “de” for throughput decline, but also a “de” for cultural and institutional decolonization from economism and the religion of growth (Bayon et al., 2010).

## 6. Market Solutions and Economic Restructuring

As an alternative to degrowth strategies, van den Bergh reinstates an environmental economist’s perspective that product and service prices need to reflect much better environmental and climate

externalities, which will then force people to change their behaviour. He argues that rather than trying to govern a reality that is too complex to comprehend and plan it to specific outcomes of reduced consumption, it is better to “cap-and-trade” or price externalities, sending signals to consumers, which in turn will lead the economy to a qualitative shift from polluting to clean activities, what he calls “economic restructuring”. van den Bergh suggests that we should remain agnostic about the impact of such restructuring on growth both because we cannot predict what will happen and because being explicit about the possibility of degrowth will undermine the adoption of the policies. I disagree for six reasons:

1. As explained above, if we take technological optimism out of the picture, I fail to imagine ways of a restructuring (through a CO2 cap or otherwise) that will not involve significantly less economic activity and a decline of GDP and incomes. I suspect that the undefined qualitative change of behavioural shifts that van den Bergh expects will resemble what we define as sustainable degrowth, i.e. a society with frugal consumption and downshifted, more localised economies. I prefer to call things with their name and make clear that this is what we are aspiring to, more so since in this way we will have to debate how to make the descent smooth (Odum and Odum, 2001). There is no political gain to be made by hiding consequences from people and pretending that maybe we can have the cake and eat it all. On the contrary there is a high risk of tactic agnosticism backfiring if and when people experience a loss of income or material comfort to which they did not consent.
2. There is general scepticism within the degrowth movement concerning policies that involve the institutionalization of new markets for goods and services that were previously not treated as commodities (e.g. domestic work, and ecosystem services). The substitution of money relations for social relations which were not mediated by the profit motive is seen as problematic *per se*, and responsible for cultural and spiritual degradation. Also following Polanyi (1944), there is concern that the commodification of nature and labour, “fictitious commodities” that are not produced for market exchange, is at the heart of economic and social crises. However, whereas there is agreement on the need to set limits to the social domains upon which market rationality applies (Gorz, 1994), there is also pragmatism in that some environmental bads, such as CO2 emissions, may need to be priced and taxed, if they are to be reduced (Latouche, 2009).
3. Unlike what economic models and graphs assume, prices are not necessarily a smooth or automatic mechanism of adaptation. Even if prices change gradually, oil or CO2 are such vital elements of the economy that there is risk of shocks and unpredicted non-linear effects. Some analysts link the current economic crisis and this of the 1970s to the hike in oil prices (Hall and Day, 2009). There is much to say in favour of the traditional planning perspective in terms of adaptation (see Section 8)
4. Arguments in favour of prices are often tautological, as market prices are by definition more efficient than so-called “command and control” instruments, since economists define efficiency in terms of the degree of allocation by market prices. The evidence however suggests that regulation may also be effective; the Montreal protocol for example that regulated the phasing out of ozone-depleting substances has been relatively more successful than the emissions trading-based Kyoto protocol (Velders et al., 2007).
5. Changes in energy or resource prices, and by extension food prices, are likely to affect unevenly the most vulnerable segments of the population (e.g. energy poverty, and famine). Some economists argue that we should distinguish between efficiency and distribution and change prices irrespective of equity impacts, taking care of distribution separately. Experience however tells us that this is seldom done. We need a comprehensive policy package of

<sup>5</sup> Imagine for example a scenario under which governments follow a type of “Sarkozy Commission” proposal and substitute GDP with new well-being indicators (convenient indeed for governments in a period of stagnant or declining incomes). Would this change much in terms of government, firm or individual strategies? Firms will still need growing profits to survive in a competitive environment, individuals will need higher salaries to be secure and continue enjoying access to what is valued by their peers, and governments will still need more money to pay for their growing expenditures. van den Bergh implies that he has no problem with the pursuit of money at all levels in so far as ecological limits are set. The question is then whether the pursuit of money can be sustained and subordinated within such limits, or whether it unleashes a dynamic that will make sure that no limits stand in the way of profits.

