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'The economy' as if people mattered: revisiting critiques of economic growth in a time of crisis

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ABSTRACT

Coronavirus (COVID-19) policy shut down the world economy with a range of government actions unprecedented outside of wartime. In this paper, economic systems dominated by a capital accumulating growth imperative are shown to have had their structural weaknesses exposed, revealing numerous problems including unstable supply chains, unjust social provisioning of essentials, profiteering, precarious employment, inequities and pollution. Such phenomena must be understood in the context of long standing critiques relating to the limits of economic systems, their consumerist values and divorce from biophysical reality. Critical reflection on the Coronavirus pandemic is combined with a review of how economists have defended economic growth as sustainable, Green and inclusive regardless of systemic limits and multiple crises – climate emergency, economic crash and pandemic. Instead of rebuilding the old flawed political economy again, what the world needs now is a more robust, just, ethical and equitable social-ecological economy.

KEYWORDS

Coronavirus (COVID-19); crisis capitalism; limits to growth; Green economy; economic value; social-ecological transformation

1. Introduction

Prioritising financial interests and economic growth over human life is nothing new, and has long been evident in the polluted state of the environment with its related morbidity and mortality. There are good longstanding social and ecological reasons why an economic crisis should be taken as an opportunity for redirecting the means of basic social provisioning away from stock markets, financiers, bankers, corporate interests and profiteering, while reconsidering what is provided, to whom and for what. However, there are also powerful lobbies, organisations and institutions forming the social structures and mechanisms that operate to prevent any substantive change and cover-up the social and ecological failures.

Gills and Morgan (2019) have explained why the Global Climate Emergency demands a profound historical transformation of our civilisation but also how this has been prevented and what could be done about this. As they note (Gills & Morgan, 2019, p. 13),

it is manifestly the case that the main impediment to change is our system of capital accumulation with its commitment to material growth of economies. This, as the evidence so obviously shows, creates both an escalating problem to solve and a whole set of interests continuously working to slow down solutions.

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Gills (2020) points out that humanity now faces a ‘triple conjuncture’ of global crises: climate change and ecological breakdown; a systemic crisis of global capitalism and neoliberal economic globalisation; and the current global Coronavirus pandemic.

The Coronavirus pandemic of 2020 provides a dramatic example of how modern economic systems are precariously structured to achieve financial returns. They are not robust in the face of sudden changes in demand, whether increases (e.g. panic buying) or decreases (e.g. not flying), or interruptions to supply. Financially motivated moves to change supply have involved avoiding physical stocks, increasing global outsourcing of production and elongating supply chains. The result has been international dependencies making the system more susceptible to collapse. More than this, the primary capital accumulating motive, encapsulated in the economic growth imperative, means an inability of the system to pause even for a week, let alone a month or two, without economic and social crisis.

Success under capitalism is measured by accumulating money to reinvest to accumulate more money, with a precarious link to the qualitative state of the real material economy and production. That such a growth economy is divorced from the material reality upon which it depends, an unsustainable utopia and devastatingly harmful socially and environmentally, has long been noted by ecological economists (Daly, 1973; Georgescu-Roegen, 1971). Capitalism uses money to trade things (e.g. goods, services, commodities, property rights) to generate money flows through exchange. When exchange breaks down the money stops flowing: people are laid-off, interest on debts are not paid, investments fail, firms go bankrupt, banks go under, savings are lost, runs on banks start. Economic growth is all about keeping the exchange cycle of money growing as fast as possible, and accumulating capital to increase the capacity to do so. The biggest worry for politicians in the global North is then to maintain such a financially oriented growth system when its basic means of operation fail, and to this end protecting ‘the economy’ has become a priority above all else.

In Austria the ski areas of the Tyrol had been identified by other nations (e.g. Iceland) as centres responsible for spreading the virus via international tourism, but information was suppressed because tourism was booming (up 11% on the previous year) and business leaders closely allied to the ruling conservative party were against restrictions (Traill & Schocher, 2020). The UK government, concerned about its expanding airline and tourist business, was advising that trips to Italy were generally safe after the Italian lockdown started, and similarly for Spain, and on the 12th March stated ‘It’s not the current position of the UK, based on medical and scientific advice, that we should halt flights’ (Stewart et al., 2020). Four days later they started doing exactly that. As the virus spread and death toll rose governments were forced to take action. However, many governments when initiating action were reluctant, slow and ill-prepared (e.g. UK, France, USA) or refused to implement any strong compulsory restrictions (e.g. Brazil, Sweden, the Netherlands), which later appeared to contribute to their relatively high per capita death rates.¹

From the start of the Coronavirus outbreak in Europe and America politicians were balancing the impacts on ‘the economy’ of taking action against mortality and morbidity.² Official announcements emphasised only that ill and old people were dying, as if this were not really something about which most people should be worried. In a capital accumulating society, where production and productivity are at least rhetorically at the fore, losing the old and sick means ‘the economy’ might actually be healthier afterwards, because a group of unproductive financial dependents is removed.

Protecting economic interests was deemed consistent with advocating ‘herd immunity’ with its associated acceptance of high deaths rates. The idea of ‘herd immunity’ is to allow a virus infection to spread throughout an animal population with members either obtaining natural immunity or dying. Until mid-March 2020 this approach was official UK policy supported by the Prime Minister,

Boris Johnston (Stewart et al., 2020). The policy was defended by the UK's chief medical officer, Chris Whitty (Stewart et al., 2020), and chief scientist, Patrick Vallance (Stewart & Busby, 2020). Whitty explained that it would require 80% of the population to become infected (if or how the remaining 20% would remain uninfected was unclear), and the death rate would be 1%, i.e. similar to normal seasonal flu. This meant accepting over 540,000 deaths in Britain. However, the chiefs had ignored the World Health Organisation (WHO) estimate of a 2% death rate in January as well as the update on the 3rd March when the WHO Director-General stated that: 'Globally, about 3.4% of reported COVID-19 cases have died'.³ This would involve a worst case scenario of over 1.8 million deaths, and if the virus eventually spread to the whole UK population then 2.3 million.

