# Chapter 15
# Deceitful Decoupling: Misconceptions of a Persistent Myth

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## 15.1 Introduction

The long-standing tension revolving around the "possibility of decoupling" among the green growth versus post/de-growth narratives has muddied the waters of tackling the climate crisis we are currently facing. These “decoupling wars” (Jackson & Victor, 2019) have, on the one hand, been seeking to answer whether reductions in resource and energy use and respective emissions are possible without modifying our accustomed growth trajectories. On the other hand, post/de-growth narratives argue for doing things differently: urging for the reconsideration of a reduction of resource and energy dependency as objective in itself, valuing collective well-being (People’s Conference on Climate Change and the Rights of Mother Earth, 2010) instead of indicators such as GDP as a metric to be maximised (Costanza et al., 2014; van den Bergh, 2009) on a resource-constrained planet.

The recent COVID-19 pandemic has resurfaced the debate yet once again, creating yet another bifurcation in the road. The question remains on whether we can achieve a post-COVID-19 green economic recovery (UNEP, 2020) based on assumptions of efficiency and decoupling while re-growing; confronted with movements mirrored by globalised Fridays for Future or Extinction Rebellion[1] urging for

[1]Youth movement since August 2018, stemming from the actions of Gretha Thunberg and other youth activists, drawing attention to the climate crisis and reclaiming their future https://fridaysforfuture.org/ and Extinction Rebellion https://rebellion.earth/

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S. Villamayor-Tomas, R. Muradian (eds.), *The Barcelona School of Ecological Economics and Political Ecology*, Studies in Ecological Economics 8,
https://doi.org/10.1007/978-3-031-22566-6_15

profound transformation in the way things are done to tackle the ecological emergency and breakdown (Monbiot, 2018).

The debate, albeit has occupied the agenda over decades in the form of the infamous Environmental Kuznets Curve (EKC) (Kuznets, 1955; Stern, 2004)[2] and the IPAT formula[3] advocating for the possibility of a green economy. Such claims, attempting to overcome "limits to growth" (Meadows et al., 1972) or the "spaceship earth" (Boulding, 1966) claustrophobia, have been contested by many scholars and the ecological economics community (Martinez-Alier, 1995, 2012). Affluence, capital accumulation (Hornborg, 1998, 2009), and accumulation by dispossession (Harvey, 2004) indeed occupy a significant role in shaping our interactions between socio-economic systems and the environment (Scheidel et al., 2018). Materials and energy flows (Fischer-Kowalski & Amann, 2001) help self-organise, maintain and develop internal functions and structures of societies forming the backbone of our societal metabolisms (Giampietro et al., 2011; Şorman, 2014). Nevertheless, societal metabolisms have associated socio-ecological interdependencies, mostly stemming from the unequal distribution of ecological goods and services (Martínez-Alier, 2002). Studies indicate that even if the metabolisms of industrial countries were kept stable at 2000 levels, for the rest of the world to catch up would result in a quadrupling of global emissions by 2050 (Fischer-Kowalski et al., 2011). Moreover, the evolution of the global North-South (McGregor & Hill, 2009) divide has reinforced commodity chains and extraction frontiers (Martinez-Alier et al., 2010), manifestations of exploitative labour and trade relationships (Hornborg, 2020) surfacing via contentious political processes and powerful multilateral institutions. Therefore, as previously argued, the win-win promise of a "sustainability" scenario of letting humankind "*have our cake and eat it*" (Rees, 1990, p. 435) has not been achieved in the last 30 years, despite all goodwill and green growth promises with a decoupling intent.

The decoupling debate reappeared over the years in the form of eco-efficiency, eco-innovation, and the circular economy, fostering sustainable consumption, especially relevant in the European Union's Action Plans (EU Circular Economy Action Plan, 2020). The European Green Deal (EGD),[4] for example, aims to radically transform economic activities to make substantial progress towards creating a circular economy. However, full circularity is unattainable since there is entropic decay in materials, as discussed in further detail in Sect. 15.4. Moreover, the same notion is engraved within the Sustainable Development Goals (SDGs), where "Decent Work and Economic Growth" (Goal 8) (United Nations, 2020), although inclusive

[2] A hypothesis suggesting that countries follow an inverted U-shaped pathway, suggesting that environmental degradation occurs in the early stages of development; yet as income rises and countries become more affluent, environmental conditions improve. For a critique of the rise and fall of the EKC, see (Stern, 2004).