<sup>6</sup> I owe this observation as well as many of the ideas exposed in this section to Giacomo D’Alisa.

environmental, social and economic reforms (such as reduced working hours, basic income and health coverage) that will make sure that the costs of the transition are not unequal distributed and no one falls out of society's safety net.

6. Caps and taxes on environmental damages are likely to increase the cost of many growth-producing activities, which will have to internalise and account for, otherwise displaceable, costs. Many activities that form the core of the current economy (e.g. plastics, heavy metals, and big oil) would have never come to be if they had to pay for their externalities (more so inter-generational ones). As [Latouche \(2009, 74\)](#) comments, perhaps exaggerating to make a point, “with proper prices, civil aviation would come to a halt, and there would probably not be many cars on the world”. Such “costs” and impacts are precisely why polluters are seldom seriously asked to pay and why caps are seldom set at significant levels. As a result, within the current profit-driven political-economic system, the cap-and-trade schemes that end up being accepted and implemented are often lightly regulated ones with low caps, which offer new outlets for accumulation, but little much else (see [Spash \(2010\)](#) and [Swyngedouw \(2010\)](#) for the case of carbon trading).
7. Externalities are cost-shifting successes ([Martinez-Alier, 2002](#)). It is naive to think that internalising them is just a matter of “policy” and can be done without significant political and social change. [Latouche \(2009, 75\)](#) puts it vividly: “a politician who would propose such a programme and implement it when elected would be killed before the week was out”. Some polluters are more likely to recourse to violence than pay for their environmental or social externalities ([Martinez-Alier, 2002](#)). Powerful interests will not sit back quietly, accept environmental caps and taxes and adapt to van den Bergh's “economic restructuring”. On the contrary, they will use their political muscle and benefit from the potential impact on the poor to form cross-class alliances to repeal serious reforms.

A degrowth agenda would face even more resistance from the same quarters. But degrowth is not a “policy”; it is framed as a political alternative that seeks a popular mandate for radical changes (including caps and environmental taxes). The question then is whether such an alternative could ever become popular. To this question I now turn.

## 7. Social and Political Change

Sustainable degrowth is a multi-faceted political project that aspires to mobilise support for a change of direction, at the macro-level of economic and political institutions and at the micro level of personal values and aspirations. Income and material comfort is to be reduced for many along the way, but the goal is that this is not experienced as welfare loss.

van den Bergh is sceptical about the political feasibility of this proposal. Beyond arguments and opinions, both of us, an economist and an environmental scientist, have to read and learn from historians and social scientists that have studied big social and political changes. But let me discern our differences on how we see social change happening, and hence clarify the debate over the feasibility of the degrowth proposal.

In van den Bergh's implicit mental model of political change there are scientists, politicians, and the people. The role of scientists is to convince politicians and people about what needs to be done. Ideas such as degrowth that are unlikely to be accepted by “mainstream” scientists and hence politicians should be avoided, since they are likely to remain a marginal rearguard.

There are two problems with this. First, van den Bergh sees scientists and their proposals (“policies”) in isolation from the political-economic system of politicians and vested interests within which such proposals come to operate, and of which scientists themselves are part of. Economists are not unbiased observers or developers of metrics; they

are key players in the perpetuation of the growth economy and imaginary.

