



# Defining growth dependence

Anja Janischewski<sup>1</sup>  · Katharina Bohnenberger<sup>2,3</sup> · Matthias Kranke<sup>4</sup> · Tobias Vogel<sup>5</sup> · Riwan Driouich<sup>6,7</sup> · Tobias Froese<sup>8</sup> · Stefanie Gerold<sup>9</sup> · Raphael Kaufmann<sup>10</sup> · Lorenz Keyßer<sup>11</sup> · Jannis Niethammer<sup>12</sup> · Christopher Olk<sup>13</sup> · Matthias Schmelzer<sup>14</sup> · Aslı Yürük<sup>15</sup> · Steffen Lange<sup>16</sup>

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## Abstract

Many socio-economic systems require positive economic growth rates to function properly. These growth dependencies pose serious challenges given uncertainty about future growth rates and the role of economic growth as a driver of environmental crises. Thus, identifying and transforming socio-economic systems that currently rely on growth for their adequate functioning is a crucial step towards effective sustainability transformations. To facilitate conceptual clarity, we propose a general definition and framework for operationalizing the concept of “growth dependence” through four elements: (1) the system under investigation, (2) the unit of growth measurement, (3) the meaning of “growth”, and (4) the functions or properties of the system relevant for human well-being. We illustrate the impact of varieties in definitions on assessment outcomes by applying the framework to areas widely seen as growth-dependent: labor markets, social insurance and public finance. Our framework helps researchers to develop a more coherent understanding of growth dependence, a prerequisite for assessing policy options towards growth independence.

**Keywords** Degrowth · Growth dependence · Green growth · Growth imperative · Growth independence · Post-growth

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## Introduction

Modern societies have embraced and institutionalized the operating principle that unless one goes forward, one goes backward. In fact, many have argued that contemporary societies would not function without economic growth (Malmaeus and Alfredsson 2017; Strunz and Schindler 2018). Yet while those promoting green growth contend that the economy must expand to avoid catastrophic social impacts, degrowth scholarship focuses on reduction, reorganization and localization to achieve sustainability goals (Käyrä and Kuhmonen 2024), which necessitates the decoupling of social well-being from economic growth. Growth (in)dependence is thus the elephant in the room when it comes to the polarized debate on green growth versus degrowth. Understanding the causes and dynamics of

growth dependence, as well as possibilities for instituting less growth-dependent societal systems, can ultimately lead to more successful sustainability transitions. To grasp the mechanisms behind these growth dependencies theoretically, analyze them empirically and, potentially, overcome them, scholars need to identify growth-dependent systems in a consistent manner. This presupposes clear operationalizations of the concept.

Conceptual clarity for coherent operationalizations has been identified as a priority for sustainability science (Sahle et al. 2025: 7). We contribute to this goal by proposing an operational framework for the concept of *growth dependence* and, by implication, *growth independence*. While recent work has begun to tackle this critical issue, its main focus has been on either surveying the literature for manifestations of growth dependence (see e.g. Corlet Walker

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Handled by So-Young Lee, Institute for Global Environmental Strategies, Japan.

Extended author information available on the last page of the article

et al. 2021; Keyßer et al. 2025) or applying this concept to specific cases, such as welfare state institutions (Corlet Walker et al. 2024; Wiman 2024). Rigorous operationalization is important, as Wiman (2024) notes, because it helps to set case-independent, a priori criteria for assessing whether a specific system is growth-dependent or not. Such criteria permit the explication of the conceptual choices necessary for analyzing and theorizing the causal mechanisms behind growth dependence. In this sense, our framework is not intended as a formulation of a theory of growth dependence but, instead, as a clarification of the definitional requirements for such theories.

Our endeavor is motivated by two main considerations regarding the role of economic growth in modern societies. First, a persistent trend of low or zero growth in already affluent societies, which is often called “secular stagnation”, constitutes a risk to societal welfare (Teulings and Baldwin 2014; Jackson 2018; European Environment Agency 2021: 39–40). Second, while attention to the incompatibility between economic growth and environmental goals has been declining since the 1970s (Gómez-Baggethun and Naredo 2015), recent evidence still lends little support to hopes for absolute decoupling of economic growth from environmental pressures in line with internationally agreed climate targets and broader ecological indicators (Parrique et al. 2019; Haberl et al. 2020; Hickel and Kallis 2020). As long as the strive for continuous growth is institutionally locked in, societies tread on a dangerous path towards irreversibly degrading the biosphere as the life support system of humans and non-humans alike – or confront serious social, economic and political crises following environmental policies that effectively limit growth. For both these reasons, greater engagement with the dynamics and forms of growth dependence is overdue, especially from a precautionary perspective (Petschow et al. 2020).

If less growth is socio-economically deleterious but continued growth ecologically fatal (Ayres et al. 2013: 10), and if genuinely just transitions respect planetary boundaries while meeting social minimum standards (Dufflot et al. 2021; Kortetmäki et al. 2025), reducing growth dependence offers a pragmatic way forward across a wide range of otherwise deadlocked policy debates. Discussions of growth dependence do not necessarily problematize economic growth as such, but the reliance of certain socio-economic systems on growth to meet human needs (Büchs 2021; Corlet Walker et al. 2024). Thus, both academic and policy-oriented contributions have recently advanced proposals that aim at sustainable well-being and societal resilience independent of economic growth in an age of planetary polycrisis (Seidl and Zahrnt 2010; Jackson 2016; Petschow et al. 2020; European Environment Agency 2021; Schmelzer et al. 2022). Growth independence can also be seen as a precondition for realizing

a state of “a-growth” (van den Bergh 2017). Such a logic features in various transition approaches as well, including “doughnut economics” (Raworth 2017), the “economy for the common good” (Felber 2015), “well-being economies” (Trebeck and Williams 2019) and progressive Green New Deal versions (Aronoff et al. 2019; Pettifor 2019).

The article proceeds as follows. In Sect. [Literature and context](#), we contrast growth dependence with the related concepts “growth drivers”, “growth imperatives” and “dynamic stabilization” as well as review existing definitions of “growth dependence”. In Sect. [Framework and definition](#), we present our novel analytical framework for operationalizing growth dependence within a scientifically sound approach that comprises four elements, namely (1) the system under investigation, (2) the unit of growth measurement, (3) the meaning of “growth”, and (4) the functions or properties of the system relevant for human well-being. We illustrate the framework’s value added in Sect. [Definitions of growth dependence: illustrative cases](#) by using labor markets, social insurance systems and public finance as examples of how growth dependence is institutionalized in socio-economic systems. We discuss interconnections between the three examples and outline avenues for future research in Sect. [Discussion](#), before concluding in Sect. [Conclusion](#).

## Literature and context

Since the publication of *The Limits to Growth* report in 1972, researchers have emphasized that societies focused on economic growth face obstacles to sustainable transformation (Douthwaite 1992; Jackson 2016). Particularly the science-activist field of degrowth has criticized the “addiction to growth” (Costanza 2022), the “growth paradigm” (Schmelzer 2015) or “growthism” (Daly 2019) as an ideology shaping the mental, socio-cultural and material infrastructures of contemporary societies. Accordingly, the last decade has seen intensified scholarly efforts to conceptualize these dependencies. Relevant conceptualizations include “dynamic stabilization” (Rosa 2016), “growth imperatives” (Richters and Siemoneit 2019), “growth drivers” and “growth dependencies” (Jackson 2016). In this article, we focus on “growth dependence” as a comprehensive concept that integrates most of these related concepts without equating them in terms of definition.

The associated debates have remained scattered, incomplete or restricted to certain areas of application. Research on growth dependencies is sparse although it can be found in fields as diverse as business administration (Gebauer 2018), social innovation research (Tschumi et al. 2021) and urban planning (Rydin 2013). The academic discussion is arguably

most advanced in the field of (sustainable) welfare systems, where Corlet Walker et al. (2024) and Wiman (2024) have made crucial contributions to conceptualizing, operationalizing and analyzing growth dependence (see also Büchs 2021; Koch 2022). Similarly, Oberholzer (2023) models macroeconomic stability under a post-growth scenario, yet without referring to growth dependence as a concept.

In contrast to the established theoretical literature on causes of economic growth (see Bassanini and Scarpetta 2001), scholarship on the social stabilization functions of growth is nascent. So far, the literature lacks a conceptual framework that is specific enough to enable open-ended empirical assessments of growth dependence (specific conditions) while being broad enough to cover all relevant instances of growth dependence and avoid definitional exclusions (general scope). For such an integrative, comparative discussion, clear definitions are required. As Ostrom (1986: 4) puts it: “No scientific field can advance far if the participants do not share a common understanding of key terms in their field.” Heeding this reminder, we propose an operationalization of the concept of “growth dependence” that captures the stabilizing functions of economic growth. In a first step, we compare growth dependence with the related and partially overlapping concepts of “growth drivers”, “growth imperatives” and “dynamic stabilization”. In a second step, we review existing approaches to growth dependence, highlighting their ambiguities to sharpen the concept internally.

*Growth drivers* can be understood as factors that tend to stimulate economic growth, but at the same time do not penalize its absence (Strunz and Schindler 2018; see also Corlet Walker et al. 2024). For example, the well-established economic model of growth considers labor-productive technological progress through innovation as a fundamental growth driver (Solow 1956; Romer 1990). Here, the concept seeks to explain how growth trends occur (Petschow et al. 2020; ch. 3). The term also features in the comparative economics literature. There it designates unique elements that, while not part of the total income, affect the expansion of its individual components (Kohler and Stockhammer 2022; Baccaro and Hadziabdic 2024). Growth drivers are more closely linked to growth dependence when they denote individual dispositions and social pressures to grow. In this case, lack of growth is perceived as a problem (Richters and Siemoneit 2019). Conversely, the perception – or narrative construction – that our society is dependent on growth can spark decisions that reinforce growth drivers (see Gumbert et al. 2022).

