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# The Economics of Perpetual Progress: Analysis of the 2025 Nobel Prize in Economic Sciences

**Dr. Yamuna Kilaru[1], Dr. G. Steeven Raju[2]**

[1]Lecturer in Economics, ASD Government Degree College for Women(A), Kakinada
[2]Lecturer in Economics, Ideal College of Arts and Sciences (A), Kakinada
Email: yamuna.kilaru@asdgdcw.ac.in, steevenraju@gmail.com

**Abstract**

The 2025 Nobel Prize in Economic Sciences was jointly awarded to Joel Mokyr, Philippe Aghion, and Peter Howitt for their pioneering research explaining the mechanisms of sustained economic growth. Their collective work bridges history and theory, revealing how innovation, knowledge creation, and institutional openness drive perpetual progress. Mokyr traced the historical evolution of "useful knowledge" from the Enlightenment to modern growth, while Aghion and Howitt formalized the process of "creative destruction" that fuels technological advancement. Together, they provide a comprehensive understanding of how societies escape stagnation and sustain prosperity through continuous innovation, adaptation, and inclusive institutional frameworks.

**Keywords**: Economic Growth, Innovation, Creative Destruction, Useful Knowledge, Enlightenment, R&D, Industrial Revolution

## 1. Introduction

Over the last two centuries, the global economy has undergone a remarkable transformation, transitioning from millennia of stagnation to a sustained pattern of growth. The 2025 Nobel laureates in Economic Sciences — Joel Mokyr, Philippe Aghion, and Peter Howitt — offer complementary explanations for this phenomenon.

## 2. Mokyr's Historical Mechanism: Knowledge, Society, and the Birth of Sustained Growth

The Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel for 2025 was awarded to Joel Mokyr, Philippe Aghion, and Peter Howitt for their seminal contributions to the theory of innovation-driven, sustained economic growth. Mokyr was honored for explaining innovation-driven economic growth and identifying the prerequisites for sustained technological progress, while Aghion and Howitt were jointly recognized for developing the formal theory of sustained growth through 'creative destruction.' Collectively, their work provides a comprehensive framework, integrating economic history with rigorous macroeconomic modeling, to understand why living standards have undergone a revolutionary change over the last two centuries.

The Historical Crucible: Useful Knowledge and Societal Openness (Joel Mokyr)

Joel Mokyr's contribution is rooted in economic history, seeking to explain the definitive shift from a Malthusian era of sporadic growth and subsequent stagnation to the sustained growth that began with the Industrial Revolution. Mokyr posits that this transition was facilitated by a constant, self-reinforcing flow of useful knowledge, which he divides into two components:

1. Propositional Knowledge: The systematic understanding of *why* something works (e.g., principles of natural philosophy, physics, and mathematics).
2. Prescriptive Knowledge: Practical instructions, recipes, or designs detailing *what* is necessary for something to work.

Prior to the 19th century, technological advancements were primarily based on prescriptive knowledge, often lacking a scientific basis, making cumulative improvements difficult. The breakthrough came with the Scientific Revolution and the Enlightenment, which fostered a feedback loop where propositional knowledge informed prescriptive practice (improving the steam engine with atmospheric pressure insights) and vice versa. This convergence created a vast, accessible knowledge base that could be continually built upon.

Furthermore, Mokyr emphasizes the critical role of institutional and social factors. Sustained growth requires a society that is open to change and possesses reduced resistance from established interest groups who stand to lose from new technologies. He notes that institutions that facilitated compromise and a general acceptance of intellectual and technological transformation were essential in removing a major barrier to perpetual progress.

Mokyr distinguishes between prescriptive (practical know-how) and propositional (scientific theory-based) knowledge. The fusion of both during the Enlightenment created a feedback loop that enabled continuous innovation and industrial transformation.