Second, in van den Bergh's implicit model, it is to powerful politicians we should all, scientists and civil society, appeal to. From such a perspective, which takes the current distribution of power as granted, there is little hope for a degrowth proposal. However, there is an alternative viewpoint, according to which big social change never appeals to the “kings” and “priests” of the time. Revolutionary changes, in society or science, are often punctuations after big periods of stasis or development locked in a paradigm ([Kuhn, 1962](#)). Crises and quick reversals of what was perceived as the normal direction of things ([Davies, 1962](#)) open windows of opportunity for change. As [Wallerstein \(2010, 141\)](#) puts it: “when the system is far from equilibrium ... small social mobilizations can have very great repercussions”. According to [Korten \(2008\)](#) mobilisations start with a “new cultural story” initially a conversation among a few, that gradually comes to challenge an established paradigm that seemed previously unmovable. In the gap and loss of meaning created by a crisis, such new stories may be seen to offer more convincing explanations and directions for action. Small, but accumulating, actions stemming from the initial conversations create gradually a new reality and give a concrete expression to the benefits of a different way of doing things. The new cultural story and the alternative, liberated social spaces and practices that embody it connect disparate people across interests and generate a social movement of thought and practice. As liberated spaces expand people lead and leaders (old and new ones coming in power) follow and respond ([Korten, 2008](#)).

The movement for degrowth is much more in accordance with [Korten's](#) model of revolutionary social change ([Fournier, 2008](#); [Baykan, 2007](#)), than the more technocratic model underlying van den Bergh's view. Scientists working on degrowth counter a false cultural story (growth as progress) and work to construct a new even if imperfect one (sustainable degrowth). Scientists are in conversation with practitioners and activists “escaping the economy” – ([Cattaneo and Gavalda, 2010](#)) – who embody degrowth ideas in new material spaces. Scientists and practitioners network to experiment, creating new spaces, intellectually and physically.<sup>7</sup> A movement may grow which will extend this new alternative cultural story, build alliances with other similar cultural stories and movements, and in the void opened by the current crisis, create a convincing and popular alternative.

In my view, climate change and the creation of a low-carbon society require such a revolutionary social change (not in the sense of violent, but in the sense of fast and dramatically different), rather than the marginal one – politically speaking – implied in van den Bergh's model. van den Bergh proposes an ambitious policy agenda, but offers no associated ambitious political proposal on how could this become possible (or an explanation why the same proposals have been on the table for so many years without being effectively implemented).

## 8. Feasibility and Acceptance

A State that institutes salary caps, sets strict emission caps, increases taxes to the rich or bans advertising will need some muscle. But there are currently strong and intensifying interdependencies between politicians and private interests, not least through the funding of political parties, which themselves depend on a growing economy. For some the control of governments by vested private interests marks the end of democracy and the dawn of an era of oligarchy ([Kempf, 2010](#)). The degrowth proposal is at odds with such tendencies, as it insists in the possibility to bring radical – ecological and redistributive – change through parliamentary democracy (see [Latouche, 2009](#)). We cannot

<sup>7</sup> The second international conference on degrowth followed a novel format whereby scientists and practitioners discussed in facilitated working groups policies for degrowth and research priorities (see [www.degrowth.eu](http://www.degrowth.eu)).

surrender *a priori* the possibility of a non-totalitarian, popularly elected government with a mandate to redistribute and plan in the direction of sustainable degrowth. In the past we have had reasonable democratic planned economies that boldly redistributed surpluses from private consumption to public goods. Mike Davis (2007) documents how the U. S. economy was refashioned in a stroke to fight fascism: as investments were shifted from private consumption to the public war machine, cars were shared, hitchhiking became a popular way of transport, bicycles made a comeback, urban food gardens multiplied and recycling and thrift reached unprecedented levels. As a voluntary communal spirit reigned, conspicuous consumption became socially ostracised (exhibiting publicly that you are rich remained unpopular well into the 1970s). It is a manifestation of the colonization of our imaginary that we now consider infeasible any bold collective attempt to plan our way out of the ecological catastrophe. As philosopher Slavoj Žižek puts it, it is much easier for us to imagine the end of the world than serious social change.

van den Bergh is sceptical also of the prospect of individuals opting voluntarily for living a simpler and more frugal life (much less to fight politically to demand it). In his view, the image of the hunter–gatherer cannot appeal to a society of locked-in shopping mall consumers, more so given the biological – evolutionary – roots of selfish, conspicuous consumption. First, since this is a common – and easy – criticism, let me make clear that the hunter–gatherer or the caveman are not the ideal human subjects of degrowth. In my view, it is the convivial yet simple and content, enlightened human (my own preference goes for Kazantzakis' fictional hero "Alexis Zorbas"). Degrowth does not imagine turning back the clock to an idealized past that may have never existed, but using the capacities we have developed to create a mature future of being content with little material, but abundant relational, goods (Latouche, 2009). The desire for a simpler, secure and more communal life resonates with a large part of the population, well beyond radical environmentalists.