[3] Where Environmental impact (I) is expressed and directly proportional to population (P), affluence (A), and technology (T).

[4] https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en

and sustainable in principle, base their premise on an ever-increasing pie of economic growth. However, the Barcelona School of ecological economics has long contested that developing growth-oriented policies around the expectation that decoupling is or will be possible has been a misleading policy while also criticising the use of GDP as a proxy for well-being (Ward et al., 2016). Recently, Hickel and Kallis (2020) have once again claimed that green growth is a misguided objective; that absolute decoupling from carbon emissions is highly unlikely to be achieved at a rate rapid enough to prevent global warming over 1.5 °C or 2 °C, even under favourable policy conditions.

In essence, decoupling has a foundational role within the Barcelona School of Ecological Economics and Political Ecology. First, due to the lack of evidence in absolute decoupling between resource and energy dependency and growth (Parrique et al., 2019), there is a crucial need to look at "*how the world operates*" and rethink alternative pathways of living within planetary boundaries. This calls for new ways of doing economics which interrogates economic processes limited by biophysical constraints both on the supply side in terms of resources and the sink side recognising environmental limits from the local to the global. Second, decoupling (and its lack thereof) calls for scrutinising embedded societal relations that interrogate "*why we do what we do*" that cover socio-political factors such as power dynamics, institutional arrangements, cultural variables, and economic and financial drivers. These questions also explore the unequal access to and distribution of goods and services, benefits, and burdens (Robbins, 2011) while inquiring into participation and decision-making mechanisms over how the world's resources are (un)used. Third, the absence of decoupling also calls for deliberation over individual and collective action on "*how we envision alternative imaginaries*" in post normal times (Funtowicz & Ravetz, 1993). This means creating spaces and opening up the discussion for new actors and different futures departing from the business as usual growth-based scenarios.

Along my academic journey – deeply rooted in the Barcelona school Ecological Economics and Political Ecology – I try to scrutinise these notions of decoupling, having closely worked on *energy metabolism*, the study of energy flows that are required to sustain societies; *energy justice* calling for a re-evaluation of ethical and gender concerns in energy decision making and my research on *energy cultures*, delving deeper on role individual and collective behaviour toward energy in transformational research and action.

In the remainder of this chapter, Sect. 15.2 focuses on the different concepts of decoupling and system boundaries; Sect. 15.3 reviews and synthesises further empirical evidence that analyses trends of decoupling both in terms of resources and emissions; Sect. 15.4 dissects claims for a circular economy and rebound effects, a phenomenon closely observed during the COVID-19 global pandemic that goes hand in hand with the decoupling narrative; Sect. 15.5 wraps up the discussion of decoupling as a deceitful narrative that is prolonged as a persistent myth hindering genuine systemic and transformative change.

## 15.2 Different Decoupling Concepts and Accounting Mechanisms

Decoupling is typically categorised based on environmental pressures stemming from the production side, referring to *resource decoupling* including materials, energy, and the less obvious water; and the impact side of our actions framed around *impact decoupling* including greenhouse gasses, land, water pollutants, and biodiversity loss (Parrique et al., 2019).

*Relative (or weak) decoupling* indicates that the rate at which materials, energy use, or emissions increase is lower than the rate at which GDP increases (Burton, 2015), or in other terms that the economic growth outpaces environmental impact. Although this may seem like a favourable veneer, it still maps out as extractivism or greenhouse gases accumulating in the atmosphere, beating our overall target to tackle climate change and live within our ecological boundaries in the long run. Already, the UNEP emissions gap report indicates (UNEP, 2019) that now in 2020, we need to reduce emissions by 7.6% per annum globally every year until 2030; otherwise, limiting global warming to 1.5 °C will be a missed chance (see also (Patterson et al., 2018)). Similarly, the Production Gap Report (SEI et al., 2019), assessing the world's current pace of fossil fuel extraction to align with Paris Agreement goals, indicates that the world is to produce far more coal, oil, and gas than is consistent with limiting warming to 1.5 °C or 2 °C, creating a "production gap" that makes climate goals much harder to reach.