The policy was dropped by the UK when it moved to lockdown but maintained in the Netherlands where social distancing formed the main policy response. Similarly, long after general government U-turns, the Swedish were also avoiding strict isolation measures. Both governments ignored the resulting relatively high per capita death rates (see footnote 1). Andreas Hatzigeorgiou, CEO at the Stockholm Chamber of Commerce stated that:

We have to combine looking at minimising the health effects of the virus outbreak and the economic impacts of this health crisis [...] The business community here really thinks that the Swedish government and the Swedish approach is more sensible than in many other countries. (Savage, 2020)

Meanwhile, an article in the *Wall Street Journal* entitled 'Coronavirus vindicates capitalism' tried to claim that the high Italian death rate was due to their government's health system and the America corporate capitalist model would respond far better (Strassel, 2020). Shortly after the USA accelerated into global pole position for both infections and deaths. Even as the general inadequacy of initial government policy led to global lockdown the primary aim was already to reassure stock markets, get 'the economy' back to normal and re-establish 'growth'. Supposedly non-interventionist, 'free-market', pro-corporate, anti-government business executives, billionaires and politicians united in supporting public policy packages offering trillions to save 'the economy'.

Again there is nothing new here. Generally capitalism has adapted to use all crises to increase returns to the richest and those in power (Klein, 2007). The neoliberal thought collective successfully used the 2008 financial crisis to their own advantage (Mirowski, 2013) and this saw billions in bailouts go to those who created the crisis while those at the bottom got less. A neoliberal capitalist system structured around corporate profits has meant cost cutting and austerity politics in the global North, notably impacting public service provision (e.g. health care), reducing protection of the poorest and increasing inequalities.

The richest nations and the most powerful corporations keep others subordinated to their interests – employing structural adjustment, military intervention, sanctions and support for authoritarian regimes. Social exploitation appears in precarious employment, unsafe working conditions and environmental degradation impacting health. The systematic exploitation of resources and peoples of the global South leaves them unable to react to crises such as a pandemic. In much of the Middle East, Africa, Latin America and Asia the prevalence of informal work and unpredictable daily wages mean self-isolation is impossible, because it would mean starvation (Hanieh, 2020). The extent to which the global North can avoid the same threat to those at the bottom is also limited, e.g. an estimate 1.5 million people were soon short of food in the UK (Lawrence, 2020b). The uneven ability of nations and peoples' within nations to respond to crises is a reflection of the structure of the globalised political economy.

In this paper I start by drawing-out some of the more general lessons that can be learnt from the Coronavirus crisis about the structure of the dominant economic system. I then relate this to how

economists have promoted the idea of soft reformulation of capitalist economies in the face of crises and specifically the environmental crisis. The correlation between economic growth and environmental degradation is an empirically straight forward fact, as shown by pollution reduction due to the Coronavirus policies stopping economic activity. However, most economists have, since the 1970s, persistently denied the associated limits to economic growth. They recommend ‘Greening’ economies, using price incentives (i.e. internalising externalities), in order to maintain growth in the face of environmental degradation and ecosystem decline and loss. I review economists’ defensive arguments and raise two specific problems with their account: how prices and value operate in actual capitalist economies, and the biophysical basis of any economy. The paper concludes by returning to the policy reaction to the Coronavirus pandemic and why attempts to re-establish economic growth, driven by self-serving vested interests, will fail to prepare humanity for future crises and indeed will help create them and make them worse.

2. Lessons from the Coronavirus crisis

When nation States ordered their populations to ‘stay home’, normal economic activity was frozen. In several countries hoarding occurred as people prioritised what they regarded as basic necessities (e.g. toilet roll, sanitary towels, pasta and rice). Profiteers sought to make money by trading on other peoples misfortunes, e.g. brokers speculating on the rising price of orange juice as Spain suffered high death rates and lockdown (Harper, 2020), airlines hiking prices on rebooking cancellations (Brignall, 2020), middlemen auctioning medical ventilators to the highest bidding public authorities (Greve & McCarthy, 2020). Meanwhile, nationalism and competitive self-interest appeared in the international fight with the USA over deliveries of face masks (DW Akademie, 2020b), and President Trump’s offer of a billion dollars to biopharmaceutical company CureVac, based in Tübingen Germany, to secure its (under development) virus vaccine exclusively for the USA (The Guardian, 2020). While the latter was blocked by the German government, therein lies the true potential of the system of private property rights over public interest. In a competitive market economy obtaining property rights over resources for exclusive use ensures a competitive advantage. Germany disliked what has been common practice of corporations and the global North in the global South to secure supply lines under capitalism. Yet the globalised economy remains precariously supplied.

