

# The great acceleration: is it ending and what comes next?

Gareth Dale

..| 30th June 2023 |

*The great acceleration - in GDP, population, cities, water use, deforestation - is stuttering. What does this mean for a just transition?*

The great acceleration, a concept spotlighting humanity's impact on its natural environment, was coined twenty years ago.

A research group studying socioeconomic trends and their environmental impacts noticed explosive upticks, from around 1950, across multiple datasets: the growth of foreign investment, GDP, greenhouse gas emissions, population, cities, roads, dams, travel and tourism, the consumption of energy, water, paper, cars, and fish, deforestation rates, and many more. *The Great Acceleration* reported that although some trends are speeding up, others, including stratospheric ozone loss and marine fish capture, had begun to decelerate.

Their term for this surge of people and money and concrete consciously echoed Karl Polanyi's *The Great Transformation*. However, Polanyi's book provides a causal explanation of socioeconomic change, while theirs is descriptive. It registers that human activities are generating large-scale changes in Earth-system processes, and at a quicker pace.

The trends in the graphs, it has always been evident, will not accelerate in tandem for ever. But where are they headed now?

The initial formulation was based on data from 1950-2000, and most indices, including GDP growth, transport, and primary energy use, continued upward into the 2000s and beyond.

The original research group did, however, note some modulations. The expansion of domesticated land slowed somewhat, as did fertiliser use in rich countries.

Falling fertility rates foreshadowed the end of population growth: the number of humans will peak this century, perhaps twenty years from now, before heading south.

Then in 2016 the book entitled *The Great Acceleration* reported that although some trends are speeding up, others, including stratospheric ozone loss and marine fish capture, had begun to decelerate.

“The great acceleration will not last long,” it concluded. “There are not enough big rivers left to dam” — or oil to burn, groundwater to pump, forests to fell, fish to catch.

### Benign slowdown?

With much greater emphasis, the end of the acceleration was announced in 2020 by the geographer Danny Dorling. He stirred in a dash of ruddy optimism: the slowing to a stroll will bring benefit to [the planet, the economy and our lives](#).

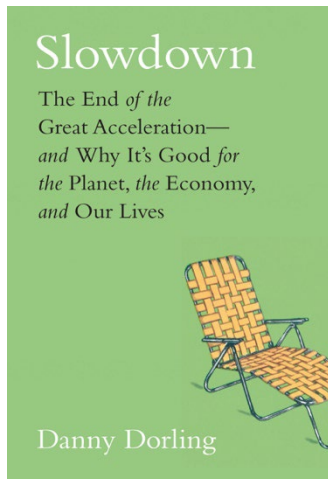
His book, *Slowdown*, charts the deceleration along a dazzling spread of data lines, including “the debts we take on; the number of books we buy; and, most important of all, the number of children we have.”

In this essay I review the data. I’m persuaded that the great acceleration is running out of some of its fuel, but not by Dorling’s counter-thesis that ‘slowdown’ lies ahead.

I look instead at other concepts and metaphors: the ‘systemic chaos’ of world-systems theory and the ‘great derangement’ of the novelist Amitav Ghosh.

The first of these views our conjuncture through dynamics of global power: ‘hegemonic cycles.’ The second captures relationships between the era-defining processes of environmental collapse, global disorder and cultural irrationalism.

### Future stability?



Economics, alongside demography, is at the heart of Dorling’s slowdown thesis.

Economics, alongside demography, is at the heart of Dorling’s slowdown thesis. The heyday of the great acceleration was the GDP gallop of 1950-73, the ‘trente glorieuses.’ Since then, growth has slowed to a trot, and it would be rash to predict any return to [boomtime](#).

The slowdown has consequences for capitalism, says Dorling. It is mutating into something different, a new social order without capitalism’s rampant consumerism.

In most parts of the world, income inequality is falling, and in some parts, “capitalism is being pushed out by governments that employ the rule of law to better the behaviour of the rich.”

Capitalism is becoming “less brutal” — and probably less violent too. The global wealth disparity is diminishing, as growth in the rich world slows faster than in the poor, and many vehicles of mass suffering and death — wars, epidemics, starvation and famine — are arriving less frequently than ever before.

