CHAPTER 4

Getting Serious About the Limits to Growth: ELR and Economic Restructuring Under Decroissance

Macroeconomic Policy and Environmental Realities: Can We Have Full Employment Under Decroissance?

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4.1 Introduction

In the aftermath of the 2007–2009 global economic recession, there has been an active policy debate centered around what policies could restore economic growth. Should the government expand aggregate demand and directly increase employment? Or, should austerity and other neoliberal policies be imposed to reduce overall debt and deregulate markets in order to make economies more "competitive?" Advocates of the latter approach have claimed that the unusually high levels of government debt in many

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countries restrict policy options, and only the latter approach can restore economic growth and full employment. On the other hand, Post Keynesians and Modern Monetary Theorists (MMT) argue that government debt does not prevent governments from increasing expenditures by means of monetary expansion when there is high unemployment, and expansionary fiscal and monetary policies can indeed effectively restore economic growth. Advocates of these seemingly opposing policy prescriptions effectively argue about which of two approaches are more likely to restore economic growth. A realistic assessment of the scientific evidence on climate change, biodiversity losses, and natural resources clearly shows that both schools commit the same fundamental error: environmental constraints make it impossible for *any* macroeconomic policy to "restore" the economic growth we have experienced over the past two centuries.

We cannot continue to expand the human ecological footprint as we have over the past 200 years. Scientific evidence, continuously and comprehensively updated and analyzed in a sequence of reports by the Intergovernmental Panel on Climate Change (IPCC), clearly shows that atmospheric temperatures are rising, and the cause is almost certainly the growth of human activity.[1] It is also evident that we are losing the biodiversity that safeguards our existence, and many of the services of nature on which human life depends are deteriorating due to overexploitation. In sum, the last 200 years use of carbon-based fuels, the tenfold growth of material consumption per person, and the concurrent growth of the human population to over seven billion persons are together causing massive environmental degradation.

While it is true that a mixture of austerity (government budget cuts, dismantling of the social safety net, privatization of public assets, lowering of labor costs) and stimulative economic policies (some tax cuts and very aggressive central bank injections of reserves into the banking system) have "restored" some traditional economic growth in the United States after the 2007–2009 crisis, it is also obvious that eight years after the recession ended wages remain stagnant, labor force participation rates have declined, nearly all gains from growth have gone to the highest 10 percent of income earners, and government debt remains high. And, in Western Europe, economic growth has been near zero since the 2007–2009 crisis, unemployment still exceeds 10 percent, and government deficits have not been reduced. There are, therefore, calls for a shift in policies that can better induce economic growth. The policy shift in Europe is clearly towards neoliberal policies, however, and concern for the

environment has diminished as the economic crisis has dragged out. For example, the Socialist government of France defied the voters in 2013 and negotiated a "stability pact" with the national business organization MEDEF that included lower taxes on business, lower labor costs, reductions in the French social safety net, and deregulation of business and labor markets. In 2014, the socialist government introduced its "Loi Macron," named after the openly neoliberal Economics Minister, that reduced protections of labor, Sunday opening of retail establishments, and the deregulation of many sectors of the economy. In 2017, Macron was elected President.

At the same time, there is some pushback against austerity policies in countries where those policies have been implemented. But, while the political debates and social conflicts triggered by austerity policies have captured everyone's attention, no one on either side of the debate seems to have noticed that even the weak economic post-recession growth continues to cause carbon emissions and environmental degradation to increase further. For the first time, the 400 mark in carbon particles per million in the atmosphere was surpassed in 2014.

4.2 The Ecological Consequences of Growth that Economists Choose to Ignore

Scientific evidence shows that humanity's footprint on earth is causing rapid climate change, ocean acidification, mass extinction of living species, disappearing land cover, degradation of freshwater resources, disruption of the nitrogen and phosphorous cycles, and many other transformations of our ecosystem. A study by Mathis Wackernagel and associates (2002) estimated that humanity's exploitation of the Earth's resources corresponded to 70 percent of capacity in 1961, but grew to 120 percent in 1999. A few years later, the World Wildlife Fund (2008, p. 2) estimated that "humanity's demand on the planet's living resources … now exceeds the planet's regenerative capacity by about 30 percent."[2] The WWF estimated that the human population began using nature's services at a rate that exceeded the capacity of the Earth's ecosystem to replenish itself some time during the 1980s.

Humanity's efforts to compensate for the stress on nature's services and the depletion of non-renewable resources often made things worse. The so-called *Green Revolution* that increased the amount of food produced per acre during the latter half of the twentieth century has caused

numerous stresses in society. The rapid substitution of machines, chemicals, and an industrial-like organization of agriculture has destroyed traditional rural communities and displaced hundreds of millions of people. The consequences show up in the form of growing urban slums, mass illegal immigration, broken family structures, and greater income inequality. Modern agriculture, among all sectors of the economy, is the single largest contributor to global warming, even larger than transportation and power generation.[3] And, the growth of *monoculture*, the large-scale capital-intense production of single crops covering vast territories formerly devoted to much more varied agricultural production, is the main contributor to the loss of biodiversity. Magdoff (2015) explains that the shift to monoculture is motivated by economies of scale, which are derived from the substitution of large equipment for labor, the heavy application of chemical fertilizers and insecticides in place of more labor-intensive and varied exploitation of the land, and industrial food processing operations in which machinery and assembly-line methods require uniform products. Friedman (2015) warns that the rapid development of genetically modified organisms (GMOs) will further upset the natural processes of our ecosystem in ways that cannot be managed with any reasonable degree of accuracy.

