

# Joel Mokyr's Contribution to the Nobel Prize: The Economic Growth Theory of Knowledge Dissemination and Institutional Innovation

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**Abstract:** Joel Mokyr, the winner of the 2025 Nobel Prize in Economic Sciences, adopts an interdisciplinary perspective spanning economics and history, focusing on the "Great Divergence" issue. He has constructed a unique knowledge-based economic growth theory that profoundly reveals the origin of modern sustained economic growth. His core argument is that sustained growth relies on the accumulation and dissemination of "useful knowledge" (including propositional knowledge and prescriptive knowledge). The 17th-century "Baconian Program," by incentivizing scientific research and enhancing knowledge accessibility (such as unifying terminology and spawning academic communication media), promoted a positive cycle between science and practical inventions, becoming a crucial turning point. He further proposes three prerequisites for sustained growth: the co-evolution of science and technology, the popularization of mechanical skills, and a socially open attitude toward disruptive changes. Transcending the limitations of traditional growth models, this theory reintroduces cultural and institutional factors, complementing Aghion-Howitt's "creative destruction" theory through historical analysis and modeling. It not only provides a new explanation for issues such as the origin of the Industrial Revolution but also offers important insights for formulating economic growth policies in contemporary times and China. Mokyr's theory has been recognized by the Nobel Prize for its originality, innovative interdisciplinary research methods, and strong practical explanatory power.

**Keywords:** Joel Mokyr; Nobel Prize in Economic Sciences; Economic Growth Theory; Baconian Program; Knowledge

Accessibility; Creative Destruction

## 1. Introduction: The Historical Turning Point from Stagnation to Sustained Growth

For most of human history, economic growth has been an occasional and short-lived phenomenon. Despite occasional major technological breakthroughs, these discoveries usually only led to temporary improvements in living standards, followed by a tendency toward stagnation. However, over the past two centuries, sustained economic growth has emerged for the first time in human history. This transformation has lifted countless people out of poverty and laid the foundation for modern prosperity. This historic turning point raises a key question: Why has sustained growth become the norm in modern economies? What factors have enabled certain regions to break through traditional growth bottlenecks and enter a trajectory of sustained growth?

Joel Mokyr, the winner of the 2025 Nobel Prize in Economic Sciences, has revealed the mechanisms behind this fundamental transformation through in-depth research on historical data. Mokyr's contribution lies in explaining the origin of modern economic growth from cultural and institutional perspectives, emphasizing the key role of knowledge dissemination and social institutions in technological innovation [1], and providing a unique perspective for understanding long-term economic growth. Given that many scholars have already focused on the role of knowledge dissemination in economic growth, why has Mokyr's theory stood out and gained recognition from the Nobel Prize? This paper will delve into Mokyr's theoretical contributions and their uniqueness, analyzing why he has won the Nobel Prize among numerous studies.

## 2. Mokyr's Academic Background and Research Themes

## 2.1 An Academic Career Spanning Economics and History

Joel Mokyr was born in 1946 into a Jewish family in Leiden, the Netherlands. His parents were survivors of the Holocaust. After obtaining a bachelor's degree in economics and history from the Hebrew University of Jerusalem, he pursued further studies at Yale University in the United States and earned a PhD in economics in 1974. Mokyr's academic career has been mainly spent at Northwestern University, where he is currently the Robert H. Strotz Professor of Arts and Sciences. As a scholar spanning economics and history, Mokyr has a unique research perspective that combines economic theory with historical analysis, laying the foundation for his groundbreaking contributions in the field of economic growth research.