Whereas social positioning and the desire for differentiation might as well be programmed in our genes, this does not need to take necessarily the shape of an endless rivalry for material accumulation. Ceremonial sport competitions are a much nobler and cleaner way to channel rivalry and status differentiation for testosterone-filled males. Anthropologists document the multiple forms rivalry has taken in human societies from gift-giving to self-sacrifice as the ultimate honour. Conditioned by genes, cultures still decide. Our capitalist culture does select for material possession, but the driving force is the structural imperative of the system to grow or die, not the genes of the people. The positional quest for wealth in our "affluent society" is linked to state policies that have shifted investments from public to private goods (Galbraith, 1998), in order to maintain at all costs private accumulation. Precisely because there are "complex factors of lock-in" (van den Bergh, this issue), we need to plan systemic change. People were alright without shopping malls and televisions a few decades back, and rest sure they will so be if they have to live without them in the future.

## 9. A Common Ground

In this article I argued that in these times of crisis we need a new story-line and vision; a new political project, not individual environmental policies, increasingly rejected because of their "cost on the economy". Sustainable degrowth does away with economism and growth and offers such a promising vision which is cohesive enough for the purpose. The vision is one of a society with a stable and leaner metabolism, where well-being stems from equality, relation and simplicity, and not material wealth. The hypothesis is that this vision, and the transition to it, is doable. And the research challenge is to study the conditions under which this hypothesis may turn out true.

A central difference with van den Bergh originates in our assessment of the relationship between throughput, growth and

welfare. A key question is whether the past correlation between throughput and GDP, and the failure of absolute decoupling suggest a more structural correlation between the two. This is a fertile area for theoretical and empirical research.

Even if we disagree in much with van den Bergh, we share a defiant optimism in the face of generalized pessimism, if not despair. And we share some common remedies (e.g. international climate change agreement, reduced working hours, and controls on advertising). Although in my view such policies require radical political change of the sort explained above if they are ever to be seriously implemented, I do not suggest waiting for this before we start researching or promoting them. Numerous interesting questions emerge including for example, the effectiveness of reduced working hours schemes and their implications for social security; the feasibility of reduced working hours in a context of peak-oil; the effects of possible income and resource tax reforms; policy packages to account for the distributive consequences of environmental taxes or resource caps; modelling of the conditions under which international cooperation might emerge and the attributes of workable governance schemes; effective tools for regulating advertising, while allowing free communication, etc. Our exchange raises also the need for an ecological macro-economics linking environmental and sustainability issues to the "big" themes of the economy: inflation, debt, finance, banks and currencies. What sort of financial or monetary institutions do we need for a de- or non-growing economy?

Such fundamental questions about the core institutions of capitalist economies were not addressed under the framework of "sustainable development". Even if degrowth wanes as a scientific or political project and the truths and desires it represents find expression in a new keyword, its long-lasting legacy will be that it brought important questions back on the table.

## Acknowledgements

Thanks to Jeroen van den Bergh for his comments to various drafts of this article and for the numerous discussions we have had. My ideas owe a lot to conversations with Joan Martinez-Alier, Giacomo D'Alisa and Francois Schneider as well as tens of hours of Monday evenings spent joyfully with the Barcelona degrowth reading group.

