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The Growth Imperative: Beyond Assuming Conclusions

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Abstract

There are compelling reasons to believe there is an unhealthy growth imperative inherent in private enterprise market systems that threatens the environment. Unfortunately, many who criticize a dysfunctional growth imperative fail to make a compelling case. This article argues that too often ecological and Marxist economists fail to answer crucial parts of skeptics' arguments and instead assume their conclusions, and offers an alternative defense of the unhealthy growth imperative hypothesis based on perverse incentives, institutional biases, and endogenous preference formation.

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growth, throughput, ecological economics, Marxism, endogenous preferences.

Mainstream economists have long regarded economic growth as something positive, and for most it continues to be their primary economic goal. On the other hand, many environmentalists increasingly view economic growth with suspicion, and worry that a *growth imperative* is at the bottom of our environmental problems. Search for common ground has proved frustrating as it led to a proliferation of competing definitions allowing almost anyone to march under the banner of *sustainable development*. What is one to think? Specifically, what are we to make of statements like: "Anyone who believes that exponential growth can go on forever in a finite world is either a madman or an economist" from ecological economists? (Boulding 1966). Or, "Capitalism is a system that must continually expand. No growth capitalism is an oxymoron" from Marxists? (Foster and Magdoff 2010). A good place to start is by asking precisely what it is that is growing, because often people are not talking about the same thing at all.

1. Ecological Economics and Growth

Ecological economists interjected a useful concept they call throughput into the growth debate. *Throughput* is defined as physical matter of one kind or another that enters the economic system

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from the natural environment, and physical matter than exits the economic system as waste to be absorbed back into the natural environment. Ecological economists point out that since physical stocks of different categories of natural resources are finite, and the capacity of the biosphere and upper atmosphere to reabsorb physical wastes of different kinds is also finite, economic throughput cannot grow without limit. Ecological economists turn this fact – which is undeniable – into a relevant point by arguing that (1) much thinking about economic goals and strategies implicitly ignores this fact, and (2) the future of our present economic system seems to be predicated on the false assumption that throughput can grow infinitely.

There is no denying that throughput has been growing mightily over the past few hundred years, and to many it is obvious that we are nearing limits on the ability of important components of throughput to continue to grow much longer. Contrary to what many environmentalists believed in the early 1970s, it now appears that we are exhausting the ability of the planet to absorb different kinds of physical wastes sooner than we are exhausting the ability of the planet to continue to provide natural resources. But either way, there is strong evidence that we left the "frontier economy" where human impact on the natural environment was not yet significant long ago, and are now well into a "bull in the china closet economy" where humans pose a serious threat to ecosystem resilience, even if we have not yet reached a "spaceman" economy where every aspect of our natural environment must be meticulously managed. Clearly we are pressing up against limits to the growth of some components of throughput, and even if we are farther away from reaching limits than some who are dismissed as environmental "alarmists" claim, eventually if throughput continues to grow we will reach a limit.

However, *throughput is not GDP*. And when mainstream economists talk about growth they mean growth of GDP which is defined as the *value* of goods and services produced during a year. It is measured in dollars not in the units we use to measure different kinds of physical matter throughput. Of course real GDP is measured imperfectly in "constant" dollars to correct for inflation, but these complications are beside the point.[1] The word "real" in front of GDP should not be taken to mean "physical," because it does not. Real GDP measures value not physical quantities.

So, *is it* theoretically *possible for real GDP to grow infinitely even though throughput cannot?* The answer to this first question is "yes." And that is the end of the all too facile claim that infinite growth is *impossible* on a finite planet, if what we are talking about growing is real GDP.

It is often the case that those who initially formulate an argument are more careful than their disciples. In this case Herman Daly is aware of an important distinction though his choice of words is partly responsible for the misconceptions of some of his followers. Daly acknowledges that "it is important to distinguish between the terms *growth* and *development.*" Daly goes on to define growth as "a *quantitative* increase in the scale of the physical dimensions of the economy, i.e., the rate of flow of matter and energy through the economy (from environment as raw material and back to the environment as waste), and the stock of human bodies and artifacts." Daly contrasts growth, so defined, to development which he defines as the "*qualitative* improvement in the structure, design, and composition of physical stocks and flows, that result from greater human knowledge, both of technique and of purpose." He then concludes: "On a finite earth there are biophysical and ethicosocial limits to the growth of *aggregate output*, but there may not be any limits to development" (Daly 1995: 125; italics added).

[1]Since the choice of "base year" when calculating real GDP is arbitrary, and since different base years yield somewhat different estimates of the rate of growth of real GDP, our ability to measure the growth of real GDP is inherently "fuzzy" around the edges. But this inconvenience is irrelevant here.

Using Daly's definition of growth, infinite growth on a finite planet is impossible, as his disciples often quote him. However, Daly has defined growth in such a way that to all intents and purposes it is growth of throughput. It is certainly not growth of real GDP as defined by mainstream economists. Confusion arises where Daly draws a line between "quantitative" and "qualitative." Since he defines development as something that is qualitative it is easy for Daly to acknowledge that it may have no limits. Whereas the only growth that Daly defines as quantitative must have limits, *as he has defined it*. Since mainstream economists define real GDP as something that is quantitative, and like Daly many of them acknowledge that economic development is qualitative and not synonymous with growth of GDP, it *appears* that Daly's definition of growth as something that is quantitative must be the same as mainstream economists' definition of growth of GDP. But it is not. Nowhere in Daly's definitions of growth and development above is there room for the *quantitative* concept real GDP, which is what his opponents claim, at least in theory, can grow without limit.

The phrase "aggregate output" adds to the confusion because most think of aggregate output in physical terms. As used by Daly above, aggregate output *is* physical matter. As used by mainstream economists, aggregate output is an admittedly misleading phrase because it does give the impression that it is something measured in physical terms. But the fact is that for mainstream economists aggregate output is synonymous with real GDP which, as we have seen, is a quantitative, aggregate *value* and not physical matter at all. At the risk of beating a dead horse there is one more ironic twist in this Shakespearian tale of mistaken identities. Many ecological economists believe it is difficult to quantify and sum the benefits that come from all our economic activity in a meaningful way because, according to them, different categories of benefits are not commensurable. Mainstream economists, on the other hand, question whether it is possible to quantify aggregate throughput. They point out that throughput comes in different components – top soil, oil, carbon emissions, etc. – and while each component can be quantified and measured in physical terms separately, mainstream economists argue there is no easy or meaningful way to aggregate them into a single, quantitative measure of aggregate throughput. The two sides in this debate have not only talked past one another, they also have opposite opinions about what can and cannot be meaningfully and usefully quantified.