## 2.2 Exploration of the "Great Divergence" Issue

Mokyr's core research focus is the "Great Divergence" issue [2], i.e., why the West took the lead in entering modern growth in modern times, while the East stagnated. This issue has long attracted the attention of numerous scholars, but Mokyr's research perspective is distinctive. He is not satisfied with explaining growth differences from a single factor but explores the origin of modern growth from a broader cultural and institutional background. Unlike previous researchers, Mokyr approaches the "Great Divergence" issue from a cultural perspective and offers a unique explanation. He believes that existing research has clearly underestimated the role of "knowledge" in economic growth. Mokyr's studies show that modern growth was not confined to a single region but spread widely across Western Europe; the dependence of growth rate on institutions seems to have weakened over time; and modern economic growth is more robust, better able to withstand exogenous shocks. These characteristics are difficult to fully explain with existing economic growth theories.

## 3. Mokyr's Knowledge-Based Economic Growth Theory

**Table 1. Comparison of Mokyr's Propositional Knowledge and Prescriptive Knowledge**

Dimension	Propositional Knowledge	Prescriptive Knowledge
Core Definition	Knowledge that explains natural laws and answers "why it works"	Knowledge such as practical methods and process formulas that answers "how to do it"

## 3.1 The Accumulation and Dissemination of "Useful Knowledge"

The core argument of Mokyr's theory is that "sustained growth depends on the continuous accumulation of useful knowledge." He divides knowledge into two types: propositional knowledge and prescriptive knowledge [3]. As shown in Table 1, the former explains natural laws and answers "why it works"; the latter refers to practical methods, design drawings, or process formulas that answer "how to do it." Mokyr believes that the most effective state of innovation is "knowing both what and why"—people not only master the operational methods of things but also understand the principles behind them. This understanding enables society to continue developing on the basis of early discoveries and make progress across generations.

Before the Industrial Revolution, technology mainly relied on experience and lacked scientific principle support, leading to stagnant improvements. For example, textile technology at that time could only adjust processes based on experience but could not explain the "correlation between fiber strength and textile efficiency" (propositional knowledge), resulting in long-term low-level repetition of technology. In contrast, when James Watt improved the steam engine, he not only mastered the practical technology of cylinder sealing (prescriptive knowledge) but also combined the explanation of energy conversion by the laws of thermodynamics (propositional knowledge), thus achieving a breakthrough iteration of technology. Therefore, in Mokyr's view, innovation attempts before the Industrial Revolution were often accidental, and some methods seemed feasible but were actually unsustainable. The Industrial Revolution became a historical turning point precisely because from this period onward, propositional knowledge and prescriptive knowledge formed a positive cycle—scientific discoveries guided the improvement of practical technologies, and technological practice in turn promoted the deepening of principles, ultimately enabling the systematic accumulation of "useful knowledge."

<b>Core Characteristics</b>	Theoretical and principled, revealing the underlying logic of how things work	Practical and skill-oriented, focusing on specific operation and applications
<b>Status Before the Industrial Revolution</b>	Insufficient accumulation, not deeply integrated with practice	Mainly relying on experiential inheritance, lacking scientific principle support
<b>Role in innovation</b>	Provides theoretical support for innovation, reducing the randomness of innovation	Serves as the practical carrier of innovation, transforming theory into actual technology

### 3.2 The "Baconian Program" and the Knowledge Accessibility Revolution



**Figure 1. Logical Chain of the Knowledge Transmission Mechanism of the Baconian Program**

A key concept in Mokyr's theory is the "Baconian Program" [4], derived from the ideas of the 17th-century English philosopher Francis Bacon. The Baconian Program emphasizes the importance of understanding natural laws for conquering and transforming nature, and advocates exploring laws through experiments [5]. Mokyr specifically points out that the proposal of the Baconian Program played a crucial role in enhancing the status of knowledge in economic growth: on the one hand, it stimulated people's enthusiasm for scientific research, greatly increasing the quantity of knowledge; on the other hand, it significantly enhanced knowledge accessibility, promoting the more effective dissemination and utilization of existing knowledge (see Figure 1). Among these two aspects, Mokyr particularly emphasizes the latter—the strengthening effect of the Baconian Program on knowledge accessibility. He lists several reasons to explain how knowledge accessibility is enhanced: from a technical perspective, the Baconian Program prompted more knowledge to be recorded in unified terminology and spawned knowledge dissemination media such as academic journals, significantly reducing the cost of acquiring knowledge; the Baconian Program reshaped social culture, changed people's attitudes toward knowledge, and encouraged sharing discoveries, learning, and communication; relevant institutions also developed during this period, such as the gradual establishment of knowledge dissemination mechanisms including

