

Companion for Chapter 3 - A Brief History of Economic Development

SUMMARY

- Before the start of the Industrial Revolution, total world output was essentially flat and the world was fairly equal in income levels. Most parts of the world were rural, with smallholder peasant farmers trying to eke out a survival for their families. Then around 1750, there was an economic takeoff and world output increased dramatically. This takeoff was due both to rising output per person and increasing population. The world population was fairly stable for thousands of years (below half a billion) before it rapidly increased to over 7.2 billion today. Gaps in income opened up between the rich and the poor: some parts of the world transformed from peasant agriculture to a modern high-tech, knowledge-intensive industrial and service economy, while other parts of the world remained at subsistence levels.
- Modern economic growth began in England around 1750. A unique combination of forces spurred this growth in economic life that eventually spread to the entire world. Agricultural productivity started to rise and rural areas were able to produce a surplus for the industrial workforce. Topography, river ways, canals, ports, and mineral deposits in combination with market incentives, rule of law, and a university-led scientific outlook all helped boost growth.
- In 1776, in an environment where commercial law existed and intellectual property rights were recognized, James Watt improved on a previous steam engine design, and patented his Watt steam engine. His invention made it possible to efficiently and economically harness massive amounts of energy from coal deposits.
- There are two kinds of economic growth: endogenous and catch-up growth. Endogenous growth is driven by relentless technological innovation; it is associated with the growth of the world's technological leaders. Specifically, endogenous growth is a process of dynamic increasing returns to scale in the economy. Technological breakthroughs raise GDP, which increases the purchasing power of the market for further innovations, which then increases the incentives for investing in R&D and spurs even further breakthroughs that in turn raise GDP further, etc. The result is a kind of chain reaction that keeps the growth process in motion.
- Catch-up growth is driven by adopting technologies from abroad, rather than developing them any home. It is associated with the growth of a “laggard” country (a country lagging behind the technological leader). Catch-up growth can be considerably faster than endogenous growth as it is not centered around inventing wholly new economic systems or technologies.
- Recognizing the fundamental differences between these two kinds of growth is critical to understanding what types of institutions a country needs in order to foster economic growth. Institutions fostering innovations are needed to sustain endogenous growth, while institutions for rapid adoption and diffusion of technology are needed for catch-up growth. 180
- Since the Industrial Revolution, several waves of technological change have kept the process of endogenous growth moving forward: the steam age (1780–1830), the age of steel production

and railway building (1830–1880), the age of electricity (1880–1930), the age of the automobile, of the chemical industry and of aviation (1930–1970), and the age of information and communication technologies (1970–2010). Russian economist Nikolai Kondratiev regarded these long waves of technological change as the main drivers of economic advancement and also a source of economic crisis when one cycle reaches its conclusion.

- In 1965, the CEO of Intel Gordon Moore noted that the transistor count on an integrated circuit was doubling roughly every 18 to 24 months. This phenomenon, dubbed Moore's law, has been observed for roughly 58 years.
- The United States has been the main technological leader for well over a century and has had a per capita growth rate of 1.7% per year since approximately 1820. For most of the world, economic growth has been about catching up with the technological leader through a process of diffusion. However economic growth does not ripple through the world homogeneously. Several factors make catch-up growth more or less easy to achieve: access to navigable ways for trade, geographic proximity to the technological leader, favorable agricultural conditions, easily available energy resources, a low disease burden and productive politics.
- The first country in history to reach the \$2,000 income per capita threshold was Great Britain. Economic growth then diffused within Europe, reaching the countries closest in proximity first. The first places outside Europe to take off were the United States and Australia as early as in the first half of the 19th century, and then by 1900, the Southern Cone of South America and Japan. The rest of the world did not experience economic growth until 1950.
- By 1945, and until the end of the Cold War in 1991, the world economy was divided in four parts: the “First World” (United States, Western Europe and Japan), the “Second World” (Communist countries), the “Third World” (the unaligned newly independent postcolonial countries), and the “Fourth World” (the poorest of the poor countries).
- The First World went through a period of rebuilding after World War II. Then endogenous technological growth took hold and living standards rose rapidly. In the Second World, industrialization first seemed dynamic, but then came to a halt. This prompted political and economic reforms. In 1978, Deng Xiaoping came to power in China and opened the country to a market system, international trade and foreign investment. These reforms unleashed catch-up growth in China.
- A few countries of the Third World, the “Asian Tigers” (South Korea, Taiwan, Hong-Kong and Singapore), integrated with the First World to create a new industrial base for producing goods for the First World. This opened their doors to trade and foreign investment in order to catch the ripples of global technology-based growth.
- Gradually, the world entered an era of globalization. Facilitated by technological breakthroughs, systems of production became global. These global production systems became centered around large multinational companies dividing their value chain of production among countries to take advantage of differences in wages, skills and transport conditions.