*Growth imperatives* conceptually capture the danger of extremely detrimental consequences in the absence of growth (Kettner and Vogel 2021). Richters and Siemoneit (2019: 129, original emphasis) explicitly highlight systemic

pressures “to avoid *existential consequences*”. Furthermore, some authors interpret growth imperatives as a macroeconomic condition that makes a zero-growth state impossible because falling below a certain minimum growth threshold would entail a contraction (Binswanger 2006; Antal and van den Bergh 2013: 52–53; Binswanger 2019). Similarly, various concepts of “growth dependence” emphasize the existential consequences of insufficient growth for the maintenance of social systems (Mayer et al. 2021: 219; Tschumi 2021: 119; Schmelzer et al. 2022: 207). Some also identify significant negative consequences or harm (Bohnenberger and Fritz 2020; Corlet Walker et al. 2021) through which “certain core aspects of human wellbeing become compromised” (Corlet Walker et al. 2024: 1). Others define the scope of growth dependencies more broadly. They state that without growth, beneficial functions or widely accepted social objectives cannot be realized to the same extent (Petschow et al. 2020; Wagner and Lange 2021). By contrast, as we describe in more detail below, growth dependence can also exist when lacking or too little growth undermines a certain standard of social functioning, even if it does not trigger existential hardship for individuals or threaten the persistence of social systems. By “social functions”, we mean a certain performance that is expected of a system, such as the labor market’s provision of employment. A further difference is that “growth dependence” emphasizes the adverse consequences of lacking or too little growth without presupposing negative growth rates. In other words, growth dependence assumes that a given level of social functioning cannot be maintained in case of zero growth, leading to detrimental consequences for human well-being. It does not necessarily assume that a macroeconomic mechanism causes low growth to tip over into contraction.

*Dynamic stabilization*, popularized by sociologist Hartmut Rosa and colleagues (Rosa 2016; Rosa et al. 2017), combines growth drivers and growth imperatives within a theory of growth-dependent societies. The term specifically refers to how modern societies reproduce themselves through processes of economic growth, innovation intensification and acceleration, without which they destabilize (Rosa 2016: 673). Dynamic stabilization intertwines the growth drivers underlying the cultural-material promises of an accelerated individual life with the growth imperatives of a capitalist economy (Rosa 2016: 679–680, 684–687). Technical innovations help to cope with life’s increasing pace while driving growth and accelerating socio-structural change. The latter in turn makes living conditions more fast-paced, thus triggering a cycle of dynamic stabilization (Rosa 2012: 309).

In contrast to these related approaches, the definitions of *growth dependence* present in the literature consist of three main elements. The present approach builds and expands on

these elements, which enables a more flexible application of the concept to different cases through a generalized framework of growth dependence with greater terminological clarity. We conducted the literature review through a keyword-based search of scientific databases, complementing it by additional relevant publications known to us. We present a list of the identified definitions in Appendix A.

First, many accounts suggest that the absence of economic growth threatens the maintenance of societal functions (see Lange 2018; Petschow et al. 2020; Tschumi et al. 2021: 119; Schmelzer et al. 2022: 168; Corlet Walker et al. 2024). Some forms of growth dependence may constitute existential threats, but the maintenance of societal functions is the lowest common denominator – a necessary condition for growth dependence. Researchers should thus specify on a case-by-case basis which function is affected, in which way and why this effect is problematic.

Second, a large part of the literature underlines the need for continuous growth because otherwise negative consequences will materialize (Bohnenberger and Fritz 2020; Schmid 2021: 65; Lange 2022; Schmelzer et al. 2022: 168). In this respect, growth dependence presupposes an ideally uninterrupted process of economic expansion, rather than just temporary growth spurts. How growth is measured, however, varies across approaches. While most conceptualizations converge on gross domestic product (GDP), some foreground dependence on microeconomic measures, such as a company's size or revenues (Gebauer 2018: 240; Meyer et al. 2021: 227). Furthermore, the modifier *continued* in “continued growth” leaves room for interpretation regarding the required growth rates or the allowed degree of fluctuations along a growth trend.

Third and finally, definitions refer to a social entity to which growth dependence is attributed. However, the conceptualization and scope of entities differs widely, including “society” as a whole (Tschumi et al. 2021: 119), “areas of society” (Petschow et al. 2020: 91), “institutions” (Petschow et al. 2020: 91; Lange 2022) or “infrastructures” (Schmelzer et al. 2022: 149–150), and combinations thereof. A term representing this wide spectrum is thus required. For example, “areas of society”, “institutions” or “infrastructures” exclude society as a whole and are too narrow to capture complex logics, such as Rosa's “dynamic stabilization”. On the other end of the spectrum, the term “society” subsumes many specific domains. The concept of “institutions” is ambiguous, being used in the sense of “organizations”, “rules” or “social norms” (see, for example, Ostrom 1986; Hodgson 2006). Thus, the term “growth-dependent institutions” can describe various entities. Accurate research needs to clearly specify and delimit the social entity considered to be growth-dependent. In our framework, we thus propose

using *systems* as a concept that is both fairly encompassing and specific enough for operationalization across contexts.

Definitions and operationalizations of growth dependence have been proposed in recent work especially by Corlet Walker et al. (2024) and Wiman (2024). Their general remarks on growth dependencies within their studies of social care and pensions, respectively, illustrate the need for an overarching concept, to which our article is dedicated. Wiman (2024) provides several important clarifications regarding the operationalization of growth dependence, in particular a careful specification of a growth and no-growth scenario, which are addressed in Sect. [Framework and definition](#) below. According to Wiman (2024: 2), growth dependence exists under the condition of “worse economic outcomes in a no-growth scenario compared to a growth scenario”. Thus, a system would be considered growth-dependent if it performs better with more growth and worse with less or zero growth. In contrast, we understand growth dependence more restrictively as the inability to maintain sufficient social functioning with less or zero growth (see Sect. [Framework and definition](#)).

Compared to the work by Corlet Walker et al. (2024), whose framework is designed to identify growth dependencies in order to analyze them in detail for the sake of transformation (ibid.: 7), we omit dimensions of the phenomenon that are not strictly required for the definition or operationalization of the concept itself. Thus, while similar, these two frameworks serve slightly different purposes. The framework by Corlet Walker et al. (2024: 2–3, original emphasis) consists of five dimensions “*The object of growth*”, “*The agents(s) being harmed*”, “*The type of harm*”, “*The agent(s) pursuing growth*” and “*The presence of negative feedback loops*”. The first dimension corresponds to our second element, which specifies the unit of growth measurement. Dimensions two and three characterize the consequences of too little growth including the affected actors. We capture these aspects within the element of relevant social functions or properties. We do not include the fourth dimension of agents pursuing growth. While they are relevant for understanding the mechanisms of growth dependence, their specification is not a requirement for a definition of growth dependence. The fifth dimension points to the risk that a decline in growth rates will trigger a disproportionate downturn in the system's capacity to meet human needs. We also consider this to be a possible result of growth dependence and, at the same time, as an aspect of growth imperatives, insofar as it is linked to a spiral of decreasing in growth rates.

Our framework for operationalization can be applied across disciplines, regardless of the growth dependence mechanisms in question. Defining a concept means striking a certain balance between elasticity and rigor: A useful

concept can be specified with a certain degree of flexibility to account for a variety of empirical cases and contexts. At the same time, the definition should be stable and systematic enough to ensure comparability across cases and contexts. The framework presented below strikes this balance by providing a broad, structured, but also bounded space of growth dependence specifications. We loosely draw on the method of concept analysis, focusing on identifying the attributes and boundaries that define a concept (Walker and Avant 2019). The framework is not focused on any specific type of underlying causal mechanism, which can refer to institutionalized systems, as well as cultures and ideologies as belief systems, and individual preferences and mentalities as psychological systems.<sup>1</sup> Furthermore, the framework serves as a template for building definitions for concrete research questions by detailing elements of growth dependence, rather than providing a list of observed phenomena. It shall help researchers to construct “intensional definitions”, which list the necessary and sufficient conditions for something to fall under the defined concept (ten Hacken 2015: 11). These definitions can then be the starting point for open-ended analyses of the growth dependence of socio-economic and other systems.

## Framework and definition

In the current literature on growth dependence researchers emphasize different aspects. A common understanding, we argue, implies that growth dependence<sup>2</sup> means that some socio-economic entity requires growth of an economic variable<sup>3</sup> to avoid potentially detrimental consequences, or,

<sup>1</sup> The links between growth dependence and cultures, ideologies and mentalities are too multifaceted to be adequately addressed in this article. All three may be expressions of existing growth-dependent systems, or they may generate growth-dependencies themselves, for example for a political system, through the voting behavior of the people. Furthermore, they may be a determinant of how less growth translates into negative consequences, or they may simply represent unfounded claims about negative consequences.

<sup>2</sup> We acknowledge the multiple meanings of the term “dependence”. A similar but more general meaning of an item A depending on an item B is that B affects A – that is, changes in B result in changes in A (Oxford Learner’s Dictionaries). This meaning is relevant for gradual effects such as the negative correlation between growth and employment rates in Okun’s law. However, in line with existing definitions, we focus on the meaning of “dependence” to be “a state of needing something or someone, esp. in order to continue existing or operating” (Cambridge Dictionary). References: <https://www.oxfordlearnersdictionaries.com/definition/english/dependence>, <https://dictionary.cambridge.org/dictionary/english/dependence>.

<sup>3</sup> While growth often refers to macroeconomic measuring units only, the framework presented here is also applicable to the dependence on growth of firm- or sector-level measuring units, such as revenue or production input (which is beyond the scope of this article).

equivalently, to maintain some functionality. This general understanding is, however, open to various diverging specifications. In this section, we suggest that researchers should specify at least the following four elements in order to yield rigorous case-specific definitions of growth dependence:

- (1) the system under investigation,
- (2) the unit of growth measurement,
- (3) the meaning of “growth”, and
- (4) the functions or properties of the system relevant for human well-being.