universities and academic conferences; the social demand for knowledge increased significantly, and people were willing to pay for acquiring knowledge, which in turn promoted the production and dissemination of knowledge.

### 3.3 Three Prerequisites for Sustained Growth



**Figure 2. Three Prerequisites for Sustained Growth in Mokyr's Theory**

Based on research on historical data, Mokyr proposes three prerequisites for achieving sustained growth [6] (as shown in Figure 2):

- 1). The co-evolution of science and technology: People must understand why things work, not just how they work. This understanding enables society to continue developing on the basis of early discoveries and make progress across generations.
- 2). The popularization and improvement of mechanical skills: Mokyr emphasizes that the reason why Britain was the first to achieve sustained growth is that it had a large number of skilled craftsmen and engineers at that time. They could understand design plans and transform ideas into commercial products, which is crucial for achieving sustained growth.
- 3). Society must maintain an open attitude toward potential disruptive changes: Growth based on technological change will not only create "winners" but also "losers." New inventions will replace old technologies, possibly breaking existing structures and working methods. Mokyr also points out that for this reason, new technologies often encounter resistance from vested interest groups who

believe their privileges are threatened.

#### 4. The Unique Contributions of Mokyr's Theory

##### 4.1 Transcending the Limitations of Traditional Growth Theories

Mokyr's theoretical contribution lies in explaining the origin of modern economic growth from cultural and institutional perspectives, emphasizing the key role of knowledge dissemination and social institutions in technological innovation, and providing a unique perspective for understanding long-term economic growth. This theory transcends the limitations of traditional growth theories, especially Robert Solow's exogenous growth model [7]. Solow's theory has an important flaw: it fails to explain the driving force of growth—how technological progress actually occurs.

By studying historical data, Mokyr reveals why sustained growth has become the norm in modern economies. He takes a unique approach, providing a new explanation for why the Industrial Revolution occurred in Western Europe rather than elsewhere from the perspective of "knowledge ecology." Mokyr believes that the "Baconian Program" represented by Francis Bacon during the Enlightenment was crucial. This program not only incentivized scientific research but also reshaped knowledge "accessibility." The promotion of unified terminology, the birth of academic journals, the establishment of scientific societies, and the formation of an open communication culture together constituted an ecosystem that encourages knowledge exploration and dissemination, enabling a positive cycle between scientific explanations and practical inventions, accumulating the knowledge system, and creating prerequisites for technological progress to achieve sustained growth.

##### 4.2 The Reintroduction of Cultural and Institutional Factors

Before Mokyr, most economists had abandoned the view that "culture affects the economy," not only because it provided cover for racists but also because it lacked sufficient explanatory power. In 1970, Nobel laureate Robert Solow ironically stated that attempts to explain growth using variables such as culture often "end in the

magnificent failure of amateur sociology." However, through rigorous historical analysis and theoretical construction, Mokyr successfully reintroduced cultural and institutional factors into the research framework of economic growth.