Slowdown, says Dorling, will bring stability, and fewer epidemics. Even the threat of nuclear war is receding, thanks to a “slowdown” of nuclear weapons - the “huge global decommissioning” that the nuclear states have begun. In short, “we are heading toward a more just and stable future.”

### **Pollution and pestilence**

Dorling’s forecast is seductive. But how robust is it? Some of its central planks look shaky. Greenhouse gas emissions, for one thing, are accelerating, and, at least by some measures, material throughput is increasing too.

As to equality, the last ten years have shown no narrowing at all of the West vs Rest gap (at least if we exclude China). When measured by “absolute Gini,” the gap is widening and this, in the form of food insecurity, has set the stage for famines to return. Famine, ultimately, is rooted in income inequality.

In addition, we need to talk about Covid. Dorling’s sanguine prediction on epidemics was at the printers just as a mysterious virus was finding its way to a Wuhan wet market.

Even pre-Covid, it was known that new parasites and pathogens, including from zoonotic leaps, have been on the rise, facilitated by habitat destruction, industrial livestock agriculture and climate change.

### **Bridges burning**

In *Slowdown*, Dorling presents rising emissions as the major exception to the trend of benign deceleration. But even here his prognosis is too rosy.

It would be “probably incorrect” to suggest that “the near future will be very different to the recent past,” he reasons, because socioeconomic change is generally slowing.

What this fails to grasp is the threat posed by non-linear change. After briefly conceding that climate feedback loops may “come into play in future,” there comes a shrug: “linearity has been the case, so far, for my entire lifetime.”

This is staggeringly blasé. It’s a car passenger heading toward the precipice who looks in the rear-view mirror to reassure us we’re still on the road.

In fact, climate change and its effects are generally accelerating. Large-scale climate feedbacks are, *pace* Dorling, absolutely “in play” and they dramatically amplify the risks of irreversible Earth-system change, even if there remain uncertainties as to when they’ll propel which earth systems past tipping points.

The best estimate is that crossing dangerous tipping points comes with “significant probability” at today’s warming level and “high probability” at warming above 2°C, a temperature rise that is highly likely to be exceeded. The longer that business-as-usual carries on, the greater the risk of tipping points being tripped.

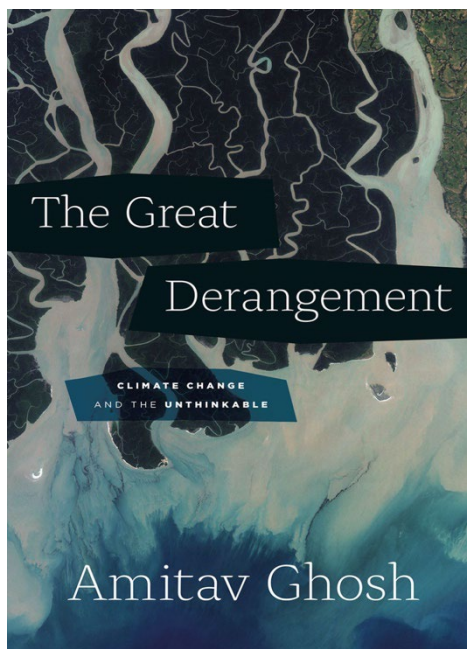
Rather than looking backwards to the recent past, the benign Holocene, to find reassurance that the planet is keeping calm and carrying on, we should register with trepidation that not only have we

exited the Holocene but many of Earth's biogeochemical processes are, thanks to human interventions, deteriorating at breakneck speed and along multiple dimensions, propelling changes that risk precipitating [cascading chaos](#) (nonlinear leaps, flocks of ['black swans'](#), etc).

Nature, as Ghosh reminds us, *"does jump."* Climate breakdown is warping the relationship between [ecological and social time](#). It's [burning the bridges that connect us to the past](#) — for Earth systems will decreasingly resemble those in which human civilisation developed hitherto — and to the futures that we used to imagine.

### The Great Derangement

The case that the great acceleration is approaching its use-by date is compelling, but Dorling's alternative, slowdown, is no improvement. The standout feature of the coming era will be a matter of *instability*, not pace.



