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Growth and sustainability in post-Keynesian perspective: Some notes

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Zentrum für Ökonomische und Soziologische Studien (ZÖSS)
Rouven.Reinke@uni-hamburg.de
Universität Hamburg
Fakultät für Wirtschafts- und Sozialwissenschaften
Fachbereich Sozialökonomie
Welckerstr. 8
20354 Hamburg

Abstract

It can hardly be denied that perhaps the most serious challenge to mankind has not yet been addressed properly by post-Keynesianism: the over-stretching of our planetary boundaries. Most of the resources which we need to sustain our lives are non-renewable and, therefore, limited. And most of our production processes produce some kind of joint product (externality) like air, ground or water pollution which hold no value to the producer and instead harm the environment upon disposal. Consequently, the existence of mankind on this planet may be threatened when indispensable resources such as energy are running out and the environmental damage changes our living conditions in a way that mankind cannot survive.

Key words: Ecological crisis, monetary production economy, zero growth, stagnation, growth imperative

JEL codes: B59, E12, P18, Q50

1. Introduction

Andrew Oswald and Nicholas Stern, two eminent mainstream economists, recently posed a question about why their economic colleagues let the world down on climate change (Oswald/Stern 2019)? They observed that the number of publications on climate change in top academic journals of the economic discipline is significantly low (see tab. 1). As a result, they concluded:

> *...the published articles in our leading journals are disturbingly few and far between, and nowhere near commensurate with the magnitude of the problem and the potential and necessary contribution of economics. We are sorry to say that we believe economists are failing human civilisation, including their own grandchildren and great-grandchildren (Oswald/Stern 2019).*

Table 1 The paucity of climate change research in mainstream economics journals

Journal name	*Number of articles ever published on climate change*
Quarterly Journal of Economics	0
Economic Journal	9
Review of Economic Studies	3
Econometrica	2
American Economic Review	19
Journal of the European Economic Association	8
Economica	4
Journal of Political Economy	9
American Economic Journal – Applied	3

Notes: These are chosen as 'general' economics journals. Total articles by these journals (all topics) = 77,000 approx.

Source: Own calculations using the Web of Science (Clarivate Analytics). Search done in August 2019.

Taken from: Oswald/Stern 2019

Although this accusation has been levelled against mainstream economics, the same argument could be made for many heterodox approaches and, particularly post-Keynesianism, which is arguably the most prominent heterodox paradigm. In its flagship journal, the *Journal of Post Keynesian Economics*, only a handful of articles has been published on ecological subjects. Clive Spash and Anthony Ryan criticise this neglect, stating:

> *The post-Keynesians have almost totally ignored environmental problems, as well as resource and energy constraints, in the tradition of maintaining capital accumulation and full employment (Spash/Ryan 2012:1098).*[1]

Therefore, it can hardly be denied that perhaps the most serious challenge to mankind has not yet been addressed properly by post-Keynesianism: the over-stretching of our planetary boundaries. Most of the resources which we need to sustain our lives, particularly in the material context of Western civilisations, are non-renewable and thus limited. Additionally, most of our production processes produce some kind of joint product (externality) like air, ground or water pollution which not only hold no value to the producer but also harm the environment when disposed. As a result, the sheer existence of mankind on this planet may be at risk when indispensable resources like energy become depleted and the environmental damage causes significant changes in our living conditions, making human survival, at least not in today's population numbers, impossible.

Consequently, our investigation will explore whether economics, specifically post-Keynesian approaches in general and the monetary theory of production often referred to as "fundamentalist Keynesianism" (see Coddington 1976: 1259ff., Gerrard 2012, Heise 2019) in particular – can and should contribute to addressing these challenges. Prior to delving into this topic, we will first assess the severity of the challenges and commonly mentioned strategies for integrating ecological issues into economic considerations.

2. Ecological crisis – what is at stake?

Firstly, non-renewable resource depletion and environmental damages due to externalities must be distinguished. The first challenge can be mitigated by referring to the fact that most resources as inputs in production processes merely undergo a conversion of substance (throughput) but will not be consumed or destroyed in a material sense. This conversion, however, produces some entropy[2] making the process to some extent irreversible. On the other hand, this leaves room for regaining the resources to some extent through recycling. The risk of depletion of a resource, therefore, depends on the initial endowment, the rate of conversion, the rate of recycling and the rate of substitution. While the initial endowment can be taken as given, the rates of conversion, recycling and substitution are endogenously determined and surely influenced by the price system. Despite the recognition of all kinds of market failures, it can be expected that markets will help intertemporal allocation of non-renewable resources in a way, that depletion must not be seen as an insurmountable threat to the survival of mankind[3].

[1] While numerous recent publications have introduced novel contributions, several of which are acknowledged in this paper, the assessment by Splash and Ryan remains predominantly valid.

[2] Entropy is a multi-facetted concept that can be understood in various ways. In this context, entropy is utilised as a measure of disorder: 'According to the Second Law of Thermodynamics, the total entropy of any isolated thermodynamic system tends to either remain constant or increase over time, approaching a maximum value. This also means that an isolated system will gradually become more and more disordered' (Vozna 2016: 7).

[3] According to lifespan forecast for many non-renewable minerals presented in the renouned Global 2000 Report to the President (Barney 1980) their depletion was expected to have occurred already by the early 2000s. However, these pessimistic expectations did not materialise. For a critical assessment of what has been referred to as 'circular economy' see e.g. Figge/Stevenson Thorpe/Gutberlet (2023).