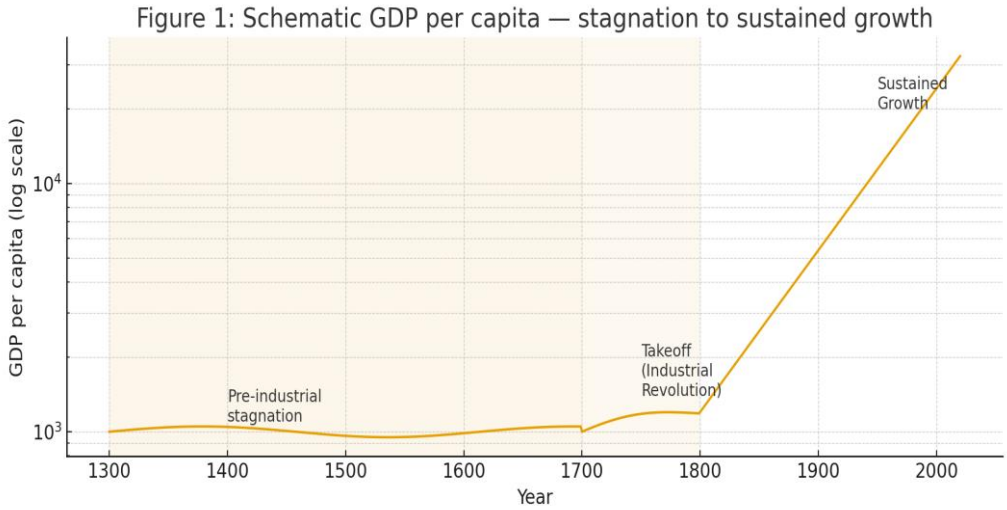


Figure 1. GDP Growth across Centuries – showing transition from stagnation (1300–1800) to sustained growth (1800–2020).

## 3. Aghion and Howitt's Model: The Dynamics of Creative Destruction

Aghion and Howitt (1992) formalized Schumpeter's idea of creative destruction. Their model describes how firms at the frontier invest in R&D, obtain temporary monopoly profits, and are subsequently displaced by newer innovations. This self-reinforcing process drives long-term macroeconomic growth despite firm-level turbulence.

The Formalization of Creative Destruction (Aghion and Howitt)

Inspired by the observed instability underlying stable macro-growth, Philippe Aghion and Peter Howitt constructed the first general equilibrium macroeconomic model of endogenous growth based on creative destruction. Their 1992 publication provides the theoretical engine for Mokyr's historical narrative. Creative destruction describes the process where a new, superior innovation emerges, rendering the existing best technology or product obsolete and driving the incumbent market leader out of business.

In their model, the prospect of earning temporary monopoly profits, secured through patents or first-mover advantage, provides the essential incentive for firms to invest heavily in Research and Development (R&D). This investment is the engine of technological progress. As R&D activity increases, the average time between innovations decreases, accelerating the destruction of existing market leadership. An economic equilibrium is established where the forces incentivizing innovation balance the forces of competition, thereby determining the sustained rate of economic growth.