MODELING COMPANION

To delve further, read through modeling companion C on how various production functions can be used to model different types of economies (from hunter-gatherers to industrial).

Concepts and Definition

Can you define or explain the significance of these concepts?

Economic takeoff	Catch-up growth
Industrial revolution	Kondratiev waves
Watt engine	Moore's law
Scientific Revolution	Diffusion
Invisible hand	First, Second, Third and Fourth Worlds
<i>The Communist Manifesto</i>	Asian Tigers
<i>The Wealth of Nations</i>	Global production systems
Endogenous growth	Flying geese model

Check your facts

- 1) How long does it take to double the number of transistors in an integrated circuit?
- 2) What is the name for the above law?
- 3) Around what year did global GDP take off?
- 4) What year did James Watt create the modern steam engine, Adam Smith write *The Wealth of Nations* and the American colonies declare independence?
- 5) What are typical values for the rate of endogenous growth?
- 6) What are typical values for the rate of catch-up growth?
- 7) What are the first and fifth Kondratieff waves?
- 8) Who started reforming the Chinese economy and when?
- 9) Who started reforming the Soviet economy and when?
- 10) What are South Korea, Taiwan, Hong-Kong and Singapore often referred to as?

Answers: 1)18-24 months; 2)Moore's law; 3)1750; 4)1776; 5)1-2% ; 6)5-10% 7)Steam Engine, ICT; 8)Deng Xiaoping in 1978; 9)Mikhail Gorbachev in 1985; 10)The Asian Tigers

Review questions

- How different was the world in 1000 from 1700?
- How did the world look like before the Industrial revolution?
- What triggered the takeoff in economic development? When and where was that?
- Which technologies are seen as key contributors to the takeoff?
- Are there different types of economic growth? If so, explain what they are.
- How is endogenous growth different from exogenous growth?
- What type of institutions are needed to foster these different types of growth?
- What are Kondratiev waves?
- What conditions are conducive to diffusion?
- What role does trade play in economic growth? How can it be facilitated?
- How might geography impact the diffusion of economic growth?
- What are the historical patterns of catch-up growth?
- What did the the geopolitical order in the post-WWII world look like?

Who are the Asian Tigers? Why do we call them like that and when did they start industrializing?

DATA ACTIVITIES

EASY

A. Agriculture, Industry and Services

Go to the World Bank database (<http://data.worldbank.org/country>) and look up the following indicators: Agriculture, value added (% of GDP); Industry, value added (% of GDP); Services, etc., value added (% of GDP). Use the graph tool on the website to learn about these indicators for each of the income groups (low, middle, high income).

- 1) Which income group is highly dependent on agriculture?
- 2) Which income group is highly dependent on industry?
- 3) Which income group is highly dependent on services?

Answer: 1) low; 2) middle; 3) services

EASY

B. Year passing \$2,000 GDP per capita

Take a look at Figure 3.3 in the textbook.

- 1) Explain what this map represents.
- 2) How is this map related to different types of economic growth?
- 3) Do you observe any interesting patterns?

MEDIUM

C. History of Economic growth and Population

Using www.gapminder.org, plot the history of economic growth and population from 1800 to the present day.

- 1) Explore the data visualization tools under the “Gapminder World” tab.
 - a) Choose 5 countries with different present day economic outcomes. Plot the history of economic growth for each. State the criteria you have used to choose your countries and economic indicators.
 - b) Plot the history of economic growth and population in your chosen countries from 1800 to present day. You can use “Income per person” as your economic indicator in the x-axis and “Population” as the indicator in the y-axis. Click on the “Play” button to visualize how the values changed throughout time. Describe what you observe.
- 2) Download the data you used in 1 b) by using the Data tab in Gapminder.org, and reproduce your results in Excel or Google Spreadsheet.

MEDIUM

D. It all started in England...

The table below provides a list of Britain's advantages at the dawn of the Industrial Revolution and helps explain why endogenous growth started there around 1750.

Factors in Economic Takeoff	British Advantages
Government	Parliamentary system, limited government
Property Rights	Patents, contract, labor, land markets
Geopolitics	British naval superiority, protection from invasion, colonial possessions
Primary Resources	Domestic supplies of coal and iron, colonial supplies of cotton
Climate	Temperate

Agriculture	Rotation system
Labor Supply	No feudal obligations, enclosures, landless peasantry
Disease Burden	Moderate
Science and Technology	Scientific Revolution (Bacon and Newton)
Innovation Systems	Patents, universities, book culture

- 1) Identify which of these factors are related to the geography of Britain, and for each of these factors, explain precisely why that factor was an advantage. (In other words, explain why that factor would have benefited an economic takeoff).
- 2) Identify which of these factors are related to economic institutions, and for each of these factors, explain precisely why that factor was an advantage
- 3) Identify which of these factors are related to political institutions, and for each of those factors, explain precisely why that factor was an advantage

