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Green growth vs. green agenda in attaining sustainable development

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Abstract

Based on the application of the algebra of optimal control theory to a systems approach to sustainable development goals (SDGs), this article argues that the “green agenda” of the environmental SDGs is neither necessary nor sufficient to attain sustainable development; it suffices for this purpose the pursuit of environmentally conscious socioeconomic SDGs. This green-growth perception of sustainable development allows it to take on different content for different initial conditions, acknowledging thereby the diversity of policy means under which such development may be sought across countries and regions, regardless the phase of the business cycle.

Keywords: Sustainable Development; Green Growth; Green Agenda; Optimal Control Theory

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1. Introduction

In 2015, the General Assembly of the United Nations (UN) adopted 17 sustainable development goals (SDGs), which are supposed to “stimulate action over the next 15 years in areas for critical importance for humanity and the planet” (UN 2015, p. 5). These goals are summarized in Table A1 in the Appendix, while following the systems approach of Barbier and Burgess (2017), they are classified into economic, social, and environmental SDG sets (SDGSs) as in Figure 1. They refer to: 1. No Poverty; 2. Zero Hunger; 3. Good Health and Well Being; 4. Quality Education; 5. Gender Equality; 6. Clean Water and Sanitation; 7. Affordable and Clean Energy; 8. Good Jobs and Economic Growth; 9. Industry Innovation and Infrastructure; 10. Reduced Inequalities; 11. Sustainable Cities and Communities; 12. Responsible Consumption and Production; 13. Climate Action; 14. Life Below Water; 15. Life on Land; 16. Peace, Justice and Strong Institutions; and 17. Partnerships for the Goals.

Sustainable development is defined to occur at the intersection of these three sets of goals, forming elliptic triangle $AB\Gamma$. SDGs are *desiderata* and hence, the intersection includes only the SDGs that reinforce the path towards sustainable development not only within and but also across SDGSs. For example, Nilsson et al. (2016) have observed that ending hunger in sub-Saharan Africa is related inversely to renewable-energy production and the protection of the terrestrial ecosystem. Also, von Steckow et al. (2016) point to possible tradeoffs between improved climate action and quite a few other SDGs. It is clear that in so far as sub-Saharan Africa is concerned, if the environmental SDGs are to belong to the intersection triangle $AB\Gamma$, they will do somewhere along triangle side $B\Gamma$ on the boundary of the environmental SDGS at most. But, is even this possible based only on the concern for the SDGs of the remaining two, socioeconomic SDGSs? Also, do country/region-specific initial conditions produce different reading of sustainable development from the point of view that one, for example, country perceives such development to be close to point B and another country sees it in connection with point Γ ?

The purpose of this article is to give a first answer to these questions. Letting the elements of the environmental SDGS comprise the so-called “Green Agenda” and the boundary of this set be consistent only with “Green Growth”, the two issues of concern are: (i) whether environmentally conscious or the same, green-growth minded socioeconomic policymaking can produce sustainable development at least from the viewpoint of green growth, (ii) whether the matter of green growth can be consistent with a variety of initial conditions, and ultimately, (iii) whether a green agenda is neither necessary nor sufficient to yield sustainable development. What green growth entails in the context of the discussion herein is acknowledgment of the environment as an input in the production process, the presence of institutional arrangements dealing with environmental externalities effectively, and mechanisms ensuring ecosystem resilience (Arrow et al., 1995). The basis of any sound political economy is certainly socially inclusive economic growth, which nevertheless cannot be sustained in the long-run if the environmental component of such growth is neglected. Growth has to be “green” too, and, inclusive green growth has to address the market, policy, and institutional failures that lead to the overuse of natural assets.