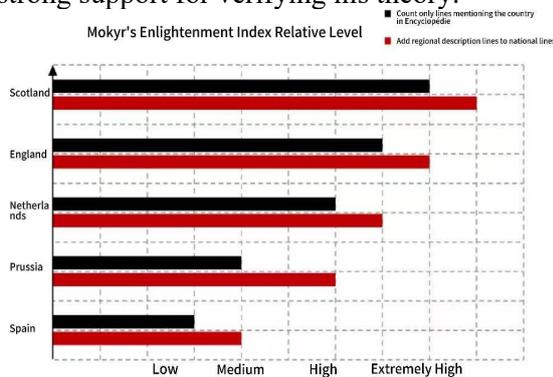
Mokyr's studies show that cultural and institutional factors have a profound impact on economic growth by influencing the production, dissemination, and application of knowledge [8]. He proposes that a society must have mechanisms to accommodate, protect, and even reward new ideas to sustain innovation. This explains why Britain took the lead on the path of growth in the 17th century: not because of natural resources, but because of ideological emancipation. This theoretical contribution of Mokyr provides a more comprehensive and in-depth perspective for understanding long-term economic growth, filling the gap in economic growth theory in this regard.

##### 4.3 The Innovative Application of Historical Methods

As an economic historian, Mokyr's main contribution lies in showing how modern growth emerged through the collation and analysis of a large amount of historical data. He uses historical data as a method to reveal the reasons why sustained growth has become the new normal. Mokyr's research method is different from traditional economic theory research; he deeply integrates the history of ideas, political history, and economic history [9], combining vivid narratives with rigorous quantitative methods to comprehensively examine various mechanisms affecting economic growth.

To verify his views, Mokyr counted the number of lines describing each country in the *Encyclopédie ou Dictionnaire Raisonné des Sciences, des Arts et des Métiers* and divided it by the local population to construct an "Enlightenment Index." He adopted two methods (as shown in Figure 3): the first only counted the lines mentioning the country, and the second added the lines describing specific regions of the country on the basis of the national lines, thus obtaining two versions of the index. After comparing the Enlightenment Indexes of various countries, Mokyr found that the indexes of England, Scotland, and the Netherlands were much higher than that of France, which was traditionally regarded as the center of the Enlightenment, and this

distribution was exactly consistent with the order of economic take-off in Europe. This innovative historical analysis method provided strong support for verifying his theory.



**Figure 3. Comparison of the Dual Statistical Dimension of Mokyr's Enlightenment Index (Data source: Mokyr's line count of the Encyclopédie ou Dictionnaire Raisonné des Sciences, des Arts et des Métiers and population-standardized calculation)**

## 5. The Complementarity between Mokyr's Theory and the Aghion-Howitt Model

### 5.1 The Introduction of the "Creative Destruction" Theory

In the 2025 Nobel Prize in Economic Sciences, Mokyr shared the award with Philippe Aghion and Peter Howitt, with Mokyr receiving half of the prize money and Aghion and Howitt sharing the other half. In the press release issued on the same day, the Nobel Committee pointed out that Mokyr revealed why sustained growth has become the norm in modern economies through research on historical data [10]. Aghion and Howitt, on the other hand, studied the operational mechanisms behind sustained growth. In a 1992 paper, they constructed a mathematical model to explain "creative destruction" [11]: when a new, better product enters the market, enterprises selling old products will be impacted.

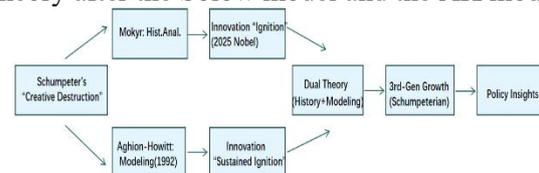
Aghion and Howitt's theoretical contribution is their research on the idea of "creative destruction" [12]. In their theory, Aghion and Howitt assume that product production in the economy requires certain technologies as intermediate inputs. If an enterprise masters the technology for production, it can possess market power and obtain excess monopoly profits. In the economy, technological progress is achieved through the replacement of old and new technologies. People obtain new technologies

through R&D investment, but whether R&D can succeed is random to a certain extent. Once R&D is successful and a newer technology is produced, the corresponding old technology will be destroyed.

