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The Resolution Of The Cornucopian-Ecologist Issue On Global Warming-Climate Change

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ABSTRACT

Cornucopians and ecologists have debated the hypotheses of global warming as a result of the emission of greenhouse gases for several decades, focusing upon different interpretations of risk: resilience against precaution. One can now employ recently available data on GDP, energy consumption, emissions and global average temperature to decide between these two positions. The cornucopian position is wrong, the evidence strongly indicates.

Key words: greenhouse gases, global temperature, energy consumption, GDP per capita, cornucopians, ecologists, Simon, Wildavsky, Lomborg, Lovelock, CPRs, logic of collective action.

INTRODUCTION

For two decades the battle over global warming – climate change has raged with the sciences, especially within the social sciences. What social scientists debate is whether our social systems generate the problematic of global warming as well as whether policies should be enacted to combat climate change. At the centre of this heated discussion is the nature of the global market economy: Does global capitalism result in the pollution of the atmosphere besides overall environmental degradation?

In this article I will employ most recently available data to show that there is a link between the economy and greenhouse gases over the consumption of massive amount of energy, which all lead to global average temperature rise. The recent much talked about climate report stated:

Climate change, once considered an issue for a distant future, has moved firmly into the present. Corn producers in Iowa, oyster growers in Washington State, and maple syrup producers in Vermont are all observing climate-related changes that are outside of recent experience. So, too, are coastal planners in Florida, water managers in the arid Southwest, city dwellers from Phoenix to New York, and Native Peoples on tribal lands from Louisiana to Alaska. This National Climate Assessment concludes that the evidence of human-induced climate change continues to strengthen and that impacts are increasing across the country. [U.S. Global Change Research Program, 5/6/14; *Media Matters*, 5/7/14]

The Cornucopian Position

Until the recent release of this climate change report to the US federal government, politicians have not taken the hypothesis of global warming or its accompanying hypothesis of climate change too seriously. There are of course exceptions, but in general the elites in politics and business adhere to the cornucopian view, namely that climate change if really occurring is due to other factors than an irreversible global warming process as well as that the burning of fossil fuels has little to do with this process of global warming. On the contrary, cornucopians regard the recent climate change report as "climate hysteria", because the more affluent the

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world becomes due to economic growth, the better it will handle pollution. Planet Earth is a horn of plenty (*cornucopia*).

The action implications of the cornucopian position are clear: do nothing about global warming, which may actually result from temporary and irregular changes in the sun. This no-policy stance is called: *resilience*. Global coordination upon the governance of climate change policies is a waste of time and resources that could be employed to fight other problems of the planet, like poverty, deceases, malnutrition, etc.

The cornucopian position was first developed by economist Simon (2003) and political scientist Wildavsky (1988, 1997). It was part of a general rebuttal of environmentalism and deep ecology, based upon the argument that economic incentives when allowed free reign will sooner or later solve pollution problems though technological innovation. What are crucial are private property rights, as they induce people to clean up around themselves. The world has enormous resources which can be tapped wisely through allocation in perfect markets. Scarcity is only a temporary phenomenon.

Whereas Simon in his critique of environmentalism targeted in particular the fear of a population boom with attending scarcities of resources, Wildavsky focused upon the ecological accusations against business of selling unsafe products of various kinds. Yet, both rejected emphatically the three hypotheses concerning global warming and climate change, stated above.

The cornucopian position is today connected with the books and writings of Danish Bjorn Lomborg (2001, 2007, 2009, 2010, 2013). He has argued perhaps somewhat inconsistently along four somewhat different lines of argument:

- The first hypothesis about global warming is not sufficiently backed by data;
- The second hypothesis about a link between temperature rise and greenhouse gases is not supported by data, nor is it plausible.
- The third nypothesis cerning climate change being the outcome of global warming is not correct, as it could be explained better by other hypotheses;
- Finally, it is not economical to engage in lots of costly actitivies to counteract global warming and the emission of greenhouse gases.

The only policy stance supported by this scepticism about global warming, emissions and climate change is: resilience, or wait and see.