In one passage Daly does discuss GDP explicitly and acknowledges that it is a measure of value, whereas throughput is measured in physical units. "Although GDP is measured in value terms and cannot be reduced to a simple physical magnitude, it is nevertheless an index of an aggregate of things that all have irreducible physical dimensions. The relationship between real GDP and throughput is not fixed, but neither is its variability unlimited. And to the extent that one believes that GDP growth can be uncoupled from throughput growth, then all the more reason to be willing to accept limits on throughput growth" (Daly and Farley 2003: 230). However, the entire debate is precisely about the extent to which GDP growth can, or cannot, be "uncoupled" from throughput growth. Even in this passage Daly tries to rig the debate by asserting that GDP is "an index of an aggregate of things that all have irreducible physical dimensions," thereby implying that while the rate of growth of throughput need not be as great as the rate of growth of GDP, nonetheless GDP cannot grow without some increase in throughput. But this does not follow logically. With enough of what Daly calls "uncoupling," at least in theory, GDP can grow while throughput does not.

Some ecological economists have now conceded that what they call "relative decoupling" – reducing throughput *per dollar* of GDP – is possible, but continue to insist that "absolute decoupling" – holding throughput constant as GDP continues to grow – is not. But once again, the debate has always been about whether or not absolute decoupling is possible, at least in theory. Simply asserting that it is not possible begs the question. If the rate of growth of relative

decoupling, i.e. the rate of growth of "throughput efficiency," is at least as high as the rate of growth of GDP, then throughput will remain constant, or fall, even as GDP continues to grow.[2]

However, Daly proposes a peace treaty between decoupling optimists and pessimists which all would do well to embrace: "If the environmental protection achieved by limiting throughput costs little or nothing in terms of reduced GDP growth, then no one should oppose it. If GDP could grow forever with a constant throughput, then ecological economists would have no objection" (Daly and Farley 2003: 230). In other words, limit the growth of throughput as protecting the environment requires, and then go ahead and grow GDP as much as you can. Daly's point should be about priorities for policy, not about possibilities or impossibilities: first do what is necessary to protect the environment. Only then is it socially responsible to increase GDP at whatever rate proves possible. For any who reject the perspective of King Louis XV of France – *apres mois le deluge* – Daly's recommended policy not only follows logically, it renders any "pre-game" debate between technological optimists and pessimists unnecessary since play on the field will determine who is right or wrong soon enough.

A more interesting question is whether or not it is *easy to* imagine *how real GDP* could *continue to grow even though at some point throughput cannot.* Before considering this question, we need to clarify any ambiguity in the phrase "continue to grow." Just how long are we talking about?

At some point the solar system will no longer exist. Before that, planet Earth may become as lifeless as Mars through non-human causes. But most assume these "endings" are a long way off, and even if not, irrelevant to the debate over whether or not real GDP can continue to grow indefinitely. On the other hand, prominent founders of ecological economics such as Nicholas Georgescu-Roegen and Herman Daly suggest that the second law of thermodynamics provides a possible ending to our story which, unlike the end of our solar system, is relevant to the growth debate. This law states that the amount of energy available for work in a closed system necessarily decreases with use. This law is also known as the "entropy law" and is often stated: in a closed system if work is done entropy necessarily increases. However, not only is the Earth an open, not a closed system, since we get inputs of entropy decreasing energy from the sun, death by entropy could only take place so far in the future that we should be so lucky to last long enough to die from too much entropy![3] Unfortunately, we are on track to render the biosphere uninhabitable long before entropy engulfs us. In any case, what "could real GDP continue to grow even though throughput cannot" means is "could real GDP continue to grow *long enough* so the end comes from some other cause, not because an exhausted biosphere can no longer provide us with necessary resources and process our wastes." Now that we are clear about what the second question means, how do mainstream economists answer it? Most do not hesitate to answer it in the affirmative.

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[2]The difference between relative and absolute changes in consumption of physical inputs has been understood at least as far back as William Stanley Jevons and the "Jevons paradox." Modern discussion of the "rebound effect" is little more than a rediscovery of this phenomenon (Polimeni et al. 2009). Nevertheless, as a matter of simple logic, with regard to any kind of throughput one chooses: GDP can continue to grow infinitely at whatever rate the "efficiency" of that throughput grows without increasing consumption of the throughput chosen one iota.

[3]Whether or not the entropy law of thermodynamics is relevant or irrelevant to the growth debate has been hotly debated. While I believe it is clearly irrelevant, I offer no exhaustive defense of this conclusion here. See Kerschner (2010) for an overview of the "energy dogma" debate between Robert Ayres and Herman Daly. See Schwartzman (2008) for a compelling explanation of why entropy is a red herring with regard to our current environmental problems.

Mainstream economists explain their answer pointing out that the *value* of goods and particularly services people enjoy *can* increase even while the throughput used to produce them, and the throughput released as byproducts in their production and consumption, declines. For example, mainstream economists point out that in the computer industry many kinds of throughput per unit of computing capacity have dropped dramatically since the 1940s. Suppose iron ore throughput efficiency in computer manufacture had dropped by a factor of 10. This would mean we could consume 5 times more computing capacity now than in 1940 while cutting iron ore throughput for computing services in half.[4]

Many mainstream economists also answer "yes" because they believe that before we exhaust one kind of throughput we can change production technologies to substitute a different throughput that is still plentiful, or if needs be consume a different good or service instead. Sometimes called "technological optimists" by their critics, these economists point out that this is the new "plan" for energy inputs. We now know we must become carbon neutral before the end of the century to avoid risking cataclysmic climate change. This means those planning to prevent climate change believe it is possible to substitute renewable sources for fossil fuels before we run out of atmospheric storage space for greenhouse gases. Just as GDP can grow 10 percent a year without any increase in carbon emissions as long as carbon efficiency also grows at 10 percent a year, many mainstream economists argue this can be true for other kinds of throughput as well.