### 5.2 The Combination of Historical Analysis and Theoretical Modeling

Mokyr's historical analysis complements Aghion-Howitt's theoretical modeling [13] (as shown in Figure 4). Specifically, Mokyr reveals the interactive relationship between technology, culture, and institutions from a historical perspective, while Aghion and Howitt show how innovation replaces old structures [14] and drives economic growth through mathematical models. This theoretical combination spans historical observation and model analysis, providing a complete framework for understanding long-term economic growth and important insights for policymakers.

Mokyr's research explains when innovation is "ignited," while Aghion and Howitt reveal how innovation becomes the "sustained engine" of economic growth. In 1992, their pioneering co-authored paper "A Model of Growth Through Creative Destruction" [15] formally mathematized Joseph Schumpeter's creative destruction theory and incorporated it into mainstream economic growth models. The Schumpeterian Growth Theory [16] they founded has become the third-generation growth theory after the Solow model and the AK model.



**Figure 4. Mokyr-Aghion-Howitt Theoretical Complementarity Framework**

## 6. Policy Implications of Mokyr's Theory

### 6.1 Implications for Contemporary Economic Policies

Mokyr's research not only deepens people's understanding of long-term growth but also provides insights for contemporary issues. His theory emphasizes the key role of knowledge dissemination and social institutions in technological innovation, which has important guiding significance for formulating policies to promote sustained economic growth.

Mokyr's theory shows that sustained growth is

not a given [17], and society must always be vigilant against risks that hinder progress. In its award citation, the Nobel Committee warned: "The laureates' work shows that economic growth cannot be taken for granted. We must safeguard the mechanisms behind creative destruction so that we do not fall into stagnation again." This warning is particularly important in the current context of slowing global economic growth and accelerating technological iteration.

## 6.2 Implications for China's Development

Wang Yanhang, a senior researcher at the Chongyang Institute for Financial Studies of Renmin University of China, stated in an interview that Mokyr, through a combination of a large number of micro-historical materials and macro-narratives, points out that modern economic growth truly started after the Industrial Revolution not because of a single technological breakthrough, but because of a shift in ideological paradigm: humans began to systematically ask "why" rather than just "how." This view has important implications for understanding China's economic development.

Xie Danxia, a doctoral supervisor and tenured associate professor at the Institute of Economics, School of Social Sciences, Tsinghua University [18], also pointed out that Mokyr's research deeply integrates the history of ideas, political history, and economic history, combining vivid narratives with rigorous quantitative methods to comprehensively examine various mechanisms affecting economic growth. Influenced by Professor Mokyr, Xie Danxia has also proposed a new mechanism for explaining long-term economic growth, especially the origin of the Industrial Revolution—that the development of information carrier technologies such as papermaking and printing may be an important factor driving the occurrence of the Industrial Revolution.

## 7. Why Mokyr's Theory Won Nobel Prize Recognition

### 7.1 Theoretical Originality and Breakthrough

Although most people agree on the role of knowledge dissemination in economic growth and there have been related studies, Mokyr's theory has won Nobel Prize recognition because he systematically expounds how factors such as knowledge dissemination, culture, and

institutions interact to form an environment conducive to innovation and economic growth, deeply depicting the origin and evolution of modern economic growth, and filling the gap in economic growth theory in this regard.

Mokyr's theoretical contribution lies not only in emphasizing the importance of knowledge dissemination but also in systematically expounding how factors such as knowledge dissemination, culture, and institutions interact to form an environment conducive to innovation and economic growth. His research shows that sustained growth is not an accidental miracle but the result of the joint action of science, institutions, and open competition. This theoretical framework provides a more comprehensive and in-depth perspective for understanding long-term economic growth, with important theoretical value and practical significance.

### 7.2 Innovation in Interdisciplinary Research Methods

The innovation of Mokyr's research methods is also an important reason for his Nobel Prize recognition. He combines economic history, cultural history, the history of science, and economic theory to create a new research paradigm. This interdisciplinary research method enables him to understand the nature of economic growth from a broader perspective and reveal phenomena that are difficult to explain by traditional economic theories.

