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Analysis

The Middle-class Collapse and the Environment

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ABSTRACT

The thesis that unequal societies are harmful to the planet was defended by Boyce (1994) in a framework based on the unequal bargaining power between rich and poor. Our study reinvestigates this theory by removing any reference to power in order to study the conditions under which it can still occur. We show that a middle-class collapse can aggravate or alleviate the burden on the planet, depending on income disparities and weight of upward vs. downward mobility. Moreover, the paper shows how an appropriate *Environmental policy* can increase the political acceptability of a *Social one* designed for mitigating the deleterious effects of a middle-class collapse through the reduction of (ex-post) income disparities.

1. Introduction

The rise in inequality since the 1980s in many rich countries, sometimes close to the levels of the 1920s, is indisputable (Atkinson et al., 2011).[1] Krugman (2007) notes that the top 100 CEOs in the United States of America saw their income surge by around 2800% between 1970 and 2000, whereas the pay of all employees only increased by 10%, notably because the incomes of the 20% lowest paid workers decreased during this 30-year period. Dew-Becker and Gordon (2005) show that productivity gains since 1980 have benefited the top percentile, whereas the mean wage has remained stable. Piketty and Saez (2003) confirm the contrasts by noting that the share of the US income owned by the wealthiest percentile was about 25% in 1998 compared with 18% in 1913. Even more meaningfully, while in 1970 the 0.01% richest earned 70 times more than the average household, in 1998 their income was 300 times higher, meaning that these 13,000 "happy few" earned almost as much as the 20 million poorest ones combined.

Despite criticism of the concept of sustainability, the debate on sustainable development has usefully focused attention on the urgency to save our planet around three essential pillars: (i) the economic dimension; (ii) the environmental dimension; and (iii) the social dimension. From this point of view, and despite the slow search for operational criteria (Howarth, 2007), we now reside in a post-Brundtland world (Sneddon et al., 2006), and the environmental question comprises a part of the political agendas of nations.

But in retrospect, maybe the social dimension of sustainable development was relegated too quickly to the secondary position behind the ecological one in certain rich nations, which is quite paradoxical given the widespread discussion on the issues of inequality and poverty in poor countries hampering their efforts to face their environmental challenges. In this regard, the question of inequality and poverty preventing rich nations from addressing their own ecological problems has thus far received limited scholarly attention. At best, we can cite the works on environmental justice from Bullard (1983) to Bullard and Wright (2009) as well as Pastor (2001), Baden and Coursey (2002), Ash and Fetter (2004), Boyce (2007), or Ash et al. (2009) for instance. Yet while these studies show the existence of environmental segregation at the urban level, they do not establish that the ecological impact of the most unequal cities is greater than that of the less unequal ones; even though this is probably true. Concerning the broader links between national inequality and a country's inclination to harm the planet, it took yet years to read the thesis that the most unequal nations cause the greatest ecological damage (Boyce, 1994).

More generally, Boyce (1994) is interested in iniquitous cases where victims of pollution have no means to get compensation from polluters for the damage they cause, especially business owners directly interested in the possibility of polluting freely, and even less to demand that they reduce their emissions. By studying the links between several

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[1] See also Piketty and Saez (2003) for the USA, Atkinson (2005) for the UK, and Saez and Veall (2005) for Canada, all confirming a "great divergence" (Krugman, 2007; Noah, 2012) after 30 years of a "great compression" (Goldin and Margo, 1992).

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environmental indicators and measures of economic and political inequality, Torras and Boyce (1998) confirm that the most unequal nations are also more harmful to the planet. In widening the topic to health, Boyce et al. (1999) show that the more economic and political power is concentrated, weaker are environmental measures, at the expense of health. In the same vein, Magnani's (2000) study on OECD members shows that inequality reduces R&D expenditures in environmental protection. In an institutional approach on the best way in which to preserve forests in Mexico, Klooster (2000) shows that in most unequal villages where timber management is dominated by the rich, resources are overexploited, while when distribution of rights is more equal, communities manage the resources with a more conservationist approach since no group can nor seeks to impose its rules. For their part Holland et al. (2009) show that biodiversity has regressed at a tragic pace during the past 50 years with a significant link to inequality. Naturally, other researchers do not find such a link, like Scruggs (1998) for instance on a sample of OECD nations, but his data on inequality are dated from 1980, before the clear rise observed during the three following decades.

While Boyce's (1994) seminal paper concentrates on the supply side of the economy and adopts a Political Economy perspective (based on the idea that rich people have the power to delay public action on environmental matters, so that the more society is unequal, and the power concentrated, the more the planet suffers), our study re-investigates the link between inequality and ecological pressure but by eliminating any notion of power through a demand-side approach with many atomistic agents/consumers. Thus, our model will be based on this reality that consumers remain relatively ill equipped compared to the big firms that dominate today's global markets and thus, that they cannot influence in depth the markets and rules under which these firms make their business on a world scale. And in this perspective, formally verifying Boyce's thesis, even conditionally but after having eliminated any notion of (political and/or economic) power, will contribute to our knowledge on the link between inequality and ecological pressure.