However, instead of the two questions above, what we need to be asking ourselves is a third, and different, question: Is there something about our economic system that keeps us on a trajectory to produce the kinds and quantities of goods and services that will continue to increase throughput? In other words, is there a growth imperative in our present economic system that is environmentally unsustainable? In the words of Herman Daly, is there something about our economic system that generates uneconomic growth, growth that is not only environmentally destructive, but also fails to yield real economic development? If so, what are the causes of uneconomic growth, and what can be done to stop it? Of course this is the question concerned environmentalists thought they were asking all along.

2. Marxism and Growth

Citing the master himself – "Accumulate, accumulate! That is Moses and the prophets!" (Marx 1967: 595) – Marxists argue that capitalism is nothing if it is not about accelerating economic growth. Whereas Marxists long emphasized what they called "internal contradictions" that rendered capitalist growth *economically* unsustainable, some now argue that an even bigger problem arises when capitalism does sustain economic growth sufficiently to surpass critical environmental thresholds and become *environmentally* unsustainable. Four American Marxists who have written extensively about the negative impact of capitalism on the environment are James O'Connor (1998), John Bellamy Foster (1994, 2000, 2002, 2009), Joel Kovel (2002), and Paul Burkett (2006).

In a recent example, John Bellamy Foster and Fred Magdoff (2010) begin their essay "What Every Environmentalist Needs to Know About Capitalism" with an excellent summary of evidence suggesting that we are experiencing a "planetary ecological crisis." They begin a subsequent section titled "Capitalism Is a System that Must Continually Expand" as follows:

[4]Of course in this hypothetical scenario if we insist on consuming 20 times more computing capacity than we did in 1940 then iron ore throughput would double, and obviously that cannot continue indefinitely. As always, the crucial question is simply whether the rate of growth of throughput efficiency can keep pace with the rate of growth of GDP.

"No-growth capitalism is an oxymoron…. Capitalism's basic driving force and its whole reason for existence is the amassing of profits and wealth through the accumulation (savings and investment) process. It recognizes no limits to its own self-expansion." Foster and Magdoff go on to explain that because capitalism recognizes no limits to its self-expansion, environmental crises will continue to worsen unless capitalism is replaced by socialism. This may well be the case, but are Marxist assertions that capitalist growth is incompatible with environmental limits any more compelling than ecological economists' claims that infinite economic growth is impossible on a finite planet?

What Marx was at pains to explain was that competition for profits drove capitalists relentlessly to appropriate and invest ever greater amounts of what he called *surplus value*. But just as mainstream economists do not measure the market value of goods and services produced in units of physical matter, Marx did not measure surplus value in units of physical matter either. Instead, Marx defined surplus value as the difference between the number of hours of labor needed to produce all goods and services minus the number of hours needed to produce the intermediate goods used up in the production process and the consumption goods purchased by the workers with their wages. In other words, the accumulation Marx referred to above is an accumulation of *hours* of labor expended, which he called exchange value, and therefore the growth of surplus value is limited only by the total number of hours worked and how many of those hours capitalists can manage to appropriate. To be precise, Marx's argument was that over time capitalists would accumulate an ever larger percentage of the exchange value produced in the economy, i.e. an ever larger fraction of the hours worked in an economy. But even if this percentage approached 100 percent in the limit it would say nothing necessarily about the *quantities* of physical goods capitalists were accumulating. In other words, capitalist accumulation of surplus *value* is not necessarily limited by the availability of physical matter, and just because the planet has physical limits does not mean that what Marx meant by capitalist accumulation of surplus value cannot increase indefinitely, any more than it means that the market value of final goods and services produced, GDP, cannot increase indefinitely.

In conclusion, the claim that continued growth of capitalist accumulation *of surplus value* is impossible on a finite planet is no more compelling than the claim that continued growth *of real GDP* is impossible on a finite planet. In both cases many who make the claim fail to realize that value is not matter, and carelessly apply reasoning to value as if it were. Others who do recognize the difference between value and matter simply assume that the rate of growth of the value of production *must* outstrip the rate of growth of throughput efficiency. It is easy to motivate this impression by pointing out that this has, in fact, historically been the case under capitalism to date. However, the fact that real GDP growth has outstripped the rate of growth of throughput efficiency up to now is (a) obvious to anyone who recognizes that we have been exhausting the environment, but (b) irrelevant to whether or not this must necessarily continue to be the case. What is at dispute is whether or not throughput efficiency can grow indefinitely. Because if it can, no matter how slowly, then GDP can also grow indefinitely at that same rate without any increase in throughput.

Arguments to the effect that infinite economic growth is environmentally impossible by ecological and Marxist economists who fail to squarely address the claim that throughput efficiency could, in theory, grow indefinitely are guilty of assuming their conclusion. However, this does not mean there is not an unhealthy and environmentally destructive growth imperative in today's capitalist economies, and perhaps in any capitalist economy. It just means we must go beyond facile arguments which, upon inspection, prove not to be compelling.

3. Production for Profit Not Use

A third line of argument that is also unlikely to convince the uncommitted is the charge that in capitalism production is for profit not use, and the single minded pursuit of profit at all cost

necessarily generates environmentally destructive growth. According to U.S. law, executive officers of corporations whose stock is publicly owned – which actually means privately owned by absentee owners – have a fiduciary responsibility to maximize profits. Moreover, managers who fail to do so are likely to be dismissed by shareholders concerned about the size of their dividends and the market value of their shares. Finally, corporations that fall behind in the race to maximize profits will be replaced by more successful corporations as financial markets favor more profitable firms. In sum, absentee ownership and competitive pressures do relentlessly enforce profit maximization as the decision-making criterion in private enterprise market economies. Critics complain this means that when managers of capitalist firms decide what and how to produce, they do not base their decisions on how much wellbeing their products will provide consumers, how pleasurable the workday will be for their employees, or how much damage their choices will inflict on the environment, but instead simply on what will maximize profits.

