

The Art of Economic Catch-Up

In his previous Schumpeter Prize-winning work, Lee analysed the “middle-income trap,” in which a developing country grows strongly only to plateau at a certain point. Yet certain developing countries, most significantly China, have managed to escape this trap. Building on the conception of the ladder from developing to developed countries being kicked away, this book suggests alternative ways, such as “leapfrogging,” in which latecomers can catch up with their forerunners. Providing policy solutions for development challenges in nontechnical terms, Lee frames his theories with insightful and inventive allegories. In doing so, he also accounts for the catch-up paradox, in which one cannot conclusively catch up if they are continually trying to follow the path of those ahead. Lee argues that eventual catch-up and overtaking require pursuing a path that differs from that taken by forerunners. This highly original and accessible book will appeal to students, scholars, practitioners, and anyone interested in economic development and innovation.

KEUN LEE is Professor of Economics at the Seoul National University, and the founding director of the Center for Economic Catch-up. He was also the President of the International Schumpeter Society, and a member of the UN Committee for Development Policy, and currently an editor of *Research Policy*, a council member of the World Economic Forum, and a member of the governing board of Globelics. He was awarded the 2014 Schumpeter Prize for his book on *Schumpeterian Analysis of Economic Catch-up: Knowledge, Path-creation and the Middle Income Trap* (Cambridge University Press, 2013).

Economists and policy makers all over the world are eager to understand better the remarkable technological and economic development of Korea, Taiwan, and more recently China from poor backward economies to economies supporting a number of world class sophisticated industries. In my view the writings over the past decade of Keun Lee have provided great illumination regarding how this progress has been achieved. This book provides a coherent and accessible review of his analyses and takes it further to consider how these countries have been able to reach the technological and economic frontiers despite increasing resistance from firms and countries who have not welcomed this new competition. This book is essential reading for those interested in economic development.

– Richard R. Nelson, Columbia University

Only a few middle-income economies have been able to cross the hurdle to reach high-income status since the end of World War II. Drawing from the experiences of those few economies, the book not only identifies the key for the success to sustain dynamic, technological innovation but also provides practical advice to the enterprises and the government in a middle-income economy about how to do it. This is an impeccably researched and very readable book. A must read for anyone who is concerned about the middle-income trap and how to overcome it.

– Justin Yifu Lin, Dean, the Institute of New Structural Economics and Institute of South-South Cooperation and Development, Peking University; Former Chief Economist, the World Bank

Building on his mastery of state-of-the-art economic theories and drawing on his unparalleled knowledge of how firms and nations develop, Keun Lee has produced an invaluable guide to economic catch-up. The book provides very pragmatic but highly sophisticated advice to policy makers and firm-managers in developing nations that want to develop their economies. It is simply a remarkable book.

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– Ha-Joon Chang, University of Cambridge, author of *Kicking
Away the Ladder* and *Economics: The User's Guide*

A world expert on how developing countries catch up to developed ones, Professor Keun Lee has now written an accessible and important book about the strategies developing countries can use to overcome the barriers they face. This is a must-have book for both policy makers and businessmen in developing countries.

– Lord David Sainsbury, former Minister of Science and
Innovation, UK Government

Keun Lee's new book starts with a deep meditation on the process and detours of economic transformation, and quickly becomes a captivating treatise and a sparkling manifesto on the mechanics of sustained economic changes. It ends up being a policy blueprint on how to handle the big issues that keep economists, political leaders, development experts, and ordinary citizens up at night. Keun Lee has charted the path to economic nirvana.

– Célestin Monga, Vice-President, African Development
Bank Group

Using colorful metaphors and rich case studies, this provocative volume very effectively distills the insights from Lee's prize-winning *Schumpeterian Analysis of Economic Catch Up* for generalists and policy makers. Based on his formidable experience in East Asia, Lee postulates a set of barriers developing countries potentially face to following established development paths. He then offers valuable lessons on, for instance, the limitations of passive GVC insertion strategies, or the identification of "windows of opportunity" where entry barriers are not yet established. Taken together, Lee offers central elements of what he intriguingly terms the "art of catch up" – of identifying or creating new paths to prosperity.