## References

- Alcott, B., 2010. Impact caps: why population, affluence and technology strategies should be abandoned. *Journal of Cleaner Production* 18 (6), 552–560.
- Baykan, B.G., 2007. From limits to growth to degrowth within French green politics. *Environmental Politics* 16 (3), 513–517.
- Bayon, D., Flipo, F., Schneider, F., 2010. La décroissance, 10 questions pour comprendre et en débattre. Editions La Découverte.
- Castoriadis, C., 1985. Reflections on "rationality" and "development". Thesis. 10/11, 18–35.
- Cattaneo, C., Gavalda, M., 2010. The experience of urban squats in Collerola, Barcelona: what kind of degrowth? *Journal of Cleaner Production* 18 (6), 581–589.
- D'Alessandro, S., Luzzati, T., Morroni, M., 2010. Energy transition towards economic and environmental sustainability: feasible paths and policy implications. *Journal of Cleaner Production* 18 (6), 532–539.
- Daly, H.E., 1996. *Beyond Growth: The Economics of Sustainable Development*. Beacon Press.
- Davies, J.C., 1962. Toward a theory of revolution. *American Sociological Review* 27 (1), 5–19.
- Davis, M., 2007. Home-front ecology. What our grandparents can teach us about saving the world. *Sierra Magazine*, July/August 2007.
- Douthwaite, R., 2010. Why the global debt burden means there will be no recovery. Proceedings of the 2nd International Conference on Economic Degrowth for Ecological Sustainability and Social Equity.
- Fotopoulos, T., 2009. *The Multi-Dimensional Crisis and the Inclusive Democracy*. IJID Publications.
- Fournier, V., 2008. Escaping from the economy: the politics of degrowth. *International Journal of Sociology and Social Policy* 28 (11/12), 528–545.
- Galbraith, K., 1998. *The Affluent Society*. Houghton Mifflin, New York.
- Georgescu-Roegen, N., 1973. The entropy law and the economic problem. In: Daly, H.E. (Ed.), *Economics, Ecology, Ethics: Essays toward a Steady-State Economy*. W.H. Freeman, San Francisco.
- Goetz, A., 1994. *Capitalism, Socialism, Ecology*. Verso, London.