Critical supply disruption can arise for numerous reasons including war, sanctions, profiteering, natural disasters and human perturbation of ecological systems (e.g. human induced climate change). The Coronavirus epidemic exposed the structure of global supply chains and their fragility. Outsourcing to save costs and ‘make money’ has meant moving production to countries with low environmental and labour standards, poor welfare systems and public health care, making workers vulnerable. Increased international dependency has been built around fossil-fuel intensive transportation. Cost minimisation has removed the holding of large stocks as a buffer. Over the last forty years supermarkets in the global North moved to ‘just in time’ supply chains dependent upon regular delivery services for restocking. Simultaneously, consumer choice was expanded along with ‘lifestyle’ marketing to create brand loyalty and product differentiation to segment markets and enable price discrimination. For example, in the UK supermarkets have been offering more than 40,000 lines from around the world, including a permanent summertime of fresh fruits and vegetables (Lawrence, 2020a). This market system is designed for profiteering.

Under responses to the Coronavirus the excess provision of differentiated products for profiteering became recognised as a burden, not a benefit, and something that had to be addressed as an inefficient resource waste reducing ability to supply. Thus, excess demand stimulated by panic

buying in the UK led supermarkets to stop supplying so many products to meet the same basic need (e.g. 60 types of sausages), and within a week of government restrictions they were cutting product lines, e.g. bakery lines from 17 to 7 and 20 types of pasta to 6 (Jack, 2020). Packaging needed to be streamlined not differentiated. Government policy had unintentionally stimulated a reappraisal of how public needs are supplied and exposed an important distinction. Social provisioning for the needs of all is not the same as corporate supply for profit maximisation – expansion of ‘choice’ in the market place, tailoring products to meet individual consumer preferences, highly specialised inflexible production lines and product packaging.

The maintenance of what is deemed ‘essential’ also became an explicit priority. The Coronavirus pandemic saw both supply chain failure and retail outlets being deliberately shut down to avoid people congregating and accelerating infection rates. This meant defining what is allowed to be supplied and what is not. For example, the UK government listed ‘essential retailers’ as including: supermarkets and other food shops, pharmacies, shops selling alcohol including those within breweries, petrol stations, newsagents, bicycle shops, home and hardware stores, laundrettes and dry cleaners, garages, pet shops, post offices and banks. At the same time the UK’s supermarkets were left to self-regulate how they would meet the essential needs of the public, as if the government should not intervene in the ‘free market’. Cultural differences affect what is deemed necessary as a means to satisfy a need, but even more fundamentally the question arose as to what should be deemed essential? The British disputed whether chocolate Easter eggs should be sold (BBC News, 2020d), while Americans demanded gun shops be reopened after initial closure (Levin, 2020) and Florida deemed televised wrestling entertainment an essential service (BBC News, 2020e). Fundamental questions are evident here concerning how an economic system is structured to meet essential needs.

What should be supplied under what conditions and who should decide and on what basis? Why do some products appear and others get removed from the market place? The role of power and the influence of different actors (e.g. government, corporations, unions, civil society) is revealed through preferential treatment. Self regulation by corporations is the preferred neoliberal way and allows governments to shift responsibility, but policy response to address the Coronavirus stood in stark contrast to this. Ambivalence over the role of government could be seen in vacillation as to when to regulate, let alone what to regulate and how.

The potential for profiteering from supplying the ‘non-essential’ was quickly recognised by corporate online delivery services that went unregulated. Amazon provides an example of how such capitalist enterprises operate. They increased staff working hours and hired tens of thousands on temporary contracts and minimum wages, while providing no or inadequate virus protection and so partially countering the very reason their high-street competitors had been closed. When a New York worker led a strike, that demanded anti-Coronavirus measures and protective gear, he was fired (Evelyn, 2020). Meanwhile Amazon CEO, Jeff Bezos, the richest man in the world, asked for donations to his new Amazon Relief Fund promoted as necessary to aid his workers (Zoellner, 2020). Amazon pays a minimum wage of \$15/hour, while Bezos earns \$8,961,187/hour (Hoffower, 2019). The company pays no tax in the USA but is worth a trillion dollars (Zoellner, 2020). Protests by workers in France and small business concerns over unfair competition under Coronavirus regulations led Amazon to claim it would temporarily (for about two weeks) deliver only ‘essentials’, which it self-defined as those things in the highest demand (BBC News, 2020a; Guichard & Pailliez, 2020; Pailliez & Guichard, 2020). In April 2020 a French court in Nanterre ordered Amazon to limit its deliveries in France to essential goods only, amid claims of failing to protect its workers from Coronavirus, or suffer a penalty of one million euros per day (BBC News, 2020b). Shortly after Amazon shut down its six warehouses in France.

The allocation of essentials in price-making market economies works on the same basis as non-essentials. That is, self-interest and ability-to-pay determine who gets what, which means nations become unilateral and when panic buying hits there are empty supermarket shelves and some people go without. As work on famines shows (Sen, 1986), market capitalism diverts essentials away from those in most need to those with most money. There is a fundamental requirement for ethically guided government regulation in any market system, because there is no inherent capacity for social benefit or good in such a system. The inequity and inefficiency in meeting the needs of all are normally of no concern because the vast majority (at least in the global North) do not suffer enough to create political change.

As long as those at the bottom are a distant minority, and not simultaneously dying in embarrassingly large numbers, they can seemingly be ignored. However, in a major crisis the inequities become a matter of life and death even in the richest democratic nations. The homeless, who have been growing in numbers on the streets of the growth economies (700,000 in Europe and UK), appear as a group susceptible to starvation (Boffey, 2020). The standard inadequacy of government policy is exposed leading to demands by concerned groups for emergency action to prioritise shelter and care (The Guardian, 2020). The Coronavirus outbreak revealed the speed with which a substantive policy change could be implemented given the political will to do so. Why is such funding, care and concern left to charities or absent in times of economic prosperity? Where are the claims of national unity and social inclusiveness then?