*Absolute (or strong) decoupling,* on the other hand, claims that economic performance behaves independently from material or energy extraction or emissions. Newer terms extending the potential boundaries and glossary definitions of decoupling have also been defined such as "*virtual decoupling*" (Moreau & Vuille, 2018) referring to developed countries outsourcing intensive industrial production chains to lesser developed countries, also known as the carbon leakage phenomena. The role of increased "tertiarisation" (or dematerialisation through services) (Heiskanen & Jalas, 2000) as a complementary angle also shifts attention given to emissions, with the know-how (immaterial) sectors occupying a greater weight in the composition of the more "developed" economies. Vadén et al. (2020) also argue that relationships between resources and emissions decoupling might not be so straightforward and linear; such that there may be instances of material efficiency (Schandl et al., 2016) or a boost in "financialisation" (the role and weight of the financial sphere within the economy) (Kovacic et al., 2018), which may all lead to somewhat decoupling with very different implications.

In terms of accounting for impact, discussions center around shifting current accounting mechanisms[5] from one based on *territorial emissions* (production-based accounting with GHG emissions assigned based on the source localisation) to one based on a *consumption-based accounting* (CBA) (Lininger, 2015; Davis & Caldeira, 2010; Peters, 2008; Munksgaard & Pedersen, 2001). CBA, initially used

[5] As used by the International Energy Agency (IEA) via the national measurements methodology.

for Carbon Footprint measurements (Ireland, 2018), takes into account the outsourcing effect (Bastianoni et al., 2014); somewhat[6] internalising responsibilities based on re-integrating externalities. It is often argued that CBA should be mainstreamed in climate policy for disclosing "real" corresponding emissions per country as it will serve for constructing policies with a holistic perspective for crucial innovations (Wiedenhofer et al., 2020) for tackling the global climate emergency and ecological crisis. Approximate numbers indicate that production-based emissions in the Global South are 10–15% higher than consumption-based emissions, and vice versa for the Global North (Fuhr, 2019). Similarly, research illustrates (Wood et al., 2018) that approximately one-quarter of the global land use (Weinzettel et al., 2013), 40% of materials (Wiedmann et al., 2015), 20–30% of global water use (Lenzen et al., 2013), and over 20% of greenhouse gas (GHG) emissions (Peters & Hertwich, 2008) reside embodied in trade.

In terms of "truth-ful" accounting and defining adequate policy mechanisms based on political realities (Afionis et al., 2017) for tackling issues of equity and justice appropriately and for proposing alternative exit strategies, such realities must urgently be confronted.

## 15.3 Results from Empirical Evidence and Reviews

Recent literature argues that there is little or no evidence in terms of absolute decoupling looking into embodied energy in trade, material consumption, resource use, and emissions.

Akizu-Gardoki et al. (2018) devise an alternative "Decoupling Index" that uses 126 countries' *total primary energy footprints* (rather than total primary energy supplies), taking into account embodied energy imported with goods and services. Within a 14-year period of analysis (2000–2014), the authors empirically show that 93 countries[7] disprove decoupling; while 27 show absolute decoupling for the analysis period, with only 6 countries (ESP, ITA, HUN, GBR, JPN, and FRA) with a Human Development Index of 0.8 above maintain absolute decoupling over time (*ibid.*).

Regarding *global material flows* covering over half a century of analysis (1950–2010) Schaffartzik et al. (2014) reveal that although industrial metabolic profiles stabilise over time with equal shares of biomass, fossil energy, and construction minerals; they are surpassed by other regions like Asia, replicating patterns of industrial growth engines. However, this does not translate into "per capita" affluence or material consumption and instead adds to the growing bubble of global

[6] There are different methodologies and discussions on how trade-related GHG emissions should be accounted for. For an overview of alternative approaches to allocating GHGs or proposed shared allocation schemes, see (Peters, 2008).