Also, among humanity's efforts to develop alternative sources of energy are biofuels projects such as ethanol produced from corn and sugar cane, which require vast amounts of land and water. Biofuels have also directly contributed to the expansion of monoculture. For example, in Brazil lands have been brought under production, including forests, to expand the production of sugar cane that serves as the raw material for producing ethanol fuel. Ominously, the expansion of cane sugar production has pushed cattle and other types of agriculture into the Amazon basin, the huge region that is the Earth's largest carbon sink. At the same time, efforts to exploit new sources of petroleum are even more environmentally damaging. For example, the conversion of tar sands into petroleum requires large amounts of energy to "melt" the tar, and this use of energy to create more energy not only adds new carbon emissions to the ultimate carbon emissions from using a liter of gasoline, but the processing of the tar sands also pollutes a large area of one of Canada's largest river basins. And, the environmental consequences of new drilling methods such as "fracking" are still unknown, but the massive use of dangerous chemicals, the creation of earthquakes, and the likely escape of large amounts of methane into the atmosphere has led

some countries to ban the process. Finally, the dirtiest of carbon sources of energy, coal, continues to be exploited because the market price of coal reflects only a small fraction of the total social cost of burning coal for fuel.[4] For example, large-scale coal production causes mountain top destruction and irreversible river pollution in Kentucky and West Virginia in the United States.

The growth of economic activity has also caused social conflicts and oppression. The growing demand for material output has in recent years triggered wars over oil supplies in Kuwait, Iraq, and Georgia, threats of war by petroleum importers such as the United States against oil producers like Iran, Venezuela, and Ecuador, and there have been civil wars in more than a dozen African countries for control of assorted natural resources. The continued violence in the Niger Delta of Nigeria is driven by the extreme poverty that exists side by side with the oil industry. Large countries such as China, the United States, Russia, and others are actively engaged in a military arms race in order to expand and maintain their control over the world's scarce resources. Several countries, among them Iran, Pakistan, and North Korea, have developed or are seeking to develop nuclear weapons to protect their carbon resources. International economic integration has disrupted traditional societies and their customary economic relationships. Economically driven social stresses manifest themselves in many ways, including the long-distance international migration of large numbers of people, rising income inequalities within most of the world's countries, and actual hunger for one billion of the world's seven billion people.

In sum, our capitalist economies have brought about technological changes, just as predicted by neoclassical growth theory outlined by Solow (1956, 1957), and elaborated more recently by Romer (1990), Grossman and Helpman (1991), and Aghion and Howitt (1992). However, these technological changes induced by increased energy use and population growth have resulted in a more intense exploitation of the ecosystem rather than a mitigation of the environmental destruction. Human society thus remains on a dynamic path of complex and interrelated economic, social, and environmental changes that are not sustainable. The long-run costs of our current production are much higher than current market prices suggest.[5] This destructive technological reaction has led scientists such as James Lovelock to warn that our very human existence is in danger: "It is not the Earth that is threatened, but civilization."[6]

4.3 Economists' Failure to Deal with the Environment

Most academic and virtually all private financial sector economists failed to see the "dotcom" bubble that was quite obvious to heterodox economists and casual observers in 2000, and those same economists then failed to see the equally obvious sub-prime real estate debt bubble that burst in 2007. Today, we see economists missing what overwhelming scientific evidence suggests is an even more dangerous *ecological exploitation bubble*. Even many Post Keynesians who understand the causes of the earlier business bubbles openly push for more government spending to employ people to build roads that will encourage building more automobiles, more airports that will facilitate even more jet travel, and more ports that will facilitate the shipping of food and resources across the globe. As a politically convenient response to austerity-prone conservatives, economists of other schools, such as Post Keynesian proponents of directed fiscal policies, often fall back to accepting tax cuts for corporations to spur investment in factories and income tax cuts to spur more consumption, not unlike President Obama's 2009 $787 billion stimulus program consisting mostly of income tax cuts and highway construction programs. There was almost nothing in that program to spur the fundamental restructuring of the economy towards long-run environmental sustainability.

The failure to anticipate slowly unfolding ecological disasters is, unfortunately, not as surprising as it may seem from an ecological perspective. Psychologists have pointed out that favoring the present over the future is perfectly reasonable human behavior from an evolutionary perspective. After all, humans exist today because their ancestors were good at quickly focusing on immediate problems, such as dealing with the bear at the mouth of the cave or the finding the next meal rather than being distracted by deep abstract thoughts about the future of humanity. Thus, we could excuse economists for being human when they focus on immediate problems while ignoring long-run issues. However, as professional social scientists, shouldn't economists provide an unbiased objective assessment of the future?

