

Complexity Economics Overview

Complexity economics is a new paradigm within economic theory that see the economy as a complex adaptive systems, composed of multiple diverse agents interaction through networks and evolving overtime.

It is one of a number of alternative economic theories that have arisen over the past few decade, due to a growing wariness to the limitations of our existing economic theory. So lets first talk a bit about this standard approach to economic theory.

The foundations to modern economics date back to the 18th century where it borrowed much of the formal apparatus of mathematics and the natural sciences, especially from physics with its classical mechanistic view of the world in terms of linear deterministic cause and effect.

Within this paradigm of classical economics individual human behavior is comparable to the physical laws of motion, it is both regular, predictable and largely deterministic, meaning the standard tools of mathematic can be applied.

Classical economics models the economy as a closed system, that is to say separate from social, environmental and cultural factors, which are not include in the models thus the social domain is constituted by sets of isolated individuals that are governed purely by economic self-interest.

Similar to classical physics equilibrium is a fundamental assumption of many economic models, according to the equilibrium paradigm, there are optimal states to the economy, to which the system will automatically and quickly evolve, driven by the market forces of supply and demand. This idea is enshrined in the metaphor of the 'invisible hand'.

Lastly standard economic inherited the reductionist view of classical physics implying that the behavior of a society and its institutions does not differ in kind from the sum of its individual agents, thus the behavior of all the agents together can be treated as corresponding to that of an average individual.

By applying these assumption standard economics has converted what was once a branch of moral philosophy into a powerful framework based upon formal mathematics, that has proven to be a solid foundation in supported the massive economic transformation that was the industrial revolution.

Today major trends such as the rapid development of our global economy, the rise of financial capitalism, the huge growth in the services, knowledge and information economy and environmental awareness are all working to reveal the limitations in the foundation assumptions of classical economics.

In response to these changes a number of new economic theories have emerged Under the heading of heterodox economics, that all emphasize a need for an expansion of our economic framework to incorporate new social, cultural and environmental parameters to give a more realistic vision of how economies functions in practice.

Primary among these is behavioral economics that tries to go beyond the classical model of the individual motivated by rational self-interest to incorporate a richer set of cultural and social motives driving individuals behavior.

Or environmental economics is another area, that tries to address the failure of the current framework to incorporate the value accruing from natural resources and ecosystems services.

Complexity economics is part of this alternative theoretical framework, Representing a new paradigm that sees the economy as a complex adaptive system, composed of multiple agents with diverse motives, whose interaction within networks give rise to emergent structures such as enterprises and markets.

Instead of seeing the economy as the product of isolated individuals making rational choices with perfect information resulting in efficiency markets, complexity economics see the individual as embed within social and cultural networks that influence there behavior and with limited information that often leads them to make apparently irrational actions, resulting in suboptimal markets.

As apposed to seeing the economy as the product of a static equilibrium Complexity economics instead is more focus upon the non-equilibrium processes that transform the economy from within, through continues adaptation and the emergence of new institutions and technologies as the economy evolves over time.

Complexity economic applies this concept of evolution to understanding the dynamics of economic development, which is understood as a process of differentiation, selection and amplification, acting on designs for technologies, social institutions and businesses that drives continuous change within the economy

Complexity economics is beginning to employ the whole suit of tools from complexity theory such as Agent based modeling of economies, that give us the possibility to run simulated experiments to understand the possible positive and negative consequences of economic regulations and intervention.

Network theory is another important tool, as economics and financial globalization have networked our world with a complex and often unknown set of interdependencies, network analysis of these linkages is becoming crucial to gaining an understanding of the overall system.

Many other concepts from complexity theory are being applied to economics such as feedback loops to model the relations of interdependences that regulate economies or game theory and even chaos theory has been used for analyzing regularities within the fluctuation of stock market prices.

Our global economy is a true complex system, with multiple highly interconnected and interdependent social and technical elements that co evolve. Expanding our economic framework beyond equilibrium and linear system theory is a core challenge that complexity science is helping us bridge.