Environmentalism

There is a variety of schools within environmentalism, from prudent anthropomorphism to radical deep ecology, but they all tend to endorse the global warming – climate change hypotheses stated above. The differences in opinions between the various environmentalist positions do not concern the existence of global warming and climate change. Instead, they cover other dimensions in ecology policy, such as:

- How far is mankind to be allowed to draw upon natural resources for its livelihood and nourishment?
- What species besides the human beings are considered to have so-called moral standing?
- How is the principle of sustainability to be defined?

Radical environmentalism, or deep ecology, states that the human race has become too numerous for Mother Earth and that it directly or indirectly eliminates other species. Here, I would argue for prudent anthropomorphism.

It cannot be more underlined that the global warming hypothesis is not self-evidently true. It needs backing from a set of empirical evidence that would be increasing as research into climate change continues. One could refer to theoretical support in the form of the laws of thermodynamics, stating that energy is indestructible. Thus, burning such an incredible amount of fossil fuels to get energy must result in pollution and heating. In any case, accumulating empirical data supports the three links established in the Figure 1 below:

- From global GDP to global energy usage;
- From total energy consumption to global emissions of CO2 equivalents;
- From CO2 emissions to temperature rise.

Nothing indicates that we may expect any changes in these trends (a) – (c) above. Why, then, is the global economy like a *Juggernaut* in producing them? And why is politics so ineffective in counter-acting climate change? To understand why coordination to counteract global warming is extremely difficult, either by means of voluntary means in the market economy or through state cooperation in IGOs, we need to draw upon the lessons from modern game theory, both 2-person game theory and N-person game theory, about collective action.

Basics Of Global Warming

CO2 equivalent emissions are generated in several ways. The focus in the debate about global warming is upon the contribution of the prevailing economic system, referred to as the "global capitalist market economy". This makes an analysis of the economic background of global warming politically relevant. However, emissions are produced by human beings breathing as well as animals digesting. Thus, emissions go up as the world population grows. Moreover, emissions are increased when the forests, especially the rain forests and the Siberian forests, are cut down and burned. And the more acid the oceans, the less CO2 they can take up.

The focus upon the impact of the economic system upon emissions includes not only illegal activities such as logging the Siberian forests and burning the rain forests or increasing desertification in Africa and Asia. It covers the entire effect of economic production upon the emissions of C02 equivalent stuff via the key link: energy consumption, or mainly the frantic burning of fossil fuel. We start by looking at the relationship between total global economic output and total energy consumption for the period 1990-2011.The global market economy delivering goods and services or income uses an enormous amount of energy. Figure 1 shows the close link between GDP and energy consumption. As global income has almost doubled since 1990, so has energy consumption – see Figure 1.

Given the almost one to one increases in GDP and energy use, one understands the attention devoted to increase energy efficiency, meaning more output for less input of the main types of energy sources today: fossil fuels (80 %), atomic energy (5%) and renewable energy (15%). One has suggested that hydrogen and electricity should be used more, but they are intermediate energy sources, to be derived ultimately from the ones employed today. To use fossil fuels to get hydrogen or electricity involves little gains in energy efficiency.

Today's energy problematic has two somewhat contradictory aspects or sides, the fear of running out of oil on the one hand (Hubbert peak), and the reduction in usage of atomic energy on the other hand. Although the risk of a Hubbert peak for oil has subsided due to the arrival of the exploitation of shale oil and gas, it is true that some countries face Hubbert peaks for their conventional oil production, like Norway and Russia for instance.

Environmentalists are much concerned about the massive retrieval of shale oil and gas, but at the same they cheer the reduction in the use of atomic energy. When a country like Germany

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decides to give up atomic energy, then the risk is considerable that the usage of coal will increase. Today Germany imports large amount of coal from Columbia with negative environmental impact for Indians as well as Germans.

It is a matter of searching for safety, when environmentalists reject shale oil and gas as well as atomic energy. Policy-making for the environment and energy is much based upon risk evaluations, as underlined by late American Aaron Wildavsky (1988, 1997). The fear in relation to shale oil and gas is the attending environmental destruction, whereas the danger in relation to atomic stations refers to human damage. It seems that both horn of this dilemma are potentially destructive.