We should note that some economists did foresee the dangers of financial bubbles. For example, Thorstein Veblen (1904) warned us about financialization (the separation of financial activity from the real economy) more than a century ago. A couple of decades later, John

Maynard Keynes (1936, Chap. 12) explained in detail why uncertainty will occasionally, and inevitably, cause financial markets to disrupt real economic activity, and Hyman Minsky (1978, 1982) elaborated further. But, disturbingly, these perceptive economists were pushed out of mainstream economic teaching and thinking by the dominant "marginalist" neoclassical way of economic thinking, to the point that today mainstream economists lack the analytic tools to deal with the danger of financial instability.

It is important to note that this bias in economic methodology has not been accidental. Because economists are the principal spinners of stories that people rely on to make sense of their economic situation, there is a clear motive for the vested interests of high finance to induce economists to develop a research program (neoliberalism) and use a modeling framework (neoclassical marginalism) that put the capitalist system in an unrealistically positive light. Wisman (2013, p. 922) points out that financial and business lobbyists and public relations officers actively manipulated the economics culture in order to induce economists to furnish "… support to free-market ideology, thereby lending 'scientific' support to right-wing policies." In this regard, the former chief economist of the International Monetary Fund (IMF), Simon Johnson (2009), recently explicitly wrote that the financial industry "gained political power by amassing a kind of cultural capital—a belief system," the result of which was that "faith in free markets grew into conventional wisdom …."

The same thing seems to be happening with regard to how economists deal with environmental problems. The economics profession today finds that the neoclassical models that are taught as having universal applicability to all economic issues effectively deprives them of the tools (i.e., models and methodology) that would lead to more realistic and urgent conclusions about our environmental situation. The neoclassical economic models we use assume all economic activity passes through the market system, but the natural environment most often interacts with human economic activity outside organized markets. This is the reason that prices of coal, oil, and gas are such poor measures of their true long-run costs, as documented by, for example, Diaz and Moore (2015) and Shindell (2015). Consequently, the environmental effects of economic activity are ignored when we use those models to analyze issues and economic policies. And, by ignoring real environmental constraints, we are biased towards concluding that restoring economic growth is the best way to reduce unemployment.

4.4 Environmentalists, Appalled Economists, and Other Dissident Voices

Relatively few economists have sought to answer the question of how humanity can reverse its destruction of the ecosystem that is critical for human existence. Among the exceptions were Kenneth Boulding (1966), Nicholas Georgescu-Roegen (1971), and Herman Daly (1973, 1980b), E.F. Schumacher (1973), and, more recently, Peter Victor (2008) and a number of French economists that have embraced the *decroissance* movement. The widely read book warning about the unsustainability of human activity on Earth in the early 1970s, *The Limits to Growth* by Meadows et al. (1972), was not written by economists and generated very little interest among economists. Daly (2014, p. 238) describes the series of conferences that followed the publication of *The Limits to Growth*:

> Somehow by the third conference the theme had mutated from "limits and alternatives to growth" to "management of sustainable growth."…. The new, "more balanced" view was that we really must not limit growth, just focus on good growth rather than bad growth. Growth had somehow become "sustainable", contrary to the main conclusion of *The Limits to Growth*. The reasoning behind this reversal was kept vague. There was an utter failure of nerve on the part of scientists and especially economists …. Indeed, practically no economists attended the conference. The very idea of limiting growth was too big a pill for economists, politicians, and most scientists to swallow. They coughed it up and silently spit it into their napkin at the conference banquet.

After the series of IPCC studies carried out by thousands of scientists from across the world as well as the many other scientific studies that have consistently confirmed humanity's impact on the environment, it is time to stop referring to economists' self-censorship on environmental issues as an avoidance of responsibility. We should call it *evasion*, given that it is a clear violation of the laws of science.

4.4.1 The Hedonic Treadmill

David Lykken of the University of Minnesota studied a sample of identical twins who grew up apart from each other, and he found that the twins' stated levels of happiness were very closely correlated, regardless of the differences in lifestyles they experienced. He concluded that, in the long

run, happiness is 90 percent genetic, and only minimally influenced by environmental factors. In the short run, however, environmental factors could alter happiness substantially. Lykken (1999) suggests that each person has a happiness set point around which his or her happiness fluctuates. That is, people experience variations in happiness over their lifetimes, but in the long run they can, at best, only be marginally happier than their genetically determined set point of happiness.

Philip Brickman and Donald Campbell (1971) coined the term *hedonic treadmill* to describe the seemingly paradoxical urge for people to increase their material wealth even though it has little long-term effect on their happiness. People are very concerned with their relative status in society, and a capitalist society defines status in terms of material wealth. Brickman and Campbell argue that people work hard to raise their income because status-conscious individuals know others are working hard to increase their incomes. Individuals who choose to work less would fall behind and suffer a psychological welfare loss. Each individual, therefore, ends up working hard in a never-ending struggle to keep up with the rest of society. Because everyone does the same, individuals' relative status, and thus their happiness, changes little.[7]

The political columnist Michael Prowse (2003) provocatively used the concept of the hedonic treadmill to describe modern consumerism as the way in which a capitalist system exploits workers. Prowse argued that workers could achieve a higher level of happiness with less hard work and more leisure and non-work activity. The former only provides income for more material consumption, but the latter leads to self-actualization. He thus argues that the only gainers from the hedonic treadmill are capitalists, who, because of the hard work of the hedonically trapped individual workers and consumers, are able to maintain the high profits that keep them wealthier and, because relative status is important, happier than those consumer/workers afraid they will fall behind their peers if they get off the treadmill.

