Funding the Future

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This is one of a series of posts that will ask what the most pertinent question raised by a prominent influencer of political economy might have been, and what the relevance of that question might be today. There is a list of all posts in the series at the end of each entry. The origin of this series is noted here.

After the first two posts in this series, the topics have been chosen by me, and this is one of those. This series has been produced using what I describe as directed AI searches to establish positions with which I agree, followed by final editing before publication.

In this post, I turn to a new theme, acknowledging those economists who are notable and who also happen to be friends, and in some cases, people I might even call mates. This is undoubtedly true of Steve Keen. I well remember first reading his opus, Debunking Economics, and thinking this man was little short of a genius for the insights he had to offer in a way that was readily accessible. Now I have had the opportunity to share his company, thoughts and insights, and we find ourselves referring to each other in promoting economics based on the principles of double-entry accounting.

This familiarity, however, presented me with a problem. I prepared three versions of this essay. One was based on Steve's work on private debt, relating in turn to his analysis of Hyman Minsky's work. A second was based on his work on the principles of economics, which is at the core of Debunking Economics. I did, however, choose to use this version, highlighting his recent work on economics and ecology. The others might appear as appendices if this series is ever published, and they explain the slightly unusual title of this essay.

Steve Keen is known for his modelling of private debt and financial instability, but behind that lies a deeper critique of modern economics — one that calls into question the discipline’s very foundations. He argues that the models used to guide governments, central banks, and global institutions systematically ignore the physical reality of production. They pretend that output emerges from “capital” and “labour” alone, as if machines power themselves, as if energy is incidental, and as if ecological

limits are optional.

Keen’s work, therefore, asks a question that undermines an entire intellectual edifice: if economics describes the real world, why does it ignore the real world’s physical laws? And if it ignores those laws, how can it claim to offer guidance on growth, sustainability, or the future of civilisation itself?

Hence, the Steve Keen Question: ***If the economy is a physical system dependent on energy and material throughput, why does mainstream economics still pretend it can be understood without reference to the laws of nature?***

The myth of the ethereal economy

Keen’s starting point is the recognition that mainstream production functions — the centrepiece of economic modelling — are mathematical fantasies. They imply that output is a smooth function of two abstract inputs: “labour” and “capital.” Energy does not appear. Materials do not appear. Technology is a magic multiplier. Growth emerges from algebra, not from physical processes.

Keen argues that this is not simplification — it is denial. Real economies are not conceptual arrangements of inputs; they are thermodynamic systems. They transform energy and matter, generate waste, incur entropy, and depend on ecological stability. To treat them otherwise is to build policy on make-believe.

Ignoring energy leads to impossible conclusions

Because mainstream models omit energy, they produce absurd implications. They imply, for example, that output can rise indefinitely even without increased energy use. They suggest that capital can substitute for natural resources without limit. They assume that technological efficiency can outpace physical constraints forever.

Keen notes that such assumptions violate basic thermodynamics. Machines cannot do work without energy. Production cannot occur without materials. Waste cannot disappear because calculus demands it. The result is a discipline whose formal models guarantee that ecological crises cannot happen — not because they are impossible, but because the equations refuse to acknowledge them.

Economic growth as energy conversion

Keen’s analysis reinforces a truth known to physicists but strangely excluded from economics: growth is not primarily a financial phenomenon; it is an energetic one. Historically, economic expansion has always been tied to increased energy capture — from wood to coal, from coal to oil, and from oil to gas. Productivity gains arise not from

cleverness alone but from leveraging greater flows of usable energy through machinery, transport, agriculture, and industry.

By reconnecting economics to physical reality, Keen shows that growth is contingent, not automatic; constrained, not infinite; and dependent on ecological stability, not guaranteed by market forces.

Debt, energy and the illusion of perpetual motion

In Keen's biophysical models, debt-fuelled expansion does not merely create financial fragility — it obscures the energetic basis of growth. Cheap credit can simulate prosperity for a time, but it cannot conjure energy or materials. When ecological constraints tighten — water shortages, degraded soils, declining fossil fuel EROEI (Energy Returned on Energy Invested) — debt becomes a way of borrowing from a future that cannot deliver.

This is why Keen insists that an economy that ignores energy limits will eventually crash through them, financially as well as ecologically. A society cannot paper over biophysical scarcity with bank liabilities.

Climate change as a macroeconomic blind spot

Keen has been one of the fiercest critics of the climate-economy models used by central banks and governments. These "integrated assessment models" treat 4°C or even 6°C of global warming as causing modest economic losses — as if the collapse of food systems, the inundation of cities, and the breakdown of ecosystems could be offset by gains in tourism or manufacturing.

Keen calls this what it is: pseudo-science disguised as economics. When models assume away the catastrophic, they encourage complacency in the face of civilisational risk. Once again, the problem is the same: models that refuse to acknowledge physical reality cannot produce rational policy.

What answering the Steve Keen Question would require

To take Keen seriously would demand a transformation of economic thinking — not a tweak. At a minimum, it would require:

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Rebuilding economic models from physical principles, integrating energy, materials, waste, ecology, and thermodynamics as foundational, and not optional.

*
Abandoning the fantasy of infinite substitutability, recognising that some resources are irreplaceable and that technology cannot bypass physical limits.

*
Re-evaluating growth, shifting from an obsession with GDP to an understanding of sustainable throughput and genuine well-being.

*
Pricing and regulating ecological limits, not as externalities but as binding constraints on the economy’s operating envelope.

*
Integrating climate risk honestly, treating high-temperature futures as catastrophic, not trivial disturbances.

These changes would overturn much of what passes for “rigorous economics” today.

Inference

The Steve Keen Question exposes a profound contradiction at the heart of contemporary economic governance. Our societies are built on models that ignore the physical basis of production, deny the reality of energy constraints, and treat ecological breakdown as a rounding error. Keen’s work shows that this is not merely mistaken — it is lethal.

To answer his question is to accept that economics must rejoin the natural sciences, abandon its equilibrium fantasies, and confront the biophysical limits that shape the future of humanity. The alternative is clear: an economics that ignores nature will eventually be corrected by nature, violently if necessary.

Keen’s warning, in this version, is unforgiving and straightforward: an economy is a physical system, not an algebraic dream and systems that defy the laws of nature eventually collapse.

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