Prior to the Coronavirus pandemic, economies were regarded as booming with high growth rates while elected officials were pursuing austerity policies that cut down on public services and governments were busy removing support for those at the bottom. The gap was widening between the 'haves' and the 'have nots'. For those to whom it was previously of little concern, the crisis suddenly threw into stark relief the position of being one of those without a job, ill, weak, old or homeless. Many realised their own precarious position in the system. Middle class, self-employed, small businesses owners became dependent on government handouts or faced bankruptcy with the prospect of joining the unemployed. There is nothing desirable about joining the groups marginalised by the productivist ideology of a competitive growth economy, where a good person is a good consumer with a salaried job.

The predicament of those at the bottom within the economies of the 'developed', industrialised, global North may be bad but it is much worse for those in the global South. Yet, economic growth has been promoted since the late 1940s as the only means for addressing poverty and sustaining 'development' (Sachs, 1999/2015). This persistent growth = development ideology has operated in denial of both social and ecological impacts. The pretence is that economic growth is, or could be, socially inclusive, environmentally benign and sustainable.

3. The lie of sustainable inclusive growth and a green economy

Within two weeks of lockdowns the lobbying was underway for more de-regulation and securing government as the ally of finance, business and corporate interests to fund bailouts and restart economic growth. In response to the economic impacts of Coronavirus policy, Mohamed El-Erian, chief economic adviser at Allianz (the world's largest financial services and insurance corporation) and former deputy director at the International Monetary Fund (IMF), recommended 'putting in place better foundations for structurally sound, sustainable and inclusive growth', because 'advanced economies are saddled with structural and institutional impediments that have stifled growth' (El-Erian, 2020). The rhetoric involves promoting the growth economy as the only option and as

being totally compatible with delivering improvements in environmental quality and social equity with government intervention and regulations as impediments. The recommended policy response is the same as after the 2008 financial collapse. The position was made quite explicit by World Bank President David Malpass at the (virtual) G20 meeting of Finance Ministers, 23rd March 2020:

Countries will need to implement structural reforms to help shorten the time to recovery and create confidence that the recovery can be strong. For those countries that have excessive regulations, subsidies, licensing regimes, trade protection or litigiousness as obstacles, we will work with them to foster markets, choice and faster growth prospects during the recovery. (Malpass, 2020)

As with previous crises, Coronavirus quickly revealed that capitalist economies without growth are economies in total crisis, and that corporations are ultimately totally dependent on public funds and government intervention. After each crisis the public pays to protect billionaires and reformulate a new version of the same socially inequitable and environmentally destructive growth economy.

The claim that capitalist economies can be redesigned into some sort of inclusive and sustainable form has not been limited to corporations and financial vested interests. Some prominent authors, regarded as offering insights into future alternative economies to address the environmental crisis, have treated economic growth as if it were an optional extra for modern economies and capitalism in particular. The likes of Raworth (2017/2018), who defines herself as a ‘radical economist’, and van den Bergh (2011), an environmental economist, have advocated agnosticism about economic growth, while Jackson (2009, pp. 197–202), an ecological economist and post-growth advocate, regards economic growth as necessary for ‘development’ and dismisses any serious discussion of capitalism let alone taking issue with its structure (see Spash, 2020). That there is no capitalism without economic growth, and so no such thing as a Green capitalist economy, should by now be obvious. The only time greenhouse gases have fallen in the modern industrial period has been due to economic collapse typically during a recession/depression or due to total devastation by warfare.

The Coronavirus economic shutdown provided clear empirical evidence of the substantive impacts of economic activity on the environment (Edwards, 2020; Hauser & Jackson, 2020). The drop in material and energy throughput led to immediate reductions in noise pollution, improved water and air quality leading to better living conditions for humans and non-humans. The conflict between economic growth and the environment was made self-evident and visible. Fish returned to the canals of Venice, skies cleared over the industrial centres of China and smog disappeared from the world’s capital cities. Environmentally destructive sectors, normally promoted as progressive leaders in the expansion of the growth economy, suddenly ceased operation, e.g. airlines. Up to 70,000 lives were estimated to have been saved (temporarily at least) by two months of clean air in China (McMahon, 2020), but somehow pollution, health impacts and lives lost to the growth economy just do not seem to count for much. For thirty years or more the oxymoron of sustainable inclusive growth has been advocated under a variety of titles from sustainable development (World Commission on Environment and Development, 1987) to the Green economy (UNEP, 2011) to the sustainable development goals (United Nations General Assembly, 2015).

4. Revisiting the defence of economic growth against limits

Since the rise of the environmental movement in the 1960s, the economic growth paradigm has been subject to social and ecological criticism, which bore fruit in numerous books in the 1970s (Daly,

1973; Easterlin, 1974; Hirsch, 1977; Meadows et al., 1972; Mishan, 1969; Schumacher, 1973; Scitovsky, 1976). A focal point for debate was the *Limits to Growth* (LTG) with its multiple scenario analysis (Meadows et al., 1972). The LTG modelled five factors: population growth, accelerating industrialisation, adequacy of agricultural production, depletion of natural resources and pollution. An economic system based on growth was revealed to be susceptible to collapse due to multiple potential interactions, making policy responses aimed at singular causes ineffective. The systemic problems indicated the need for changing the system.

However, most economists continued to unquestioningly promote capitalism due to their dogmatic and paradigmatic commitment to the growth imperative and price-making markets (Spash, 2020). This form of market has prices resulting from ‘negotiations’ between actors (e.g. firms-consumers; employer-employee) in contrast to being set by an administrative, or other, authority (Polanyi et al., 1957). Faith in price-making markets as resource allocators entails the belief that relative prices change to stimulate substitution and innovation, leading to technological fixes for any problems. Money as the measure of all values requires universal commensurability, so that everything appears substitutable for everything else. Treating the world as different forms of commensurable capital – human, natural, artefactual, social – makes none of any more importance than any other. So loss of natural capital is easily compensated by man-made (human, social, artefactual) capital. Armed with such ‘logic’, mainstream economists have denied the relevance of both the consequences of and limits to growth.