– William Maloney, Chief Economist of Equitable Growth,
Finance, & Institutions, World Bank

With the technological frontier changing as fast as it is now, a must-read to better understand the past and the future of development. Lee provides compelling evidence that catching up is an “art” with no predetermined path and makes societies and policy makers accountable for their choices.

– Annalisa Primi, Head, Structural Policies and Innovation,
Development Center, OECD

Keun Lee’s new book proposes strategies for industrial development that are current, feasible, and well argued. He brings a welcome recognition of the scale of China’s industrialization and its implications for the greening of development strategies.

– Professor John Mathews, Macquarie University, Sydney

In this book, one of the forefront thinkers today derives an attractive argument for the closing of the development gap between latecomer and leading countries. Framed along the catch-up paradox, the argument is based on the concept that one is not able to catch up if s/he just keeps catching up. In the author’s words, eventual catch-up and overtaking require economies to pursue a path that differs from that taken by the forerunners. The important concepts here are building capabilities and leapfrogging by swiftly exploiting windows of opportunity. Keun Lee uses his virtuosity and deep understanding of the development process to put forward a very exciting book. A must-read for development economists in the field of technology upgrading and economic convergence.

– Nick Vonortas, Professor, the George Washington
University and Editor, *Science and Public Policy*

This lucidly written book is a seminal research work that recognizes narrow pathways with high risks and uncertainty, but shows alternative ways to move ahead on the sustainable path of economic development and transformation both in developed and developing countries. Keun Lee ignited hope for developing countries to catch up and shape economic thinking and public policy for a new and better world. This

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book is a must-read for public policy makers and scholars of development economics and innovation studies.

– Lakhwinder Singh, Professor of Economics, Punjabi
University, India

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Barriers, Detours, and Leapfrogging
In Innovation Systems

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Preface

I published my book on economic catch-up five years ago. Although the book attracted recognition, won the Schumpeter Prize, and is getting a rapidly and increasing amount of citations, I have always felt that it is overly technical for a large audience. Furthermore, my personal research has continually progressed and has touched more aspects than those covered in the first book, urging me to write the current book.

Compared with the 2013 book, the current one is less technical than the first as it features no regression tables. The current book attempts to be more insightful than the previous by being framed along such terms as catch-up paradoxes and by employing several metaphors, such as kicking away the ladder, taking detours, and flying on a balloon. While catch up means closing the gap between latecomer and forerunner economies, the catch-up paradox posits that catching up cannot be attained if one merely continues to “catch up” or imitate the forerunners. The previous and current books discuss economic problems latecomer countries face as they attempt to go beyond the development trap. However, these books also differ in certain aspects. The first book focuses on sectoral specialization to go beyond the middle-income trap, whereas the second book discusses several other dimensions, namely, three detours and three paradoxes that are necessary to overcome the two failures and one barrier that latecomer economies face. In his bestselling book, *Kicking Away the Ladder*, Ha-Joon Chang observed that the passage (ladder) from poor to rich nations is either blocked or kicked away. In contrast, this book argues that transitioning from being a latecomer to a rich economy remains possible if economies were to take detours and then fly on a balloon, namely, leapfrog into new technologies.

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Enhancing the welfare of humankind is vital. Yet achieving sustained economic growth, especially in developing countries, remains unknown and has been a longstanding topic in economic research. The economic literature endeavors to find a universal factor for economic growth that will bind all countries, regardless of income level and structural differences. As a point of departure, this book contends that the growth mechanisms of rich and poor nations differ and that a very narrow passage exists between those nations. Therefore, an economy must be very careful when crossing this passage, otherwise it may fall into a middle-income trap or face decelerated growth at the middle-income stage. I have entitled this book not as the science but as the art of catching up, because a successful catch-up rarely occurs and because navigating the narrow passage requires sophisticated mobilization of resources and strategic thinking. The book also delves into smart strategies and economic policy implementation more than it does scientific discovery. However, the prescribed arts are derived from various quantitative evidence cited in the book.