DISCUSS AND DEBATE

- 1) Using the table in data activity D, discuss and debate the relative importance of the different factors in Britain's economic takeoff.
- 2) In the 15th century, China had a clear technological superiority, particularly in shipping technology, and so European progress was very dependent on technology transfers from Asia (Maddison 2007). Discuss why the Industrial Revolution happened in Europe rather than in Asia, and in England rather than in the rest of continental Europe. Which arguments do you find most persuasive?
- 3) Discuss the possibility of a Kondratiev sixth wave of sustainable technologies. What are positive and negative factors that could foster such a technological wave?
- 4) Based on figures 3.6 and 3.7 in the book, and on the case study below, discuss various factors that might deter Foreign Direct Investment (FDI).
- 5) According to Angus Maddison (see further reading, below), in 1700, 40% of the Netherland's labor force was in agriculture. Is this notable? Why or why not? What percentage of the labor force worked in agriculture for the other European countries have at that time?
- 6) Describe and comment on table 3.5, "Per Capita GDP Performance in the Three Most Successful Phases of the Capitalist Epoch" in *The World Economy* by Angus Maddison.
- 7) Using the case study of Bangladesh below, discuss the nature of global value chains and the role of foreign direct investment (FDI), in particular with respect to technological diffusion.

CASE STUDY

Challenges facing the garment industry of Bangladesh: Roles of domestic and foreign companies

Bangladesh has been recognized as one of the “Next 11” emerging countries to watch, following the BRICS countries (Brazil, Russian Federation, India, China, and South Africa) and listed among the “Frontier Five” emerging economies, along with Kazakhstan, Kenya, Nigeria and Viet Nam. The RMG (ReadyMade Garment) industry has been the major driver of the country’s economic development in recent decades and is still fundamental to the prospects of the Bangladesh economy. This industry is considered the “next stop” for developed country TNCs (Transnational Companies) that are moving labor sourcing away from China. This opportunity is essential for development, as Bangladesh needs to create jobs for its growing labor force.

With the prediction of further growth in the industry and the willingness of developed country firms to source from Bangladesh, the picture on the demand side seems promising. However, realizing that promise requires the country to address constraints on the supply side. At the national level, poor infrastructure continues to deter investment in general and FDI in particular (UNCTAD, 2013a). At the firm level, one issue concerns the need for better compliance with labor legislation, as illustrated by several tragedies in the country’s garment industry. Besides strengthening such compliance, the industry needs to develop its capabilities, not only by consolidating strengths in basic garment production, but also by diversifying into higher-value activities along the RMG value chain.

Currently, Bangladesh’s garment firms compete predominantly on price and capacity. The lack of sufficient skills remains a major constraint, and both domestic and foreign-invested firms need to boost their efforts in this regard. A recent UNCTAD study shows the dominance of basic and on-the-job training, which links directly to established career trajectories within firms. However, high labor turnover hampers skill development at the firm level. On-the-job training is complemented by various initiatives supported by employer organizations, which have training centers but often cooperate with governmental and non-governmental organizations.

FDI has accounted for a relatively small share of projects in the Bangladesh RMG industry in recent years. During 2003–2011, only 11 per cent of investment projects registered in the industry were foreign-originated. Nevertheless, owing to the larger scale of such projects, they account for a significantly high share of employment and capital formation, and they can be an important catalyst for skills development in the labor force.

UNCTAD World Investment Report 2014.Box II.2.

http://unctad.org/en/PublicationsLibrary/wir2014_en.pdf

FURTHER READING

- **Big history**

Pulitzer Prize winning book presenting a study of global history through the lens of geography, demography, and ecological happenstance. Diamond's thesis sheds light on why Western civilization became hegemonic.

[Diamond, J. \(1999\). *Guns, germs, and steel: the fates of human societies*. W.W.Norton Co.](#)

- **Economic history**

Economic historian Angus Maddison estimated the GDP per person over the long time period from the start of the Common Era (1 C.E.) and provided very detailed data for after 1820. This is the most extensive effort to document historical economic indicators. Read the following: Introduction and Summary (p:19-27), Chapter 1: p: 29-33, Chapter 3: p:125-130.

[Maddison, Angus. 2006. *The World Economy*. Paris: Organization for Economic Co-operation and Development.](#)

Chapter 2 of "The End of Poverty" contains a short summary of two hundred years of modern economic growth describing how the world moved from universal poverty to varying degrees of prosperity (p: 26-50).

[Sachs, Jeffrey D. *The End of Poverty*. Chapter 2: The Spread of Economic Prosperity](#)

Article sketching the worldwide change over the past two centuries through the concept of standard of living.