[7] Decoupled countries reduce to 27 (from 40); relatively decoupled countries reduce to 17 (from 29); and conversely, recoupling rises in 80 countries from 55.

resource use and extraction (*ibid.*). On a similar note, after an analysis of 40 years of resource productivity analysis Krausmann et al. (2017) summarise that although some countries may be decoupling in absolute terms, this value is cancelled out when trade is taken into account. Wood et al. (2018) confirm that impacts embodied in trade, especially regarding material goods, led by clothing and footwear, are growing tremendously, with energy and GHG emissions following in a less pronounced manner. Wu et al. (2018) highlight the differences in a decoupling index, where "developed countries" primarily continue to develop high-tech and high-efficiency GDP growth drivers, whereas "developing countries" have not undergone a transformation to absolute decoupling due to a lack in energy efficiency measures, disorganised industrial structures, and absence of Information Technologies (IT) in capital investment. These studies highlight a threefold causality: (1) we have lengthened commodity supply chains due to the abundance of readily available transport fuel; (2) this has been made possible by notably shifting and outsourcing more significant impacts to developing regions that take on primary extractive and secondary industries; (3) meanwhile, we have bought into the promise of circularity regarding the reuse of materials. Hass et al. (2015) illustrate that circularity is low mainly because most materials are not available for recycling in the first place and that the growth of materials injection into our systems outpaces any potential recycling attempt (See Sect. 15.4 for more details).

Similarly, recently conducted reviews of empirical research conclude no robust evidence regarding decoupling. (For an exhaustive literature review of decoupling literature, see Parrique et al., 2019; Koirala et al., 2011; Mardani et al., 2019 among others). The Decoupling Debunked document (Parrique et al., 2019) concludes that there is no indication of decoupling that is *absolute, global, permanent,* and *sufficiently fast and large enough both in terms of resources or impacts*. Likewise, a review of 179 decoupling articles (Vadén et al., 2020) that appeared between 1990 and 2019 concluded with no evidence of economy-wide, national/international absolute resource decoupling and reckons that "the goal of decoupling rests partly on faith." A recent exhaustive review, composed of a bibliometric mapping of 835 peer-reviewed articles (published in two parts, part I (Wiedenhofer et al., 2020) and part II (Haberl et al., 2020)) also highlight the need for substantial advances in both theoretical and empirical research required while also being complemented by alternative goals and ambitions.

With unsuccessful robust and systemic evidence, reaffirming the findings of Hickel and Kallis (2020), *absolute decoupling from resource use* cannot be achieved on a global scale against a global scale backdrop of continued economic growth.

In terms of accounting for *emissions decoupling*, a recent study by the Breakthrough Institute (Hausfather, 2021) highlights that 32 countries have managed to demonstrate economic growth while $CO_2$ emissions declined since 2005, even when accounting for emissions embodied in the goods consumed in a country. However, they note with caution that these economies are already wealthy-service driven economies and that very few examples are present from low- or middle-income countries based on extractive industries and energy-intensive manufacturing to date. While this study can present a departure narrative of consumption-based

emissions and absolute decoupling as we switch to clearer technologies, we must not forget that extraction and resource dependence remain intact on the supply side – supplies and sinks being the two sides of the same coin of the decoupling phenomena.

## 15.4 The "Not-So-Circular" Economy and Rebound Effects

The industrial economy is not as circular as claims make it be; but rather is entropic (Georgescu-Roegen, 1971) with the depletion of low entropy materials from the environment, resulting in an accumulation of high entropy wastes and exotic materials in the environment (Daly, 1992; Kerschner, 2010). This, also highlighted in a review of decoupling literature by Wiedenhofer et al. (2020), is frequently disregarded in decoupling studies, where the phenomena itself is usually approached from a statistical/econometric viewpoint, often overlooking thermodynamic principles of energy and materials and their core role and function in defining societal metabolisms.

As Haas et al. (2015) show, on a global metabolism, only 6% of all processed materials are recycled, against the backdrop of global material consumption increasing by 3.6% in a decade (Schaffartzik et al., 2014). These numbers only slightly improve for the European Union amidst convincing circular economy narratives (Haas et al., 2015). Over half of the total solid material throughput in economies (52% or 3.5 GT/year) (Giampietro & Funtowicz, 2020) is composed of either food or energy inputs that are subject to entropic decay (especially in terms of energy quality). Only when biomass is included among the recycled solid flows, total circularity only increases to 37% (Haas et al., 2015). The remaining 45% of materials that are used form the backbones of social systems, becoming infrastructure and construction and "immovables" of societies; while only a minute percent of material flow, 3% or 0.7 GT/year, is associated with consumable and durable products (Giampietro & Funtowicz, 2020). Moreover, all of these social structures and metabolisms come at the expense of ecosystem services at our disposal (Costanza et al., 2017), with water throughput often ignored in stabilising socio-ecological systems (Giampietro & Funtowicz, 2020).