We are seeing an intertwining of dynamics in three registers — Earth systems, global economy, and world order — that, separately and in combination, generate turbulence. This could be termed the “great derangement”

We are seeing an intertwining of dynamics in three registers — Earth systems, global economy, and world order — that, separately and in combination, generate turbulence. What term best captures this? Among the contenders are Ghosh's “The Great Derangement” and the “systemic chaos” of [world-systems theory](#).

Ghosh deploys his term allusively to refer to the essence and telos of capitalist modernity. Our age, “which so congratulates itself on its self-awareness, [may well] come to be known as the time of the Great Derangement.”

He portrays a global society hammered out on anvils of capitalism and empire: perversely irrational despite its rationalist swagger, totalising despite pluralist commitments, individualistic and toxic to community life, savage toward the racialised poor, and recklessly instrumental toward the natural realm and the human future.

These last are Ghosh's focus. He recognises that Earth-systems blowback from capitalist industrialisation is increasingly dominating the human condition. Treating it as an exception to the dominant trends, as Dorling does, is inadequate.

### Hegemonic unravelling

The other option is *“systemic chaos,”* where ‘chaos’ denotes not [random happenings](#) but *volatility*. It initially referred to the unravelling of established rules and practices during phases of hegemonic transition.

Coined by Janet Abu-Lughod (who in *Before European Hegemony* takes inspiration from [chaos theory](#) to suggest that non-linear dynamics loom large in world-systemic transitions), the idea was later given wings by Giovanni Arrighi and Beverly Silver.

In their schema, hegemonic successions over the last five centuries follow a pattern. The major hegemonies they focus on — United Provinces, United Kingdom, and United States — have been similar in many core features (and some minor ones too, including even the colours of the national flag).

Each of them gained a competitive edge in productive industry (respectively, woodworking and shipbuilding, steam and manufacturing, electricity and the assembly line). These brought commercial success, which fed geopolitical heft and financial ascendancy (Amsterdam, London, New York).

Each rising hegemon presided over a transformation of capital and power, including the expansion of an international market economy.

Each one benefited from liberal rules ([freedom of the seas](#), free trade, free capital flows) and its intellectuals presented economic liberalism as in the universal interest (Hugo Grotius, Adam Smith, Milton Friedman).

Each one presided over relative stability during its era of productive pre-eminence and territorial expansion, followed by an “autumn” phase of the cycle, featuring overaccumulation crises and financial expansion.

At this point their paramountcy faltered and challengers arose, signalling the exhaustion of the structures that had underwritten success. The final acts were marked by turbulence, systemic chaos, and eventually world war.

The wars of hegemonic transition—1688-1713 of the Dutch-Anglo alliance against France, and the 1914-45 wars that pitted an Anglo-US-Russian alliance against Germany/Japan—exhausted the old powers.

Equally, they functioned as launchpads for emergent hegemonies, Britain and the US respectively, which forged the next international settlement.

The great postwar boom is partly explicable against this backdrop. The previous hegemonic cycle had ended in the Great Depression and world war which, by destroying capital and ushering in a new hegemonic settlement (‘Bretton Woods’ is the shorthand), and via the Cold War [permanent arms economy](#), laid the ground for rapid capital accumulation.

The subsequent half century by contrast, 1973-2023, has been an “autumnal” phase of financialisation. It has seen banking crises and bubble economies galore — indeed most of the big financial bubbles in world history have occurred [since the 1970s](#).

Our era, with its faltering hegemon and geopolitical “[impasse](#),” fits the pattern of previous hegemonic successions, portending further volatility.

## **World-ecological cycles**

Within the just-described world-systemic power cycles, each successive hegemon has been grounded in a larger territory, of both the core nation and its zones of domination.

Each organised increasingly globalised circuits of capital, at an increasing scale of production and pace of circulation, and with violent ecological consequences.

These latter were not a preoccupation of Arrighi and Silver, but the environmental historian Jason W Moore developed the case. His studies show how the organisational revolutions at the heart of the hegemonic cycle pivoted not only on the command over labour but over natural resources too.

Applying the concept of [metabolic rift](#), Moore proposes that capitalism, unable to sustain itself as a closed system in which nutrients are recycled, must exist as “a flow system, requiring ever greater external inputs to survive.”