One can make a case that an economic system in which people consciously choose in light of effects on human and environmental wellbeing is superior to a system where choice is based on an abstract statistic divorced from our true objectives. Indeed, many who advocate for socialism, including this author, do so in part because we believe consciously striving for human, social, and environmental wellbeing is part of what is necessary to achieve them. However, sophisticated advocates for capitalism are well aware that the profit criterion replaces all other criteria in capitalism. This fact is stipulated, not disputed by those who champion capitalism, and regarded as a virtue rather than a liability. It was not Karl Marx, but Adam Smith who wrote "it is not from the benevolence of the butcher, the brewer, or the baker that we expect our dinner, but from their regard to their own interest," which Smith found reassuring. For its champions the question is not if capitalism is single-minded and driven like no system before it. The question is not if capitalism is heartless. Smith knew capitalism for the soul-less creature it is but argued that it serves us well nonetheless. What its advocates claim is that by harnessing that "old reliable," human self-interest, profit maximization under competitive market conditions will more successfully maximize human and environmental wellbeing than any self-conscious attempts to do so ever can. A successful rebuttal to their argument must demonstrate concretely why this is not the case.

Adam Smith was largely unaware of many perverse incentives that plague private enterprise market economies, only some of which have been begrudgingly acknowledged by the mainstream of the profession since his day. Nor did Smith have before him the mounting empirical evidence available to us that crucial ecosystems have now been compromised. To be compelling the main argument for an unhealthy growth imperative must demonstrate that private enterprise market systems contain perverse incentives which put the environment at risk, such as those examined in the sections that follow. However, a question for those of us today who do appreciate the breadth and depth of perverse incentives in capitalist economies and can see the damage they have wrought, is whether our situation is made all the more precarious because the system is designed to relentlessly follow a single rule, literally, come hell or high water. Is the environment at even greater risk *because* those who make the crucial decisions about what and how we produce have been systematically rendered powerless to exercise discretionary judgment no matter how damaging the consequences of maximizing profits proves to be? And is timely reform more difficult and less likely *because* people have been taught to defend the rule of profit maximization as our great benefactor against all detractors?

I believe the answer to these questions is "yes." However, the fundamental problem is not that the system is driven *per se*. If the system relentlessly drove decision makers to protect the environment that would be a godsend not a problem. The fundamental problem is that in the presence of significant perverse incentives intrinsic to capitalism, maximizing profits is destructive of environmental sustainability. It is because of perverse incentives like those explored below that the single-minded, relentless energy of the system becomes part of the problem. Capitalism is like a thoroughbred race horse bred and trained to run fast, but prone to racing off in the wrong

direction. The underlying problem is we are running in the wrong direction, not our speed *per se*. But given the fact that we are running in the wrong direction, running fast does takes us farther afield, and thereby becomes part of the problem.[5]

In sum, the problem is not that human beings have become more and more economically productive, which is what someone *should* mean when they say that human economic wellbeing can grow, at least in theory, without limit. Infinite economic growth should be a comment on the capacity of humans to continue to become ever more clever about how we go about our economic activities. It should be an expression of faith that there is no inherent reason we cannot continue to satisfy our economic needs in an ever shrinking portion of the 24 hour day, if only we do not needlessly expand our economic needs! When understood in this way the problem is not historically unprecedented increases in economic productivity. Instead the problem is (1) what we do with increases in our productivity, (2) the expansion of economic needs into desires whose satisfaction does little or nothing to increase economic wellbeing, and (3) biases in our major economic institutions that discriminate against throughput efficiency.

4. Institutions, Power, and Green Capitalism

Before proceeding to analyze how the defining institutions of capitalism – markets and private enterprise – create perverse incentives and anti-environmental biases which add up to an unhealthy growth imperative, it is helpful to briefly address important matters that are beyond the scope of this article. Not all capitalisms are created equal. For example, social democratic, neoliberal, and corporatist capitalisms are all quite different in many respects. Moreover, societies are more than economic systems, and real world economic systems are never purely capitalist. Therefore, the damage any society with a capitalist economy inflicts on the environment is the combined effect of not only its capitalist institutions – markets and private enterprise – but of other economic and non-economic institutions, and most importantly, of the power wielded by different interest groups. For example, some societies have larger remnants of community-managed common property, while privatization has proceeded much further in other societies. Some societies have cultural institutions which foster a consciousness that places a high value on environmental stewardship, while others do not. In some capitalist economies finance, insurance, and high tech industries are more powerful, while in others extractive industries are the dominant fraction of the ruling class. And of course, the environmental movement and its allies are more powerful in some societies than in others. All of this makes a great deal of difference with regard to how much damage any particular society will inflict on the environment. This is how we should understand why capitalism can be greener in Europe, for example, than in the United States. This is how we should understand why consumer preferences with regard to modes of transportation in the United States have been powerfully molded by the destruction of urban trolley systems and subsidization of highway construction last century due to the tremendous power wielded by U.S. automobile and oil industries.

This is also how we should understand the debate over whether green capitalism is, or is not, possible. Green*er* capitalism is very much possible because non-capitalist institutions and political power matter a great deal regarding how much damage will be inflicted on the environment. And because capitalism will regrettably be with us at least a little longer, we both can – and must – make capitalism much greener than it is today. On the other hand, this article argues that because private enterprise and markets necessarily create perverse incentives with anti-environmental

[5]Critics of capitalism are often challenged to deny that it has proven to be the most energetic and dynamic economic system humans have devised to date. Dynamism can be good, but when misapplied to produce *un*economic growth this strong point only magnifies the damage.

biases, no society which continues to use these institutions to organize and coordinate production and consumption can entirely escape the unhealthy growth imperative they generate. In other words, the defining characteristics of capitalism are not environmentally "neutral," and to quote John Bellamy Foster, "what every environmentalist needs to know about capitalism" is that its defining institutions create an anti-environmental current which all who seek to protect the environment are compelled to swim upstream against.