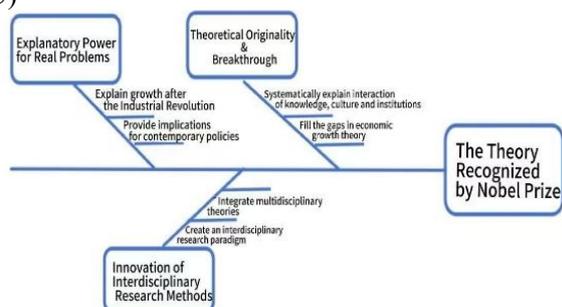
Mokyr's research methods have influenced subsequent scholars, including his students and collaborators. For example, Xie Danxia, a doctoral supervisor at the Institute of Economics, School of Social Sciences, Tsinghua University, stated that Mokyr's research methods have had a great impact on him, prompting him to propose a new mechanism for explaining long-term economic growth, especially the origin of the Industrial Revolution. This influence indicates that Mokyr's research methods are pioneering and inspiring.

### 7.3 Explanatory Power for Practical Issues

Mokyr's theory not only has theoretical value but also strong practical explanatory power. His research explains why modern economic growth emerged after the Industrial Revolution [19], why it occurred in certain regions rather than others, and why sustained growth has become the norm in modern economies. These issues are

of great significance for understanding the contemporary global economic pattern and formulating policies to promote sustained economic growth.

In its award citation, the Nobel Committee pointed out that the research of the three laureates not only deepens people's understanding of long-term growth but also provides insights for contemporary issues. For example, the development of artificial intelligence is expected to accelerate knowledge accumulation, but technological progress may also bring negative impacts such as environmental pollution and increased social inequality, which require improved policies to address [20]. Mokyr's theory provides a theoretical framework for understanding these contemporary issues and guidance for formulating corresponding policies. (see Figure 5)



**Figure 5. Fishbone Diagram Analyzing the Reason for Mokyr's Theory Winning Nobel Prize Recognition**

## 8. Conclusion

Joel Mokyr was awarded the Nobel Prize in Economic Sciences for his unique and influential theoretical contributions to explaining the origin of modern economic growth. He explains the origin of modern economic growth from cultural and institutional perspectives, emphasizing the key role of knowledge dissemination and social institutions in technological innovation, and providing a unique perspective for understanding long-term economic growth.

By studying historical data, Mokyr reveals why sustained growth has become the norm in modern economies. He takes a unique approach, providing a new explanation for why the Industrial Revolution occurred in Western Europe rather than elsewhere from the perspective of "knowledge ecology." He believes that the "Baconian Program" represented by Francis Bacon during the

Enlightenment was crucial. This program not only incentivized scientific research but also reshaped knowledge "accessibility." The promotion of unified terminology, the birth of academic journals, the establishment of scientific societies, and the formation of an open communication culture together constituted an ecosystem that encourages knowledge exploration and dissemination, enabling a positive cycle between scientific explanations and practical inventions, accumulating the knowledge system, and creating prerequisites for technological progress to achieve sustained growth.

Mokyr's research goes beyond emphasizing the value of knowledge dissemination; it systematically explains the interactive mechanism of knowledge, culture, and institutions: the three jointly shape an environment conducive to innovation and growth, comprehensively depicting the origin and evolution logic of modern economic growth, and filling the analytical gap of traditional growth theories. This theory provides a more comprehensive framework for explaining long-term economic growth, with both theoretical depth and practical guiding significance, and thus has been recognized by the Nobel Prize.

As the Nobel Committee pointed out, Mokyr's research reminds us that economic growth is not "taken for granted," and we must safeguard the mechanisms driving "creative destruction" to avoid growth stagnation. In the current context of slowing global economic growth and accelerating technological iteration, Mokyr's theory has important guiding significance and practical reference value for formulating policies to promote sustained economic growth.

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