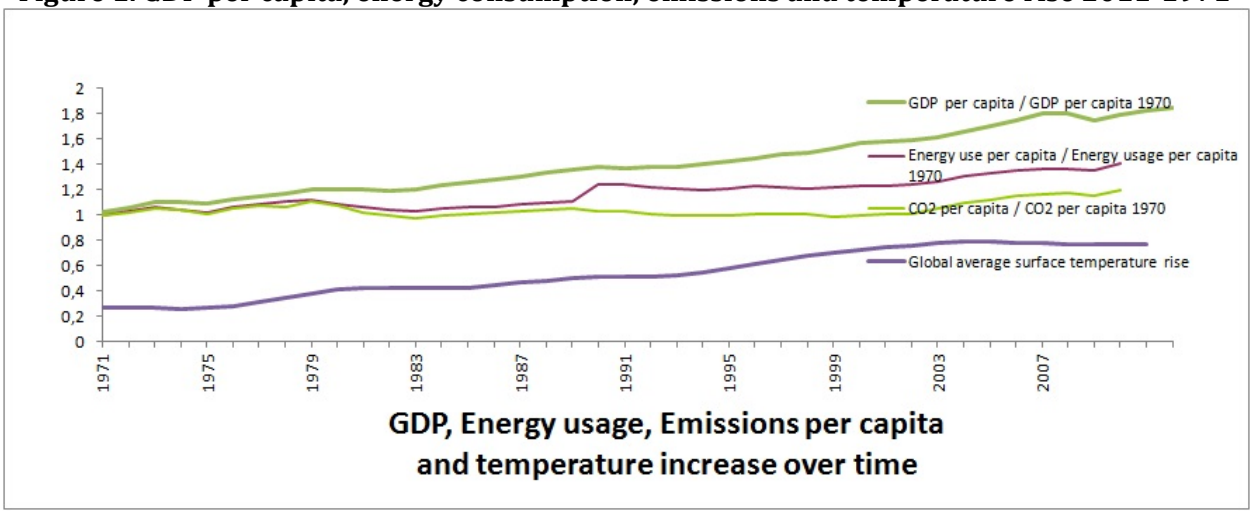
When it comes to the environmental risks with resent day structure of energy consumption, it is the rapidly increasing CO2 emissions that take centre stage. Environmentalist Lovelock (2000) saw atomic energy as the promising way out of the fossil fuel – emissions dilemma, but in vain it seems at the moment. The key focus is now upon the link between energy and CO2 emissions.

The usage of energy produced in various forms results in an enormous amount of pollution, namely CO2 equivalents. It is again a matter of an almost one – to – one relation. As energy usage has expanded by some 50% since 1990, so have emissions increased by roughly 50%.

Given the slope of the graph (Figure 1), one understands the search for energy that has less emission of CO2 equivalents or perhaps even no emissions at all. That would be sun based energy, either heating or directly retrieved electricity. Sun generated energy is most promising, but it is not economically competitive with the burning of fossil fuels. Thus, the global energy-environment conundrum has a most essential basis in the global market economy.

I adhere to the hypothesis that emissions are conducive to global warming or climate change. It is true that some scholars reject this hypothesis and others claim it is too costly to do anything to counter-act global warming (Lomborg, 2013). But the accumulating evidence supports this hypothesis, which when true would by a guiding idea for all forms of change in both our social and natural systems for the 21rst century.

Figure 1. GDP per capita, energy consumption, emissions and temperature rise 2011-1971



Note: GDP per capita, energy consumption per capita, CO2 equivalent emission per capita – all 2011/1971; global average temperature 1971 and 2011. Sources: http://ds.data.jma.go.jp/tcc/tcc/products/gwp/gwp.html; World Bank Indicators - data.worldbank.org/indicator.

One may move on from looking at the link between GDP and emissions to study the link between emissions and temperature rise. Figure 1 indicates a strongly positive relation between emissions and temperature rise since 1990. Since energy consumption is predicted to keep going up sharply in the next 10 years or so, we arrive at the global warming scenario with at least 2 degrees warming, if not more. This trend could only be reversed if sun power replaced fossil fuels to a significant extent, but that is an economic question for the global market economy as well as a problem for ecology coordination in the political systems of the Earth.