Recognizing the concept of growth mechanisms at various stages drives the exploration of key “transition” variables that facilitate the passage of countries from middle- to high-income stage growths. This book illustrates that such a transition is possible by taking detours and leapfrogging. Accordingly, this book first discusses why latecomers should take detours and leapfrog and then how latecomers can take three detours in building innovation capabilities and one detour in generating big businesses in the form of business groups. Finally, this book discusses leapfrogging into newly emerging sectors.

Latecomer economies must take detours because of the presence of two failures and one barrier: firm capability and size failures and intellectual property rights (IPR) protection from the incumbent North, respectively. Firm capability failure refers to the intrinsic difficulty of building innovation capabilities in developing countries. This type of failure radically differs from conventional

market failure, which states that R&D subsidies help achieve optimal (or increased) R&D. This view is valid only under the hidden assumption that firms are already capable of conducting R&D. Otherwise, nothing will happen even with increased incentives or subsidies. A similar criticism applies to the notion that strong IPR protection leads to further innovation, which is true only under the assumption that the firm is already equipped with innovation capabilities. Size failure refers to the lack of world-class businesses in developing countries that are currently filled with small- to medium-sized enterprises, which are considered insufficient in leading a country toward a high-income status.

The existence of these “two failures and one barrier” has necessitated latecomer economies to explore a new path in building their innovation capabilities instead of replicating practices employed by advanced economies. Although consolidating technological capabilities has long been suggested by many as a vital component of economic catch-up, guiding details for this process are lacking. This book explains the three detours in building capabilities.

The first detour promotes imitative innovation under a loose IPR regime in the form of petit patents and trademarks instead of promoting and strengthening regular patent rights. The second detour focuses on global value chains (GVCs), specifically, a nonlinear sequence of the first increasing, then reducing, and increasing again the GVC participation. In contrast to Baldwin (2016), who states that increased GVC participation is preferable, the current book warns against such a linear view. Instead, the book suggests a GVC-related detour, in which an economy should initially learn by participating at the GVC but should later reduce its reliance on these chains at a certain point by building increased domestic value chains in sequential entries into high-end segments. Otherwise, the latecomers would remain at low value-added segments, which is a middle income trap (MIT) symptom. For instance, Mexico’s per capita income has declined from 45% to 33% of the US level over the last decades, despite NAFTA (North America Free Trade Agreement).

The third detour means specializing first in short-cycle technology-based sectors and products (i.e., ITs) and, only at a later stage, in long-cycle sectors and segments (i.e., pharmaceuticals). Long-cycle technologies mean that previous knowledge remains useful and important for a long period of time. Such technologies act as entry barriers against latecomers, although they denote high profitability and thus desirable attributes. Therefore, latecomers are advised to target short-cycle technologies, where entry barriers are low but growth prospect is good because of high innovation frequency that often disrupts the dominance of the incumbent.

Aside from these detours, this book elucidates leapfrogging as the final stage of catching up or overtaking. Leapfrogging involves latecomers accomplishing something ahead of the forerunners, thereby leaping over them. This technique becomes necessary as a means of bypassing the IPR that forerunners hold by jumping ahead into new generations of technologies. Thus, leapfrogging is highly likely to succeed when executed during a shift in paradigm or generation or during exogenous moments of disruption, which early Schumpeterians such as Perez and Soete (1988) coined “windows of opportunity.” Finding ways to overcome entry barriers is one of the key motivations for utilizing leapfrogging, as the subtitle of their article suggests. A window of opportunity is a moment in time in which the entry barriers for latecomers recede. Meanwhile, Hidalgo et al.’s (2007) concept of product spaces and economic complexity does not consider entry barriers and related competition with the incumbent.