The LTG scenario analysis posed the challenge that no simple price adjustment, spread of private property rights or new technology could address the causal mechanisms that combine to create social-ecological crises. Relaxing various constraints would merely lead to a different ultimate cause of collapse due to exponential growth. Everybody today should be familiar with the implications of exponential growth (e.g. rates of virus infection and death) and the related impact on the speed of doubling times (e.g. total infections and deaths). It means that action waiting for empirical evidence comes too late, hence precaution is necessary to avoid catastrophe. The response of the Trump administration to the Coronavirus pandemic provides an outstanding example of failure in this regard, but one matched by others (e.g. France, Italy, Spain, Sweden, Netherlands, UK). The potential for exponential growth in harm due to the growth economy was similarly derided and dismissed.

Hostility towards the original LTG work by Meadows et al. (1972) was evident in a range of attacks on it by mainstream economists shortly after it was published. The same lines of reasoning in defence of economic growth and against environmentalism have persisted ever since. The claim is that there is only one relevant economic system (i.e. market capitalisms) and this reacts efficiently to shocks via unregulated price signals. The basic idea is that when supply is short relative to demand then prices will rise and supply will increase because higher prices stimulate production, exploitation of more costly resources and innovation. Typically defence of economic growth involves claiming the price mechanism has been ignored by critics, resources are abundant and human ingenuity can solve all problems sooner than changing the economic system.

Wilfred Beckerman (1974) wrote an entire book attacking the LTG thesis. Amongst other things, he argues that there are no resource constraints because the planet can be mined throughout the continental crust to a depth of one mile, which he claims has a million times currently known reserves, which will provide resources lasting a 100 million years. He then states: ‘by the time we reach A.D. 100,000,000 I am sure we will think up something’ (1974, p. 219). Beckerman had clearly not consulted a geologist as to what constitutes the Earth’s crust, and appears totally ignorant of the mineralogical barrier. Approximately 99.9% of the continental crust is composed of the oxides of just ten

elements (Si, Ti, Al, Fe, Mn, Mg, Ca, Na, K and P) by weight. The remainder are defined as ‘geochemically scarce elements’ (Skinner, 1979). Their existence tells nothing of their quality, concentration or exploitability (technically, economically, politically or ethically). The ‘mineralogical barrier’ distinguishes the large amount of geochemically scarce elements from those available for mining – only 0.01% to 0.001%. Scarce elements are trapped in the atomic structure of common rock (silicate minerals), and Beckerman is wrong to suggest their availability. Besides the technological leap and environmental destruction, mining beyond the mineralogical barrier implies using massive energy inputs to extract small quantities of minerals from huge amounts of waste rock (Dieter, 2017).

Another line of criticism of LTG has been to note that predictions of resource depletion dates are repeatedly confounded by new sources being brought online as prices rise. This is then taken to constitute evidence that there are no imminent limits (e.g. Beckerman, 1993). However, Meadows et al. (1972) expected rising costs and political struggles over resources long before resource exhaustion. As they state:

Given present resource consumption rates and the projected increase in these rates, the great majority of the currently important nonrenewable resources will be extremely costly 100 years from now. [...] Recent nationalisation of South African mines and successful Middle Eastern pressures to raise oil prices suggest that the political question may arise long before the ultimate economic one. (Meadows et al., 1972, pp. 66–67)

The ‘political question’ has indeed materialised in the form of supply-chain competition, militarisation, country destabilisation and resource wars (e.g. over Middle Eastern oil). The on-going geo-political struggles over controlling resources highlight the importance of maintaining access to scarce energy and material supplies for the growth economy. There is more to economics than prices!

The claim that the price mechanism is central to understanding of an economic system ignores variety in types of social provisioning systems and types of economies, and that not all aspects of an economy need include prices. Within the narrow theoretical confines of capitalist economies with idealised price-making markets, even mainstream economists create models without explicit prices (e.g. Leontief models, the Harrod-Domar model). Prices and their operation via supply and demand models are part of microeconomics and attempts to link macroeconomic models to these microeconomic foundations have failed. Thus, the Sveriges Riksbank (‘Nobel’) Economic Prize winner, Robert Solow has no explicit prices in his macroeconomic growth model, although this did not stop him criticising the LTG scenario analysis for not modelling prices (Georgescu-Roegen, 1975/2009, p. 348). Actually, the LTG simulations include the equivalent of price effects via relaxing model constraints, e.g. allowing increased resource supply. The explicit mechanisms (prices, technology, a miracle?), whereby supply increases, are irrelevant to the scenario analysis. As Meadows et al. (1977, p. 201) point out, relaxing the resource constraint means ‘[t]he ultimate regulating effect of the price system is thus included, but price does not explicitly appear in the model’. The point here is that economists erroneously and hypocritically promote the role of prices, but more than this fail to acknowledge that markets are politically constituted institutionalised processes.