Analytically, this article considers general economic and social policies to be policy instruments intended to influence the goal of overall economic growth, but this goal is viewed in turn as a policy means towards sustainable development. And, we ask whether such development is still feasible if the policy-means are green-

growth minded given that the lack of policy means from the environmental SDGs is in practice equivalent to unconcern about a green agenda. The formal discussion of this issue is based on elementary optimal control theory in the next section, being hence general over the identity of the missing policy means, but in reality, only the environmental SDGs-policy means may be disregarded; otherwise, sociopolitical unrest will be steered. Consider, for instance, the current US administration, which plans to reconsider its environmental concerns as expressed in Paris Agreement (Feldscher, 2017). Can the US proceed towards sustainable development based on economic and social policies alone but policies reflecting environmental concerns too, so that the US can achieve ultimately sustainable development somewhere along the base of the intersection triangle?

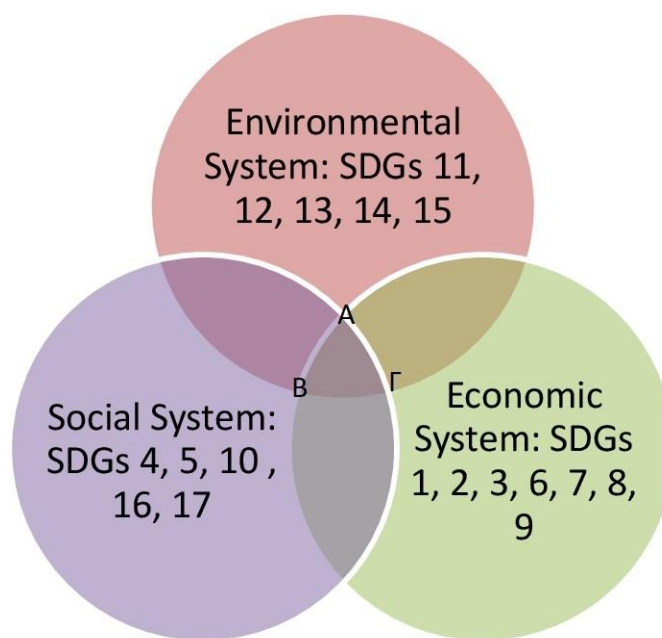


Figure 1. The Barbier-Burgess Systems Approach to Sustainability Applied to the 17 SDGs

A similar question may be posed in connection with the above example of sub-Saharan Africa. More importantly, modern globalization is plagued by increasing national and international wealth inequality, having taken its toll on real economic activity worldwide except for the net beneficiaries of globalization, China and India (Rodrik, 2017). Does it make sense to be contemplating a better environment even as a good by itself, separately from the matter of sustainable development, if by doing so the sociopolitical unrest fomented by globalization will be aggravated? The case of globalization illustrates vividly why policy should be aiming at the intersection of two at least SDGs and that these two sets cannot be other than the economic and social ones. It also illustrates whether it is feasible to be aiming at sustainable development regardless the state of economic activity or the same, starting from any point along the phase of the business cycle. Section 3, which concludes this article, elaborates on this matter further.

2. Formal considerations

Suppose that the goal, g^* , of a policymaker is to attain sustainable development, but one SDG from each of two only SDGSs may be used as means towards that end. Hence, the goal of the policymaker is to steer the social economy towards a point on one of the three sides of the elliptic triangle of sustainable development in Fig. 1. The policy goal g^* lies on a triangle side that depends on the particular SDGs chosen as policy means; for example, $B\Gamma$, will be this side if one policy means-SDG is chosen from the economic SDGs and a second such policy means is chosen from the social SDGs. The two policy means-SDGs, p and q , have to be positively related from the point of view of contributing both of them to the attainment of g : $\partial g/\partial p > 0$ and $\partial g/\partial q > 0$. For example, "From a growth perspective, therefore, the promotion of certain dimensions of gender equality may appear to offer a win-win solution but from a gender equity perspective, there is no guarantee that growth on its own will address critical dimensions of gender equality" (Kabeer and Natali, 2013). Noting next that economic SDGs 1, 2, 3, 6, and 7 presuppose good performance in terms of the also economic SDGs 8 and 9, which performance is corroborated in turn by the social SDGs 4, 10, and 16, one concludes that only an economic policy centering around SDGs 8 and 9, and accompanied by a social policy in connection with SDGs 4, 10, and 16, can lead towards some g^* on $B\Gamma$, improving along the way all other SDGs indirectly.