A more far-sighted observer might wonder if there is not some way to arrive at a cooperative global solution, say an international *economic disarmament treaty* under which all countries agree to scrap their hedonic treadmills. Such a worldwide agreement would clearly cause conventionally measured economic growth to slow. But, if more pleasant work and more leisure enable more self-actualizing activity, overall happiness will rise. These observations add a whole new meaning to the traditional revolutionary slogan: "Workers of the World, Unite!"

How much would human welfare improve if all countries responded to worker pressure and instituted a 30-hour workweek? Or, a 20-hour workweek, as John Maynard Keynes (1930) predicted we would have adopted by now? Coote, Franklin, and Simms (2010, p. 2) of the New Economics Foundation explain their call for a 21-hour workweek as follows:

> A normal workweek of 21 hours could help to address a range of urgent, interlinked problems: overwork, unemployment, over-consumption, high carbon emissions, low well-being, entrenched inequalities, and the lack of time to live sustainably, to care for each other, and simply to enjoy life.

So, many people have seriously thought about the issues brought up here. There has been relatively little progress among economists, however.

4.4.2 Les Économistes Atterrés

One group of economists that has not avoided the environmental issue is Les Économistes Atterrés (The Appalled Economists), an active association of French economists who directly respond to what they see as serious biases in mainstream economics. They advocate a set of policies that simultaneously deal with unemployment, social inequities, and environmental degradation that have been referred to in France as *décroisssance* (degrowth).[8] Proponents of décroissance thus call for a completely new economic paradigm, in which resource-intensive human production, or what the environmental economist Herman Daly (1980b) has for several decades called *high-throughput production*, is replaced by resource-minimizing, or low-throughput, production that employs many people, still improves the quality of life, but does not increase resource throughput. There is even a monthly newspaper entitled *Décroissance: Le Journal de la Joie de Vivre* (Degrowth: The Newspaper for the Joy of Living). Décroissance should not be confused with *sustainable growth*, a term often used in the media and by many non-profit environmental groups. Most advocates of décroissance view *sustainable growth* as a contradiction in terms because they interpret scientific evidence as suggesting no form of material growth is sustainable in the long run.

The Économistes Atterrés and other proponents of décroissance reject the possibility of preventing ecological disaster by means of marginal adjustments to our current capitalist system.[9] Décroissance requires a new

form of social technology that will enable humans to reorganize the way they go about living and interacting with their natural environment while improving life-enhancing social interaction. The details of changes these proponents seek are too substantial to be brought about within the time frame required to avoid environmental disaster by "market-based" mechanisms or marginal shifts in policies and formal institutions. Instead, they are revolutionary in nature, and they will require a collective choice to bring about major changes in lifestyles, production methods, human consumption, and economic organization. To prevent environmental crises from strengthening autocratic political tendencies, the Économistes Atterrés (2012) also seek a more democratic and participatory political system in which the wealthy vested interests cannot dominate the political process.

Specifically, Économistes Atterrés like Harribey et al. (2012) propose the following program:

1. End the use of fossil fuels and nuclear energy by massively cutting energy usage and developing non-fossil and non-fissible fuels.
2. Expand public transportation to where it has the capacity to carry the entire population to work and leisure activities.
3. Shift freight to railroads and away from road traffic.
4. Food independence and agricultural sovereignty.
5. Public investment in the economic restructuring, including public ownership of energy, transport, education, and low-income housing infrastructure.
6. Use productivity increases to reduce work hours without reducing labor income.
7. Increase labor's share of total income and reduce capital's share, improve the distribution of income.
8. For macroeconomic adjustment, adjust work hours rather than the number of jobs.
9. Reduce the scope of the market economy and expand the public commons.
10. Establish a transparent process for evaluating the full environmental consequences of all human activities.

Objectively considered, the ten-point program is straightforward provided one accepts the environmental challenges clearly described by the various IPCC reports over the past 20 years.

4.4.3 Some History of Thought

It is instructive to note that the natural environment is, and always has been, an integral part of the overall circumstances that economists must take into consideration when they study economic activity. Human provisioning activities require a great many natural resources and an organized society in addition to the usual forms of capital and labor that economists normally include in the production functions with which they analyze economic activity. Human beings and their ancestors evolved as group animals within an also-evolving natural environment. And, even though it often seems as though the closest contact most of us in a developed economy have with nature is the fruit and vegetable section of the supermarket, our lives are still intimately linked to nature. Our field of economics, however, clearly *has* largely lost all contact with nature.

Economics was not always such an "unnatural" science. For example, in the 1700s, the Physiocratic School argued that even though society was split into three distinct classes consisting of farmers, landowners, and the urban artisan/industrial class, only the farmers actually produced anything that added to human well-being. This was clearly an exaggeration, but this focus correctly reflected the fact that humans fundamentally derived most of their well-being from nature even if they did transform the resources they took from nature. But starting with Adam Smith (1776), economists began to focus more on industrial production, investment in capital, and labor markets, that is, the purely human activities separated from nature. Malthus (1798) pushed nature into the background as a source of diminishing returns but not as an active player who was also an active variable influenced by all other economic activity. The separation became complete with Léon Walras' (1874) mathematical model of an economy that consisted entirely of product and factor markets; anything for which there was not a market thus became "non-economic" activity and was not included in the economist's scope of activity. The Walrasian model provided the basis of what became neoclassical economics, in which economic activity is a purely human endeavor. Economic progress was seen as a process that required the dual human activities of saving and investment/innovation.