Resource struggles highlight how prices are the outcome of a range of factors outside the orthodox economic model: collusion, power struggles, geo-politics, regulatory regimes, government bailouts, subsidies, funding of infrastructure and so on. For example, the price of oil does not consistently increase, despite its absolute physical decline and increasing absolute demand. Nation states seek to secure resources and may invest in stock-piling and over production relative to the requirement of production and consumption at a given time (e.g. North American investment in non-

conventional fossil fuels, oil and gas). Cartels may restrict production to increase prices (e.g. OPEC). Countries may flood the market with oil to destroy the balance of payments of other countries (e.g. Russia vs. Saudi Arabia). Events and/or policies may restrict demand and cause it to collapse (e.g. recession, Coronavirus). By April 2020 oil producing nations had successfully colluded to cut production by 10% in their attempt to stabilise the price collapse due to the Coronavirus policy induced drop in demand (DW Akademie, 2020a). The basic point here is that markets do not operate in a political vacuum, as claimed by mainstream economists, and prices are not the outcome of some simple self-equilibrating, unregulated, contest between supply and demand, let alone stable.

4.1. *Economic value and the consumer society*

Measuring everything in money metrics helps maintain and spread such problematic theoretical abstractions as equilibrium prices and the idea that they represent some objective resource costs in a perfectly competitive world economy. In support of its demand theory, economics has adopted an individualist preference utilitarian philosophy of value with universal commensurability. Everything has an exchange value measurable by money, where harm is equated with good.

A paradigm case of such 'logic' in action is the work of 'climate economists' (e.g. William Nordhaus, Richard Tol, Lord Stern) on global cost-benefit analysis (for critical reviews see Spash, 2002a, 2007a, 2007b). For such economists, damages from human induced climate change can be cancelled out by increases in consumption goods measured by gross domestic product (GDP), Gross National Income (GNI) and/or money benefits. They measure the value of life itself by either lifetime earnings or an individual's willingness-to-pay to avoid risk of death. Lost lives (e.g. people drowning in Bangladesh due to flooding and sea level rise) can then be equated to more recreational opportunities (e.g. golfing days in the USA), while the rich are made more valuable than the poor. Indeed, representatives from industrially developing nations, led by India and China, refused to accept an Intergovernmental Panel on Climate Change report that included a willingness-to-pay based value of life attributing people in industrialised countries (e.g. Europe, USA) fifteen times the (monetary) value of those in less industrialised countries. The economic logic here justifies climate action as efficient if it saves one rich person rather than fourteen poor people. The economists involved asserted that the calculations merely reported the facts, revealing their empiricist naïve objectivism, and remained totally unrepentant, ignoring the ethical meaning and consequences of their valuations (Spash, 2002b).

The ethics of mainstream economics is about trade-offs in a fictional world where all values can be expressed in a single metric (i.e. money), all choices compared in terms of their costs and benefits and decisions made on the basis of optimising the net benefit. This is the same 'logic' used to argue that the costs to 'the economy' of implementing Coronavirus restrictions need to be weighed against the benefits in terms of lives saved and illness prevented. Similarly, maintaining restrictions (i.e. avoiding costs in terms of increased death and illness) competes with restoring economic growth always euphemistically referenced as creating 'jobs' (i.e. the benefit of increasing GDP). Thus, Austria's Chancellor, Sebastian Kurz, on announcing restriction relaxation emphasised that he wanted to 'come out of this crisis as quickly as possible and fight for every job in Austria' (BBC News, 2020c). This is the same conservative Chancellor that brought in legislation, in coalition with the far right, that increased the working day from 8 to 12 h, levels not seen for a century, against major labour union protests (DW Akademie, 2018), and so undermined the number of jobs and their quality.

That the leading measure of economic growth, GDP, is also highly problematic as an indicator of human well-being is commonly recognised (e.g. Stiglitz et al., 2009). Since the rise of sustainability,

there have been numerous attempts to produce all sorts of adjustments and alternative indicators (Roman & Thiry, 2017). However, the general aim is not to overthrow the growth paradigm, but rather to reform evaluation of its operation, as if the issue were merely the wrong indicator, and not the wrong economics, economic system and way of living. Once the logic of economic value is unravelled the ethics of the society it aims to justify come into question, along with its practices.

Consumer society is built on promoting product disposal both physically and psychologically. For example, the life time of the average mobile phone is four years (UNEP, 2009), but they are discarded in North America in half that time, while the software on the devices changes in a six to twelve month cycle (Entner, 2011). Thus, the culture of a resource extracting, throwaway, fashion conscious society is backed by innovation and technical obsolescence. Claims for Green growth and circular economies do not even begin to address the structure of industrial economies and their linear systems of resource throughput and low entropy dependency (Giampietro, 2019).

The globalisation of this capitalist form of economic structure means domination of resource rich regions for extraction, control of ecosystems for productivist ends (goods and services) and social dependency on monetary flows. Within countries resource extraction wins over indigenous peoples' rights and Nature. This is the case in both the global South and North. German brown coal (lignite) extraction has destroyed much of the remnant of ancient Hambach forest while also evicting residents and destroying whole towns. Native Americans in Canada have suffered from tar sands extraction and in the USA lost against fossil fuels interests building oil and gas pipelines (e.g. Standing Rock protests against the Dakota Access Pipeline). Alternative economies and ways of social provisioning by indigenous communities are typically regarded as backward and unprogressive and their values derided. The economic rhetoric is about production, consumption, competition, innovation and government operating to support growth in corporate profits.

The consumerist tread mill involves 'keeping up with the Joneses', a syndrome activated and reinforced by corporate advertising promoting conspicuous consumption (a phenomenon recognised already by Veblen, 1899/1991). The impossibility of 'keeping-up' is explained as part of the social LTG by Hirsch (1977). Positional goods are limited by definition, so making them readily available destroys their positional value and motivates switching to alternatives. In a complementary critique, over several decades, Easterlin (1974, 1995, 2003) deconstructs the economic preoccupation with growth in income as a measure of happiness, and its failure to address what really counts in contributing to human well-being (i.e. non-positional 'goods' such as health, loving relationships, friends). Some have then moved to promoting subjective measures of well-being (Kahneman & Krueger, 2006), but these merely shift from one hedonic measure to another (O'Neill, 2006, 2008), in an attempt to avoid systemic change.