Latecomers tend to experience difficulties because of entry barriers existing in many product areas, and because they have to compete with the incumbents to be able to enter and occupy spaces. Thus, in our dynamics of economic catch-up, the role of leapfrogging is similar to “flying on a balloon when the conventional ladder used to catch up is kicked away.” As we can only fly balloons under favorable weather conditions, economic leapfrogging becomes successful only when exogenous windows of opportunity are available. Certain

preconditions for flying also exist, such as having built-up capabilities, meaning driving skills. Otherwise, we may fall to the ground instead of flying into the sky.

Leapfrogging involves both intersectoral and intrasectoral dimensions. Inter-sectoral leapfrogging is, to a certain extent, similar to the “long jump” in Hidalgo et al. (2007), which argues that latecomer economies must shift to core product spaces that are located far away from their current or periphery position. By contrast, intrasectoral leapfrogging, which is our main concern, involves jumping across generations of technologies within the same sector. Intrasectoral leapfrogging is easier than the intersectoral long jump, as long as latecomers have already built certain absorptive capabilities such as manufacturing experiences in the given sectors. Although Hidalgo and his colleagues (2007) do not provide suggestions on how to achieve such long jumps, Chapter 5 in this book discusses several cases of leapfrogging and elaborates a number of strategies and conditions for that purpose.

Detour and leapfrogging are the two core theoretical concepts in economic catch-up. The third core concept, which is important, especially at early stages of development, is points of entry to the established international division of labor. Given their late entry, these economies generally enter through low-end segments or sectors freed from firms in advanced economies in the form of the own-equipment manufacturing processing type or the FDI. By combining the three core concepts, we devise a comprehensive theory of economic catch-up comprising entry → detours → leapfrogging. Such sequential dynamics are essential to overcoming the previously mentioned two failures and one barrier. Despite its inherent risks, leapfrogging is also necessary because it remains the sole means for economies to forge ahead and to overtake forerunners. Thus, leapfrogging is an insufficient yet necessary condition allowing the transition of latecomers to advanced economies.

Although this book shares Abramovitz’s (1986) vision in his article, “Catching-Up, Forging Ahead, And Falling Behind,” the key

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message of this book is rather paradoxical because a latecomer can never catch up unless they create a new path that is different from that of a forerunner. Such a paradoxical aspect of economic catch-up can be attributed to its nature as chasing not a fixed but moving target. Given that the target (i.e., the forerunner) is constantly moving, a latecomer cannot overtake if they merely follow footsteps. As an alternative, the latecomer should eventually create a new path, shortcut, or detour upon reaching a certain point on the road although it may start by imitating, following, and learning from the forerunner. This issue, which was introduced in the previous book, is comprehensively analyzed in the current book.

The catch-up theory presented in the current book is framed along three paradoxes. The first paradox is “to be similar, be different,” which means that to reach and achieve similar income levels as their forerunners, a latecomer must take a path that is different from that of the forerunner. The second paradox is “taking a detour can be faster than taking a direct road,” which means that given the traffic in the direct road, a latecomer may take a detour and reach their destination faster than others. The final paradox is “you may either fly or fall through a window,” which means that only those who are ready to fly with strong wings can attempt leapfrogging; others will be faced with many risks. This book also discusses the role of firm organization, such as big businesses in the form of business groups, another aspect of the detour strategy that is necessary to overcome size failure or the lack of such businesses in latecomer economies. This book therefore establishes both technological and organizational innovation as the two black boxes in the Schumpeterian economic catch-up.