What counts as relevant in element (4) bears particular risk of ambiguity. Thus, researchers should make the normative criteria explicit that underlie the choice of functions or properties in terms of their relevance for social needs and human well-being. Operational definitions can then be built by combining these four elements. Theories of growth dependence arising from subsequent research would typically aim to explain a mechanism as a causal relationship that involves these four properties, by which no growth/too little growth leads to the non-maintenance of relevant functions. This causality is illustrated by the arrow from element (3) to element (4) in Fig. 1. In the following subsections, we discuss specification categories of each of the four framework elements (3.1–3.4) and then combine these four elements into a general definition of growth dependence (3.5).

### System under investigation

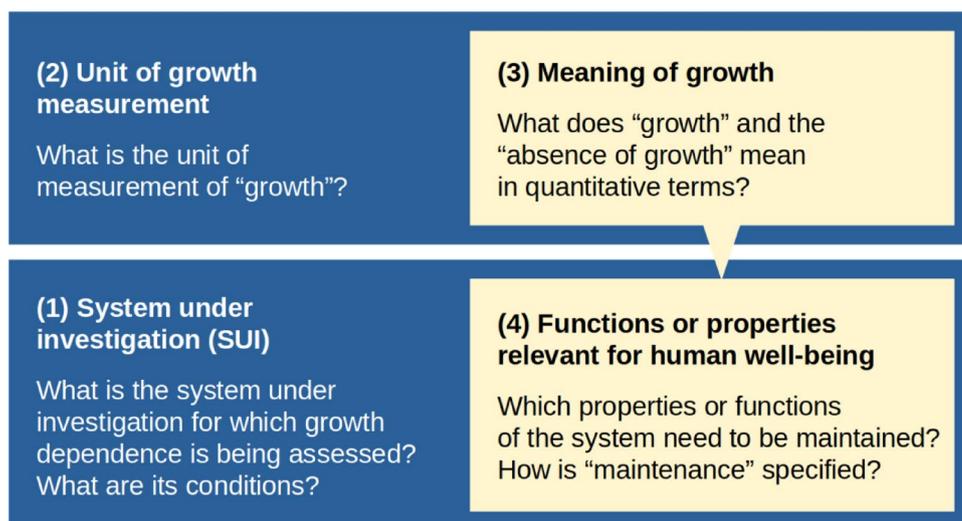
First, what is the system being studied? The first step is to delineate the system under investigation whose growth dependence is examined. For instance, such systems could be labor markets, social insurance systems, systems of public finance, stock markets, firms or national economies. The framework can be applied to different levels and subsystems, from regional economies to the global economy.

Speaking of “systems”, rather than “institutions” or “areas of society”, makes the concept applicable to a broader range of social and economic structures. According to Meadows (2008: 188), a *system* is:

A set of elements or parts that is coherently organized and interconnected in a pattern or structure that produces a characteristic set of behaviors, often classified as its “function” or “purpose”.

While definitions of systems are not uniform (Elder-Vass 2007), Meadows’ definition usefully underlines structural features of elements and interconnections, such as the employment relations between firms and workers in labor markets. A particular advantage of the systems perspective is the constitutive distinction between system and system environment, including the forms of exchange between the

**Fig. 1** Framework overview showing the four essential elements of growth dependence definitions. The two large boxes illustrate the pairwise connection between the four elements, with “growth” being the rate of change of the “unit of growth measurement” and the “functions or properties” being an attribute of the “system under investigation”. The arrow from element (3) to element (4) illustrates the causality from the absence of growth or too little growth to the non-maintenance of functions and properties that lies at the core of the growth dependence concept



two (see Luhmann 1995; Mele 2010). This angle makes it possible, for example, to distinguish the labor market system from social insurance systems without losing sight of their interdependence.

### Unit of growth measurement

Second, what is the measuring unit of “growth” in the term “growth dependence”? As stated above, the most common metric used in the literature is macroeconomic GDP growth, but some analyses also include microeconomic measuring units, such as a firm’s revenue, profits or market shares. A larger part of existing literature focuses on real GDP (Keyßer et al. 2025), which is the inflation-adjusted measure of the market value of all final goods and services produced domestically in a given period<sup>4</sup>. The use of other macroeconomic measuring units, such as GDP per capita, gross national income (GNI), or nominal GDP, may be relevant for specific applications but the choice of these different units of growth measurement likely leads to different outcomes of a system’s growth dependence assessment, as illustrated in Sect. [Definitions of growth dependence: illustrative cases](#).

The unit of growth measurement can either describe an economic metric from within the system or beyond. Many systems such as firms or public organizations may allow for the distinction between an “inner” measuring unit and an “outer” measuring unit. In the case of social systems, the “inner” measuring unit would be revenues from individual contributions or subsidies, or revenues, market shares or profits in case of firms. The “outer” unit then measures the economic activity of a larger system or system environment

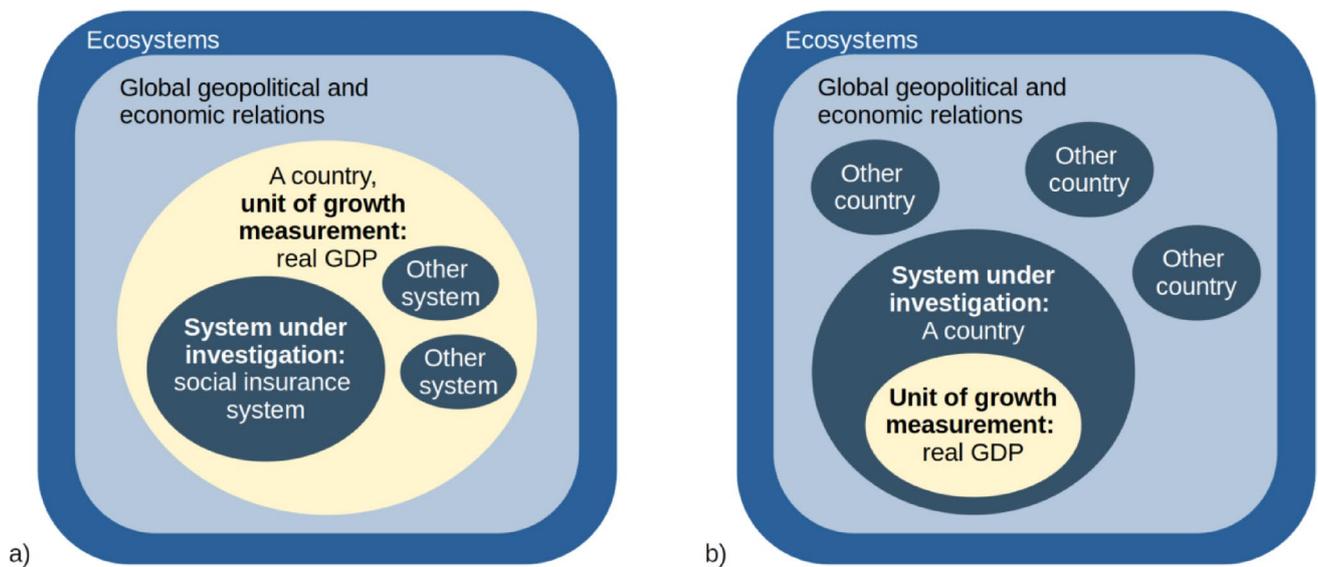
in which the system under investigation is embedded, such as national GDP for national social insurance systems or global GDP for interbank markets. Pension systems, too, can be understood to be embedded in the global economy via the link of investment in international financial markets (Wiman 2024: 3–4). Moreover, the global perspective is relevant for questions such as the impact of lower GDP growth of a country on itself in the context of geopolitical and global economic relations, or the impact of lower growth in high-income countries on other parts of the world (see Tan and Tang 2013; Mayer 2017; Gräbner-Radkowsch and Strunk 2023; Leoni 2024). Figure 2 illustrates this idea of embeddedness.

Furthermore, the identification of a system as growth-independent is limited to the specified growth-measuring unit. Even if a system is growth-independent with regard to one growth-measuring unit (such as GDP), it might still be growth-dependent with regard to another unit (such as firm level revenue). In sum, the most commonly applied specification of the measuring unit is real GDP. In some instances, other macro- or micro-level measures may be used, but the distinction should be made clear.

### The meaning of “growth”

Third, what does the “absence of growth” or “too little growth” in contrast to “growth” mean in quantitative terms? The scenario of growth absence could be seen as average zero growth or growth below a near-zero threshold over a specified period of time. Moreover, when it comes to the dependence of a system’s functions on growth, one has to distinguish between the *vulnerability to the absence of*

<sup>4</sup> See Campante et al. (2021); Landefeld et al. (2008). Note that the exact definition of GDP is subject to changes over time (see Christophers 2011; Semieniuk 2024).



**Fig. 2** Schematic representation of two systems under investigation (dark blue) with an “outer” and “inner” unit of growth measurement, respectively (yellow): Panel a) shows a social insurance system that is embedded in the national economy of a country with real GDP being the “outer” unit of growth measurement. In panel b), the country itself

becomes the system under investigation, where its own real GDP serves as the “inner” unit of growth measurement. The countries in both examples are, in turn, embedded in global geopolitical and economic relations, as well as larger ecosystems

*growth per se, and the vulnerability to a transition from growth to the absence of growth.*<sup>5</sup>

The latter scenario of a *vulnerability to a transition from growth to the absence of growth* does not necessarily entail that the system’s functions are hampered in a scenario of growth absence. Even if such a downward shift in growth rates may pose numerous challenges, including for well-being (Büchs and Koch 2019), livelihoods (Vogel et al. 2024) and financial stability (Tokic 2012), the system’s functions need not be in peril under structurally low growth. For instance, regarding financial stability, reductions in growth expectations in such a transition can cause financial asset devaluations, thereby posing an additional risk of bankruptcy cascades (Tokic 2012), but financial stability might then be reestablished after actors have adjusted their expectations to low or zero growth. Thus, we recommend not denoting systems as growth-dependent solely because challenges may occur during a transition from growth to the absence of growth (which can be addressed through specific stabilisation strategies), but instead classifying systems as growth-dependent only when the challenges persist in a scenario of ongoing growth absence.