Attempts at reforming the economic system against its inherent failures are increasingly common in times of crisis. The modern calls for circular economies hark back to calls for recycling and reuse based on materials balance theory (Kneese et al., 1970). Ultimately, circular economies, recycling, increased product durability and technical efficiency are means of reducing or slowing material flows to the environment, but not of addressing the hedonistic consumer culture or overthrowing the basic laws of physics.

4.2. The biophysical basis of an economy

Georgescu-Roegen (1975/2009) analysed the frivolous use of resources in a consumer society, raising ethical issues about who gets to use which resources and for what. He based this analysis on the role of energy and materials in the reproduction of the economic system. The fiction of macroeconomic

models is that goods and services can flow in a perpetual isolated cycle between households and firms without any relationship to either the necessary energy or material inputs, or the environment into which all energy and materials must ultimately go. Georgescu-Roegen (1971) related the economic process to physical laws and specifically the exploitation of low entropy resources. Entropy is a measure of the qualitative state of energy. Energy is conserved within an isolated system (where neither material nor energy enters or exits), but moves towards minimum usefulness (from low to high entropy). Earth has three main sources of low entropy (useful energy): (i) terrestrial stocks of concentrated minerals; (ii) solar flow of radiant energy; and (iii) the gravitational force of the moon, planets and sun. Industrialisation is built upon the exploitation of (i) and is totally dependent upon fossil fuel energy.

The energy transition from a solar economy (biomass and wood) to fossil fuel economy (coal, petroleum, natural gas, oil shale, fracking) is a standard aspect of industrialisation (Schandl & Schulz, 2002), and explains the social metabolism of the growth economy (Krausmann, 2017). The correlation of carbon dioxide (CO₂) emissions with economic growth is then a straight forward result of burning fossil fuels. As far as the physics is concerned, there should be no surprise that the outcome of economic growth is to enhance the greenhouse effect ultimately leading to global warming. Of course this is merely one amongst many environmental problems – soil erosion; deforestation; water salinisation; insecticides and pesticides; particulates in the air; tropospheric ozone pollution; stratospheric ozone loss; acidic deposition; toxic chemical waste; heavy metals; asbestos; nuclear waste; e-waste; biodiversity loss; acidification of the oceans; micro plastics; hormone discharges into the water supply and so on ... The Laws of Conservation explain that energy and mass can neither be created nor destroyed. Economic growth via increased production and consumption must increase inputs of material and energy into the economy, and so increase waste loads into the environment. Pollution is an all pervasive problem for an industrialised growth economy.

What neoclassical economists regard as pollution ‘externalities’ are talked of as one-off minor aberrations in an otherwise perfectly functioning price-making market system. In reality they are a normal, indeed inevitable, part of economic processes and their significance increases as economic growth proceeds, while the ability of natural systems to assimilate them declines (Kneese et al., 1970). Negative externalities are not external to the economic system, but rather part of the established economic process of cost-shifting (Kapp, 1963/1978). Including the resulting social and environmental costs in markets, via internalising ‘externalities’, means changing all the prices in an economy, which means planned prices. If no existing prices are changed then the economy is merely ‘planned’ in a different way, by default (subject to institutional history and accident). Either way, prices reflect power relationships, not objective resource scarcity values. Yet, neoclassical economists ignore the implications of their own ‘externality’ theory and its implications that undermine their price theory of value (Spash, 2019).

Facing the inevitable evidence of increasing pollution, mainstream economists have produced a fall-back position that claims the environment is a luxury good. Once people are wealthy enough they can afford clean air, clear water and other environmental goods and services, but that requires they get rich first via economic growth. This ignores the essential role of ecological systems in social provisioning and waste assimilation for both rich and poor (e.g. see, Martinez-Alier, 2002). Belief in the possibility of environmental recovery after destruction by the growth economy is an artefact of mainstream economists’ mechanistic models, and ahistorical concept of time, making all events reversible. That toxic waste has proven untreatable, extinct species do not return, ecosystems cannot be recreated and people who die from pollution are not brought back to life, seems to have no consequences for such ‘economic logic’. Once again biophysical reality is simply ignored.

5. Concluding remarks

Whenever the capital accumulating economies of the world hit a crisis that threatens economic growth vested interests react by prioritising its re-establishment. Since the early 1990s the corporate business elite have successfully shifted attention from their being the cause of environmental destruction to increasingly claiming they must be seen as the champions of a Green new economy. That economic growth is more important than the environment or people's lives has often been apparent in the promotion of sustainable development and a Green economy. Prior to the Coronavirus crisis the climate crisis was high on the media agenda, but the difference in response is quite stark. The potential for exponential growth in virus infections and deaths led to direct regulation and restrictions on human behaviour (not nudging or market based instruments or price incentives). In contrast, for over thirty years no significant action has been taken to change the behaviour causing the exponential growth in greenhouse gas emissions.