Today, the limited capacity of nature and the already large per capita footprint means that much of the production we include in our gross domestic product (GDP) must be scaled back. Policymakers thus have the seemingly impossible task of lowering GDP while facing strong political pressures to boost employment, maintain financial stability, reduce poverty, and raise living standards. So it is small wonder that most policymakers

have quietly let the vested business interests actively muffle the message on the environment so that they can avoid, or at least postpone, the real choices humanity must make. This myopic approach is effectively justified by neoclassical economics and the faux debate between austerity and fiscal stimulus that economists have engaged in the past few years.

4.4.4 A True Post Keynesian Approach

From a historical perspective, therefore, the program of décroissance described above is no more radical than the current monopoly capitalism that has, over the past several centuries, completely reordered the way humans live, organize their economic activity, and interact with nature. In fact, beyond the environmental damage motivated by the monetary profit incentives, the capitalist system continues to accumulate very costly burdens in the form of social and economic inequalities, unemployment, war, class conflict, and the inevitable future adjustments to the economic, social, and ecological damage. Humanity does not face a choice between maintaining the current system as we know it and building a completely new complex mixture of economic, social, and natural systems. Rather, the choice is between an uncertain and probably disastrous future if the current capitalist system is kept in place and an alternative way of living that is less likely to cause the end of humanity. And, as Wagner and Weitzman (2015) argue,we must make this difficult long-run choice with incomplete information and knowledge about each of the options.

Scientists have only a partial understanding of the complex interactions between the economy, society, and nature, although we do know enough to sense that we could be creating a disaster. Advocates of décroissance invoke the *precautionary principle*, which is to avoid doing those things that have some likelihood of causing severe damage. And, they invoke the principle of *policy flexibility*. Specifically, humanity will have to develop more flexible and adjustable planning mechanisms so that the inevitable unforeseen outcomes can be adjusted for and dealt with. You can clearly see the difference between neoclassical economics and the Économistes Atterrés, for example. The latter argue that we will have to make many more decisions in the future as our environments evolve; we do not inhabit a system with a constant and stable equilibrium for which we only have to specify the starting point from which everything will then follow automatically along the lines of mathematical dynamic economic models that neoclassical economists use.

This uncertain environment should actually be familiar policymaking territory for Post Keynesians who understand so well that investment decisions are long-run decisions with outcomes that cannot be foreseen with any degree of certainty. In short, they are well-prepared to also deal with the uncertainty of environmental outcomes. If only we can convince Post Keynesians to abandon their single-minded push for macroeconomic policies to expand production and employment without regard for the environmental possibilities.

4.5 The Role of ELR in Shifting to a Low-Throughput Economy

Clearly, we cannot continue to expand current forms of production. Perhaps other types of production can grow, and employment can be expanded in those sectors while employment in high-throughput activities is reduced. It has been suggested in many casual conversations on sustainable economic development that employment could actually be increased by "going green." Such statements suggest that overall *energy throughput* in economic production can be reduced without causing a rise in unemployment provided new low-throughput production is more labor-intensive than the current energy-intensive sectors of the economy.

Skepticism of such claims is in order here, however, because our current economic and social systems will most likely cause population to continue to grow, modern agriculture to push more workers into more energy-intensive sectors in the developing world, and corporate marketing to channel incomes towards more consumption of energy-using goods and services. As a modern Jevons effect, we will destroy the habitats of more species and consume more carbon energy despite less resource use per unit of production. Nevertheless, it is technically correct to argue that macroeconomic policy should focus on increasing low-throughput, labor-intensive production while also decreasing high-throughput activity. The question is whether this task is compatible with full employment, improved living standards, and social equality.

4.5.1 Identifying Low-Throughput Activities

Structural economic change requires, first of all, the identification of low-throughput provisioning activities. Agriculture presents obvious cases where a shift in economic organization could raise employment

while reducing the throughput of natural resources in the human provisioning process. According to a report by the agricultural study group GRAIN (2014):

> Although big farms generally consume more resources, control the best lands, receive most of the irrigation water and infrastructure, get most of the financial credit and technical assistance, and are the ones for whom most modern inputs are designed, they have lower technical efficiency and therefore lower overall productivity. Much of this has to do with low levels of employment used on big farms in order to maximize return on investment. Beyond strict productivity measurements, small farms also are much better at producing and utilizing biodiversity, maintaining landscapes, contributing to local economies, providing work opportunities and promoting social cohesion, not to mention their real and potential contribution to reversing climate change.

There are other sectors of the economy where labor-intensive low-throughput activities can be expanded to replace capital-intensive high-throughput activities while potentially raising human well-being. The healthcare sector, for example, could be expanded to raise life expectancy and reduce days lost to illness and disability. Also, with ageing populations, there is also a greater need for caregiving in general, and such activity is also often quite labor-intensive. Care for the aged is largely provided informally by family and neighbors, and such voluntary provisioning makes caregiving inherently unequal and dependent on family structures. A more formal system, still highly labor intensive, would enhance security and well-being for the aged in modern market societies.