5. Market Bias: Why We Consume Too Much and Consume the Wrong Things

Why not more leisure? Between 1950 and 2000 productivity increased fivefold in the American economy. Yet the average American worked more hours per year at the end than at the mid-point of the century.[6] This amazing epiphany led Juliet Schor (1992) to write her bestselling book *The Overworked American*. In 1950 Americans were not a poor, underdeveloped economy where critical economic needs went unmet for a majority of the population, but the wealthiest country on the planet. Yet we "chose" to take 100 percent of our increase in productivity over the ensuing half century in the form of increased consumption of goods and services, and *none* of it in the form of increased leisure time. As a matter of fact, apparently not even that was sufficient as American households dipped into our leisure time deeper to get even more goods! Had we instead taken all our increased productivity as leisure our material standard of living would have been exactly the same in 2000 as it was in 1950 and the standard work week – not work day – would have been eight hours instead of forty. In other words, working only one day a week instead of five we could have been materially no worse off, and throughput per person would have been no greater in 2000 than in 1950. Clearly it is not increases in human economic productivity *per se* that threaten the environment. Instead the problem is whatever induced us to take so much of our productivity gains in the form of goods whose production and consumption required huge increases in throughput.

Perhaps we chose to take so much of our increase in productivity in the form of more throughput using consumption because we were unaware this was causing a problem. No doubt this is partly true. Few Americans in the 1950s were aware that increasing throughput was rapidly creating serious environmental problems. But a great deal of environmental education and consciousness raising since 1970 has clearly not sufficed to change Americans' consumption/leisure trade-off substantially.

What if the increase in productivity was captured mostly by people at the very top of the economic pyramid, leaving those at the bottom no choice but to keep working long hours to maintain their standard of living? Particularly during the last quarter of the century when inequality of income and wealth accelerated dramatically, this explanation makes a great deal of sense. Since much of the productivity increase went to people who do little or no work, and little went to those who work long hours and therefore could conceivably work less, much of the productivity increase had to take the form of increases in private consumption by the wealthy. In this regard the solution is clear: we need to redistribute wealth and income to redirect productivity increases to those who have not already maxed out on leisure. But does the evidence suggest that once Americans reach middle class status they typically begin to enjoy their productivity increases in the form of more leisure? After recovering from World War II more of productivity increases took the form of longer vacations, earlier retirement, and more family leave in Western European countries than in the

[6]As traditionally measured the growth of GDP over-estimates how much productivity has truly increased in many ways. But whether productivity has increased five or two fold, the point remains: for the past half century we have "chosen" to take remarkably little of our productivity growth in the form of increased leisure.

United States. But few would argue that *consumerism* has been confined to the super rich, or deny that it has affected Europeans as well as Americans, even if somewhat less so.

Juliet Schor concluded that Americans were overworked because we were overspent, and argued that the real question therefore was what drives us to consume more than we should. In *The Overspent American* (1998) Schor focused on middle-class Americans in particular, and found they were spending more than was fiscally prudent, more than they had in the past, and more than they realized. She fingered what she called *competitive consumption* as the chief culprit, placing her in a heterodox tradition challenging how mainstream economic theory treats consumption dating back to Thorstein Veblen.

Schor argued that two trends accelerated competitive consumption in the United States beginning in the mid-1970s. Most importantly increasing income inequality put greater pressure particularly on people in the middle to overspend to keep up with those toward the top. In an interview about the book published in the September 1998 issue of the *Multinational Monitor* Schor explained: "The lifestyle of the top 20 percent of the income distribution has come to be an important aspirational goal for people throughout society, many of whom earn far less than the roughly $100,000-a-year incomes that are represented by that group.…These are the people who have taken on the biggest increases in consumer debt in recent years and are feeling the pressure to upscale." The second trend Schor identified was the increasing importance of TV in defining status hierarchies in a society where "people know each other less and know television characters more." She found that after controlling for other factors people who watch TV more spend more, and hypothesized that this had more to do with the nature of the shows advertisers were paying for than with the advertising itself. "TV mainly shows people in the top 20 percent of the income distribution. A family that is supposed to be an ordinary middle-class family on TV has a six-figure lifestyle. TV inflates people's perceptions of what is normal and raises their consumption aspirations."

Schor has continued to investigate the causes of "competitive consumption" herself, and a number of sociologists have offered alternative hypotheses about why Americans do not take more of our productivity gains as leisure.[7] In particular, researchers have concentrated on ways in which time spent in work is not a voluntary decision by employees but is instead constrained by the demands of employers. Recent research on how satisfied or happy people feel has also provided evidence confirming Thorstein Veblen's theory that while predictable, conspicuous consumption and aping one's betters is, in the end, a zero sum game. Empirical research suggests that increases in *average* income seem to have little positive effect on *average* happiness, while increases in income inequality have a negative effect on most people's sense of wellbeing.[8]

Many sociologists, environmentalists, and progressives, but few mainstream economists, now see a tragic comedy unfolding: a social species, hard-driven to compete for status in a hierarchical society, is fast becoming like the proverbial lemmings as we are trapped in an economy where the primary means of demonstrating social status is through competitive consumption which yields diminishing aggregate benefits, even as it accelerates destruction of the environment we depend upon.

Why not more collective consumption? While productivity increases taken as leisure put far less strain on the environment than consumption, as anyone who has calculated his or her

[7]See Schor (2004). For a review of competing hypotheses and evidence see Maume and Bellas (2001). For an excellent compilation of essays on "consumerism" see Goodwin et al. (1997).

[8]There is now a large literature exploring the relationship between economic growth and what is called "subjective wellbeing." Researchers who detect little or no empirical relationship between average income and average subjective wellbeing include Zolatas (1981), Easterlin (1974, 2005), and Easterlin and Sawangfa (2009a, 2009b). For a contrary view see Haggerty and Veenhoven (2006).

ecological footprint knows, not all consumption is created equal as far as the environment is concerned.[9] But not only does eating a pound of hamburger tread more heavily on the environment than eating a pound of tofu, individual consumption is generally more environmentally damaging than collective consumption per unit of social benefit.[10] For the same increase in throughput we can install three thousand dollars worth of new playground equipment in a public park where a thousand children might play on it, or we can install the same equipment in my back yard where only my child and a few of his friends play on it. Clearly the public good increases throughput much less than the private good per unit of social benefit.