Each hegemonic phase is also a “cycle of agro-ecological transformation,” in which new methods are devised to appropriate external inputs: a new “world ecology.”

As the metabolic rift deepens, capital pushes its ecological contradictions to progressively wider spheres, displacing them onto sacrifice zones in the Global South, or via technological innovations, or onto future generations.

The Dutch, British, and American hegemonies each oversaw new rounds of agricultural and agroindustrial expansion, fuelling the accumulation process with cheap food, cheap labour, cheap energy, and cheap resources.

Thus, Dutch hegemony “emerged through a world-ecological revolution that stretched from Canada to the spice islands of Southeast Asia; British hegemony, through the coal/steam power and plantation revolutions; American hegemony, through oil frontiers and the industrialization of agriculture.”

During the “three great hegemonic eras,” a particular hydrocarbon — timber, coal, and oil, respectively — was “freely appropriated, with relatively minimal capital outlay.”

Each hegemony joined “productivity and plunder” in a process that brought vast new supplies of natural resources into play, in the course of the global expansion of circuits of capital and a concomitant escalation of habitat destruction and pollution.

### **Running out of road**

What are the implications of the world-systems case? Arrighi and friends, in my view, overstate the neatness of hegemonic-cyclical patterns, and the extent of US decline, as well as the degree to which Washington imposes stability — as opposed to wilfully causing havoc.

Nonetheless, the concept of systemic chaos is useful and suggestive, and so too is the idea that the hegemonic cycle is running out of road.

In their model, the geographical scope of each hegemon exceeds the last. If this dynamic continues, [Arrighi reasons](#), a ‘realist’ trajectory of systemic chaos and conflict could lead to a reassertion of US power or to its supersession by China or an East Asian federation.

Alternatively, he imagines a cooperative and liberal next step, pivoting on the dense fabric of rules and institutions that make today’s world order quite unlike the earlier hegemonic transitions, with global challenges managed in a more trusting, cooperative and rational way.

Further, the destructive forces in play nowadays are incomparably greater, rendering the prospect of old-style transition via world war an apocalyptic prospect.

What of the other great destructive force, environmental despoliation?

In Moore’s account, the crisis of US hegemony coincides with crises of world agriculture and “world ecology.” The shovelling of [cheap nature](#) into the economic furnace is not functioning as it once did.

[From the mid-nineteenth century](#), he notes, real food prices trended downward until they bottomed out in [1987-2000](#). Since then they have steadily [rise](#)n.

This is for multiple reasons, one of which is the re-purposing of land toward goals of energy security and climate change mitigation.

Of US cornfields, [nearly half are dedicated to ethanol](#) production, as is much of Brazil’s sugar crop, and oilseed in the EU. In turn, rising food prices are contributing to the return of generalised inflation. When food prices are hiked, other businesses tend to [follow](#).

Hypothetically, the food crisis could be mitigated through a dietary switch, with arable farming replacing livestock. Alternatively, capitalism’s dialectic of plunder and productivity could potentially revive, with discoveries of fundamentally new sources of “cheap food” and “cheap nature.”

To Moore, this is implausible, in view of the sheer scale of ecological exhaustion. Ultimately, the road we’re running out of is nature. “Today,” he forecast [ten years ago](#), we are seeing “the end of Cheap Nature as a civilizational strategy.” Beyond the mid-2030s, “it is difficult to see how capitalist agriculture can survive.”

This prediction is too telescoped and too absolute, yet the basis for a rapid collapse of some agricultural regions or particular crops clearly exists, at the join between accelerating climate chaos and industrial monocrop agriculture—given its high [vulnerability](#) to environmental fluctuation.

Volatility of food supply and price, moreover, are exacerbated by powerful market players. As [Rupert Russell](#) describes in *Price Wars*, “chaotic markets are creating a chaotic world.”

A small price disturbance in one region causes havoc in another. Commodities speculation, notably, amplifies the impact of climate shocks on food price fluctuations.

Food insecurity, in turn, influences war and peace—most visibly right now in the Sahel where desertification has exacerbated poverty and despair, sowing dragon’s teeth.

Price volatility, meanwhile, enriches asset-holders, including commodities traders and hedge fund speculators, widening the global wealth chasm with its concomitant social tensions and instability.