Collective Action And Global Warming

There is no lack of proposals for combating climate change. They range from various methods to increase the price of fossil fuels – taxes, markets for pollution permits etc, over blueprint schemes to massive usage of sun power to various forms of rule make – national, international, and regional – about the overuse of environmental resources, like forests or rain forests. They founder all upon the impossibility of the global market to handle externalities due to the omnipresence of free riding.

In the global market place, players are driven by clear incentives: minimize costs and maximise benefits in the short run. All proposals to cut down emissions, either by making fossil fuels more expensive or halting the cutting down of forests, are based upon some form of altruism, which market egoism will not accept, however this scheme is formulated, enacted or enforced. The emission of CO2 equivalents like the destruction of the rain forest constitute in reality external effects that the market economy will not pick up and price correctly. Thus, reneging upon external costs is the incentive compatible strategy by market players – that is the strategy of free riding in collective action.

The atmosphere like the rainforest is an open access resource in a global market economy. From the point of view of the incentives of the market players, whoever they may be: entrepreneurs, firms, nations or illegal operators, the game involves is the so-called Prisoners' dilemma, where the rational solution of the interaction (Nash equilibrium) is defection instead of cooperation to eliminate externalities. Thus, shale oil and gas will replace conventional oil, coal fired power stations will continue to be built and loggers and peasants will compete in cutting or burning down the rain forests.

It has been argued that a so-called common pool regime (CPR) may overcome the PD-game that drives the "tragedy of the commons". CPRs would rely upon the logic of iterative and successive PD-games to generate a stable cooperative outcome – the Tit-for-Tat solution (Axelrod, 1984). The players would start cooperating and then defect as a response to defection, retaking cooperation against cooperation. The CPR scholars find such strategic behaviour behind the protection of open access resources like pastures, irrigation schemes and voluntary quotas in fish harvesting (Ostrom, 1990; Keohane and Ostrom, 1994). However, these CPRs are basically national ones, limited to a country of non-compliance by free riders can be counteracted, in the last resort by some form of state intervention.

In a globalised market economy, CPRs are extremely difficult to establish and operate. Thus, China and India will refuse to pay extra for carbon emissions via some scheme, claiming that more expensive coal would hinder their catch-up with advanced economies. After all, carbon emissions per capita are higher in several rich countries, especially in the Gulf monarchies. The Stern Review (2007) suggestion that Western countries and Japan should assume the developing country's burden of extra costs for paying for carbon externalities was unrealistic, given the present economic weakness of the US and the EU.

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The conditional cooperative strategy in a PD-game is not a Nash equilibrium when this is iterated in a finite series of play. The backwards solution gives the sub-game perfect Nash equilibrium of reneging at each node. Voluntary schemes of cooperation are bound to break down sooner or later. They persist because there is some form of third party intervention.

International CPRs are extremely difficult to implement fully, meaning the enforcement of the rules in question – take e.g. the International Whaling Commission. These institutions like CPRs are also very difficult to set up by political coordination among governments – the social choice problematic.

The UN has engaged in global state coordination in relation to global warming. It has held a large number of global reunions about climate change and it operates a large program – UNEP – with numerous global activities to protect the environment. However, the global meeting of states has resulted in little expect expressing support for vague principles like e.g. sustainability. The difficulty of a group to take collective action has been modelled in N-person game theory, analysing the drawbacks of a decision rule like unanimity or highly qualified majorities.

The UN global ecology coordination uses unanimity, meaning that each state has a veto against collective action proposals. As the number of participating states is high, the probability of a final positive decision is extremely low. Tiny states have the same weight as the huge states in the G20 group. The outcome is endless meetings but no decisive collective action: the so-called Polish Diet or *liberum veto.*

CONCLUSION

The much debated issue of global warming and greenhouse gases between cornucopians and ecologists can now be decided with much confidence. There is a significant increase in global temperature due to the emission of greenhouse gases. It is worrisome, as climate change will be permanent and yet unpredictable. Global warming is to a considerable extent driven by economic development, requiring enormous amounts of energy, in order to deliver higher levels of affluence per capita.

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