Our focusing on the demand-side of the market is not only due to our wish to exclude any notion of power, but also to the fact that global overconsumption of lands, energy and raw materials, is due to the wish to satisfy (and prolong) an insatiable demand, with two severe: the overproduction of waste and GHG (Rothman, 1998; Stern, 2004) and some unmatched biodiversity losses up to date (Holland et al., 2009; WWF, 2014). While some inverted-U shapes seem appear with the income of nations regarding pollutants from the supply side of the market (since firms have theoretically an incentive to reduce their inputs and, in this way, their waste and other emissions *per unit of production*), this is still not the case regarding many of our emissions, waste, and harms to the biodiversity, which ultimately depend on our still unsustainable consumptions and lifestyles (Bagliani et al., 2008). Crucially indeed, none of these threats follows an inverted U-shape with the income of nations. Regarding e.g. the emblematic case of CO_2, there is no consensus on an environmental Kuznets curve, not even among the rich nations. While Roberts and Grimes (1997), Schmalensee et al. (1998) or Sun (1999), for instance, seem find such an EKC, others like Shafik (1994), Holtz-Eakin and Selden (1995), Taskin and Zaim (2000), Heil and Selden (2001), Friedl and Getzner (2003) or Lantz and Feng (2006) conclude in the opposite direction. Thus, the idea of a favorable issue *à la* Kuznets remains largely unclear at the individual and country scale (Ekins, 1997; De Bruyn et al., 1998; Stern, 2004), and even more at a global one if we include the effect of the partial relocations of polluting activities in emerging markets. This is even more dubious when we add the indirect or outsourced costs of the environmental policies of the rich countries (Mayer et al., 2005[2]), making globalization always unsustainable (Tisdell, 2001). So, we will rule out any reference to an inverted U-shaped link between income and environmental pressure in our model, preferring to assume a monotonic relationship at the consumer's level.

The remainder of this paper is organized as follows. Section 2 presents the method used to tackle the inequality–environment relation. Section 3 gives and discusses the results. Section 4 concludes.

2. Material and Methods

Our stylized model formalizes the link between inequality and environmental pressure in a consumption-based framework without power relationships and with a monotonic relation between income and consumption. It introduces three classes of agents distinguished by their income levels and three ranges of products with various environmental impacts.

2.1. Model Structure and Assumptions

2.1.1. Society and Demography

We assume a society whose *population* is normalized to 1 ($N = 1$) and composed of three social classes ($i = 1, 2, 3$): the poor of size N_1, the middle-class of size N_2, and the rich of size N_3. Since N is normalized to 1, the weight of each class is thus $\theta_i = N_i/N = N_i\ (\forall i)$ with $\Sigma\theta_i\ (=\Sigma N_i) = 1$.

2.1.2. Economic Agents

We consider a consumption society where each agent of type i ($i = 1$ for poor people, $i = 2$ for the middle-class and $i = 3$ for the rich) derives utility U^i from the consumption of three ranges j of goods and services ($j = 1$ for the low range, $j = 2$ for the middle range and $j = 3$ for the high range), thanks to an income Y_i assumed as given, with $Y_3 > Y_2 > Y_1$.[3] Formally, the utility of any agent i ($\forall i$), for the consumption C^i_j of the three ranges j, follows a Cobb–Douglas function:

$$U^i = \left[C^i{}_1\right]^{\alpha_1} \times \left[C^i{}_2\right]^{\alpha_2} \times \left[C^i{}_3\right]^{\alpha_3} \forall\, i = 1 \text{ to } 3, \text{ with } \alpha_1 + \alpha_2 + \alpha_3 = 1$$

where αj ($j = 1$, 2 or 3) represents the weight granted by agent i ($\forall i$) to the consumption of each range j of goods and services (G&S thereafter).

Thus, by assuming that preferences are the same from one social class to another (so that the αjs are the same for all agents, whatever social class), we adopt a standard framework with representative consumers, considering that these latter have the same tastes whatever their class and differ only by their means to consume. To clarify, a poor person who would have access to wealth would wish at first to consume more and, above all, more from the highest ranges, like the rich. In the same vein, a rich who would have fallen into poverty would be constrained to consume less by necessity and especially less, nay anything at all, in the highest ranges. And this, even if his intrinsic preferences have no fundamental reason to have changed, not more, besides, than those of the poor person would have reasons to change in depth since in reality there is no ultimate reason that their deep preferences be so different and once and for all unsurpassable. Indeed, poor people, as everyone, have no reason to prefer the low-end products and surely not for the remaining years of their life if they had to become rich and once having exceeded prime habits. They are also capable of discernment regarding the ranges of products so that a great majority, nay all, would like to consume more and especially in higher ranges,

[2] The authors show the "boomerang effect" of forest policy in Finland. Since demand for wood has never dropped, the Finnish success story has led to the degradation of same forests, but in Russia.

[3] Our model is oriented on the demand side of the economy letting aside its productive dimension. We thus assume a partial equilibrium approach where consumers of the three social classes have unequal incomes, as unequal *Walrasian endowments*.