Education will remain a labor-intensive process even if new information technologies are introduced because much learning is *tacit* in nature. Polanyi (1958) explains that not all technology and knowledge can be *codified*, by which he means those types of information that can be written down in the form of clear instructions, blueprints, or recipes, or explained in textbooks or on the internet. Instead, the passing on of society's stock of knowledge and technology requires personal example and guidance. Also, on-going educational activities for people of all ages are also necessary for maintaining a good social and economic environment, according to educators like John Dewey (1897), and socialist thinkers like Paulo Freire (1970). Especially important given the fundamental inconsistencies of our current economic system and the complex issues related to our coexistence with the natural environment are Dewey and Freire's emphasis on

using education to motivate critical thinking, something that automated and routinized education cannot teach. Freire (1970, Chap. 2) specifically advocated *problem-solving education* that teaches students to think for themselves, feel confident to confront the problems they face, and to feel capable of making choices on how to deal with problems. Such self-liberating education necessarily requires a substantial inter-active and nurturing labor input. Other low-throughput activities like entertainment, art, maintenance services, repair services, sports activities, natural parks, scenic reserves, and activities related to maintaining the commons also need to have more labor allocated to them.

Post Keynesians understand that these shifts in production must be accompanied by shifts in demand. In general, people consume goods and services both individually and jointly, as some goods are rival goods that can only be consumed by one person at a time, while other goods are non-rival goods that many people can consume simultaneously. Only one person can wear a shirt or drive a sports car, but many people can enjoy natural scenery, public transportation, public television broadcasts, and music in the park at the same time. Environmental limits points to the need for a shift towards collective consumption and away from individualized consumption. This shift will require changes in work time versus leisure.

4.5.2 Changing Lifestyles by Reducing Work Hours

The total number of jobs can also be increased by reducing the hours that each individual person engages in provisioning activity. A decrease in working hours is also necessary in order to shift consumption from high-throughput products to less energy-intensive products because consumption of the latter often require more leisure time. Because fewer working hours increases leisure time at the expense of material production, some authors like Schor (2013) make the case that a shift towards fewer working hours will actually improve "the quality of individual and community life." Coote and Franklin (2013) of the New Economics Foundation (NEF) detail how quality of life issue are intimately related to working hours because it takes time to consume services, community activities, and cultural activities. Time-constrained consumers inevitably end up favoring material consumption over collective consumption in the form of community activities. Coote and Franklin argue that the latter are currently under-consumed because people are time-constrained and effectively

forced to engage in high levels of individualized material consumption in place of more time-intensive social activities that actually increase the well-being of group animals such as human beings. In an earlier work, Coote et al. (2010) estimated that if British workers (rather than business owners) capture all expected annual productivity gains over the next three decades and if they take those productivity gains in the form of fewer hours of work, then working hours can be reduced to 21 hours without any loss in income accruing to workers.

Of course, a shift to shorter working hours will require worker solidarity and strong unions, supported by collective government institutions. The market power that employers have gained over workers in most countries by means of political lobbying, immigration, and overseas outsourcing has completely stopped the 100-year-long trend towards shorter working hours in the United States, for example. As a result, median wages actually fell over the past 40 years despite continued labor productivity gains. Shorter work hours have been strongly opposed by employers, and they will almost certainly be actively opposed in the future; hence the Économistes Atterrés' call for stronger democratic institutions and responsive government. The wealthy will not voluntarily cede the privileges that enable them to accumulate even more.

4.5.3 Employment of Last Resort

Keynes (1936) advocated a policy of explicit job creation to combat high unemployment and economic depression. Today, a number of economists have together developed a jobs strategy that calls for the government acting as *employer of last resort* (ELR). Under this strategy, the government stands ready to employ anyone who seeks work at some minimal living wage, so that government employment acts as an automatic employment stabilizer and a basic wage floor. For example, Tcherneva (2013) argues that current monetary policy effectively targets investment, not employment, and there is no reason to expect that more investment will substantially reduce unemployment. In fact, capital is a substitute for labor, and Onaran and Galanis (2012) raise the possibility that an easy monetary policy that increases investment may actually lower wages and thus reduce aggregate demand, with the result that neither aggregate demand nor employment expand. As we now know, in the United States the highly expansionary "quantitative easing" monetary expansion by the Federal Reserve after the 2007–2009 recession was very slow in generating

employment. In fact, the expansionary monetary policies before the 2007 financial crisis generated little employment or wage increases for most workers, and their main effect was to create a housing bubble that ultimately sank the global economy. Tcherneva and other heterodox economists linked to the Post Keynesian school, such as Minsky (1982), Harvey (1989), Wray (1998), and Forstater (2004), have called for more direct forms of job creation by the government.

Some of the rationale for more focused macroeconomic policies above reflects the recognition that general monetary and fiscal policies affect both the demand and supply sides of an economy. One of the alleged weaknesses of the Keynesian macroeconomic model is that it deals exclusively with the demand side of the economy, but this criticism was not entirely accurate even if Keynes' exposition in the *General Theory* did focus largely on the short-term effects of policy. Several close followers of Keynes almost immediately expanded Keynes' analysis to include a supply side as well as a demand side; see, for example, Harrod (1939) and Domar (1946). In the case of ELR, the creation of jobs affects the amount of products produced in the economy. Employing people to teach creates education, and employing people to provide medical services creates a healthier population, just as employing people to build a bridge creates a bridge. On the supply side, ELR can therefore play a direct role in enabling a restructuring of economic activity towards low-throughput production.