[Easterlin, R. A. \(2000\). The worldwide standard of living since 1800. *Journal of Economic Perspectives*, 14 \(1\).](#)

Part 1 chapter 1 of this volume summarizes recent research by growth economists on how mankind escaped from poverty with a focus on demography, institutions, human capital, and technology. It contrasts these interpretations with the existing historical evidence and recent findings of economic historians.

[Mokyr, J. and Voth, H. 2010. *Understanding growth in Europe, 1700–1870: theory and evidence*. The Cambridge Economic History of Modern Europe, Vol. 1: 1700-1870 \(Eds, Stephen Broadberry. and Kevin O'Rourke\). Cambridge: Cambridge University Press, pp. 7-42.](#)

- **Historical essays**

British economist John Maynard Keynes describes the long period of stasis from the time of the Roman empire until the onset of the Industrial Revolution.

[Keynes, John Maynard. 1930. "Economic Possibilities for Our Grandchildren."
\[www.econ.yale.edu/smith/econ116a/keynes1.pdf\]\(http://www.econ.yale.edu/smith/econ116a/keynes1.pdf\).](#)

Adam Smith was the first economist to explain the workings of a modern economy in terms of specialization and the division of labor.

[Smith, Adam. 1776. *An Inquiry into the Nature and Causes of the Wealth of Nations*. <http://www2.hn.psu.edu/faculty/jmanis/adam-smith/wealth-nations.pdf>.](#)

One of the fiercest critics of the harshness of early industrialization was of course none other than Karl Marx and his coauthor Friedrich Engels.

Marx, Karl, and Frederick Engels. 1848. *Manifesto of the Communist Party*. <https://www.marxists.org/archive/marx/works/download/pdf/Manifesto.pdf>.

John Maynard Keynes looked back to the period just before World War I and described the unique global circumstances of the time.

Keynes, John Maynard. 1920. *The Economic Consequences of the Peace*. *Library of Economics and Liberty*. Accessed June 26, 2014. <http://www.econlib.org/library/YPDBooks/Keynes/kynsCP2.html>.

- **Convergence and Divergence**

Article evaluating the robustness the theory of convergence.

De Long, J. B. D. (1988). *Productivity growth, convergence, and welfare: comment*. *American Economic Review*, 78 (5).

Article arguing that divergence in productivity levels and living standards is the dominant feature of modern economic history.

Pritchett, L. (1997). *Divergence, big time*. *Journal of Economic Perspectives*, 11 (3).

Pomeranz examined the causes and mechanisms that brought about the great divergence between the West and the rest of the world challenging elements of every major interpretation of the European take-off.

Pomeranz, K. 2000. *The Great Divergence: China, Europe, and the Making of the Modern World Economy*. Princeton: Princeton University Press.

- **Technologies**

Article investigating the impact of steam technologies on productivity growth, whether steam measures up to the contribution of ICT in the late twentieth century and whether steam's contribution to productivity growth is responsible for the chronology of trend growth in the economy overall.

Crafts, N. 2004. *Steam as a general purpose technology: A growth accounting perspective*. *The Economic Journal*, 114(495), pp. 338-351.

Using British trade data, this article presents a test of the two main views of the British Industrial Revolution: the first one sees it as a broad change in the economy and society; the second as the results of technical change in only a few industries.

Temin, P. 1997. *Two views of the British industrial revolution*. *The Journal of Economic History*, 57(01), pp. 63-82.

Allen argues that the spinning jenny helps explain why the Industrial Revolution occurred in Britain rather than in France or India.

Allen, R. 2009. The industrial revolution in miniature: The spinning jenny in Britain, France, and India. *The Journal of Economic History*, 69(04), pp. 901-927.

- **Technological transitions**

This paper suggests that the geographical patterns of income differences across the world have deep underpinnings and emphasize that economic development is a complex process driven by economic, political, social, and biophysical forces.

McCord and Sachs, "Development, Structure, and Transformation," NBER Working Paper 19512, October 2013

Landes comments on the struggle to pass from preindustrial to industrial and the role of technological progress.

Landes, D. 1990. *Why are we so rich and they so poor?*, *American Economic Review* 80(2), pp. 1-13.

Allen, R. 2011. *Global Economic History: A Very Short Introduction*, Oxford: Oxford University Press.

Landes sheds light on the paradox that while, a thousand years ago, the Chinese were ahead of anyone else, China did not produce the kind of scientific and industrial revolutions that gave Europe world dominion.

Landes, D. 2006. *Why Europe and the West? Why not China?*, *Journal of Economic Perspectives* 20(2), pp. 3-22.

Wrigley provides an account of the role that energy supplies played in the emergence of modern economic growth and argues for the centrality of energy in the historical rise of industrial societies.

Wrigley, E. 2010. *Energy and the English Industrial Revolution*. Cambridge University Press, Cambridge, UK.