The picture looks different when environmental damage is considered. Although it is extremely difficult to model the impact of externalities on the ecological system due to its high degree of interrelatedness and complexity, the emission of the greenhouse gas (GHG) CO_2 has been identified as major cause of man-made climate change, which again affects the foundations of human existence in a fundamental way: The increase in average global mean surface temperature (GMST) – global warming – as compared to the pre-industrial era does not only impact on the entire eco-system but it does so in a non-linear, discontinuous way. This makes any kind of cost-benefit analysis trying to determine an "optimal" level of climate change – and, thus, an "optimal" quantity of greenhouse gas emission – impossible (see e.g. Grubb/Wieners 2020, Weitzman 2009) because the system may eventually reach a tipping point beyond which the stability and, thus, sustainability of the ecosystem can no longer be guaranteed (see Rockström et al. 2009). Therefore, a certain limit to the rise in GMST – 1,5 % as compared to the pre-industrial epoch – has been set based on natural science knowledge and modelling, and has been politically accepted as boundary (see IPCC 2018) which involves a limit to the emission of GHG far below the level currently emitted (see fig. 1)[4]. Hence, decarbonisation of economic activities is an imperative and the focus to which the economic science is supposed to contribute[5].

In principle, economics can treat the externality problem of global warming in two different ways: internalisation by creating a market or by enacting a Pigou tax (see e.g. Oates/Portney 2003: 328f.). Creating a market by assigning property rights to the environment – more precisely: emission rights for polluting the environment with GHG – is probably what most economists would come up with in the first place because providing the most efficient solution to scarcity[6] is what markets are known for. As the scarcity of the environment is politically set – 1,5 % rise in GMST allowing for a certain amount of GHG emission per year – GHG emission rights of equivalent quantity could be sold to those that need to pollute the environment – the price, as in every other market, would be determined by (given) supply and demand. The same result of internalising the external effects could be achieved by imposing a tax on those commodities whose production or consumption emits GHG. The tax price must be gauged according to the price-elasticity of GHG emitting commodities.

We are now confronted with a number of questions: Which way to handle GHG emission – market or taxes? Is growth compatible with the 1.5% target or is post- or zero-growth an indispensable objective? Has post-Keynesianism in general and fundamentalist Keynesianism in particular anything to contribute to any of these questions that mainstream economics cannot or does not address?

[4] The following analysis is based on the assumption of a sustainable limit to GHG emissions. Therefore, we exclude the consideration of carbon capture and storage (CCS) measures such as direct air capture (DAC) due to their technical immaturity.

[5] William D. Nordhaus (2019) claimed climate change to be the ultimate challenge to economics in his lecture delivered when receiving the "Nobel Prize" in 2018.

[6] As the level of scarcity is not determined by weighing the welfare benefits of increased production and consumption (and pollution) against the cost of environmental damage (and more production and consumption) but rather by political postulate, it is more accurately a matter of effectiveness than efficiency; see Stern/Stiglitz (2021).

3. How to decarbonise the economy – market or taxation?

Decarbonising the economy appears to be a crucial task to be achieved if climate change is to be mitigated. But which way to accomplish this? In order to answer this question, we need to distinguish three different levels: the theoretical level, the institutional level and the political-economic level:

1. At the *theoretical level*, it must be analysed whether establishing property or, rather, emission rights or imposing Pigou taxes will more effectively protect the global climate.
2. At the *institutional level*, it must be analysed which of the two measures is more feasible to implement.
3. Finally, at the *political-economic level*, we need to investigate which of the two measures is more feasible, taking into consideration that protection of the global climate is an international public good that affects many powerful vested interests.

At the *theoretical level*, both options should equally be effective as long as we assume perfect markets on the one hand and governments following solely means-end-operational rationality as benevolent social planner on the other hand[7]. However, post-Keynesianism is based on assumptions – lack of perfect information and foresight – that do not allow for perfect markets to handle allocation (pareto-)optimally or for governments to mechanically pursue means-end-systems. Market outcomes may particularly be distorted when actors are powerful in the absence of perfect competition and when actors have incentives to speculate in the absence of perfect information and foresight. Although regulations can be put in place to mitigate these 'market failures', they can never be entirely cured, and regulations – as experienced during the recent World financial crisis – are prone to regulatory capture, relapse and escape (see e.g. Palley 2021). Similarly, Pigouvian taxation comes with many problems once the nature of necessary information is considered: The social planners need to know the production elasticities of GHG and the price elasticities of commodities for each present and future sector in order to set the optimal tax rate, which supposedly will have to be changed any time these elasticities change due to technological advances or changes in consumption patterns. It is hard to see how this could be consistently achieved[8].

At the *institutional level*, the global dimension of global warming poses huge difficulties. As no single nation can effectively internalise the external effects created somewhere else, both the market solution and the tax solution must be global[9]. This can be achieved either by establishing a global market for emission rights or by organising cooperation on national taxation. Establishing a global market for emission rights appears simple: An issuing organisation – perhaps under the umbrella of the United Nations – must be founded, a trading place established, and regulations (e.g. for non-compliance and secondary

[7] The number of publications on this issue is enormous, see e.g. Aldy/Stavins (2012), Nordhaus (1992), Nordhaus (1994), Stavins (2008).

[8] Empirical evidence suggests that price elasticities vary across income groups (see Chancel 2022). Consequently, the tax regulator may need to consider differentiation between different income groups in order to avoid placing the majority of the burden of greenhouse gas (GHG) abatement on low-income groups.