To scientifically test whether a system is growth dependent in the sense of a *vulnerability to the absence of growth* (or, in other words, a requirement of growth to avoid harmful consequences), one can proceed by specifying two things, namely a growth scenario and a scenario of growth absence

(see e.g. Wiman 2024)<sup>6</sup>. If one finds a growth scenario with adequate functionality and shows that the system’s functions are inadequate in a scenario of growth absence, the system is growth-dependent. If, however, the functionality remains intact in the scenario of absent growth, the system is not growth-dependent (that is, it is growth-independent). Thus, both the growth and the absence of growth scenario have to be operationalized – for instance, as annual growth rates consistently above 2% and growth rates between 1% and –1% over a period of 10 years (averaging zero growth), respectively. Growth dependence in this sense – that is, the requirement of growth for the system’s adequate functionality – means that there exists a (possibly unknown) non-negative threshold  $g_0$  (lying between the growth rates in the two scenarios or at the growth rate in the growth absent scenario) above which the system performs adequately; yet when the growth rate is at or below the threshold  $g_0$ , the system’s functions are hampered.

### Functions or properties relevant for human well-being

Fourth, the maintenance of which functions or which properties of the system does one refer to? And how is their non-maintenance specified? Thus, one needs to define

<sup>5</sup> Such a downward shift of growth rates can be seen as a part of a degrowth transition (O’Neill 2012).

<sup>6</sup> Wiman (2024) carefully operationalizes a growth and no-growth scenario in order to test for comparably better or worse outcomes in the system under investigation. This operationalization procedure may be applied for analyzing the requirement of growth for the system’s adequate functionality, as well.

what constitutes the “vulnerability” of the system in the absence of growth. Functions of socio-economic systems are, for example, the provision of income or social inclusion. In labor markets, stable employment is a highly relevant property. The non-maintenance of employment can be then specified as a statistically significant annual rise in the unemployment rate. Self-perpetuation is one of the fundamental functions of most systems. If a system’s self-perpetuation is dependent on growth, it exhibits an existential form of growth dependence. For instance, one might find that a capitalist firm eventually ceases to exist if it generates zero profits for a while. Often, insufficient growth will not necessarily cause the dissolution of systems. For example, rising unemployment because of low growth does not induce the end of the labor market (for similar reflections on this issue, see Wiman 2024: 6). However, employment may drop below a tolerable level.

Overall, we suggest the formal criterion of the non-maintenance of systemic properties or functions in the absence of a certain growth minimum to define growth dependence (see Sect. [The meaning of “growth”](#)). However, this criterion requires additional specification, as it – as is – does not provide any information about the relevance of these properties and functions or the impact on people due to their reduced performance level. As mentioned above, relevance is a normative issue. Therefore, it may be appropriate to leave the articulation of relevant criteria to social discourse. However, this alone also seems insufficient. There is a risk of interpretative authority whereby, on the one hand, even the slightest impact could be defined as relevant, thereby inflating growth dependence. On the other hand, even the most serious impacts could be classified as irrelevant, so nothing appears growth-dependent despite their severity. Therefore, more binding normative criteria are needed to provide substantial access to relevant properties, functions, and degrees of impact on people. This enables arguments in social discourse to be underpinned rationally. In line with much of the literature on growth dependence (see e.g. Keyßer et al. 2025: 13) and sustainability science more generally (see Lamb and Steinberger 2017; Horcea-Milcu et al., 2019), we suggest the conscious and transparent selection of normative categories focusing on human well-being, ranging from pleasure and desire fulfillment to needs and capabilities (see Robeyns 2017: 118–126).

As a side note, linear and non-linear effects of lower growth can be differentiated. Linear effects manifest themselves in the gradual deterioration of relevant functions or properties while non-linear effects unfold through larger and more abrupt diminishments of the system’s functions or properties (Corlet Walker et al. 2024: 3). While this distinction is relevant for categorizing observed growth dependencies, an operational definition may encompass both types by

**Table 1** Overview table of the main specification categories of the framework elements, that fall under the umbrella of the general definition (Sect. [Definition](#)). The names of the four framework elements are written in bold

The four elements defining growth dependence			
<b>The system under investigation</b> can be ... ... the whole economy on a regional, national or global level; ... an organizational unit of the economy (e.g., market, insurance system).	<b>The unit of growth measurement</b> can be ... ... an “inner” economic indicator (from within the system itself, see Fig. 2b); ... an “outer” economic indicator (from outside of the system, see Fig. 2a).	<b>The meaning of “growth”</b> can be ... ... a requirement of growth above an (unknown) positive threshold; ... a requirement of growth above a zero threshold.	The non-maintenance of <b>functions or properties relevant for human well-being</b> can be ... ... the loss of self-perpetuation of the system under investigation; ... a significant drop in systemic performance.

labelling a system as growth-dependent if its functions or properties significantly deteriorate with lower growth rates, which can happen either gradually or abruptly.

To summarize, if all the functions or properties relevant within the chosen normative framework are maintained in the absence of required growth as specified by element (3), the system is not growth-dependent. Conversely, if at least one of these functions or properties drops significantly in the absence of required growth, the system in question counts as growth-dependent.

### Definition

The four elements described in this section form the components that all rigorous definitions of growth dependence must contain. To tie these elements together in a coherent logic and explicate the causal relation from “no/too little growth” to the non-maintenance of functions and properties, we suggest as general definition of growth dependence:

*A system is growth-dependent if it requires growth of a unit of economic measurement to maintain all its functions or properties relevant for human well-being.*

Conversely, *growth independence* is given if the system under investigation does not require growth in the specified measuring unit to sustain its relevant functions and properties. In Table 1, we present an overview of the main specification categories for the four framework elements. All variants that can be built by combining these specifications fall under the umbrella of the proposed general definition.

## Definitions of growth dependence: illustrative cases

In this section, we show how a diversity of definitions of growth dependence leads to different conclusions about whether a system is actually classified as growth-dependent. By implication, evaluations of policies aimed at reducing growth dependence or at increasing growth independence vary with the concrete definition of the four elements introduced in the last section. The concept of “growth dependence” is prominently adopted in research on labor markets, social insurance systems and public finance but no homogeneous definition of growth dependence is applied in all three fields. We illustrate how particular mechanisms of growth dependence that are named for these fields can be embedded in our framework. In each of the systems under investigation, different specifications of the framework elements are emphasized. We discuss two specifications of varying definitions for each field: For labor markets the system’s functions; for social insurance systems the measuring unit of growth; and for public finance the system’s functions and the measuring unit establish a profound difference. The subsections illustrate that the application of the framework by distinguishing and specifying the four elements promotes a clearer and more consistent research on growth dependence.

### Labor markets

Rising unemployment is considered a major issue in non-growing economies (see Antal 2014). The suitability of policies to alleviate this dependency, such as redirecting productivity changes or universal basic services, depends on the chosen system functions. For example, one can call labor markets to be growth-dependent if they require positive economic growth rates to maintain stable employment rates; alternatively, one could say that growth dependence exists if any social function of labor markets is dependent on economic growth. We unpack the two definitions that differ in how the relevant functions or properties – the fourth element of our framework – are specified. The narrower definition holds that a labor market is growth-dependent if it requires positive economic growth to *maintain stable employment rates*. According to the broader definition, a labor market is growth-dependent if it requires positive economic growth to maintain *all its relevant societal functions*.

In both definitions, the *system under investigation* is the formal labor market. In this system, workers and employers are connected via the wage relation. Informal or unpaid labor is not included in the system of investigation. The *measuring unit* of growth is real GDP. The specification of growth vs. no growth takes a long-term perspective, not considering temporary fluctuations, such as temporary recessions, but

long-run growth rates. Finally, the potential *relevant functions or properties* of labor markets are manifold. Three stand out in modern capitalist societies. First, most peoples’ livelihoods depend directly or indirectly on wage incomes. Second, access to social security benefits is often tied to employment. Third, employment is a major source of inclusion, recognition and personal identity (Frayne 2015).

The employment rate is a system property that can serve as an approximation of the system’s ability to fulfill the above-stated functions. The narrower definition therefore revolves around the employment rate as a proxy for all the relevant functions. The broader definition, by contrast, refers explicitly to all relevant functions. In the broader definition, a labor market is growth-dependent if any one of these functions, including employment, is no longer maintained because of the absence of long-run positive real GDP growth. Using these definitions consciously can improve the assessment of the growth dependence of labor markets.

Numerous studies implicitly apply the narrower definition. These studies examine the empirical relationship between real GDP growth and the unemployment rate. Most have found a negative relationship, known as Okun’s law (see Ball et al. 2017), with only scattered counterexamples (see Conteh 2021). More specifically, econometric analyses show that unemployment tends to rise in the case of zero growth rates (Sögner and Stiassny 2002; Ball et al. 2017; see Antal 2014 for an overview). One explanation is that if labor productivity increases, the same economic output can be achieved with less labor input. As a result, unemployment goes up without output growth (Antal 2014: 280).

Policy proposals for reducing the growth dependence of labor markets are abundant in this strand of research. They often focus on redirecting technological change from labor productivity growth toward enhancing energy and resource productivity (Ayres et al. 2013: 10–11; Lange 2018; Petschow et al. 2020), thereby intensifying economic activity in sectors with low productivity (growth) (Jackson and Victor 2011), or shifting the cost of labor to energy and resources (Köppl and Schratzenstaller 2021).<sup>7</sup>

Other proposed measures include working time reductions (Kallis et al. 2013), a job guarantee (Alcott 2013), universal basic income (Weeks 2011) and universal basic services (Gough 2019). While some of these policies also aim to maintain stable employment rates (e.g., working time reductions or job guarantee), these policies tend to have broader goals, which are more in line with the second, broader conceptualization of labor markets’ functions: These policies try to decouple employment from some of its social functions, such as the provision of income (e.g., universal basic income), livelihoods (e.g., universal basic

<sup>7</sup> For a brief case-specific discussion of these issues, see Ferguson (2016) on artisan bakers in Australia.

services) or social status (e.g., job guarantee). Thus, the specification of the labor market's functions in the definition of growth dependence matters for the design and evaluation of policy measures aimed at reducing growth dependence.