But, is this possible? This is one key question that the present article tries to answer. It is clear that analytically, p and q , are composite indices of such policy combinations within the corresponding SDGSs while g is a composite index of all 17 SDGs. It is also clear that g^* belongs to the boundary of the SDGS whose members are excluded from the set of policy means and therefore, p and q should implicitly reflect concern about this SDGS, too. If, for example, this is the environmental SDGS, the general economic and social policy should also be reflecting green-growth concern for natural-resource use and environmental protection even though none of these goals is handled as a means by itself. As a policy concern by itself, optimal resource-use may be prohibiting its exploitation as an input of production. Yet, if for some reason, the manifestation of such a concern is absent, care about the exploitation of this resource may still be taken by adjusting the production plan as deemed fit.

Moreover, assume for simplicity that:

$$g = bp + hq \quad (1)$$

where b and h are some positive constants so that $\partial g/\partial p > 0$ and $\partial g/\partial q > 0$. This is a general expression which does not specify the SDGSs from which p and q are drawn. It also presumes that one only policy means is not enough to reach g , which assumption does derive empirical content from the above considerations. Moreover, to ensure that one mean cannot substitute for the other as it appears to be the case by setting $dg = 0$ in the total differential of (1) and solving next for $\partial p/\partial q$, the changes in policy means are assumed to be costly. To have an increasing marginal cost of adjustment, costs, c , are modeled as a quadratic function of the rate of change of the policy means: $c_p = \theta \dot{p}^2$ and $c_q = \vartheta \dot{q}^2$; the subscripts denote the means whose adjustment cost is contemplated, θ and ϑ are constant coefficients, and the dot ($\dot{}$) designates time derivative.

Now, the policymaker is called for to minimize these costs plus the square of the deviation of the goal variable from what is thought to be its optimal value, i.e. minimize:

$$\mathbb{Z} = \int_0^{\infty} [\epsilon(g - g^*)^2 + \theta \dot{p}^2 + \vartheta \dot{q}^2] dt \quad (2)$$

subject to (1), where t is time and $\epsilon > 0$ is the cost of having the goal variable away from its optimal value. When (1) is inserted in (2), the Euler conditions are:

$$\dot{p} = \epsilon\theta(bp + hq - g^*)/\theta$$

$$\dot{q} = \epsilon\vartheta(bp + hq - g^*)/\vartheta$$

with characteristic equation:

$$\theta\vartheta\mu^4 + \epsilon(b^2\theta + h^2\vartheta)\mu^2 = 0$$

and solutions of the form:

$$p(t) - p^* = \Phi \exp(\mu't) \quad (3)$$

$$q(t) - q^* = \Phi \frac{h\theta}{b\vartheta} \exp(\mu't) \quad (4)$$

$$\mu' = -\sqrt{[\epsilon(b^2\theta + h^2\vartheta)/\theta\vartheta]} \quad (5)$$

$$q^* = (g^* - bp^*)/h \quad (6)$$

given convergence of policy means to finite optimal stationary values, p^* and q^* ; μ' is the only negative root of the characteristic equation. That is, given the goal g^* , policy means p and q suffice to form the optimal policymaking to reach this goal. Also, at $t = 0$, (3) and (4) give that:

$$\frac{q_0 - q^*}{p_0 - p^*} = \frac{h\theta}{b\vartheta}$$

So, given g^* , the optimal policymaking depends entirely on initial conditions. And, finally, the above algebra implies that adding a third policy means would complicate policymaking and policy implementation considerably.