[9] There is a growing literature on global climate governance covering issues here referred to as institutional and political-economic level; see e.g. Martine/Alves (2019), Luomi (2020), Pattberg et al. (2022).

trading of emission rights) put in place. However distributional issues are more complex[10]: How will the revenues of the sale of emission rights be distributed? Will there be exemptions for some countries (e.g. low-income countries) or for a certain period or level of GHG emissions? Will high-emission sectors be compensated in some way? Will low-income households be compensated for the regressive price effects of internalising external effects? How will non-compliant countries be held accountable?[11] Similar questions arise when taxation is considered: The Pigou tax that a country would have to charge depends on the amount of GHG abatement and the nation-specific elasticities mentioned above. How can the country-specific abatement level be determined? Moreover, how can the appropriateness of national tax rates be controlled, particularly if exemptions for specific sectors or groups of consumers are allowed?

This brings us to the *political-economic level*, which addresses questions of rationality traps in international cooperation and the distorting effects of vested interests in finding optimal solutions (see e.g. Oates/Portney 2003, Tanner/Allouche 2011; Jenkins 2014). It is well known that cooperation requires certain prerequisites: Communication among the potentially cooperating parties must not only be established, but it must also secure the common objective of cooperation. If no such common objective can be established – i.e. if some countries perceive the introduction of a market for emission rights or the imposition of a Pigou tax as necessary means to cope with climate change while other countries believe such instruments would impair their competitiveness or undermine their welfare basis – cooperation is very unlikely[12]. But even if a common objective can be established, cooperation will only hold if the contribution each party has to make can clearly be specified, monitored and sanctioned in case of non-compliance[13].

It seems common sense among economists that both carbon taxation as well as CO_2 Emission Trading Systems (ETS) are preferable to other forms of CO_2 abatement such as subsidies or tax redemptions for low-emission technologies or the regulatory ban of certain high-emission commodities (see e.g. OECD 2013)[14]. However, it seems impossible to ultimately discriminate between taxation and ETS in terms of effectiveness and feasibility (see e.g. Parry/Black/Zhunussova 2022) and, potentially, a mix of both approaches (see e.g. Li/Jia 2017) and a combination with other measures of climate policy (see e.g. Jenkins 2014) may be best.

[10] The distributional dimension is multi-facetted: distributional justice, social and economic sustainability at the international and the intra-national level, see e.g. Fullerton (2011), Meyer/Roser (2006).

[11] The EU Emission Trading System may serve as an example of the difficulties in translating theory into practise; see e.g. Convery (2009), Betz/Sato (2006).

[12] While the EU allegedly follow a market-liberal dream favouring emission trading, the US is supposed to prefer "a package of policy measures seeking to foster climate-friendly production and investment" (Krebs 2023:7) through subsidies. A different view on international cooperation problems on climate policies is taken by Mason (2022).

[13] Nordhaus (2015) even argues that not only non-compliance but non-participation in binding climate agreements need to be sanctioned in order to establish a "climate club".

[14] At present, the German government is on the verge of passing a new Buildings Energy Act aimed at decarbonizing the heating of private and public buildings. This will be achieved by imposing legal restrictions on the use of heating systems reliant on fossil fuels. The objections raised against this law by Ottmar Edenhofer, the chief economist of the *Potsdam Institute of Climate Impact Research*, highlight the issue of prioritization. Instead of relying solely on legal regulations, he suggests enhancing the ETS (Emissions Trading System) to strengthen the incentives for intentionally limiting the use of carbon-based heating.; see ZEIT (2023).

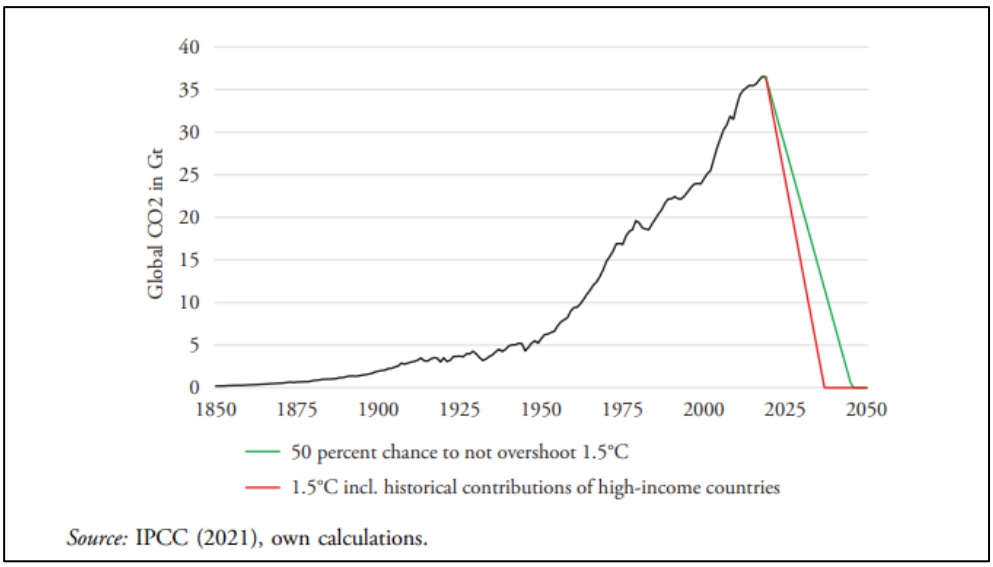
4. Is there a growth imperative?

Apparently, decarbonising the economy is no simple task. However, from a paradigmatic point of view the question to be answered is whether the feasibility of introducing growth limits in capitalist economies is perceived differently in different economic paradigms. In other words: Can a capitalist economy be sustained on a low or even negative growth trajectory?