- Hall, C.A.S., Day, J.W., 2009. Revisiting the limits to growth after peak oil. *American Scientist* 97 (3), 230.
- Hamilton, C., 2003. *The Growth Fetish*. Pluto Press, London.
- Harvey, D., 2007. *The Limits to Capital*. Verso, London.
- Heinberg, R., 2010. *Peak Everything: Waking up to a Century of Declines*. New Society Publishers.
- Illich, I., 1973. *Tools for Conviviality*. Calder and Boyars, London.
- Jackson, T., 2009. *Prosperity without Growth: Economics for a Finite Planet*. Earthscan, London.
- Kallis, G., Martinez-Alier, J., 2010. Caps yes, but how? A response to Alcott. *Journal of Cleaner Production* 18, 1568–1571.
- Kallis, G., Martinez-Alier, J., Norgaard, R., 2009. Paper assets, real debts. An ecological-economic exploration of the global economic crisis. *Critical Perspectives on International Business* 1/2 (5), 14–25.
- Kempf, H., 2010. Democracy, ecological crisis and oligarchy. Plenary presentation in the International Conference on the Climate of Democracy, Parma, 7–8 October 2010.
- Kerschner, C., 2010. Economic de-growth vs. steady-state economy. *Journal of Cleaner Production* 18 (6), 544–551.
- Korten, D.C., 2008. *Agenda for a New Economy*. Berrett-Koehler, San Francisco.
- Kovel, J., 2002. *The Enemy of Nature: The End of Capitalism or the End of the World?* Zed Books.
- Kuhn, T.S., 1962. *The Structure of Scientific Revolutions*. Discovery. University of Chicago Press.
- Latouche, S., 2009. *Farewell to Growth*. Polity Press.
- Loehr, D., 2010. Zero growth and zero interest rate. Revival of an old idea. Proceedings of the 2nd International Conference on Economic Degrowth for Ecological Sustainability and Social Equity.
- Martinez-Alier, J., 2010. Environmental justice and economic degrowth. An Alliance between Two Movements. Paper presented at the CES Conference on The Revival of Political Economy, Coimbra, 21–23 October 2010.
- Martinez-Alier, J., 2009b. Social metabolism, ecological distribution conflicts, and languages of valuation. *Capitalism Nature Socialism* 20, 58.
- Martinez-Alier, G., 2009a. Socially sustainable economic degrowth. *Development and Change* 40 (6), 1099–1119.
- Martinez-Alier, J., 2002. *The Environmentalism of the Poor. A Study of Ecological Conflicts and Valuation*. Edward Elgar, Cheltenham (UK).
- Martinez-Alier, J., Pascual, U., Vivien, F-D., Zaccai, E., 2010. Sustainable de-growth: mapping the context, criticisms and future prospects of an emergent paradigm. *Ecological Economics* 69 (9), 1741–1747.
- Mitchell, T., 2002. *Rule of Experts, Egypt, Techno, Politics, Modernity*. University of California Press, Berkeley.
- Murphy, D.J., Hall, C.A.S., 2010. Year in review – EROI or energy return on (energy) invested. *Annals Of The New York Academy Of Sciences*. 1185, 102–118.
- Nelson, R.H., 2001. *Economics as Religion from Samuelson to Chicago and Beyond*. Pennsylvania State University Press.
- Odum, H.T., Odum, E.C., 2001. *A Prosperous Way Down: Principles and Policies*. University Press of Colorado.
- Polanyi, K., 1944. *The Great Transformation*. Beacon Press.
- Polimeni, J.M., Mayumi, K., Giampietro, M., Alcott, B., 2008. The Jevons Paradox and the Myth of Resource Efficiency Improvements. Earthscan. Press, London, Sterling, VA, US.
- Raventós, D., 2007. *Basic Income: The Material Conditions of Freedom*. Pluto, London.
- Schneider, F., Kallis, G., Martinez-Alier, J., 2010. Crisis or opportunity? Economic degrowth for social equity and ecological sustainability. Introduction to this special issue. *Journal of Cleaner Production* 18 (6), 511–518.
- Seyfang, G., 2001. Community currencies: small change for a green economy. *Environment and Planning – Part A* 33 (6), 976–996.
- Sorrell, S., 2007. *The Rebound Effect: An Assessment of the Evidence for Economy-wide Energy Savings from Improved Energy Efficiency*. UK Energy Research Centre.
- Spangenberg, J., 2010. The growth discourse, growth policy and sustainable development: two thought experiments. *Journal of Cleaner Production* 18 (6), 561–566.
- Spash, C., 2010. The brave new world of carbon trading. *New Political Economy* 15 (2), 169–195.
- Speth, G., 2009. *The Bridge at the End of the World. Capitalism, the Environment and Crossing from Crisis to Sustainability*. Yale University Press.
- Swyngedouw, E., 2010. Apocalypse forever? Post-political populism and the spectre of climate change. *Theory, Culture & Society* 27 (2–3), 213–232.
- van den Bergh, J.C.J.M., this issue. Environment vs. growth. 5 types of “degrowth” and a plea for “a-growth”. *Ecological Economics*.
- van den Bergh, J.C.J.M., 2009. The GDP paradox. *Journal of Economic Psychology* 30 (2), 117–135.
- van Griethuysen, P., 2010. Why are we growth-addicted? The hard way towards degrowth in the involuntary western development path. *Journal of Cleaner Production* 18 (6), 590–595.
- Velders, G.J.M., Anderson, S.O., Daniel, J.S., Fahey, D.W., McFarland, M., 2007. The importance of the Montreal protocol in protecting climate. *Proceedings of the National Academy of Sciences* 104 (12), 4814–4819.
- Victor, P., 2010. Questioning economic growth. *Nature* 468, 370–371.
- Wallerstein, I., 2010. Structural crises. *New Left Review* 62, 133–142.