1 Introduction

THE NARROW PASSAGE BETWEEN MIDDLE- AND HIGH-INCOME NATIONS

While enhancing the welfare of humankind is a vital issue, how to achieve sustained economic growth remains unknown and has been a longstanding topic in economic research (North, 2005). Studies on economic growth all attempt to find one universal factor for economic growth that binds for all countries at all stages regardless of their income levels and structural differences. This observation is not surprising given that economics always attempts to find a "general" rather than a "specific" factor for economic growth. The field assumes a simple production function, with labor and capital as the primary factors of production and with their elasticities, and the associated technologies are also assumed to be the same across all countries. In this old growth model, which allows a gap in capital accumulation, the catch-up by the latecomer is treated as an issue of rapid capital accumulation without the consideration of different technologies. In line with this, developing countries strive for economic growth by copying the practices and institutions of advanced economies. An example is the so-called Washington Consensus, which promotes policy packages with minimal government intervention and privatization, trade and financial liberalization, foreign direct investments (FDIs) by multinational corporations (MNCs) over indigenous companies, and strong property rights.[1] However, given its poor performance, the Washington Consensus was declared dead by Rodrik, who called for a search for an alternative.[2] Against this background,

[1] This consensus was first proposed by Williamson (1990). [2] See Rodrik (2006).

the research interest in industrial policy was reignited by Nobel Laureate Joseph Stiglitz and other alternatives, such as the new structural economics concept proposed by former World Bank Vice President Justin Lin, have appeared.[3]

As a point of departure, this book suggests that advanced economies and latecomer economies at the middle- or lower-income stages have different growth mechanisms, and that a very "narrow passage" exists among these countries. Thus, one must be very careful when crossing such passage in order to avoid falling into MIT,[4] or a situation where middle-income economies tend to face a decelerated growth and consequently fail to join the ranks of high-income economies. Several studies have verified the idea that different countries adopt varying growth mechanisms, such that the economic growth at the lower-income stages is correlated with basic political institutions and basic human capital, while the economic growth at the higher-income stages (upper-middle and high-income) is correlated with innovation capabilities and tertiary education.[5] Such an observation is consistent with that of other researchers who have found that various countries take different convergent paths, with the first path converging to a low-income steady state, the second path converging to a middle-income steady state, and the third path converging to a high-income steady state.[6]

The division of the world into two or three groups at different stages is consistent with the idea of MIT. However, some economists have doubted the existence of such a trap, saying that no theory explains why and how middle-income economies adopt different

3 On the revival of industrial policy, see Stiglitz, Lin, and Monga (2013); on the new structural economics, see Lin (2013).

4 The MIT phenomenon was first mentioned in Gill et al. (2007) and has become a subject of research for Eichengreen, Park, and Shin (2012, 2013), Lee (2013a), and the World Bank (2010).

5 Lee and Kim (2009) and Bulman, Eden, and Nguyen (2014) provide some examples.

6 These three paths were confirmed by Ito (2017), who found that the growth of Asian economies has decelerated over time and may fall to advanced economy levels before their income fully catches up with that of the advanced economies. He also uses the same example to define MIT.

growth mechanisms.[7] Thus, the existence of MIT itself has been debated in the field of economics over the last decade or so since its introduction in 2007. Diverse or conflicting answers regarding this issue have been generated because the related studies have adopted different definitions of the trap and different methodologies to test its existence.