Firstly, the assumption of a low, zero or even negative growth trajectory as prerequisite for an economy in line with climate change mitigation must be discussed: why cannot economic growth and CO_2 emissions be decoupled? Theoretically, there is no reason to believe that such decoupling is impossible. Industrial, technological and consumption pattern changes may not only result in a relative decoupling, which means a reduction of emission intensity of economic growth, but also an absolute decoupling, which means delinking GHG emissions from economic growth (see e.g. Handrich et al. 2015, Deutsch 2017). Therefore, critics of the decoupling hypothesis support their arguments with historical records (see fig. 1): Since the industrial era, we have never witnessed longer spells of growth without energy consumption and absolute GHG emission growth, while the process of relative decoupling experienced recently in most OECD countries is seen as insufficient to achieve the level of GHG mitigation necessary. A study for the European Environmental Bureau (EEB) concludes:

> *Considering the last two decades as a trial period, one must confront the fact that decoupling has failed to deliver the ecological sustainability it promised (Parrique et al. 2019: 57).*

Figure 1: Global CO_2 emissions and adjustment projections



Taken from: Huwe/Rehm (2022: 399)

Although historical records are certainly no definite guide for future developments, it would surely be naïve to solely rely on theoretical possibilities of what is termed 'green growth' (see e.g. UNEP 2011, Sandberg/Klockars/Wilén 2019). It would also be irresponsible not to be prepared for potential occurrence of growth limits (zero-growth or degrowth).

Therefore, considering growth limits as serious option for future growth perspectives of capitalist economies, economic science's contribution is to examine whether a capitalist economic system can function effectively under such circumstances or, to put it differently, whether there is a growth imperative in capitalist economies. The complexity of this question arises from the fact that its answer depends on the economic paradigm employed and the ambiguity surrounding the definition of "functions effectively". Addressing the latter, one could argue that an economic system functions effectively when it tends to move towards a state of stability and equilibrium. Typically, stability and equilibrium are considered synonymous: Markets are deemed stable when they are in equilibrium, as long as they are not affected by external shocks. According to Walras' law, either all markets are in (general) equilibrium or some markets are in mutually compensating disequilibrium, triggering stabilising adjustment processes. However, in post-Keynesian models, stability can be achieved without all markets being in equilibrium or exhibiting compensating signs of disequilibrium (rejecting Walras' law; see Heise 2017). From this post-Keynesian perspective, capitalist economies never function effectively – even if ecological boundaries are ignored. The question then becomes whether the growth trajectory under laissez-faire conditions will converge towards an ecologically sustainable growth path. If not, whether an ecologically motivated dampening of the growth path will introduce additional moments of instability into capitalist systems, potentially leading to systematic breakdown or, if that is to be avoided, necessitating the neglect of sustainability targets.

The answers to these questions crucially depend on the ontological basis of the economic paradigm being applied[15]: If we assume intertemporal exchange relations to be central and take an allocative orientation, which portrays capitalist economies as essentially real-exchange or market economies, the growth trajectory is primarily determined by limitations on the supply side: In mainstream economics, these determinants include the availability of factors of production, mainly labour, technological developments, and considerations of time preference. Introducing the environment as another factor on the supply side does not present significant problems in terms of stability and equilibrium. Any growth trajectory can easily be modelled as long as prices, particularly those of factors of production, are flexible enough to adjust to the imposed conditions and the gross-substitutability axiom holds (see e.g. Lange 2018; Kallis et al. 2018: 299).

However, the situation may be different when an alternative ontological basis is assumed. Many post-Keynesian approaches take creditor-debtor-relationships as fundamental constituent. An unresolved dispute has emerged regarding whether credit-based economies exhibit a growth imperative (see e.g. Binswanger 2009, Blauhow 2012, Smith 2010) or not (see e.g. Cahen-Fourot/Lavoie 2016, Rosenbaum 2015). The dispute remains unsettled because the distinction between "growth imperative" and "urge for growth" (referring to strong systematic incentives without an ultimate requirement) is not made clear (see e.g. Hahnel 2013). Additionally, many contributions derive a "knife-edge growth" scenario (see e.g. Fontana/Sawyer 2016: 192) that is compatible with equilibrium and stability only under certain assumptions regarding variables such as savings and consumption ratios of different types of households, as well as retention ratios of companies' profits. Supporters of the growth imperative hypothesis argue that the "knife-edge growth rate" is unlikely to be zero or negative under realistic values for the above-mentioned

[15] For a discussion of the distinction between the mainstream (Walrasian) and post-Keynesian paradigm see e.g. Heise (2021).

ratios. On the other hand, critics of the growth imperative hypothesis claim that such ratios can indeed be reached if zero growth, i.e. the stationary state trajectory, is politically targeted or desired by economic actors (see e.g. Richters/Siemoneit 2017).