## Social insurance

A second system that many scholars consider to be dependent on economic growth is the social insurance system (Bohnenberger 2023). The alleged collapse of social insurance systems in the absence of growth is a major concern in academic and broader public discourse but “inner” or “outer” measuring units of growth, the expected functions and the design of social security systems influence the evaluation of growth dependence. As before, we outline the specifications of our framework along two definitions. Social insurances cover public and private insurances against unemployment, disability and sickness, as well as pension funds and long-term care systems (Garland 2014; Rothgang 2010). These variations are based on mandatory and voluntary financial contributions, which in turn imply an individual's entitlement to benefits (Garland 2014; Clegg 2018; Obinger 2021). Although they are primarily financed through individuals' contributions, they are sometimes “subsidized” by the government (Morel and Palme 2018), which creates a link between the social insurance system and the system of public finance (see next subsection).

The growth dependence of social insurance systems can be assessed with reference to an “inner” or an “outer” *measuring unit* of growth: the inner measuring unit is the level of revenues from individual contributions or state subsidies, and the outer measuring unit is the real output of the economic system in which the respective social insurance system is embedded, measured as real GDP. In the first definition, a social insurance system is growth-dependent if it requires positive *growth in individual contributions* or other forms of income, such as state subsidies, to provide the expected level and scope of welfare provisioning. In a second definition, a social insurance system is growth-dependent if it requires positive *real GDP growth* to provide the expected level and scope of welfare provisioning. In both definitions, the term *growth* is again understood in terms of general positive long-run growth rates. Whereas inner measures of growth do not consider potential distributional conflicts about the sources of contributions and state subsidies for pensions and health care, outer measures cover these distributional conflicts, for example between spending on unemployment benefits and social investments. This difference in the measuring unit of growth could lead to diverging assessments of growth dependence.

A system's *relevant functions or properties* further depend on the expectations that both the contributors and

beneficiaries have towards social insurance systems. These expectations are highly context-dependent and heterogeneous over time and space (Roosma et al. 2013; Wulfgramm and Starke 2016). The level of welfare provisioning through the social insurance system is determined by the scope of risks covered and by the recipient groups while the total expenditures are determined via the monetary cost of providing these benefits. Through these total costs, the level and scope of welfare provisioning expected from the system – its function – is connected to the growth rate upon which the system is dependent. Höpflinger (2010) and Petschow et al. (2020: 96–100) argue that, in Germany and other European countries, the pension system is furthermore growth-dependent with respect to what we term the inner unit of growth measurement, as demographic change (decreasing birth rates and increasing life expectancy) increases the costs of service provision expected from the pension system and thus requires growing contributions. Similar mechanisms apply to health insurance, with further complications resulting from cost-increasing technological developments and a potential Baumol's cost disease (Petschow et al. 2020: 99–100; Studer 2010). The design of the systems also matters. For example, Wiman (2024) shows how growth dependence differs across various pension plan types. Funded pension schemes, which rely on achieving sufficient rates of return on investment, are more likely to be growth-dependent than unfunded schemes, which work via redistribution of incomes from the current workforce.

In the case of social insurance systems, different specifications of the *functions or properties* of the social insurance system significantly influence the assessment of whether a growth dependence exists or not. As in the other cases, insurance systems and their growth dependence are politically determined in the sense that the system's level and scope of provisioning, as well as its revenue sources, are subject to political decision-making.

## Public finance

The belief that public finance is dependent on GDP growth is widespread, resulting in specific public finance policies. Many commentators assume that a certain level of GDP is required to “finance” a certain level of government expenditure, and that “debt sustainability” requires GDP growth rates at least on par with the interest rate on public debt. This concern is often raised by skeptics of post-growth (e.g. Pasche 2018; Pollin 2019), but shared also by some post-growth advocates (e.g. Salama 2023). However, no systematic scientific analysis known to us has substantiated these assumptions of a blanket growth dependence of public finance. More rigorous analysis starts with more precise definitions. Different specifications of the four elements in

our framework can yield varying notions of what growth dependence means in the case of public finance.

To illustrate, we present two different definitions. In a narrow legal definition, public finance is growth-dependent if a government is *unable to observe legal debt rules while providing adequate public services* in the absence of positive nominal GDP growth rates. This definition is used most often, implicitly or explicitly, in legal and policy-oriented economic scholarship (e.g. Blanchard et al. 2021; Pasche 2018; Wyplosz 2012). In a broader political-economic conception, public finance is growth-dependent if a government is *unable to provide an acceptable level and scope of public services, ensure low inflation and choose fiscal policies with politically accepted distributional outcomes* in the absence of positive real GDP growth. This definition and elements of it appear in both orthodox economics (e.g. Domar 1944) and ecological economics (Corlet Walker et al. 2021, 2024; Olk et al. 2023).

Public finance, the *system under investigation*, can be defined as the practices and policies that central and local governments use to govern their expenditures, revenues and debts. The *unit of growth measurement* can be specified as nominal or real GDP, depending on whether inflation is considered relevant to the functions of public finance. Accordingly, the term *growth* refers to a positive growth rate of nominal or real GDP being a requirement for the fulfillment of the system's specified functions. Finally, the *relevant functions* of public finance are context-dependent and politically contested, but typically include some tradeoff between macroeconomic stability, legal debt rules, distributional outcomes and the provision of public services.

The *functions* of public finance in the first definition are to provide adequate public goods and to observe legal constraints on the ratio of government deficits or debts to nominal GDP (e.g., the German and Swiss constitutional debt brakes or the Maastricht criteria). In a scenario where the interest rate on public debt is higher than the nominal GDP growth rate, the debt-to-GDP ratio grows even if the primary government budget is balanced (see Pasche 2018). Thus, nominal GDP growth at least on par with the interest rate is necessary to ensure that both functions of public finance – providing public goods and observing legal debt limits – can be fulfilled at the same time. Under the first definition and some further assumptions (see Pasche 2018), any public finance system with legal debt rules is growth-dependent in a scenario with positive nominal interest rates.

The second definition refers to broader political-economic *functions* of public finance, encompassing again the provision of adequate public goods, but also ensuring low and stable rates of inflation, and adopting fiscal policies whose distributional outcomes are politically acceptable. In a scenario where exogenous developments (for instance,

demographic change as explained above) require rising government expenditure to provide the same level of public goods as before, there must be either real GDP growth, inflation or contractionary fiscal policies. The reason is that higher government expenditure implies an increase in aggregate demand, which normally drives either expanding aggregate supply – that is, real GDP growth – or, if supply is constrained, inflation (see Olk et al. 2023). Fighting inflation may require politically unacceptable fiscal (and monetary) policies. In this scenario, there is a tradeoff between different functions of public finance: adequate public services, low inflation and acceptable fiscal policies. This tradeoff can be resolved only through real GDP growth.

## Discussion

The three examples point to a key insight for further research and policy design: It depends. Whether social-economic systems, such as labor markets, social insurance or public finance, are growth-dependent depends not only on the specific properties of these systems, but also on the choice of their operationalization. Research on growth (in)dependence and public debates about core issues surrounding the sustainability agenda could benefit immensely from coherently explicating the four elements included in this framework for the operationalization of growth dependence.

Beyond the previously discussed examples of labor markets, social insurance and public finance, the presented framework for operationalization could be applied to other underexplored areas, ranging from the stability of financial markets to distributional dynamics to the functioning of decentralized markets in a zero-growth economy. Relevant questions include: Does the stability of financial markets depend on real or expected economic growth rates (see Tokic 2012)? Under which conditions does inequality rise in a zero-growth economy, and specifically for which types of inequality (see Jackson and Victor 2016; Janischewski 2022)? These are only a few suggestions. Overall, we have kept our concept as open as possible to provide a framework for operationalization applicable to a wide range of cases of growth (in)dependence.

One notable complication is that growth dependencies do not exist in isolation because socio-economic systems are interrelated. It is therefore important to consider the interdependencies of socio-economic systems, which can also be researched separately, when analyzing society as a whole or when developing policies to reduce growth dependence on a societal level. For instance, increasing unemployment (the labor market system) as a result of absent GDP growth means that tax revenues decrease (the public finance system), while at the same time increasing the need for public

spending in the form of unemployment benefits (the social insurance system) (Hirvilammi 2020). In this respect, the growth dependence of one system (e.g., the labor market) can increase the growth dependence of other systems (e.g., social insurance and public finances). Similarly, policies in the context of employment, such as a green job guarantee, may help to address rising unemployment. At the same time, however, they can increase the requirements for public spending, which can intensify potential growth dependencies of the latter system. This example points to the importance of the above mentioned “society as a whole” level of observation, which, however, must be based on precise analyses of its respective subsystems.

## Conclusion

Growth dependencies in various socio-economic systems of modern societies are key barriers to achieving human flourishing without further destroying planetary ecosystems. However, dismantling such barriers requires certain analytical tools. To catalyze in-depth and comparative research of growth-dependent systems, which can inform policies to reduce growth dependence, we have introduced a general definition and a novel framework encompassing four elements: (1) the system under investigation, (2) the unit of growth measurement, (3) the meaning of “growth” and (4) the functions or properties of the system relevant for human well-being. Our illustrative discussion of labor markets, social insurance and public finance yields an important message about the possibility of appraising growth dependence: It depends on careful operationalization – different definitions can lead to different growth dependence assessments.

We have outlined the conceptual choices that respective theories of growth dependence are advised to consciously make. Thus, we provide a scientific basis for further explorations of growth dependence across various systems, supporting the interdisciplinary comparability of research findings. The framework forms a basis not only for (comparatively) analyzing existing socio-economic systems but also, crucially, for assessing the capacity of policy proposals to mitigate growth dependencies. Robust knowledge about the form and extent of growth dependencies is crucial to designing counter-measures – and thus a prerequisite for achieving and safeguarding socio-ecological sustainability.