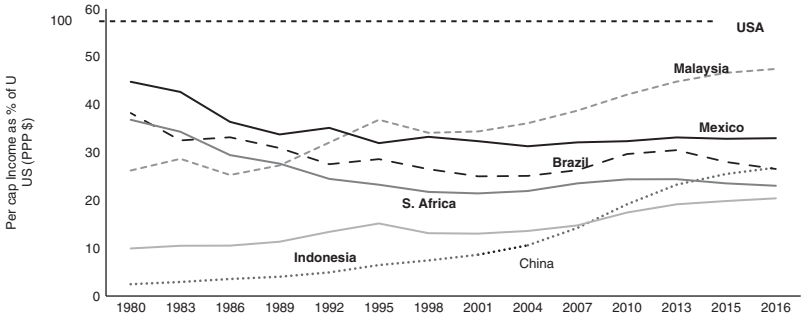
This book does not attempt to try another answer to this issue of the existence or nonexistence of MIT, but instead just notes some broad consensus to which this book subscribes. First, regardless of whether MIT exists or not, many countries are struggling at the middle-income stage or are experiencing a very slow transition from middle- to high-income status.[8] A study by the World Bank found that only twelve out of 101 middle-income economies have joined the club of high-income economies since 1960.[9] Among these countries, nine were reported to be upper-middle-income economies (20% to 40% of the US per capita income, including Greece, Portugal, Spain, Ireland, Hong Kong, Israel, Japan, Mauritius, Puerto Rico, and Singapore). Only two were reported to be low- or lower-middle-income countries (Korea and Taiwan, respectively), and one was an oil-exporting country (Equatorial Guinea).

Actually, Figure 1–1 shows clearly that typical emerging economies have not closed the gap with the US, remaining below the 40% of the US per capita, except Malaysia. For instance, Mexico declined from the higher than 40% level in the mid-1980s to 32.8% in 2015. Brazil also dropped from the above 30% level in the 1980s to lower than the 30% level in 2015. South Africa was worse, at the 23% level in 2015.

7 Aiyar et al. (2013) expressed a similar view. Im and Rosenblatt (2013) and Han and Wei (2015) conducted a transition matrix analysis and rejected the existence of MIT.

8 By performing probit regressions, Aiyar et al. (2013) found that middle-income economies are disproportionately likely to experience growth slowdowns, and this result is robust for a wide range of income thresholds for defining "middle income." Felipe, Kumar, and Galope (2014) examined the transition of economies across income groups and found some evidence to support the slow transition of economies from middle- to high-income status.

9 See World Bank (2012).



	1980	1983	1986	1989	1992	1995	1998	2001	2004	2007	2010	2013	2015	2016
US	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Malaysia	26.2	28.7	25.3	27.3	32.1	36.8	34.1	34.4	36.1	38.7	42.1	44.8	46.7	47.5
Mexico	44.8	42.6	36.4	33.8	35.1	32.0	33.3	32.4	31.3	32.1	32.4	33.1	32.9	33.0
China	2.5	2.9	3.5	4.0	5.0	6.5	7.4	8.6	10.6	14.2	19.2	23.3	25.5	26.8
Brazil	38.2	32.5	33.2	30.9	27.6	28.6	26.5	25.0	25.1	26.3	29.7	30.5	28.0	26.5
South Africa	36.8	34.3	29.5	27.7	24.5	23.3	21.8	21.4	21.9	23.5	24.4	24.4	23.6	23.0
Indonesia	9.9	10.5	10.5	11.4	13.4	15.2	13.1	13.0	13.6	14.7	17.5	19.2	19.9	20.4

FIGURE 1–1. Per Capita Income Levels of Countries as % of the United States
(Source: author's work using IMF data)

Second, most studies highlight the need for these countries to reform or take exogenous actions to free themselves from MIT, inefficient equilibrium, or economic growth slowdown. For instance, some researchers view MIT not as a trap but rather as a failure to adapt to innovation or other required reform.

These two consensuses may lead to an understanding of MIT as a symptom of failing to jump from low- or middle-income economies to high-income economies, probably due to the lack of necessary reform. Then, the belief in the idea of having different growth mechanisms at different stages and the MIT motivate us to identify the key "transition" variables that are necessary to realize a transition from the middle-income stage growth to the higher-income stage growth. In line with this, innovation capability has been increasingly recognized as the key solution for an economy to free itself from MIT, which will be discussed in detail in the following chapter. The critical importance of innovation capability is consistent with the earlier observation of the World Bank, which suggests that middle-income economies tend

to fall into MIT because they get caught between low-wage manufacturers and high-wage innovators. Their wage rates are too high to compete with low-wage exporters and the level of their technological capability is too low to enable them to compete with advanced countries.[10]

THE TWO FAILURES AND ONE BARRIER

Although the importance of innovation has been widely recognized, enhancing innovation capabilities and overcoming MIT are not easy. Chapter 2 argues that achieving such upward transition is rare and difficult due to "two failures and one barrier," which make the transition path very narrow. In fact, only a very small number of East Asian economies, such as Korea and Taiwan, have successfully traversed this path.