Although the theory of monetary production or fundamentalist Keynesianism also assumes the pre-analytic vision of capitalism being based on nominal obligations as principal constituent, the approach is different. While most other post-Keynesian theories emphasize savings, i.e. time preference considerations, as crucial for economic growth[16] , fundamentalist Keynesianism maintains that the management of resources is driven and constrained by investment in real and financial capital based on profit expectations and liquidity preference considerations[17]. There is no specific reason to believe that liquidity preference and profit expectations will be such that any capitalist economy converges toward a growth trajectory that satisfies conditions of full employment. However, there are good reasons to believe that capitalist economies are heading towards zero growth in the long run, also known as the "stationary state" or stagnation: Capital accumulation will eventually reach a level that cannot be augmented with any prospect of profits exceeding the liquidity premium set on money (plus a risk premium for the imponderability of production) resulting in zero growth. This vision was entertained by Keynes in the *General Theory* and his essay *'Economic Possibilities for our Grandchildren'* several years earlier (see Keynes 1936: 374ff.; Keynes 1930)[18]. While the prospect of stagnation, or zero-growth, is compatible with a pre-analytic vision of monetary production and may even be reached earlier in a "financialised" monetary production economy[19], there is no guarantee that the level of accumulation reached in a stationary state is compatible with ecological sustainability. However, this post-Keynesian paradigm suggests no growth imperative, despite the fact that the only purpose of economic activity is to end up with more money that it started with[20]. This does not necessarily translate into real (as distinct from nominal) extensive growth but, in fact, rather may constrain growth (see Heise 2022). Keynes seemed to be optimistic about zero-growth, but this optimism was not related to ecological issues. Instead, it was based on his believe that by reaching levels of saturation in consumption and abundance in capital investment '…in the long run (that) mankind is solving its economic problem' (Keynes 1930: 325). Moreover, he was optimistic about the role of

[16] : "The stability analysis of five post-Keynesian models (…) yielded the following results: … If agents decide to steadily save part of their income, no stable stationary state can be reached" (Richters/Siemineit 2017: 122).

[17] "It is of this fallacy that it is most difficult to disabuse men's minds. It comes from believing that the owner of wealth desires a capital-asset as such, whereas what he really desires is its prospective yield. Now, prospective yield wholly depends on the expectation of future effective demand in relation to future conditions of supply. If, therefore, an act of saving does nothing to improve prospective yield, it does nothing to stimulate investment … . The creation of new wealth wholly depends on the prospective yield of the new wealth reaching the standard set by the current rate of interest … " (Keynes 1936: 211ff.).

[18] And there is amble empirical evidence of ‚secular stagnation'; see Freeman (2023).

[19] In Heise (2022) the growing importance of financial markets often referred to as "Financialisation" has been analysed in a fundamentalist Keynesian perspective. It has been shown, that "financialisation operates as a constraint on physical capital accumulation. … it surely impairs the management of resources by creating income opportunities based on redistribution rather than value added" (Heise 2022: 14).

[20] As Keynes stated clearly: 'He (Karl Marx, A.H.) pointed out that the nature of production in the actual world is not, as economists seem often to suppose, a case of *C-M-C'*, i.e. of exchanging commodity (or effort) for money in order to obtain another commodity (or effort). That may be the standpoint of the private consumer. But it is not the attitude of business, which is a case of *M-C-M'*, i.e. of parting with money for commodity (or effort) in order to obtain more money' (Keynes 1979: 81).

economists and politicians in pursuing policies that would maintain full employment in all circumstances.

Not only in that respect Keynes was too optimistic, if not outrightly naïve. On the one hand, nowhere in the Western economically advanced world did governments (and central banks as monetary policy actors) manage or were willing to keep unemployment at low levels. On the other hand, Keynes's idea of a stationary state neglected the many offsetting factors: technological and commodity innovations restoring the marginal efficiency of capital as much as capital destruction caused, for instance, by wars or economic crisis. Therefore, a stationary state in the literal sense, i.e. no change in any variable determining the economic system, is unthinkable and incompatible with capitalism[21]. Thus, if not a growth imperative, there surely is a strong urge for growth which renders zero-growth as positivistic outlook (not as a normative vision though[22]) unfeasible[23]. Moreover, Keynes was probably most mistaken in his believe that a stationary state will 'mean the euthanasia of the rentier' (Keynes 1936: 376). As argued in Heise (2022), a lack of real investment opportunities will only urge wealth owners to invest in financial instruments and, thus, inject a component of instability into the system which is expressed by the notion of 'casino capitalism'. Instability is further increased by ever rising indebtedness either of households or the state. This is the logical result of companies earning net profits even in a stationary state, yet not investing it (as a net investment of zero is the precondition for zero-growth)[24]. Therefore, the company sector of the economy will turn into a lender position, which must be balanced either by private households or the state assuming, *pari passu*, a borrower position. An ever-growing rise in indebtedness of the state seems politically unviable and economically risky[25], ever-growing indebtedness of private households is simply impossible without eventually turning it into Ponzi finance[26]. Taking the very unequal income and wealth distribution for granted that characterises all capitalist economies, some wealthy households will have the opportunity to save, implying that other households – the less fortunate ones – must become even more indebted on a higher scale. Financial crisis, the cancellation of debts via debt cuts or insolvencies will be the inevitable long-run consequence.

[21] A literal sense of 'stationary state' would undermine Keynesian economic theorising altogether as the open-system axiom (non-ergodicity) would be violated.

[22] The use of GDP growth as a measure of progress has faced long-standing criticism. In light of this, an alternative normative vision called "a-growth" has been proposed, which takes an agnostic or indifferent stance towards growth; see e.g. van den Bergh/Kallis (2022).

[23] See e.g. Huwe/Rehm (2022: 400) who, mistakenly, claim this to be a growth imperative.

[24] According to Kalecki's profit equation, profits arise from investment spending and consumption spending funded by non-wage income, minus (plus) the amount of wage income that remains unspent (excess spending on wage income), see e.g. Laski/Walther (2013: 1). Fontana/Sawyer (2022: 93ff.) establish a strong correlation between economic growth and the presence of a positive profit rate, suggesting a causality that goes from growth to profits. However, from a fundamentalist Keynesian perspective, the direction of causality is reversed, indicating that profits (determined by the interest rate) influence growth (determined by investment).