## Appendix A

Non-comprehensive list of growth (in)dependence definitions and descriptions.

Defining statement on growth (in)dependence	Reference
Growth dependence	Bohnenberger & Fritz (2020, p. 4)
“By ‘dependent’ we mean that welfare systems require the continuation of economic growth in order to avoid significant negative social and economic consequences.”	Corlet Walker & Jackson (2021, p. 2)
“... modern economies have become ‘growth dependent’ in the sense that certain core aspects of human wellbeing become compromised when, for whatever reason, growth in the GDP is either hard to come by or is undesirable.”	Corlet Walker et al. (2021, p. 5)
“Growth dependence can be broadly thought of as those conditions that require the continuation of economic growth in order to avoid significant psychological, social, and economic harms (e.g. mass unemployment, poor health outcomes, etc.). The specific form that growth dependencies take varies from system to system.”	Corlet Walker et al. (2024, p. 2, original emphasis)
“To aid this task we begin with the following working definition of growth dependency: <i>Those conditions that require the continuation of growth in order to avoid significant physical, psychological, social, and/or economic harms.</i> ”	Petschow et al. (2020, p. 91)
“In this discussion paper we define as growth-dependent those areas of society, structures, institutions, etc. ▶ that fulfil a socially desirable function, or that contribute to a widely socially accepted objective and ▶ whose functional capacity or contribution under the present framework conditions depends on the economy growing continually.”	Schmid (2021, p. 65)
“Economic structures, social institutions and even the subjects of capitalist societies are fundamentally oriented towards growth and can therefore only be ‘dynamically stabilised’.... In other words, institutions, infrastructures and subjectivities can only be maintained in their prevailing constitution by continued growth.”	Wagner & Lange (2021, p. 44)
“One reason is that several societal areas are growth-dependent. These areas fulfil a socially desirable function and contribute to an important societal goal. But under current conditions, their functionality and contribution to society depend on continuous economic growth .....	Wiman (2024, p. 2, original emphasis)
“... adverse economic effects from the end of growth or the abandonment of a growth assumption, indicating growth dependence.”	

Non-comprehensive list of growth (in)dependence definitions and descriptions.

Defining statement on growth (in)dependence	Reference
Growth independence	Gebauer (2018), p. 232)
“To that end, an entirely different mode of production and consumption is deemed necessary, which requires a fundamental transformation of the growth-based societal and economic institutions, mindsets, and infrastructures .... Economic growth, ultimately, would no longer be the structurally fixed and culturally engrained necessary condition for economic stability and human wellbeing ....”	
“An important idea here among post-growth theorists is that of ‘growth independence’ .... It is recognised that many social benefits (notably employment, pensions and public services) are currently dependent on growth for their achievement and improvement. So a key policy goal is to make such benefits independent of growth.”	Likaj et al. (2022, p. 27)
“Growth independence can be defined as the ability of a society, including its economy and its institutions, to continue to fulfil its functions, but not to be existentially dependent on economic growth ....”	Mayer et al. (2021, p. 219)
“A degrowth society is a society that, through a democratic process, transforms its institutions and infrastructures so that they are <i>not dependent on growth and continuous expansion</i> for their functioning.”	Schmelzer et al. (2022, p. 206, original emphasis)
“Growth independence is not understood as the opposite of growth, namely shrinking. We rather adopt the meaning established in the post-growth literature ....: the ability of a society including its economy and its institutions to continue to fulfil its functions but no longer to be existentially dependent on economic growth .... Basic social and economic functions include safeguarding livelihoods, participation in society for all, basic infrastructure and healthcare.”	Tschumi et al. (2021, p. 119)
“Environmental policies possibly leading to a decline in economic growth threaten the viability of these areas. Shaping the latter in a way that they can fulfil their socially desirable function even if the economy is not growing would release environmental policies from any reservations regarding limiting growth. In other words, establishing growth-independent areas is necessary if Germany, and other developed countries are to be steered onto a path towards staying within planetary boundaries.”	Wagner & Lange (2021, p. 44)

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## Declarations

**Conflict of interest** The authors have no competing interests to declare that are relevant to the content of this article.

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## References

- Alcott B (2013) Should degrowth embrace the job guarantee? *J Clean Prod* 38:56–60. <https://doi.org/10.1016/j.jclepro.2011.06.007>
- Antal M (2014) Green goals and full employment: are they compatible? *Ecol Econ* 107:276–286. <https://doi.org/10.1016/j.ecolecon.2014.08.014>
- Antal M, van den Bergh JCJM (2013) Macroeconomics, financial crisis and the environment: strategies for a sustainability transition. *Environ Innov Societal Transitions* 6:47–66. <https://doi.org/10.1016/j.eist.2013.01.002>
- Aronoff K, Battistoni A, Cohen DA, Riofrancos T (2019) A planet to win: why we need a Green New Deal. Verso, London
- Ayres RU, Campbell CJ, Casten TR, Horne PJ et al (2013) Sustainability transition and economic growth enigma: money or energy? *Environ Innov Societal Transitions* 9:8–12. <https://doi.org/10.1016/j.eist.2013.09.002>
- Baccaro L, Hadziabdic S (2024) Operationalizing growth models. *Qual Quant* 58(2):1325–1360. <https://doi.org/10.1007/s11135-023-01685-w>
- Ball L, Leigh D, Loungani P (2017) Okun's law: fit at 50? *J Money Credit Bank* 49(7):1413–1441. <https://doi.org/10.1111/jmcb.12420>
- Bassanini A, Scarpetta S (2001) The driving forces of economic growth: panel data evidence for the OECD countries. *OECD Economic Studies* 33(2):9–56.
- Binswanger HC (2006) Die Wachstumsspirale: Geld, Energie und Imagination in der Dynamik des Marktprozesses. Metropolis, Marburg
- Binswanger M (2019) Der Wachstumszwang: Warum die Volkswirtschaft immer weiter wachsen muss, selbst wenn wir genug haben. Wiley, Weinheim
- Blanchard O, Leandro A, Zettelmeyer J (2021) Redesigning EU fiscal rules: from rules to standards. *Econ Policy* 36(106):195–236
- Bohnenberger K (2023) Peaks and gaps in eco-social policy and sustainable welfare: a systematic literature map of the research landscape. *Eur J Soc Secur* 25(4):328–346. <https://doi.org/10.1177/13882627231214546>
- Bohnenberger K, Fritz M (2020) Making welfare resilient: creating stable & sustainable welfare systems in times of declining economic growth. Transformation Policy Brief #2. ZOE-Institute for future-fit economies
- Büchs M (2021) Sustainable welfare: independence between growth and welfare has to go both ways. *Glob Soc Policy* 21(2):323–327. <https://doi.org/10.1177/14680181211019153>
- Büchs M, Koch M (2019) Challenges for the degrowth transition: the debate about wellbeing. *Futures* 105:155–165. <https://doi.org/10.1016/j.futures.2018.09.002>
- Campante F, Sturzenegger F, Velasco A (2021) Advanced macroeconomics: an easy guide. LSE Press, London
- Christophers B (2011) Making finance productive. *Econ Soc* 40(1):112–140. <https://doi.org/10.1080/03085147.2011.529337>
- Clegg D (2018) Central European welfare states. In: Greve B (ed) *Routledge handbook of the welfare state*, 2nd edn. Taylor & Francis, London, pp 137–147
- Conteh K (2021) Economic growth and unemployment: an empirical assessment of okun's law in the case of Liberia (2001–2019). *J Econ Sustain Dev* 12(40):136–145. <https://doi.org/10.7176/JESD/12-14-13>
- Corlet Walker C, Druckman A, Jackson T (2021) Welfare systems without economic growth: a review of the challenges and next steps for the field. *Ecol Econ* 186:107066. <https://doi.org/10.1016/j.ecolecon.2021.107066>
- Corlet Walker C, Druckman A, Jackson T (2024) Growth dependency in the welfare state – an analysis of drivers in the UK's adult social care sector and proposals for change. *Ecol Econ* 220:108159. <https://doi.org/10.1016/j.ecolecon.2024.108159>
- Corlet Walker C, Jackson T (2021) Tackling growth dependency—the case of adult social care. CUSP Working Paper No 28. Centre for the Understanding of Sustainable Prosperity, University of Surrey
- Costanza R (2022) Addicted to growth: societal therapy for a sustainable wellbeing future. Routledge, Abingdon
- Daly H (2019) Growthism: its ecological, economic and ethical limits. *real-world Econ Rev* 87:9–22
- Domar ED (1944) The burden of the debt and the national income. *Am Econ Rev* 34(4):798–827
- Douthwaite RJ (1992) The growth illusion: how economic growth has enriched the few, impoverished the many, and endangered the planet. Green Books in association of Lilliput, Bideford
- Duflot R, Baumeister S, Burgas D et al (2021) Building up an ecologically sustainable and socially desirable post-COVID-19 future. *Sustain Sci* 16(4):1397–1403. <https://doi.org/10.1007/s11625-021-00940-z>
- EEA (2021) Reflecting on green growth: creating a resilient economy within environmental limits. European Environment Agency, Copenhagen. <https://www.eea.europa.eu/publications/reflecting-on-green-growth>
- Elder-Vass D (2007) Luhmann and emergentism: competing paradigms for social systems theory? *Philos Soc Sci* 37(4):408–432. <https://doi.org/10.1177/0048393107307660>
- Felber C (2015) Change everything: creating an economy for the common good. Zed Books, London
- Ferguson P (2016) Productivity growth as a barrier to a sustainability transition. *Environ Innov Societal Transit* 20:86–88. <https://doi.org/10.1016/j.eist.2015.10.003>
- Frayne D (2015) The refusal of work: the theory and practice of resistance to work. Zed Books, London
- Garland D (2014) The welfare state: a fundamental dimension of modern government. *Eur J Sociol / Archives Européennes De Sociologie* 55(3):327–364. <https://doi.org/10.1017/S0003975614000162>
- Gebauer J (2018) Towards growth-independent and post-growth-oriented entrepreneurship in the SME sector. *Manage Revue* 29(3):230–256. <https://doi.org/10.5771/0935-9915-2018-3-230>
- Gómez-Baggethun E, Naredo JM (2015) In search of lost time: the rise and fall of limits to growth in international sustainability policy. *Sustain Sci* 10(3):385–395. <https://doi.org/10.1007/s11625-015-0308-6>
- Gough I (2019) Universal basic services: a theoretical and moral framework. *Political Q* 90(3):534–542. <https://doi.org/10.1111/1467-923X.12706>
- Gräbner-Radkowsch C, Strunk B (2023) Degrowth and the Global South: the twin problem of global dependencies. *Ecol Econ* 213:107946. <https://doi.org/10.1016/j.ecolecon.2023.107946>
- Gumbert T, Mamut P, Fuchs D, Welck T (2022) Sustainable consumption and the power of economic growth: exploring alternatives to the growth-dependency narrative. *Consum Soc* 1(2):273–293. <https://doi.org/10.1332/JPPD7512>
- Haberl H, Wiedenhofer D, Virág D et al (2020) A systematic review of the evidence on decoupling of GDP, resource use and GHG emissions, part II: synthesizing the insights. *Environ Res Lett* 15(6):065003. <https://doi.org/10.1088/1748-9326/ab842a>