The first failure, namely, capabilities failure, refers to the intrinsic difficulty of building innovation capabilities in developing countries. This type of failure radically differs from the conventional market failure. The market failure in innovation stems from the externality of knowledge as a public good. Thus, subsidies for R&D are prescribed to induce an optimal amount of R&D. In the market failure approach, the common and hidden presumption is that firms and other economic actors are already capable of innovation, and that monetary incentives act as both a problem and a solution. However, the stark reality in developing countries is that economic actors, especially firms, have extremely weak levels of capability and are unable to pursue and conduct in-house R&D, which they consider an uncertain endeavor with uncertain returns. Thus, the problem is not one of less or more R&D but of "zero" R&D. In developing countries where firms have a low R&D or technological capability, a safe way of doing business has thus been to buy or borrow external technologies or production facilities as well as to specialize in less-technical methods or assembly manufacturing. Thus, our answer to

[10] This view is expressed in World Bank (2010) and is shared by many, including Lee (2013a).

the so-called "innovation paradox," such that developing countries do not do enough R&D despite its high return, is simply that they do not know how or lack such capabilities of doing innovation.[11]

To move beyond such states (which lead to MIT), effective forms of intervention must include not the simple provision of R&D funds but various ways for cultivating R&D capability. Thus, instead of the concept of market failure, this book focuses on the issue of "capability failure" and the need to enhance the capabilities of firms, sectors, and nations. According to this view, learning failure occurs because of the lack of opportunity for effective learning and capability-building. Thus, more effective and alternative forms of intervention may include the transfer of R&D outcomes performed by public research institutes, as well as public–private R&D consortiums that have gained success in Korea and Taiwan, and other modes of learning, which are discussed in Chapter 2.[12]

The second type of failure, namely, size failure, refers to the difficulty of generating big business (BBs), which is often required when jumping from middle- to high-income economies. While small and medium-sized enterprises (SMEs) are typically prevalent forms of businesses in developing countries, they cannot be relied upon to lead economies to reach the high-income status. Although the World Bank has provided a huge amount of monetary assistance to SMEs in developing countries,[13] a World Bank study tried but failed to establish a causal and robust relationship between SMEs and per capita income growth or poverty alleviation.[14] Rather, having too many microbusinesses in services is considered a bad symptom that leads to premature

[11] The term "innovation paradox" is discussed in Cirera and Maloney (2017). In a sense, the problems are intertwined. Given their low R&D capabilities, a return to doing R&D for themselves must be low rather than high; it would be high only when it is assumed that R&D is simply a matter of adoption of available technologies.

[12] For more details, see Mathews (2002b); Lee and Lim (2001); Lee, Lim, and Song (2005); and OECD (1996).

[13] The World Bank has provided more than 10 billion and 1.3 billion USD of targeted assistance to SMEs in developing countries from 1998 to 2001 and in 2003, respectively (World Bank 2002, 2004).

[14] Beck et al. (2005) find some positive yet weak correlations when controlling for endogeneity.

servicization (or deindustrialization). Instead, BBs are badly needed when making a transition from low- to high-income economies because these businesses tend to enjoy scale externalities and are better positioned to be in charge of higher-value-added activities of R&D and marketing. An econometric study has shown that having a certain number of BBs, specifically more than that predicted by economy size, may indicate whether or not an economy is stuck in MIT.[15] Moreover, many emerging economies, except for the more successful cases of Korea, Taiwan, and China, are shown to have a smaller number of BBs than that predicted by their sizes. For instance, Thailand and Turkey only had one or zero Global Fortune 500 companies over the last two decades, whereas the number of these companies in Korea and Taiwan increased from three and one in the early 1990s to fourteen and eight in the early 2010s, respectively.