[25] As far as I am aware, Modern Monetary Theory (MMT) is the only economic approach that challenges the conventional view of limits on public borrowing.

[26] It should be noted that not only absolute levels of nominal debts will increase but also the debt ratio as the nominator of the ratio – the level of GDP – is supposed not to change in a stationary state.

5. Keynesian green growth?

It appears that post-Keynesianism is generally skeptical about the effects of zero or negative economic growth on the functioning of capitalism. However, there is a growing body of literature on "Green Keynesianism" that takes a more optimistic view and seeks to reconcile Keynesian monetary and fiscal policies with ecological sustainability, specifically in terms of ecological recovery and restoration (see e.g. Harris 2013, Goldstein/Tyfiled 2018, Cömert 2019).

The idea behind this kind of re-growth, which promises to overcome the alleged trade-off between ecological and social sustainability, is based on the lack of faith in standard market (ETS) or tax solutions and, instead, sees

> *decarbonisation as a project of actively building up a low-carbon economy, with the state playing a leading role, both through public investment and measures to direct private spending. This second vision rejects the trade-off between climate goals and current living standards (Mason 2022: 86).*

Fiscal policy, in particular, but also monetary policy, needs to be focused on providing public goods (such as infrastructure and R&D spending) and stimulating public demand (by promoting eco-efficiency in public buildings like schools, universities, hospitals, public administrations, etc.) that are necessary for facilitating ecological transition. Keynesian policy, therefore, should be redirected from broadly managing the economy to macroeconomic governance that emphasizes the ecological requirements of addressing climate change:

> *…, the main purpose of green Keynesianism, …, is to revitalize the economy on a more sustained basis by encouraging fiscal stimulus programs within a green-oriented framework (Cömert 2019: 133)*

The basic idea behind this reasoning is that mitigating greenhouse gas (GHG) emissions requires investment in new technologies that are less emission-intensive, yet capital-bound. Therefore, in order to transition the economy from high-GHG-emitting industries to low-GHG-emitting industries and produce fewer carbon-intensive outputs, increased private and public investment is necessary. In other words, Green Keynesianism advocates for a shift towards sustainable growth, prioritizing environmental considerations and preventing ecological degradation, rather than pursuing a zero-growth approach within a capitalist framework.

Table 2: Prototypical relations between GDP growth and GHG emission growth

Growth scenarios	Coupling relation	Strategy
Negative ΔGDP, negative ΔCO_2	Absolute coupling	De-growth
Positive ΔGDP, positive or negative ΔCO_2	Relative coupling/ relative decoupling	Zero-growth
Positive ΔGDP, any ΔCO_2	No link	A-growth
Positive ΔGDP, negative ΔCO_2	Absolute decoupling	Re-growth or Green-growth

To assess the potential of Green Keynesianism, we need to revisit the question of how economic growth and greenhouse gas (GHG) emissions are related. Earlier, we distinguished between absolute and relative decoupling. Table 2 provides further elaboration on this distinction with four prototypical relationships[27]:

1. *Absolute coupling*: This term describes a clear correlation between negative (positive) GDP growth rates and negative (positive) CO_2 emission growth rates.
2. *Absolute decoupling*: When a definite relationship is assumed between positive GDP growth rates and negative CO_2 emission growth rates, it is referred to as absolute decoupling.
3. *No Link*: If there is no relationship between GDP growth and CO_2 emission growth, it is referred to as "no link."
4. *Relative Coupling*: A loose relationship between GDP growth and CO_2 emission growth is generally referred to as relative coupling. When this relationship allows for a correlation of low positive GDP growth rates with CO_2 emission reduction, it is termed relative decoupling.

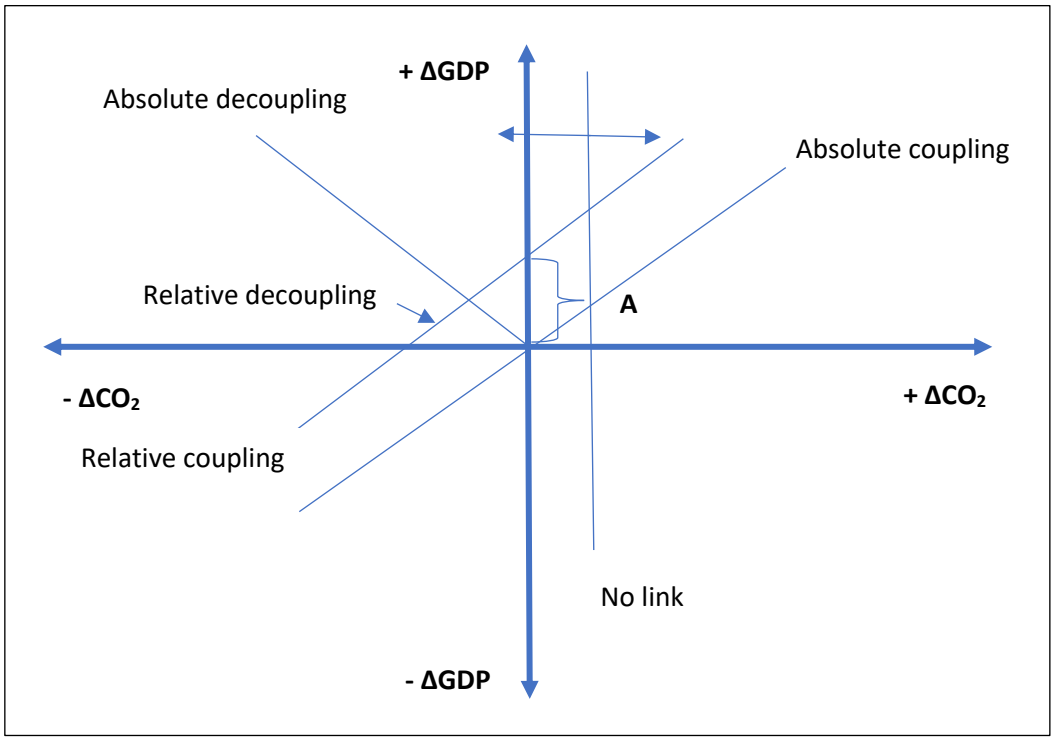
Figure 2 provides a visual representation of these different growth scenarios. The assumption of "absolute coupling" forms the basis of the *de-growth strategy*, which advocates for negative GDP growth rates as necessary means of GHG mitigation. However, absolute coupling disregards the possibility that GHG emissions can decline through structural changes from high- to low-carbon-intensive industries, technological advancements utilizing lower-emission technologies, government spending to promote ecological transformation (such as infrastructure and R&D), or direct public investment and consumption in green initiatives.