It is well known that due to the free rider problem market economies predictably under-supply public goods. Sometimes the inefficiency is so great that we substitute government purchases of public goods (like playground equipment for public parks) paid for by compulsory taxes for the market decision-making mechanism. But these special interventions are limited in number to the most egregious cases, leaving many public goods undersupplied in market economies. Therefore, not only in a theoretical pure market system, but in real world market economies where some corrective action is taken, a bias in favor of private over collective consumption remains. This bias generates an efficiency loss irrespective of environmental issues. However, because producing a given amount of wellbeing through private consumption is often more environmentally damaging than producing the same amount of wellbeing through public consumption, the bias against collective consumption in market economies is also part of the reason we fail to use our productivity increases in ways that minimize throughput. So the problem is not only that we take too little of our productivity increases as leisure and too much as consumption, it is compounded by the fact that we engage in too much individual consumption and too little collective consumption.

6. Private Enterprise Bias: Why We Over-exploit Our Resources

It is widely acknowledged that self-interested users with free access to common pool resources will over-exploit them (Hardin 1968; Hahnel 2011: ch. 4). But mainstream economists claim that in theory privatizing the ownership of natural resources should prevent the tragedy of over-exploiting the commons. Within the mainstream there are those who argue that sometimes practical, ethical, or political problems rule out privatization, and therefore to prevent over-exploitation access must be restricted by some other means; government regulation through licensing or permits and self-restraint by a community of users being the two most widely discussed (Ostrom 1990; Hahnel 2011: ch. 7). However, most mainstream economists believe that when possible privatization does, at least in theory, prevent over-exploitation.

This conclusion, however, follows *only if* the rate of profit resource owners expect to achieve on investments is the same as the rate of time discount society should use when comparing net benefits from resource extraction in different time periods.[11] Mainstream economists largely confine their discussion of possible differences between private and social discount rates to

[9]The notion that people's consumption has an implicit "ecological footprint" is a useful one even if measuring it is inherently more problematic than many of its supporters care to admit. Redefining Progress is one organization that offers a footprint calculator online: <www.myfootprint.org>

[10]If we separate out military spending from the rest of collective consumption this difference is even more dramatic.

[11]"If resources are to be allocated efficiently, firms must use the same rate to discount future net benefits as is appropriate for society at large. If firms were to use a higher rate, they would extract and sell resources faster than would be efficient" (Tietenberg 2003: 77).

differences between social and private risk premiums.[12] Many political economists, on the other hand, see reason to expect the normal rate of profit to exceed an ethically justifiable social rate of time discount even in a world without uncertainty and therefore any risk premiums. Consequently, as explained below, according to modern political economy theory, if the decision about how fast to extract natural resources is left to private owners they will predictably extract them too fast, leaving too little resources for future generations.

A common interpretation of intergenerational equity is that it requires treating people equally independently of what generation they belong to. In other words, it requires us to weigh the wellbeing of someone in the future equally against the wellbeing of someone in the present. However, this does not necessarily imply a zero social rate of time discount. There are three reasons a society committed to intergenerational equity might adopt a social rate of time discount different from zero.

1. The most commonly cited reason is if economic productivity is expected to increase over time. Suppose the productivity of the economy is increasing every year at some predictable rate, and consequently it is foreseeable that future generations will enjoy a more productive economy than the one we enjoy today. In this case intergenerational equity implies that society should prefer goods delivered earlier when there will be fewer goods per person, compared to later, when there will be more goods per person, and therefore should adopt a positive social rate of time discount.
2. Even if we assume no increases in economic productivity, i.e. no technological change, there is a second reason society may prefer production to occur earlier as compared to later. If population is growing, the stock of produced goods must grow at the same rate if we are to equip every member of society with what he or she needs to be able to produce and consume as much as each member of previous generations. This implies that a society with a growing population, as compared to one with a stable population, has an extra *need* for production to occur earlier as compared to later, and therefore should adopt a positive social rate of discount.
3. Finally, there is one reason society might prefer production later rather than earlier, and should therefore adopt a negative social rate of time discount. If the stock of natural capital is deteriorating, future generations will face less favorable economic circumstances than present generations to that extent. In other words, deterioration of the natural environment should have the opposite effect on society's rate of time discount than increases in the productivity of the economy's technology.

In sum, society may have good reason to put a higher value on production earlier to the extent that technology is improving and/or the labor force is growing, and a lower value on production earlier to the extent that stocks of natural capital are deteriorating faster than their natural rates of regeneration. To see why the rate of profit in a capitalist economy will typically be higher than this social rate of time discount consistent with intergenerational equity, consider a capitalist economy where there is no population growth, no technical change, and just to keep matters simple, no natural resource inputs at all, and therefore no deterioration of natural capital stock to worry about. In this situation, as explained above, intergenerational equity requires a social

[12]"One difference between private and social discount rates may stem from a difference in social and private risk premiums" (Tietenberg 2003: 77). Yet this is the only possibility Tietenberg mentions in his lengthy text, and he is typical of mainstream economists in giving the impression that in a world free of risk, governed by competitive markets, there would be no reason to expect any discrepancy between private and social discount rates.

rate of time discount equal to zero. However, there is no reason to believe the rate of profit in such a capitalist economy would be zero. The assumption of no changes in technology increasing the productivity of the economy does not mean the economy is not already productive. It simply means that no *increase* in productivity is expected. As long as the economy is productive, i.e. capable of producing a physical surplus after replacing all stocks used up in production, and as long as workers fail to appropriate all this surplus, the rate of profit for their employers will be positive, and consequently in excess of the ethically justifiable social rate of time discount in this economy which is zero.

In such an economy it can be shown: (1) there is a maximum rate of profit that corresponds to a wage rate of zero, (2) there is a maximum wage rate that gives workers the entire net product which corresponds to a profit rate of zero, and (3) between these two extremes the rate of profit is always positive and inversely related to the wage rate (Sraffa 1960; Hahnel 2002: ch. 5).[13] But all real world capitalist economies must operate between the two extremes since workers would refuse to be workers in the first extreme, and capitalists would refuse to be capitalists in the second extreme.

While population growth and productivity increases are legitimate reasons to favor production in the present over the future, what the institution of private enterprise run for profit does is discount the future to an additional, or extra, degree beyond what is appropriate, independently of any risk that may exist. In our hypothetical example above, suppose capitalists were powerful enough to command an 8 percent rate of profit. This would lead them to discount the future by 8 percent when comparing the net benefits of extracting resources next year to the net benefits of extracting them this year, whereas society under the assumptions hypothesized has no reason to discount future benefits from resource extraction at all.