The other road that is disappearing is “cheap energy,” at least in fossil fuels. During the 1950-73 long boom, the energy from one barrel of oil would fuel the locating, extracting and processing of thirty more.

That ratio has fallen to around 1:6 and is predicted to collapse by mid-century—possibly as low [as 1:1.5](#). Similarly for gas. In 1990 under two percent of its energy was required to produce each therm; by 2020 that figure had [more than trebled](#), and is forecast to hit 25 per cent by around 2040.

This trend has not, in itself, reduced fossil fuel use or greenhouse gas emissions, let alone relaxing pressure on the natural realm. Rather, it has injected a restless mania into the hunt for fossil fuels, manifest in wildernesses gouged up for tar sands, shale gas fracking with its multitudinous [methane leaks](#), and ocean drilling with its [ecocidal](#) spills.

In 1989, an internal report conducted by Shell — kept hidden of course — warned that if CO<sub>2</sub> emissions continued to increase, by the middle of the twenty-first century “[civilization could prove a fragile thing](#).”

Only last week the same company, as if to test its 1989 forecast, binned its earlier intention of reducing oil output and announced that it would [ramp up gas production](#). This year’s global oil combustion is [poised to smash all](#) previous records.

Unlike with cheap food, however, there is an obvious, investment-driven route back to cheap energy, via the renewables revolution. What form is the green energy transition taking, when seen through the lens of hegemonic cycles?

### **Green shifts?**

The transition *seems* to be making rapid progress along both tracks, liberal and realist. That is to say, international organisations, NGOs and the corporate sector are pushing the net zero agenda, while Washington and Beijing are competing for leadership in post-carbon technologies such as batteries.

The appearance is not a fabrication. Clearly, a global energy/transportation shift towards renewables/EVs is underway, and powerful actors are making noise.

UN Secretary-General António Guterres, most notably, has warned that the damage from global heating is “[making our planet uninhabitable](#)” such that urgent decarbonisation of the world economy is required.

Yet the alarms are largely ignored. Admittedly, renewables are becoming cheaper, and sales of petrol-powered cars have [probably peaked](#), but the benefits are negated by the expansion of ‘brown’ energy. It’s not unlike pulling the handbrake while one foot is hard on the gas.

Much will hang on the decarbonisation agenda, but in its mainstream ‘green growth’ guise it demands colossal investment programmes that are harder to fund in our low-growth era.



Governments attempt to square the circle by promoting green *and* 'brown' growth, but they are failing to take measures to seriously reduce consumption of energy and materials.

In the US, energy use is not declining but remains constant at [around 26,000 terrawatt hours](#) (TWh) annually, while in China it has quadrupled from 12,000 TWh in 2000 to around 48,000 today.

The consensus view, that a transition to a greener economy is in train, is largely false — and to the extent that it is realised, it risks hitting [buffers](#) of non-renewable minerals and land availability, not to mention neocolonial resource grabs.

And wherever decarbonisation initiatives are perceived as insufficiently growth-friendly, political forces mobilise to deprioritise and delay.

Such has long been the agenda of the hydrocarbon industries (oil, auto, aviation), but it melds nowadays with reactionary forces crying for 'order' in face of the world-systemic unravelling.

If an alien visited our planet how puzzled might they be. The Secretary-General of the most prominent human institution cautions that if business-as-usual continues we'll wipe out [one million species](#) including perhaps ourselves... and yet no significant measures are taken.

This formulation may be bald but it is hard to read the data otherwise. Since the first IPCC Assessment Report, the UN has overseen numerous annual meetings, during which time carbon dioxide emissions *accelerated*.

Indeed, over half of humanity's total carbon transfer from lithosphere to atmosphere has occurred since the IPCC's first report in 1990. Decarbonisation reforms may be *in view*, or even *in train*, but the metric that charts their *climatological significance* is the [atmospheric concentration of GHGs](#)—and it is rising [faster than ever](#).

### **Squaring a vicious circle**

Climate change is thought of as a 'wicked problem,' and rightly so — but for reasons other than those normally cited.

Centre stage should be its relationship to capitalist states and hegemons. They preside over the global system that murdered the Holocene, a uniquely stable phase in the Earth's climate history, a paradisiacal era that sustained human civilisation for eleven millennia and will never be regained.