On the other hand, relative coupling takes these factors into account and explains why GDP growth does not necessarily have to be accompanied by CO_2 emission growth. The faster the pace of "green" structural change and technological advancements, the higher the growth rate (represented as A in Figure 3) that can be achieved without CO_2 emission growth[28]. Any positive GDP growth rate between 0 and A will therefore be associated with a reduction in GHG emissions. This scenario is referred to as "relative decoupling" and forms the basis of the *zero-growth strategy*[29].

Green Keynesianism and the *re-growth strategy* assert that achieving greenhouse gas (GHG) mitigation requires GDP growth because structural change and technological advancements are capital-bound and driven by investments. While this argument is generally valid, it fails to distinguish between intensive and extensive growth. Economic growth can be achieved through more efficient utilization of production factors by adopting new technologies (intensive growth) or by increasing the quantity of production factors used (extensive growth).

[27] This draws on Naqvi/Zwickl (2017).
[28] This has been called "sustainable growth rate" 'without implying that the resulting emissions necessarily fall within ecosystems carrying capacities' (de Bruyn et al. 1998: 172).
[29] Obviously, a zero-growth strategy does not imply that GDP growth will be exactly zero. Instead, it suggests that the required reduction in CO_2 emissions to achieve a sustainable level cannot be accomplished with the sustainable growth rate A alone. However, it does not necessarily mean that a significantly negative growth rate below zero is required.

Figure 2: Graphical exposition of growth constellations

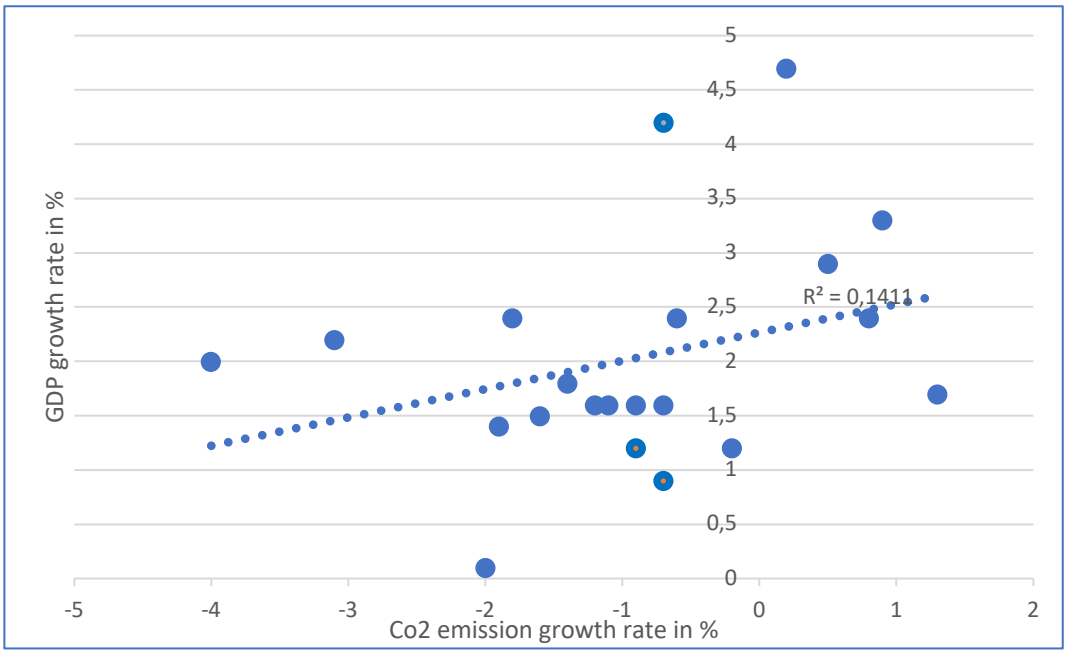


When growth is primarily intensive, GDP growth can lead to a decline in CO_2 emissions if new technologies not only increase productivity but also demonstrate greater environmental efficiency. However, once growth becomes extensive, a positive relationship between GDP growth and CO_2 emission growth will inevitably re-emerge. Consequently, achieving absolute decoupling, where GDP growth continues while CO_2 emissions decline, seems unattainable.

Finally, the "no link scenario" posits that any GDP growth can be associated with any CO_2 emission growth. The idea behind this scenario is that GDP and CO_2 emissions are completely independent of each other. While GDP growth is determined by factors such as population growth, technological advancements, and human development, CO_2 emission growth is dependent on the specific techniques (not technology!) utilized. This viewpoint aligns with mainstream economics and can be referred to as *"a-growth strategy"* (see footnote 21).