In order to guarantee full employment, employment of last resort (ELR) programs can be designed to directly put people to work only in low-throughput industries. At the same time, current high-energy and high-resource throughput industries must be greatly reduced in size, and quickly given the rapidly moving processes of global warming and biodiversity loss. ELR is a program that is not only more effective in creating employment, but policymakers can specify *where* and *what kind of* jobs are created. In short, ELR can directly shift work from high-throughput production, which can be discouraged by higher taxes and outright prohibitions, and towards low-throughput industries through government job creation for workers laid off in the former industries. ELR's role as an automatic macroeconomic stabilizer is greatly expanded under the current scenario of a failing capitalist economy that is approaching environmental disaster. ELR can thus serve as a long-run dynamic stabilizer of the restructuring of human society towards a zero-growth economy, a more equal society, and the sustainable coexistence of humanity with nature.

There is yet another reason to focus on employment: people value their participation in the provisioning process. Neoclassical economics erroneously positions work as exclusively a cost, but economists since Veblen (1899) and Keynes (1930) through case studies by Lopes (2011) and happiness studies by Veenhoven (1996), Blanchflower and Oswald (2000) and Dolan et al. (2008) make it clear that we value work. We value more pleasant work more than stressful or dangerous work, of course, but unemployment is severely problematic to most people even when social programs compensate for the lost income. Hence, an ELR policy can improve human well-being by providing more pleasant and more valued work experiences.

4.5.4 Overcoming Resistance

ELR also plays a critical indirect role in reducing opposition to the restructuring process by protecting workers during the transition process and sustaining the income of workers as the economy transitions to fewer work hours and more leisure time. After all, the difficulty with instituting an ELR program is political, not practical. In most countries, governments already employ large numbers of people, and, in line with the low-throughput industries discussed above, they are well positioned to expand activities carried out in the commons and as public goods. Specifically, government already provides most of the world's formal education, healthcare, social services, and public transportation. In many countries, government also provides financial services, personal care services, and most infrastructure services. Given its traditional status in developing economies, the active government promotion of sustainable labor-intensive agricultural practices will, by default, employ many people. Given the massive job destruction by modern energy-intensive, chemical-intensive, and capital-intensive agriculture, merely reversing this process will restore a very large amount of recently lost employment.

There is a very daunting political problem, however. Global warming, biodiversity losses, and resource depletion require that ELR programs favor collective action over private activities. Restructuring the human economy requires curbing many currently profitable and highly capitalized industries, and the resistance will be fierce. The current resistance to even modest efforts to slow global warming or protect other natural resources clearly illustrates the difficulty in bringing about the thorough economic restructuring. But by ensuring all workers will have a job, ELR substantially

reduces worker anxiety about the disruptive aspects of environmental policy. To date, labor organizations have often sided with capitalists against environmental regulations and eco-taxes because of the fear that workers would lose their jobs along with the capitalists' fear of the loss of wealth. ELR breaks that link by guaranteeing employment. ELR also strengthens labor's power in the labor market by putting a floor under wages, making workers even more likely to actively support the restructuring of the economy.

4.6 Some Final Observations

While Post Keynesians and neoclassical mainstream economists differ sharply in how to deal with economic recessions and restore economic growth, economists from both schools make the mistake of ignoring the fact that environmental constraints make economic policies based on restoring economic growth unsustainable. It does not matter whether austerity or pump priming is more effective for restoring economic growth after a deep recession; economies cannot grow the way they have over the past 200 years. Simple Post Keynesian pump priming that does not alter the structure of the economy towards the consumption of low-throughput products will ultimately fail just as spectacularly as the austerity programs they criticize.

We have described macroeconomic policies that can solve the decroissance-unemployment dilemma. By means of employment of last resort policies we can keep people busy while also restructuring our provisioning activities so that they become more compatible with our natural environment. These ELR policies will also reduce the resistance to the sharp shift in economic organization that our urgent ecological problems call for. However, this economic restructuring clashes directly with the culture and special interests of capitalism. It is difficult to imagine, except in the case of the very clear presence of environmental catastrophe, that capitalist special interests will embrace such an economic restructuring. The vested interests in the capitalist system, the bourgeoisie and the upper echelons of the working class, will not agree with reduced working hours or ELR policies, since both raise the price of labor and thus will tend to reduce the profits and rents that accrue to the privileged in the propertied capitalist system. Nor will they agree to reverse the many privatizations of the commons that we have endured over the past three decades. And a large jubilee canceling all debts while we enhance the social safety net will

be met with equally powerful opposition. It is even difficult to imagine the general population, which increasingly views its precarious capitalist materialist consumption as its only accomplishment in life, will embrace a structural change in our economy. Perhaps the successful introduction of ELR policies can convince a critical mass of workers that decroissance will not imply a reduction in living standards.