This manuscript has benefited from diverse sources of intellectual ideas, insights, and mutual interactions. First, the detailed stories of leapfrogging in Chapter 5 originated from collected works in a special issue on “Catch-up Cycles in Research Policy” (2017), to which Franco Malerba and I contributed as guest editor and coordinator. The project was jointly funded by Bocconi University in

Milan and the National Research Foundation of Korea, and the issue covered six sectors: memory chips (Jang-Sup Shin), mobile phones (Claudio Giachetti), steel (Jeehoon Ki and me), mid-sized jets (Daniel Vértesy), wines (Andrea Morrison and Roberta Rabellotti), and cameras (Hyo Kang and Jaeyong Song). The overall framework of catch-up cycles and the role of leapfrogging have also benefited from several rounds of feedback from Martin Bell, the lead editor of the special issue.

Successful catch-up requires not only capability-building but also smart specialization across sectors and technologies. This argument first emerged from my interaction with and feedback from Richard Nelson during the process of my writing a chapter on “Economic Catch-up as Evolutionary Process,” which he edited for the volume entitled *Modern Evolutionary Economics* (2018). This chapter also discussed the two black boxes in economic catch-up, namely, technological and organizational innovation. I also acknowledge Bengt-Åke Lundvall for his recent initiative to integrate the two branches of literature, namely, innovation systems and GVCs, from which certain parts of this book also benefited. I thank several colleagues and former students of mine as certain parts of the book relied heavily on our joint work. These people include Wonkyu Shin on policy space under the WTO regime, as well as Raeyoon Kang on the role of trademarks and Zhuqing Mao on the role of GVC.

The actual writing and rewriting of the manuscript underwent several rounds of feedback from John Mathews, who also played such a role in the publication of my previous book. His input helped me refine various parts of the book, especially the concept of green development in Chapter 7 and restructure the last two chapters. Nicholas Vonortas, Lakhwinder Singh, and Eduardo Albuquerque also provided detailed feedback for the manuscript. The early draft of this book was presented in various places and thus benefited from feedback. The seminar held at the World Bank in February 2018 was a valuable opportunity to present the book. I thank William Maloney who arranged the seminar, as well as Xavier Cirera and Gonzalo Rivas Gomez. I also received feedback from Annalisa Primi, Benjamin

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Coriat, and Ambassador Jong-Won Yoon in a seminar held at the OECD during the same month.

I would like to acknowledge the various seminars and conferences in which parts of this book were presented in their early versions. Such occasions include the Globelics Conference held in Athens in October 2017, and the innovation seminars held in several universities in Brazil, such as those in Campinas (organized by Nick Vonortas), Rio (Jose Cassiolato and Marina Szapiro), and Bello Horizonte (Eduardo Albuquerque) in August 2017. The contents on Africa in Chapter 7 has benefited from several seminars held on that continent, such as the Africa Development Bank in Abidjan and the Africa Economics Conference in Addis. I also thank the chief economist of the Africa Development Bank, Célestin Monga, and his colleague, Abebe Shimeles. Input was also received during the same conference from the Africa Ex-Im Bank in Kigali, Rwanda and at the World Bank Conference in Uganda. Justin Lin provided me with various input and opportunities to discuss my ideas in several meetings organized by the Center for New Structural Economics held in Beijing in 2016 and 2017, and a recent one in Addis Ababa in December 2017. Furthermore, I thank Slavo Radosevic for providing me with feedback and inviting me to various seminars in Europe, such as those held in Belarus, Brussels, London, and St. Petersburg. I also owe similar thanks to Sebastien Lechevalier, Clemente Duran, and Alenka Guzman, for the interactive seminars held in Paris and Mexico City. I learned tremendously by participating in the Babbage Symposium held at Cambridge University and by interacting with Lord David Sainsbury, Mike Gregory, Antonio Andreoni, and Ha-Joon Chang. The workshops held in the UNU-MERIT paved the way for interesting interactions with Bart Verspagen, Eddi Szirmai, Jan Fagerberg, Clovis Freire, Ludo Alcorta, and Nobuya Haraguchi.

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