- Hickel J, Kallis G (2020) Is green growth possible? *New Polit Econ* 25(4):469–486. <https://doi.org/10.1080/13563467.2019.1598964>
- Hirvilammi T (2020) The virtuous circle of sustainable welfare as a transformative policy idea. *Sustainability* 12(1):391. <https://doi.org/10.3390/su12010391>
- Hodgson GM (2006) What are institutions? *J Econ Issues* 40(1):1–25. <https://doi.org/10.1080/00213624.2006.11506879>
- Höpfinger F (2010) Alterssicherungssysteme: Doppelte Herausforderung von demographischer Alterung und Postwachstum. In: Seidl I, Zahrt A (eds) *Postwachstumsgesellschaft: Konzepte für die Zukunft*. Metropolis, Marburg, pp 53–63
- Horcea-Milcu AI, Abson DJ, Apetrei CI et al (2019) Values in transformational sustainability science: four perspectives for change. *Sustain Sci* 14(5):1425–1437. <https://doi.org/10.1007/s11625-019-00656-1>
- Jackson T (2016) *Prosperity without growth: foundations for the economy of tomorrow*, 2nd edition. Routledge, Abingdon
- Jackson T (2018) *The post-growth challenge: secular stagnation, inequality and the limits to growth*, CUSP Working Paper No 12, University of Surrey. [www.cusp.ac.uk/publications](http://www.cusp.ac.uk/publications)
- Jackson T, Victor P (2011) Productivity and work in the “green economy”: some theoretical reflections and empirical tests. *Environ Innov Societal Transit* 1(1):101–108. <https://doi.org/10.1016/j.eist.2011.04.005>
- Jackson T, Victor PA (2016) Does slow growth lead to rising inequality? Some theoretical reflections and numerical simulations. *Ecol Econ* 121:206–219. <https://doi.org/10.1016/j.ecolecon.2015.03.019>
- Janischewski A (2022) Inequality, non-linear consumption behaviour, and monetary growth imperatives. *Eur J Econ Economic Policies Intervention* 19(1):61–88. <https://doi.org/10.4337/ejeep.2022.01.06>
- Kallis G, Kalush M, O’Flynn H et al (2013) “Friday off”: reducing working hours in Europe. *Sustainability* 5(4):1545–1567. <https://doi.org/10.3390/su5041545>
- Käyrä M, Kuhmonen I (2024) Institutionalising degrowth regime: a review and analysis of degrowth transition proposals. *Sustain Sci* 19(6):2135–2150. <https://doi.org/10.1007/s11625-024-01566-7>
- Kettner M, Vogel T (2021) Sachzwänge in der kapitalistischen Ökonomie. Ihre Strukturen und Ambivalenzen. *Z für Wirtschafts- und Unternehmensethik* 22(2):287–311. <https://doi.org/10.5771/1439-880X-2021-2-287>
- Keyßer L, Steinberger J, Schmelzer M (2025) Economic growth dependencies and imperatives: a review of key theories and their conflicts. *Ecol Econ* 238:108745
- Koch M (2022) Social policy without growth: moving towards sustainable welfare states. *Soc Policy Soc* 21(3):447–459. <https://doi.org/10.1017/S1474746421000361>
- Kohler K, Stockhammer E (2022) Growing differently? Financial cycles, austerity, and competitiveness in growth models since the Global Financial Crisis. *Rev Int Polit Econ* 29(4):1314–1341. <https://doi.org/10.1080/09692290.2021.1899035>
- Köppel A, Schratzenstaller M (2021) An employment-friendly tax system. In: Seidl I, Zahrt A (eds) *Post-growth work: employment and meaningful activities within planetary boundaries*. Routledge, Abingdon, pp 160–175
- Kortetmäki T, Timmermann C, Tribaldos T (2025) Just transition boundaries: clarifying the meaning of just transition. *Environ Innov Soc Transitions* 55:100957. <https://doi.org/10.1016/j.eist.2024.100957>
- Lamb W, Steinberger J (2017) Human well-being and climate change mitigation. *WIREs Clim Change* 8(6):e485. <https://doi.org/10.1002/wcc.485>
- Landefeld JS, Seskin EP, Fraumeni BM (2008) Taking the pulse of the economy: measuring GDP. *J Econ Perspect* 22(2):193–216. <https://doi.org/10.1257/jep.22.2.193>
- Lange S (2018) *Macroeconomics without growth: sustainable economies in neoclassical, Keynesian and Marxian theories*. Metropolis, Marburg
- Lange S (2022) *Digitalization and growth independence: utilizing technologies for environmental and economic resilience*. ECDF Working Paper Ser #004. Einstein Center Digital Future, Berlin. <https://doi.org/10.14279/DEPOSITONCE-16550>
- Leoni D (2024) *Post-growth and the North-South divide: a post-Keynesian stock-flow consistent analysis*. PhD diss., University of Surrey
- Likaj X, Jacobs M, Fricke T (2022) Growth, degrowth or post-growth? Towards a synthetic understanding of the growth debate, Research Report No. 02/2022, Basic Papers. <https://www.econstor.eu/handle/10419/281436>
- Luhmann N (1995) *Social systems*. Stanford University Press, Stanford, CA
- Malmæus JM, Alfredsson EC (2017) Potential consequences on the economy of low or no growth - short and long term perspectives. *Ecol Econ* 134:57–64. <https://doi.org/10.1016/j.ecolecon.2016.12.011>
- Mayer J (2017) How could the South respond to secular stagnation in the north? *World Econ* 40(2):314–335. <https://doi.org/10.1111/twec.12389>
- Mayer H, Tschumi P, Perren R, Seidl I, Winiger A, Wirth S (2021) How do social innovations contribute to growth-independent territorial development? Case studies from a Swiss mountain region. *DIE ERDE – Journal of the Geographical Society of Berlin* 152(4):218–231. <https://doi.org/10.12854/erde-2021-592>
- Meadows DH (2008) *Thinking in systems: A primer*. Chelsea green publishing, Hartford
- Mele C, Pels J, Polese F (2010) A brief review of systems theories and their managerial applications. *Serv Sci* 2(1–2):126–135. <https://doi.org/10.1287/serv.2.1.2.126>
- Morel N, Palme J (2018) Financing the welfare state and the politics of taxation. In: Greve B (ed) *Routledge handbook of the welfare state*, 2nd edn. Routledge, Abingdon, pp 467–476
- O’Neill DW (2012) Measuring progress in the degrowth transition to a steady state economy. *Ecol Econ* 84:221–231. <https://doi.org/10.1016/j.ecolecon.2011.05.020>
- Oberholzer B (2023) Post-growth transition, working time reduction, and the question of profits. *Ecol Econ* 206:107748. <https://doi.org/10.1016/j.ecolecon.2023.107748>
- Obinger H (2021) Social expenditure and welfare state financing. In: Bèland D, Leibfried S, Morgan KJ et al (eds) *The Oxford handbook of the welfare state*, 2nd edn. Oxford University Press, Oxford, pp 453–472
- Olk C, Schneider C, Hickel J (2023) How to pay for saving the world: Modern Monetary Theory for a degrowth transition. *Ecol Econ* 214:107968. <https://doi.org/10.1016/j.ecolecon.2023.107968>
- Ostrom E (1986) An agenda for the study of institutions. *Public Choice* 48(1):3–25. <https://doi.org/10.1007/BF00239556>
- Parrique T, Barth J, Briens F et al (2019) Decoupling debunked: evidence and arguments against green growth as sole strategy for sustainability. European Environmental Bureau, Brussels. <https://eeb.org/wp-content/uploads/2019/07/Decoupling-Debunked.pdf>
- Pasche M (2018) Degrowth and sustainable public finance, MPRA pre-print. <https://mpra.ub.uni-muenchen.de/87109/>
- Pettifor A (2019) *The case for the green new deal*. Verso, London
- Petschow U, Lange S, Hofmann D et al (2020) Social well-being within planetary boundaries: the precautionary post-growth approach. *TEXTE* 234/2020. Umweltbundesamt, Dessau-Roßlau [https://www.umweltbundesamt.de/sites/default/files/medien/5750/publikationen/2020\\_12\\_14\\_texte\\_234-2002\\_precautionary\\_post-growth.pdf](https://www.umweltbundesamt.de/sites/default/files/medien/5750/publikationen/2020_12_14_texte_234-2002_precautionary_post-growth.pdf)