Economic growth has always trumped environmental protection. Typically current jobs are prioritised over future human morbidity and mortality and any impacts on non-humans. The Global Commission on the Economy and Climate (GCEC) has promoted the slogan of 'Better Growth, Better Climate', and made very clear that its concern is that: 'In the long term, if climate change is not tackled, growth itself will be at risk' (GCEC, 2014, p. 9). Janez Potočnik, European Commissioner for Environment 2009–2014, concluded his opening address to the 2013 Green Growth conference hosted by the Organisation for Economic and Co-operation Development (OECD) by stating: 'basically, I do believe, I am not talking about environmental interests here, and that I am talking about new industrial policy needed, so its not actually about Green Growth, it's about growth, full stop. Thank you'.⁴ Similarly, Ursula von der Leyen, European Commission President, has stated that 'Supported by investments in green technologies, sustainable solutions and new businesses [...] The European Green Deal is our new growth strategy' (European Commission, 2019).

When the worlds leaders wrap themselves in national flags, and claim a concern for all their citizens, the structure of the system they promote and defend might easily be forgotten. In response to the Coronavirus pandemic the primary concern of international organisations and governments for economic growth was ever present, with even the potential death of millions seemingly relegated to a secondary concern until almost too late. While politicians were still debating what action should be taken to protect their populations' health they had already prioritised reducing interest rates, holding meetings with corporate bosses and promising billions in bailouts. Within a month of the first lockdown, outside China, the bailouts became unprecedented with the United States Senate approving a package of two trillion dollars stimulus plus four trillion dollars available for loans, the European Union half a trillion euros and Japan a trillion dollars. Political parties of the Left and Greens have typically been derided, under austerity politics, as irresponsible for advocating the ability of governments to spend in the public interest for such things as national health and preventing the environmental crisis. As under the 2008 collapse, there was no money until corporations, the stock market, financiers, billionaires and bankers were threatened.

Economic crises reveal the structure of the dominant political economy and offer an opportunity for rethinking and restructuring. Re-establishing the system will maintain humanity on its course towards increasing social division and ecological crisis. Prior to the Coronavirus pandemic the climate crisis had highlighted the need to move away from fossil-fuel intensive activities and sectors. Internationally hopes were placed on the Paris Agreement, but this was never based on a realistic assessment of policy to control greenhouse gases (Spash, 2016). Indeed, there has been no plan to dismantle the fossil-fuel sector, change infrastructure or economic activity, and no precaution in

the face of increasing global temperatures. Since the signing of the Paris Agreement the world's largest investment banks have funnelled more than \$2.66 trillion into fossil fuels (Greenfield & Makortoff, 2020). Oil markets collapsing, fossil-fuel investments being decimated, airlines cutting flying and going bankrupt and people stopping daily commuting should all have occurred when the Paris Agreement was signed, if it had any real teeth. Instead they occurred as a reaction to the Coronavirus pandemic and as things to be reversed as soon as possible.

The world's governments have failed to face up to the social-ecological challenges ahead and remain unprepared, having watched for forty years to 'see' evidence of climate change. What the Coronavirus pandemic indicates is that most elected politicians in capitalist economies will only act to counter corporate and financial interests, and the consumer throwaway society, under domestically actualised extreme circumstances. The evidence here is that action came once the body count started growing and threatened to explode exponentially in politicians own countries. Lessons should also be learnt from the differentiated responses and resulting impacts of Coronavirus. These include the necessity of precaution in the face of potentially catastrophic events and how neo-liberal promotion of self-interest, individualism, consumerism and competition at the expense of community and solidarity create injustice and inequity, and stimulate panic and chaos in times of crisis. The scenario analysis of the LTG warned of what happens when harms grow exponentially: suddenly you run out of time to prevent catastrophe. Such warnings and even the very concept of limits have been repeatedly pushed aside by promises of more and better growth: sustainable development, Green growth, circular economy, sustainable inclusive growth, Green (new) deals. The harmful social and ecological implications of economic growth have been denied but never gone away.

The fear created by a crisis getting out of control raises the political danger of extreme right wing nationalism, authoritarianism, securitisation and militarisation. Nations turn inwards and act unilaterally. The hope is that the experience of a devastating global crisis will put the necessity of systems change high on the public agenda and create general awareness that 'the economy' cannot be allowed to go on as before, creating social division and gross inequalities while leaving humanity at the mercy of corporations, billionaires, speculators and profiteers. A global human health crisis has tested the system and shown its failings and should be taken as a warning in the face of the impending ecological crisis. As a fundamental starting point, economies are required that address those failings by providing robust democratic systems for basic social provisioning for all via socially and ecologically ethical means of production.

Notes

1. This is based on the success of initial responses evaluated up to mid-April 2020. Media coverage concentrated on total deaths and daily death rates, but per capita rates are more relevant in terms of assessing government policy. The top ten nations with the highest per capita death rates as of 14th April, in order, were: Spain, Italy, Belgium, France, UK, Netherlands, Switzerland, Sweden, Ireland, USA. This excludes countries with small populations (0.65 million or less). In terms of total deaths the top ten ranked nations, in order, were: USA, Italy, Spain, France, UK, Iran, Belgium, China, Germany, Netherlands; while Switzerland was 13th, Sweden 14th and Ireland 19th. Source: <https://www.worldometers.info/coronavirus/#countries>.
2. At this stage, the crisis had moved from China to Europe and then America and was just starting to grow exponentially in Brazil, Turkey, Iran, Indonesia, Mexico, India and Russia before even getting going in Africa.

3. WHO Director-General's opening remarks at the media briefing on COVID-19 <https://www.who.int/dg/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19---3-march-2020>. Accessed 14 April 2020.
4. The Annual Conference of the Green Growth Knowledge Platform (GGKP): Better Policies Better Lives, Paris, France, 4–5 April 2013. Speech transcribed from the film 'Banking Nature' (50.04–50.34 min).

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