Empirical evidence (see fig. 3) from OECD countries corroborates the relative coupling/relative decoupling scenario underlying the zero-growth strategy. Nevertheless, elements of Green Keynesianism can be integrated into the scenario of relative decoupling by influencing the growth rate represented as A in the model (fig. 2) .

Figure 3: GDP and CO_2 emission growth between 2010 – 2019 (in 20 OECD countries)



Note: OECD countries are: Austria, Australia, Belgium, Canada, Denmark, France, Germany, Israel, Italy, Japan, Netherlands, New Zealand, Norway, Poland, Portugal, Spain, South Korea, Sweden, USA, UK

Source: BP (2022); Statistical Review of World Energy, World Bank (2022); World Development Indicators.

6. Sustainability in post-Keynesian perspective – a short conclusion

Economics is about how to provide and allocate means to satisfy human wants and desires under conditions of scarcity. For long time in the history of economic thought, the consideration of scarcity was limited to the factors of production and, when many basic human needs were primarily satisfied by agricultural production, to the use of land. Under these circumstances, growth becomes a matter of the satisfaction of future wants by curtailing present desires through savings (mainstream economics) or a matter of keeping the economy on a growth path which allows for maintaining full employment (Keynesian economics). Planetary boundaries come into the picture when the scarcity of non-renewable resources is increasing and a state of depletion is within reach (see Harold Hotelling's seminal paper (Hotelling 1931)[30]), yet the destruction of mankind's basis of existence by environmental pollution – climate change as the most pressing issue – has been ignored for very long time simply because the environment's capabilities of absorption were assumed to be endless.

Internalising the external environmental effects of human consumption and production can either by achieved by taxing consumption or production (so- called Pigou taxes) or by creating an environmental market in which scarce emission rights are traded. While mainstream economics tends to favour Emission Trading Systems (ETS) – i.e. a market solution – over taxation, post-Keynesian approaches commonly view market solutions

[30] For a critical assessment see Gaitan/Tol/Yetkiner (2006).

more critically (see e.g. Huwe/Rehm 2022: 402) and, therefore, put more emphasis on state interventions or, at least, a combination of market and state, i.e. ETS and taxes. In any case, incorporating environmental issues in theoretical models of different paradigmatic orientation appears to be controversial more at the policy level than at the polity level – or, to put it differently, the acceptance of planetary boundaries and its impact on the functioning of capitalist economies is more disputed than the specific instruments to be implemented. Therefore, once a sustainable capitalism can be shown to be not contradictory in nature, impediments to sustainability transformation are more likely to be found at the politics level, where national or class interests may prove difficult to overcome[31].

From a mainstream perspective based on a market ontology, capitalism and sustainable development are not contradictory because, on the one hand, decoupling growth from exhaustible resources and environmental pollution is possible and likely if market forces are allowed to work. On the other hand, due to the allocative orientation of mainstream economics, even zero or negative growth trajectories do not pose serious problems to the functioning of capitalism when portrayed as real-exchange economy.

From a post-Keynesian perspective, however, the situation is different: Post-Keynesians typically take an orientation where the growth trajectory is demand-led, based on the willingness of investors to incur debt and wealth-owners to take on nominal obligations. Although such a growth path may eventually converge towards a stationary state, denying a strict growth imperative, most post-Keynesians would reject the idea that the laissez-faire growth path will likely lead to sustainable growth and full employment. Therefore, post-Keynesians note a trade-off between ecological and social sustainability which, typically, is resolved in favour of social sustainability through measures to increase aggregate demand using fiscal or monetary policies, or distributional measures (see e.g. Huwe/Rehm 2022: 405f).

The post-Keynesian approach of a (financialised) monetary production economy which elaborates the alternative obligation-based paradigm most concisely, adds further doubts to the proposition that capitalism can effectively function under conditions of a zero or negative growth trajectory. Any decrease in the growth path below its long-run stagnating outlook for the purpose of meeting climate change targets will not only accelerate the transformation of industrial capitalism towards casino capitalism with its inherent instability potentials, as elaborated particularly in Hyman P. Minsky's 'financial instability hypothesis' (see e.g. Minsky 1986; Heise 2022), but will tend towards unsustainable over-indebtedness of public or private households, triggering recurrent insolvency and debt crisis. Mitigating such crisis and achieving the feasibility and acceptance of a sustainable growth trajectory within a capitalist system will require large-scale international and intra-national re-distribution of wealth, income and work. The regressive distributional impact of climate policies has prompted ongoing discussions regarding the need for compensation measures (see e.g. Zachmann/Fredriksson/Claeys 2018, Vona 2021). However,

[31] Undoubtedly, the decarbonization of industrial economies may pose challenges to specific national interests, such as international competitiveness. Additionally, certain carbon-intensive industries or groups may experience adverse distributional effects from the costs associated with decarbonization, leading to opposition from those affected.

based on the principles of fundamental Keynesianism, the urgency for redistributive actions becomes even more pronounced.

Keynesian-type demand management, when directed towards green public spending and promoting green structural change, has the potential to mitigate the trade-off between social and ecological sustainability by expanding the possibilities for relative decoupling. However, it is unlikely to completely resolve this trade-off without broader and more transformative shifts in economic systems and societal behaviours.

Declaration of generative AI and AI-assisted technologies in the writing process

During the preparation of this work the author(s) used chatGPT in order to improve his English and readability. After using this tool/service, the author(s) reviewed and edited the content as needed and take(s) full responsibility for the content of the publication.

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