The COVID-19 pandemic and confinement period has also been an occasion to observe decoupling and rebounds (Alcott, 2005; Polimeni, 2012) within societies adjusting to a dramatic, involuntary downscaling of socio-economic activities due to global lockdowns. In April 2020, in comparison to 2019 values, daily global $CO_2$ emissions had decreased by around 17% (Le Quéré et al., 2020). Values exhibited in the peak low of emissions during COVID-19 were equal to those corresponding to 2006 values – 14 years ago (Canadell et al., 2020). However, several months after, studies detected a rapid rebound (Harvey, 2020), and in 2021 global energy-related $CO_2$ emissions are projected to grow once again by 4.8% (IEA, 2021). It is often argued that decoupling is bound by *temporal features* such that decoupling is usually followed by periods of no decoupling or even recoupling, making it a challenge

for becoming a permanent and continuous matter (Vadén et al., 2020; Williamson, 2021). The notion of rebound is also captured where in some instances, the very act of solving environmental problems in itself spends resources and may even create additional problems that were previously unthinkable (Allen et al., 2003).

## 15.5 Discussion and Conclusions

Most empirical literature and reviews illustrate little to no evidence of resource or impact decoupling in absolute terms that is extensive and effective enough to be accepted as given. Moreover, when externalities are to some degree accounted for, decoupling attempts are cancelled out by the impacts and consequences of trade or the exertion of built-in power asymmetries and extractive frontiers prolonging the North-South divide and socio-environmental inequalities in terms of benefits and burdens – primary research loci of the Ecological Economics and Political Ecology disciplines.

The study of decoupling needs to be scrutinised holistically, such that both demand-side and supply-side analyses go hand in hand. For embarking on a transformative path, we require a holistic vision regarding tracing the origins of resources, internalising externalities, and, better yet, downscaling dependencies. This implies moving away from "certain" narratives (Lazarevic & Valve, 2017), like decoupling or the circular economy. Instead, the intersectionality of resource use and socio-ecological well-being needs scrutiny for transformative policy and change. Recent directions for example taken by the European Environmental Agency (2021) evaluate alternative narratives other than growth accepting a long-lasting, absolute decoupling of economic growth and environmental pressures.

Decoupling is not only a biophysical constraint or a matter of efficiency limited to the technosphere but rather is one of distribution, one where far-reaching lifestyle changes (Wiedmann et al., 2020) complement technological advancements and one which embraces principles of environmental and social justice (Parrique et al., 2019). Ivan Illich had alluded to principles of sufficiency and justice in terms of putting limits to energy use back in the 1970s, where he recalled that a ceiling on energy use could indeed bring upon social relations characterised with high levels of equity (Illich, 1974). Some studies argue that a 2–6 times increase in sustainable resources at the global level would universally attain more qualitative goals (O'Neill et al., 2018); others (Millward-Hopkins et al., 2020) indicate that in the year 2050, final energy consumption globally could be reduced to 1960 levels, despite a tripling in the population.

Pathways that entail less dependency on resources need to be formulated based on alternative policies that comply with sufficiency-oriented strategies with strict enforcement of absolute reduction targets (Haberl et al., 2020). These, as such, may promote alternative forms of existence like that of degrowth (Kallis et al., 2020) or other prosperous ways down (Odum & Odum, 2008) that link resource use and emissions to collective well-being rather than provoking ecological destruction.

What is clear, however, as per COVID-19 pandemic times faced with unprecedented conditions, we are indeed able to adapt genuinely and responsively to change. Similarly, when tackling the climate crises and our dependence on resources, sufficiency for defining alternative futures is an alternative worth considering. While technological advancements proceed in all sectors, behavioural and narrative changes are crucial, if not more, in guiding this transformation.

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