It is also important to recognize that ELR cannot, by itself, shift production towards low-throughput production. It must work in combination with explicit curbs on high-throughput activity. As Popp (2002, 2004) makes clear, merely providing incentives for alternatives will not make them happen. Harmful activity, or what Daly (2014) refers to as *uneconomic production*, must be explicitly restricted, discouraged, or banned outright. To get the donkey cart to its destination, there must be a road, a carrot, and a stick. ELR provides elements of all three, but it needs help in the form of carbon taxes, political activism, holistic economic analysis, and functional democracy, among many other institutional supports.

Another concern related to the arguments made in this paper is that the reduction in material output will actually reduce human well-being because other forms of production such as social activity, maintaining the commons, and providing education cannot replace the benefits of material consumption. With regard to this issue, Amartya Sen is well-known for linking human well-being to economic growth in that economic growth gives people more choices. Sen (1985) argues that freedom from poverty and depravation depend on the extent that people have choices to escape from their poverty or depravation. He thus argues that economic growth provides for people's basic needs and offers different people more than one way to satisfy those needs. Sen's framework, known as the capabilities approach to development, redefines economic development in terms of capabilities, which are achieved by means of the growth of production. At first glance it appears as though environmental restrictions on growth thus reduce economic development. However, environmental degradation also reduces choices and freedom. When the natural commons are destroyed, natural resource flows dwindle, and production costs rise freedom-enhancing development also slows.

It is also important to keep in mind that happiness and satisfaction with life are complex phenomena, not easily defined in terms of fixed functions. There is ample evidence showing that people like manageable and predictable changes that improve their personal well-being relative to what they recently experienced, regardless of the point they start from. For example,

in one behavioral study workers were given the choice of earning the same real wage every year of their lives, experiencing gradually increasing wages that average out to the same real level as the constant lifetime wage, or gradually decreasing wages that average out to the same real level as the constant lifetime wage.[10] The majority selected the rising wage option even though it meant starting with a lower wage. Economists found the majority's choice surprising because standard economic theory mandates discounting future earnings relative to current earnings, and discounting the future means the constant and decreasing wages provided higher present values of lifetime income compared to a rising wage that starts with a below-average wage. Aside from the implication that the standard economic practice of discounting future income may not be appropriate for making decisions that maximize long-run human happiness, it appears that people would like to see things getting better over time. These results suggest that people may not be as short-run oriented as some studies suggest. Perhaps it may not be so difficult to convince people that we should alter the way we live and work in order to reduce the strong likelihood that the future will provide us with a much less happy existence, especially if ELR eliminates the threat of unemployment.

It is disconcerting that Post Keynesians have not been able to even gain recognition for simple pump-priming policies in the face of the disastrous results from austerity policies following the 2007–2009 financial crisis. It makes one wonder whether the even more invasive supplementary policies such as ELR, reduced working hours, redistribution, and reduced hedonic competition necessary to avoid environmental disaster will be possible. Perhaps circumstances will eventually become sufficiently dismal and obvious to stimulate support for systemic change of the type that we propose. In the meantime, the difficulty of implementing revolutionary programs and policies should not stop concerned economists from getting their proposals right.

Notes

1. See the latest of these reports, Intergovernmental Panel on Climate Change (2014), which thoroughly confirms the trends described in earlier reports dating back to the early 1990s.
2. The World Wildlife Fund defines humanity's global *ecological footprint* in terms of *global hectares (gha)*. The latter is the average capacity of one hectare of the Earth's surface to produce services and absorb waste, and the former is the sum of (1) all forest, grazing land, cropland, and fishing

grounds required to produce the food, fibre, and timber humanity consumes, (2) all land and water to absorb the wastes emitted when humans uses energy, and (3) all land and water required for humanity's living space, production, transportation, and storage. According to the World Wildlife Fund (2008), the total productive area of the Earth is equal to 13.6 billion gha, or 2.1 gha per person in 2005. In that year, however, the global ecological footprint was estimated to be 17.5 billion gha, or 2.7 gha per person. Hence, the WWF's conclusion that exploitation of the Earth's resources exceeds the planet's regenerative capacity by about 30 percent (2015).

3. See, for example, Union of Concerned Scientists (2015).
4. See Shindell (2015) and Diaz and Moore (2015).
5. See New Economics Foundation (2013). Also, see Wagner and Weitzman (2015) on how to go about calculating the current cost of an uncertain possibility of a catastrophic future event.
6. From a conversation quoted by the French journalist/writer Hervé Kempf (2007), p. 3.
7. David Neumark and Andrew Postlewaite (1998) show that concerns about social status are the main reason why hours worked have not fallen in countries like the United States despite large increases in real income.
8. Les Économistes Atterés (2012), Denis Bayon, Fabrice Flipo, and François Schneider (2010); see also the monthly French newspaper *Décroissance*, as well as the quarterly journal *Entropia*.
9. Note that the proponents of décroissance anticipated Naomi Klein (2014) and her popular book, *This Changes Everything*, by a decade or more in arguing that environnmental decline can only be reversed if we end the single-minded pursuit of profit endemic to our monopoly capitalist system where markets ignore many of the true costs of our energy-intensive production methods and our growing exploitation of nature's ecosystem.
10. George F. Loewenstein and N. Sicherman (1991).

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