Since two of the most salient features of the global economy over the past thirty years are the escalating degradation of the natural environment, reducing an equitable social rate of time discount, and the increasing power of capitalists *vis-a-vis* workers on a world scale, increasing the private rate of return on investment, the gap between private and social discount rates has increased dramatically during the neoliberal era. Consequently, private owners of natural resources overly discount the benefits of leaving resources in the ground to be available for extraction in the future; as a general rule, they have been over-discounting, and therefore over-exploiting our natural resources, to a greater and greater extent ever since 1980.

7. How Endogenous Preferences Aggravate Biases

The mainstream economic theory of *consumer sovereignty* always puts the blame on consumers for any problem regarding what the economy produces because it presumes that in market economies producers will simply, only, and always supply whatever consumers want.[14] If developers

[13]It should be noted that all uncertainty and therefore risk has been assumed away in this scenario and in the models cited, so that any discrepancy between the rate of profit and social rate of time discount cannot be due to differences between private and social risk. In analogous mainstream models the long-run, equilibrium, normal rate of profit is zero, so the question reduces to whether mainstream or modern political economy models under these assumptions are more compelling. In effect modern political economy theory accuses mainstream thinking of having neglected the fact that because economies are productive and workers are not all powerful, the normal rate of profit will be positive, even in absence of risk.

[14]The only exception is when few firms supply a product, in which case mainstream theory acknowledges that profit maximizing firms in monopolistic and oligopolistic industries use their market power to produce less than consumers want in order to secure higher prices and profits.

build McMansions in what used to be farm fields it is because that is what new homeowners and farmers want. It is true that profit maximizing corporations will not continue to produce goods and services they cannot sell. But this does not mean that consumers are nearly the "sovereign" overlords over what is produced in market systems its supporters would have us believe.

First of all, as has often been pointed out, consumer sovereignty is a strange notion of economic democracy. Democracy usually means everyone gets the same vote. But in market economies consumers get as many votes for the mix of products that will be produced as they have dollars to vote with. Unless we assume that the rich are affected more by the mix of goods the economy produces than the poor, this is a very undemocratic election indeed. Even if consumers as a whole were sovereign, clearly richer consumers are "more sovereign" than poorer ones.

Second, it is naïve to deny that giant corporations have both an incentive and the capacity to influence consumers' desires considerably. The fact is not all products are equally profitable, and businesses go to considerable expense to steer consumers toward goods with higher profit margins. Marketing would not be the most popular major in business schools, and U.S. businesses would not spend over 250 billion dollars a year on advertising, if businesses did not want to influence what consumers buy, or if consumers were beyond their influence and therefore truly sovereign. And one thing we can be sure businesses do not want consumers to buy when their productivity as workers increases is "nothing" because they choose to consume more leisure instead. "Nothing" is not at the top of the list of products with high profit margins that businesses have for sale. Corporations also expend some of their considerable resources to influence governments to provide infrastructure that serves as a compliment for goods with higher profit margins, and only as a substitute for goods with low profit margins.

However, there is a third reason that consumer sovereignty falls far short of what is advertised. While markets minimize the transaction costs of satisfying desires for individual consumption, (a) as already noted, they do not provide an institutional framework that helps people satisfy desires for collective consumption as easily, and (b) they also fail to register external effects on parties other than the buyer and seller. While market enthusiasts praise markets for allowing consumers to choose among different private goods, they fail to point out how markets infringe on consumer sovereignty by tilting the playing field in favor of private goods and against public goods, and in favor of private goods whose production or consumption generates negative external effects and against private goods whose production or consumption has positive external effects. Just because these important institutional biases infringe on consumer sovereignty in a more subtle way than manipulative advertising and influencing what kind of public infrastructure is available as compliments or substitutes for private expenditures, does not mean they are less important.

Once we recognize that markets are not neutral institutions that register different categories of preferences without prejudice, but instead lower the transaction costs for acquiring some kinds of goods compared to others, an interesting question arises regarding how people will respond to these *biases*. The mainstream theory of consumer behavior teaches that when price signals are wrong they lead people who are attempting to maximize their satisfaction given the preferences they have to consume too little of things that are more expensive than they should be, and too much of things that are less expensive than they should be, which yields a certain amount of inefficiency whenever prices diverge from their true social opportunity costs. While this is the end of the mainstream story where preferences are treated as *exogenous*, there is more to the story if people's preferences are *endogenous* and can change over time in ways people have some influence over. If preferences are *endogenous* why would people not try to diminish their preference for things for which they are consistently charged more than their true opportunity cost, and increase their preference for things that are cheaper than they should be?

A formal model suitable to exploring the predictable consequences of what happens when economic institutions create biases in the terms upon which goods or services are made available to people when people's preferences are endogenous was elaborated in *Quiet Revolution in Welfare Economics* (Hahnel and Albert 1990). Recognizing that people's *environmental preferences* are influenced not only by information but also by biases in our basic economic institutions deepens our understanding of why the environment remains at risk despite tremendous improvements in environmental education.

A model of endogenous preferences implies there are *two* effects of individual choice. (1) The *preference fulfillment effect*: when the individual chooses a particular consumption bundle today, she will fulfill her present preferences to a greater or lesser extent. That is the effect of the choice on wellbeing in the present. (2) The *preference development effect*: by consuming a particular bundle today, the individual may affect the human characteristics she develops in the future. Since those future characteristics "parameterize" her future utility functions, changes in future characteristics will change the amount of satisfaction she will receive from any given consumption bundle in the future. Any consequent change in wellbeing that results is the effect of today's choice of a consumption bundle on the individual's wellbeing in the future. Individual rationality requires taking *both* the preference fulfillment *and* the preference development effect on one's overall wellbeing into account when choosing consumption bundles in all time periods.

When we consider the entire set of economic institutions that comprise an economy we can think of them as lowering the transaction costs for some kinds of activities or behaviors relative to the transaction costs of other kinds of activities or behaviors. Specifically *bias* can be modeled as follows: if a set of economic institutions charge individuals who engage in an activity the *true* social opportunity cost of carrying out that activity, we say there is *no bias* in how the economic institutions make that activity available to people. But if a set of institutions charge those who choose an activity *more* than the true opportunity cost for that activity, we say those institutions have a *bias against* that particular activity. And if a set of institutions charge *less* than the true opportunity cost for an activity, we say those institutions have a *bias in favor* of that activity.