By that yardstick, which seems reasonable, they are genocidal failures — and yet they are widely looked to as the only forces capable of ensuring economic decarbonisation.

This 'wickedness' is dissected by Ilias Alami, Jack Copley and Alexis Moraitis in a recent article in the journal *Geoforum*. They begin from a standard Marxist analysis: capitalist states are structurally geared to maximising national economic competitiveness, seeking to generate revenues for their various agendas (decarbonisation included) while maintaining a steeply hierarchical social order.

As climate chaos intensifies, they argue, the liberal character of capitalist states is subjected to increasing strain.

On one hand, pressure grows to reduce greenhouse gas emissions and to help affected communities to adapt; on the other, governments develop authoritarian responses to ‘shut out’ the effects of climate chaos — above all through border militarisation, on which the rich countries spend more than on climate change mitigation. This contradiction is set to intensify in the coming decades.

### **Sandcastles in the air**

At the outset of this essay I mentioned Karl Polanyi. His subject was a world governed by market forces. They had come to “rule everything, but nobody ruled them.”

He became convinced that the various elements of the [polycrisis](#) that his generation was facing — two world wars, fascism, the Great Depression — were not discrete but constituted a single catastrophic field with a common root: the “utopian” liberal crusade to construct a self-regulating market system.

That system, he maintained in his magnum opus of 1944, had collapsed and a “great transformation” was being ushered in, thanks to a worldwide corporatist/statist turn that would open space for slower-paced and, he hoped, socialist systems.

Hardly had the ink dried, however, than the delegates convened at Bretton Woods. Uncle Sam climbed into the cockpit and very soon the great acceleration was at full throttle.

Polanyi’s [social-democratic determinism](#), his ‘optimism of the intellect,’ comes to mind when I read the final lines of Dorling’s *Slowdown*, wrapping up a concluding chapter from which the environmental crisis — the exception to the slowdown thesis — is excluded.

“What do you hope for?,” the author asks us, in a future society after “rampant capitalism” has given way to an alternative system that, in its leisurely pace and stability, is being presaged currently by Japan. He foresees himself “building sandcastles on a beach.”

Compare our sunlounging geographer to the swirling sandscapes of *The Great Derangement*. Ghosh’s eye for tides and sands and [how they shift](#) is without compare. (The cover image provides a hint.) In one passage about events in 2007 he describes a mangrove forest in Papua New Guinea.

“The barrier beaches were breached, cutting innumerable channels through to the lakes. Sand poured through them. Tidal surges tore across the villages, leaving behind a spectacle of severed trunks of coconut palms and dead shoreline trees, drifting canoes, trenches, and gullies. Entire villages had to be evacuated.”

The shredding of civilisation begins in the periphery where safety nets are weak, but it will not spare the core. All human life, he writes, is “enframed in a pattern of history that seems to leave us nowhere to turn but toward our self-annihilation.”

The portrayal is sombre but sober. The structural processes that shape world economy and world ecology are becoming neither gentler nor slower; the relations of hegemonic contestation and capital accumulation that define them are increasingly unstable.

To register this is not to sink into 'pessimism of the will.' The logic, rather, is activist, and the required policies are [simple to see](#) and to campaign for.

And it is anti-capitalist: the system of chaotic markets must be replaced by democratic planning, that of competing states and hegemons by cooperation, and social hierarchy by solidarity and [equality](#).

Mainstream pundits see that prognosis as [unrealistic](#) and they're right. Yet it is the most coherent and least fanciful of the options at this 'wicked' juncture in which all prescriptions are necessarily unrealistic.

The moderate's insanity is the pretence that temporising can be an option in a scenario where time can only be lost by deferring action.

For conservatives it's the delusion that climate chaos, if you cover your eyes, is not there. For liberals it's their support for the market system and imperialist institutions, the neo-colonial hierarchy and capital accumulation, that are generating the social toxins and environmental catastrophes from which recuperation is so pressingly required.

### **This Author**

Gareth Dale teaches political economy at Brunel University. He co-edited *Green Growth: Ideology, Political Economy and the Alternatives*. He researches economic growth/degrowth, climate politics, and technology fetishism.