- Pollin R (2019) Advancing a viable global climate stabilization project: degrowth versus the green new deal. *Rev Radical Political Econ* 51(2):311–319. <https://doi.org/10.1177/0486613419833518>
- Raworth K (2017) *Doughnut economics: seven ways to think like a 21st-century economist*. Random House, New York
- Richters O, Siemoneit A (2019) Growth imperatives: substantiating a contested concept. *Struct Change Econ Dyn* 51:126–137. <https://doi.org/10.1016/j.strueco.2019.07.012>
- Robeyns I (2017) Wellbeing, freedom and social justice: the capability approach re-examined. Open Book Publishers, Cambridge
- Romer PM (1990) Endogenous technological change. *J Polit Econ* 98(5):71–102
- Roosma F, Gelissen J, van Oorschot W (2013) The multidimensionality of welfare state attitudes: a European cross-national study. *Soc Indic Res* 113(1):235–255. <https://doi.org/10.1007/s11205-012-0099-4>
- Rosa H (2012) *Beschleunigung. Die Veränderung der Zeitstrukturen in der Moderne*, 9th edition. Suhrkamp, Frankfurt a. M.
- Rosa H (2016) *Resonanz: Eine Soziologie der Weltbeziehung*. Suhrkamp, Berlin
- Rosa H, Dörre K, Lessenich S (2017) Appropriation, activation and acceleration: the escalatory logics of capitalist modernity and the crises of dynamic stabilization. *Theory Cult Soc* 34(1):53–73. <https://doi.org/10.1177/0263276416657600>
- Rothgang H (2010) Social insurance for long-term care: an evaluation of the German model. *Soc Policy Adm* 44(4):436–460. <https://doi.org/10.1111/j.1467-9515.2010.00722.x>
- Rydin Y (2013) *The future of planning: beyond growth dependence*. Bristol University Press, Bristol
- Sahle M, Lahoti SA, Lee SY et al (2025) Revisiting the sustainability science research agenda. *Sustain Sci* 20(1):1–19. <https://doi.org/10.1007/s11625-024-01586-3>
- Salama J (2023) Financing the post-growth state. *Degrowth Journal*: 1. <https://doi.org/10.36399/Degrowth.001.01.17>
- Schmelzer M (2015) The growth paradigm: history, hegemony, and the contested making of economic growthmanship. *Ecol Econ* 118:262–271. <https://doi.org/10.1016/j.ecolecon.2015.07.029>
- Schmelzer M, Vetter A, Vansintjan A (2022) *The future is degrowth: a guide to a world beyond capitalism*. Verso, London
- Schmid B (2021) Spatial strategies for a post-growth transformation. In: Lange B, Hülz M, Schmid B, Schulz D (eds) *Post-Growth Geographies*. transcript Verlag, Bielefeld, pp 61–83
- Seidl I, Zahrt A (2010) *Postwachstumsgesellschaft: Konzepte für die Zukunft*. Metropolis, Marburg
- Semieniuk G (2024) Inconsistent definitions of GDP: implications for estimates of decoupling. *Ecol Econ* 215:108000. <https://doi.org/10.1016/j.ecolecon.2023.108000>
- Sögner L, Stiasny A (2002) An analysis on the structural stability of okun's law—a cross-country study. *Appl Econ* 34(14):1775–1787. <https://doi.org/10.1080/00036840210124180>
- Solow RM (1956) A contribution to the theory of economic growth. *Q J Econ* 70(1):65–94. <https://doi.org/10.2307/1884513>
- Strunz S, Schindler H (2018) Identifying barriers toward a post-growth economy – a political economy view. *Ecol Econ* 153:68–77. <https://doi.org/10.1016/j.ecolecon.2018.06.017>
- Studer HP (2010) Gesundheitswesen als kosteneffizientes Solidarsystem mit Eigenverantwortung. In: Seidl I, Zahrt A (eds) *Postwachstumsgesellschaft: Konzepte für die Zukunft*. Metropolis, Marburg, pp 65–75
- Tan EC, Tang CF (2013) The extent of growth dependence of selected East Asian economies on the USA. *Glob Econ Rev* 42(1):43–54. <https://doi.org/10.1080/1226508X.2013.769802>
- ten Hacken, P (2015) Terms and specialized vocabulary: taming the prototypes. In: Kockaert HJ, Steurs F (eds) *Handbook of Terminology*, Vol. 1. John Benjamins Publishing, Amsterdam, pp 3–13
- Teulings C, Baldwin R (eds) (2014) *Secular stagnation: facts, causes and cures*. CEPR Press, London
- Tokic D (2012) The economic and financial dimensions of degrowth. *Ecol Econ* 84:49–56. <https://doi.org/10.1016/j.ecolecon.2012.09.011>
- Trebeck K, Williams J (2019) *The Economics of Arrival: Ideas for a Grown-Up Economy*. Policy Press, Bristol
- Tschumi P, Winiger A, Wirth S et al (2021) Growth independence through social innovations? An analysis of potential growth effects of social innovations in a Swiss mountain region. In: Lange B, Hülz M, Schmid B, Schulz C (eds) *Post-growth geographies: spatial relations of diverse and alternative economies*. transcript Verlag, Bielefeld, pp 115–135
- van den Bergh JCM (2017) A third option for climate policy within potential limits to growth. *Nat Clim Chang* 7(2):107–112. <https://doi.org/10.1038/nclimate3113>
- Vogel J, Guerin G, O'Neill DW, Steinberger JK (2024) Safeguarding livelihoods against reductions in economic output. *Ecol Econ* 215:107977. <https://doi.org/10.1016/j.ecolecon.2023.107977>
- Wagner J, Lange S (2021) Towards digital growth-independent societies. *Ökologisches Wirtschaften* 36(01):44–48. <https://doi.org/10.14512/OEWO360144>
- Walker LO, Avant KC (2019) *Strategies for theory construction in nursing*, 6th edition. Pearson, New York
- Weeks K (2011) *The problem with work: feminism, Marxism, anti-work politics, and postwork imaginaries*. Duke University Press, New York
- Wiman L (2024) Are pensions “growth-dependent”? *Sustain Sci Pract Policy* 20(1):2372874. <https://doi.org/10.1080/15487733.2024.2372874>
- Wulfgramm M, Starke P (2016) Divided by the market, divided by the state: distribution, redistribution and welfare attitudes in 47 countries. *Scand Polit Stud* 40(1):1–27. <https://doi.org/10.1111/1467-9477.12078>
- Wyplosz C (2012) Fiscal rules: Theoretical issues and historical experiences. In: Alesina A, Giavazzi F (eds) *Fiscal policy after the financial crisis*. University of Chicago Press, pp 495–525

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## Authors and Affiliations

Anja Janischewski<sup>1</sup>  · Katharina Bohnenberger<sup>2,3</sup> · Matthias Kranke<sup>4</sup> · Tobias Vogel<sup>5</sup> · Riwan Driouich<sup>6,7</sup> · Tobias Froese<sup>8</sup> · Stefanie Gerold<sup>9</sup> · Raphael Kaufmann<sup>10</sup> · Lorenz Keyßer<sup>11</sup> · Jannis Niethammer<sup>12</sup> · Christopher Olk<sup>13</sup> · Matthias Schmelzer<sup>14</sup> · Aslı Yürük<sup>15</sup> · Steffen Lange<sup>16</sup>

✉ Anja Janischewski  
anja.janischewski@wiwi.tu-chemnitz.de

<sup>1</sup> Faculty of Economics and Business Administration, Chemnitz University of Technology, Thüringer Weg 7, 09126 Chemnitz, Germany

<sup>2</sup> Institute of Social Ecology, BOKU University, Schottenfeldgasse 29, Vienna 1070, Austria

<sup>3</sup> Institute for Socio-Economics, University of Duisburg-Essen, Lotharstraße 65, 47057 Duisburg, Germany

<sup>4</sup> College for Social Sciences and Humanities of the University Alliance Ruhr, Faculty of Social Sciences, University of Duisburg-Essen, Lindenallee 39–41, 45127 Essen, Germany

<sup>5</sup> Faculty of Philosophy and Educational Research, Ruhr-University Bochum, Universitätsstraße 150, 44801 Bochum, Germany

<sup>6</sup> Institut de Ciència i Tecnologia Ambientals (ICTA), Universitat Autònoma de Barcelona (UAB), Placa cívica, Bellaterra, 08193 Barcelona, Spain

<sup>7</sup> Institut de Recherche Interdisciplinaire sur les enjeux Sociaux (IRIS), Unité Mixte de Recherche EHESS, CNRS, INSERM, Université Sorbonne Paris Nord, Paris, France

<sup>8</sup> Chair for Corporate Sustainability, ESCP Business School, Heubnerweg 8–10, 14059 Berlin, Germany

<sup>9</sup> Institute of Philosophy and Social Sciences, Brandenburg University of Technology Cottbus-Senftenberg, Erich-Weinert-Straße 1, 03046 Cottbus, Germany

<sup>10</sup> ZOE Institute for Future-Fit Economics, Norbertstraße 31, 50670 Cologne, Germany

<sup>11</sup> Institute of Geography and Sustainability, Faculty of Geosciences and Environment, University of Lausanne, Moline - Géopolis, Lausanne CH - 1015, Switzerland

<sup>12</sup> ICLEI European Secretariat, Leopoldring 3, 79098 Freiburg im Breisgau, Germany

<sup>13</sup> Otto Suhr Institute for Political Science, Freie Universität Berlin, Altensteinstraße 33, 14195 Berlin, Germany

<sup>14</sup> Norbert-Elias-Center for Transformation Design and Research, University of Flensburg, Auf dem Campus 1b, 24943 Flensburg, Germany

<sup>15</sup> Urban Transformation and Global Change Laboratory (TURBA), Universitat Oberta Catalunya, Rambla del Poblenou, 154 Sant Martí, 08018 Barcelona, Spain

<sup>16</sup> Centre for Pluralist Economics, University of Siegen, Kohlbettstraße 17, 57072 Siegen, Germany