Theorem 1: snowballing inefficiency. In an economy that contains a bias in the relative terms of supply of two economic activities, and in which people have perfect knowledge about their endogenous preferences: (1) the divergence from the optimal, or efficient outcome will be greater than indicated by traditional welfare theory which treats preferences as exogenous; and (2) the divergence from optimality will increase, or "snowball," over time.[15]

Theorem 1 helps explain why the environment is at greater risk than mainstream economic theory leads us to expect. Because they ignore negative external effects, markets are biased in favor of pollution intensive goods. Because they minimize transaction costs for individual but not collective consumption, markets are biased in favor of private as compared to collective consumption. Because they create perverse free rider incentives markets are biased against public goods like environmental protection and pollution reduction. Because private resource owners over-discount the future, private enterprise is biased in favor of resource extraction today and against resource extraction in the future. Given these biases, what theorem 1 tells us is to expect *more* pollution, *more* over-exploitation, and *less* environmental protection than traditional economic theory predicts. But more importantly theorem 1 tells us to expect the extent of over-pollution, over-exploitation, and under-protection to grow worse over time.

While the proof of theorem 1 is not straightforward, the intuition behind the theorem is. Based on experience individuals can foresee the biases in the relative conditions of availability of activity choices they will face in the future. Recognizing that they can mold their preferences to some

[15]Proved as theorem 6.6 in Hahnel and Albert (1990).

extent away from desiring activities for which they will be over-charged and toward activities for which they will be under-charged, rational individuals will take into account both the preference development as well as the preference fulfillment effect of their present activity choices. By doing so they select present activities that tend to generate future human characteristics that in turn support future preference structures that permit them to attain greater future satisfaction than had they not adjusted their human characteristic trajectories. When faced with an overcharge in the future period, rational individuals will lower the quantity demanded to some extent simply by moving up along their future demand curve when they arrive in the future. But when afforded the opportunity to shift their future demand curve as well, rational individuals with endogenous preferences will avail themselves of a second means of adjusting to the biased conditions of availability; they will make choices in the present that shift their future individual demand curve downward for the good for which they will be overcharged in the future.

Unfortunately, the effect of all individuals making these individually rational adjustments is to shift the future market demand curve downward for activities for which individuals are over-charged as compared to what it would have been in absence of such individually rational adjustments. In an economy where production responds to market demand, this implies the production of goods for which individuals are over-charged will be even less than had individuals not adjusted their preferences. As a result the under-production and consequent misallocation of scarce productive resources, which would have occurred in any event due to the over-charge, is *aggravated* by the process of rational individual preference adjustment. The more time people have to adjust, the greater the inefficiency becomes.

A second theorem predicts that environmental educators face a harder uphill battle than they may realize when they encourage people to develop stronger preferences for environmental protection and amenities based on a better understanding of their value.

Theorem 2: warped human development. In an economy that contains a bias in the relative terms of supply of two economic activities, and in which people have perfect knowledge about their endogenous preferences: (1) individual human development patterns and the preferences that depend on them will be "warped" in a manner that can be precisely defined; and (2) the "warping" will also increase, or "snowball," over time.[16]

Theorem 2 reveals a principle mechanism through which institutional biases affect human characteristics and therefore preferences. When a set of economic institutions create a bias in the terms on which different activities are available to people, it is individually rational for people to make different choices than those they would have chosen had there been no bias. Since different activity choices lead people to develop different human characteristics, and therefore preferences, the institutional bias has promoted development of some kinds of human characteristics and preferences at the expense of others.

It is appropriate to call this self-molding process "rational self-warping" even though we recognize it to be caused by institutional bias. Individuals who did not make preference adjustments to economic biases would be irrational in the sense of failing to maximize personal wellbeing under the biased conditions of supply they face. However, the adjustments they engage in are *self-warping* in the sense that they are freely and rationally chosen, rather than imposed by some external agent, but nonetheless diverge from an optimal human development trajectory that is physically possible and would have afforded the individual greater wellbeing as he or she defines it.

So the problem is not only that people are unaware of all the benefits environmental protection brings and more education is required. The problem is also that it is rational in private enterprise market economies for people to dampen their preference for leisure which pollutes less, and enhance their preference for consumption which pollutes more; enhance their preferences for

[16]Proved as theorem 6.7 in Hahnel and Albert (1990).

private goods that pollute more, and dampen their preferences for public goods that pollute less; enhance their preferences for more pollution and resource intensive goods which markets tend to underprice, and dampen their preferences for less pollution and resource intensive goods which markets tend to overprice. The conclusion that the divergence from the optimal production program (theorem 1) and rational self-warping of human characteristics and preferences (theorem 2) increase or "snowball" over time follows directly since the more time people have to adjust their preferences, the more rational self-warping and economic inefficiency there will be.

8. Conclusion

There are compelling reasons to believe there is an unhealthy growth imperative inherent in private enterprise market systems that is threatening the environment. Unfortunately, many who criticize a dysfunctional growth imperative in today's economies fail to present the case in a way that would convince anyone who is not already of the same opinion. As explained in sections 1 and 2, too often ecological and Marxist economists fail to answer crucial parts of skeptics' arguments, and instead assume their conclusions.

After acknowledging that greener capitalism is not only possible but necessary, this article offers a more compelling defense of the unhealthy growth imperative hypothesis by describing how specific perverse incentives inherent to the capitalist economic system result in *biases*, which in turn propel increases in productivity in environmentally destructive directions. Section 5 explored how markets bias consumption choices in environmentally damaging ways. Section 6 explained why privatization of natural resources fails to prevent their over-exploitation. And section 7 explained why endogenous preference formation aggravates the destructive effects of these biases, and why, therefore, it is individually rational for people to dampen their preferences for leisure, collective consumption, and environmental preservation and enhance their preferences for natural resource and pollution intensive goods, even though this behavior is socially irrational because it aggravates the biases and increases environmental destruction over time.

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