Figure 2: Innovation Cycle — Creative Destruction

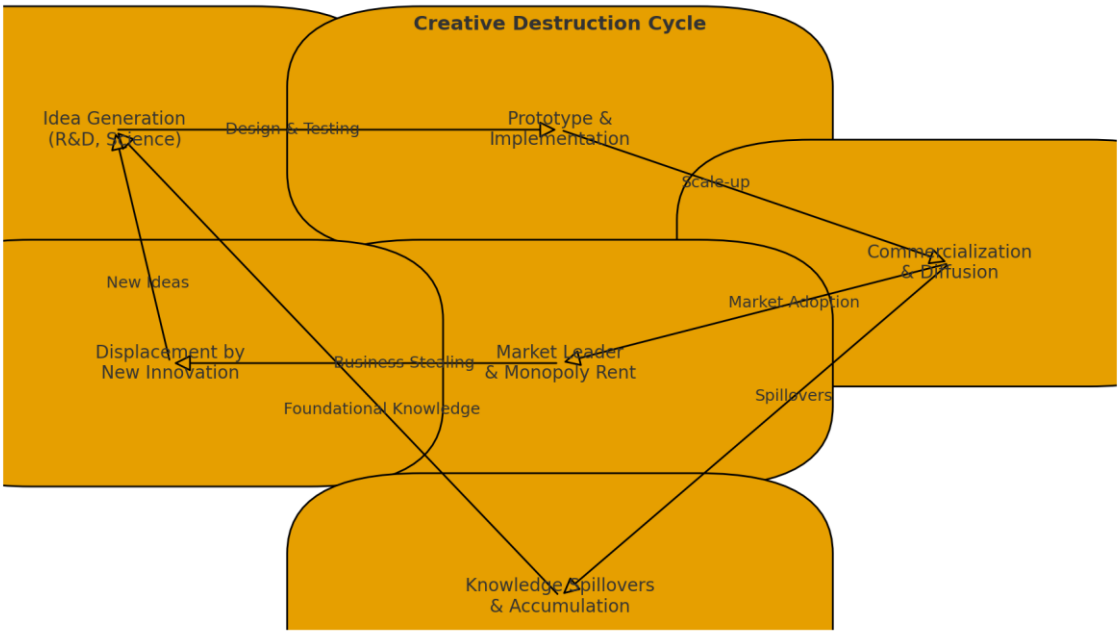


Figure 2. Innovation Cycle and Creative Destruction – illustrating firm entry, innovation, and displacement dynamics.

**4. Integrating Historical and Theoretical Insights**

The synergy between Mokyr's historical and Aghion–Howitt's theoretical frameworks lies in their emphasis on feedback mechanisms between knowledge and innovation.

**5. Contemporary Relevance: AI, Inequality, and Sustainable Growth**

Mokyr's framework suggests AI could enhance the feedback between scientific and applied knowledge, while Aghion and Howitt warn of rising inequality through accelerated creative destruction. Policies promoting flexicurity, fair competition, and environmental innovation are critical for sustainable growth.

**6. The Holistic View of Growth: Beyond GDP**

While economic growth is conventionally measured by increases in Gross Domestic Product (GDP), the laureates' work underscores that the true revolutionary impact of sustained technological innovation lies in improvements to the overall quality of life. The process of creative destruction, over the span of two centuries, has fundamentally transformed societies by delivering non-monetary benefits alongside wealth creation.

These benefits are evidenced by the sustained rise in GDP per person in industrialized nations since the 19th century, a trend indelibly linked to successive waves of innovation, from the steam engine to Artificial Intelligence.

As illustrated by the conceptual models, the outcomes of this innovation-driven growth include:

- Better Healthcare: New medicines and medical technologies resulting from R&D.
- Improved Educational Opportunities: Enhanced access to and quality of learning.
- More Leisure: Increased efficiency and productivity freeing up personal time.
- Better Products: Safer cars, more efficient home appliances, and superior goods.
- More Efficient Communication: Modern technologies like the internet and mobile communication.

This comprehensive view demonstrates that the economists' models of innovation are not merely about capital accumulation, but about the perpetual generation of utility and well-being for households, ultimately changing every facet of daily life.

Policy Implications and Contemporary Relevance

The Aghion-Howitt model yields complex welfare implications, demonstrating that the free market does not automatically achieve the optimal level of R&D investment due to two counteracting effects:

a. Intertemporal Spillovers: New innovations build upon old knowledge, creating a value for society that exceeds the private profit of the developing company. This suggests that the private incentives for R&D may be *too small*, arguing for R&D subsidies.

b. Business Stealing: The new innovation captures the entire market from the incumbent, generating private profit (often significant) even if the innovation is only marginally better than the old. This

effect suggests that R&D investment can be *too large* from a socioeconomic perspective, potentially leading to excessive technological churn.

Which force dominates depends on specific market and temporal factors. The laureates' work is crucial for modern policy, addressing issues such as market concentration—where excessive dominance by a few firms can stifle creative destruction—and the need for social safety nets. High growth necessitates high creative destruction, which in turn leads to job displacement. Therefore, policies like 'flexicurity,' which support displaced workers while making it easy for them to transition to more productive roles, are highlighted as necessary to maintain the engine of growth without incurring excessive social cost.

The combined research of Mokyr, Aghion, and Howitt provides indispensable tools for policymakers, emphasizing that sustained growth is not a natural law but a fragile equilibrium dependent on continuous innovation, appropriate market structure, and a receptive, adaptable society.

## 6. Conclusion

The laureates' contributions jointly explain how sustained growth emerged, and how it might persist in the age of AI. They underscore that innovation must be matched by inclusive institutions to sustain prosperity.

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