It is the algebra of optimal control theory, which in so far as sustainable development is concerned, says that the green agenda of the environmental SDGs is neither necessary nor sufficient to attain sustainable development; it suffices for this purpose the pursuit of environmentally conscious socioeconomic SDGs. Such a viewpoint of sustainable development acknowledges in addition that g^* may differ across sovereignties and regions depending on differences in local conditions. To utilize again our real-world examples above, president Trump's approach to sustainable development may be as good as a much different approach by sub-Saharan Africa, aiming, for instance, the former to a g^* which is closer to point Γ on $B\Gamma$ in Fig. 1, and the latter to a g^* being closer to B. It is a perception of sustainable development which is much closer to that advanced at the UN Conference on the Human Environment held in Stockholm in 1972, according to which the issues of development and environment should be treated in a mutually beneficial way. The green agenda seeks on the contrary to subjugate development to the environment, weakening subsequently development, and inducing

the alleviation of the aggravated poverty and hunger by government benefits whose availability is hurt in response to the declining tax base.

Our simple algebra refutes also the environmental Kuznets curve according to which socio-economic growth can take care of its adverse environmental repercussions by itself in line with an inverted-U relationship between environmental degradation and per capita income. Indeed, Barbier et al. (1996) among others found that “[w]ithin the horizon of the [World] Bank’s forecast (2025) global emissions of SO₂ continue to increase. Forest loss stabilizes before the end of the period but tropical deforestation continues at a constant rate throughout the period”. The economic-growth induced increase in per capita income that globalization would supposedly induce did not verify the inverted-U hypothesis simply because this hypothesis is based on a number of unrealistic assumptions. Samimi et al. (2011) document this clearly. Seeing globalization as a factor enhancing per capita income, *ceteris paribus*, our analysis does suggest too, that it cannot contribute even to green growth, let alone to the satisfaction of some green agenda. This is perhaps one reason why the green agenda and globalization are being advanced jointly, namely to serve the agenda as a remedy to the environmental concerns raised by globalization.

3. Concluding remarks

This article has put forward one argument in favor of sustainable development from the perspective of green growth rather than green agenda. The main reason for this thesis is the priority of the socioeconomic element over the environmental one under the current disappointing performance of globalization in so far as developed countries are concerned, and the pressing need for socioeconomic growth in the less developed world. As a matter of fact, green growth is what the bulk of the relevant literature has been emphasizing (OECD 2012) for many other reasons. First, as noted earlier, the 17 SDGs disregard the chain of causalities surrounding them, rendering green agenda SDGs a matter of rhetoric or ethics. For example, what can sustainable consumption, production, and cities mean under increasing poverty and hunger? Or, is it that “[s]upport for sustainable development is based on confusion about its ethical implications and on a flagrant disregard of the relevant factual evidence”? (Beckerman 2002). Second, green growth is a plausible quest relative to extremes like those by the degrowth and zero-growth advocates of the green agenda (Martínez-Alier et al., 2010) or those maintaining that environmental regulation hurts economic growth, and may thereby reduce environmental quality (Barlett, 1994).

One final point that needs to be made in support of green growth as opposed to green agenda is that the latter is politicized without adding to the quest for improved economic efficiency. Saint-Paul (2017) finds out that the pursuit of green cities, for example, leads to segregated, or in his jargon, “bunkerized” equilibria in which some environmentalist-left wing “bourgeois bohème” (bobos) lives in the “highly green” city center along with the workers serving it; and the rest of the population with its cadres lives in the periphery of the city, without any commuting between the center and the periphery. Bobos in fact are willing to subsidize this segregation. Putting aside the political and ethical issues raised by such developments, the entire scheme is not far from Tiebout foot voting, which brings federalism all the way down to local governments and private

communities. The local public good which is applicable to this scheme is certainly the local environment. And, the basic conclusion of the literature on Tiebout hypothesis “ is that only under very restrictive assumptions will foot-voting and interjurisdictional competition ensure allocative efficiency in the local public sector” (Chaudry-Shah, 1988, p. 209). And, the remaining SDGs of green agenda do not appear to address this issue.

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