The "one barrier" is associated with the negative impacts of strong intellectual property rights (IPR) protection in advanced economies on the exports from emerging economies, which often show up in IPR disputes between late entrants and incumbent firms. While IPR is increasingly recognized, owing to the activities of patent trolls, as the barrier to innovation even in advanced economies, such a harmful impact is more serious in latecomer economies.[16] A recent empirical study of mine verifies that the strong IPR protection in forerunning economies such as the US often acts as a barrier to exports for catching-up countries, such as the past Korea or present-day China.[17] As will be discussed in the next chapter, many latecomer firms, including a Korean firm, Samsung, in the 1980s and a Chinese firm, Huawei, in the 2010s, have been involved in IPR litigation brought by incumbent firms.

If we take a broader perspective, the barriers should also include the World Trade Organization (WTO) regime, which reduced the

15 See Lee et al. (2013) in the *Journal of Comparative Economics*.
16 Discussion of such harmful impacts of IPRs and how to remedy such situations is well reviewed in Coriat (2016).
17 Shin et al. (2016).

policy space by latecomer countries. This is often called the act of "kicking away the ladder" by Ha-Joon Chang (2002). This book discusses this issue in the concluding chapter on policy issues.

THE DETOURS TO OVERCOME THE CAPABILITY FAILURE

The existence of "two failures and one barrier," which has made economic transitions rare and difficult to achieve, necessitates catching-up economies to find a detour to build their innovation capabilities as well as to avoid replicating or emulating the practices of advanced economies. In other words, while the consolidation of technological capabilities at the firm level has long been suggested as a vital requirement for economic catch-up, this book posits that capability-building must be carefully designed and implemented within the broad framework of national innovation systems (NIS) proposed by Schumpeterian scholars, such as Nelson and Lundvall. The NIS is defined as the various elements and relationships that interact in the production, diffusion, and use of new and economically useful knowledge.[18] Otherwise, the process of capability-building becomes derailed and delayed. For instance, capability-building becomes less effective if a latecomer economy simply imitates the advanced economies and thus provides a very high level of IPR protection even at its early stage of development.

Moreover, the idea of sectoral innovation systems suggests that not all sectors are the same in terms of learning and catch-up possibilities, which raises the key issue of choices over technologies. In this case, the process of capability-building becomes derailed if a latecomer tries to enter sectors/segments with slow or difficult learning possibilities that are associated with long-cycle times or high entry barriers. In this sense, one of the distinctive orientations of this book, for instance, compared to the innovation paradox view, is that it

[18] One of the early discussions about NIS can be found in Lundvall (2012) and Malerba and Nelson (2012). The discussions on national innovation systems have been extended to the sectoral innovation system in Malerba (2005) and to firm-level innovation systems in Lee (2013a) and others.

considers economic catch-up as not only a matter of building capabilities but also a matter of choice or specialization in certain technologies, sectors, or activities to find niches for entry and survival.[19] This issue of choice and specialization is less important and critical at the low- or lower-middle-income stage where latecomers are just to inherit the leftover sectors and businesses but becomes a critical issue at the upper-middle-income stages, where the latecomers are getting close to the frontier and increasingly competing with incumbent firms and countries in world markets. In sum, the differences in innovation systems at the firm, sector, and national levels lead to differences in learning and innovation performance and, consequently, to differences in economic performance, specifically at the middle-income stage, which is the primary concern of this work.

While following the Schumpeterian tradition, this book also shares Abramovitz's (1986) vision of economic "catching up, forging ahead, and falling behind" and defines catch up as "reducing the gap between the forerunning and latecomer economies." However, our key message is rather paradoxical because we propose that one can never catch up if they keep catching up, where the former "catch up" means closing the gap or overtaking and the latter "catching up" means imitation. Another way of illustrating this catch-up paradox is that "to be similar, you've got to be different," which means that while catch-up means trying to be similar, long-term success requires taking a path that differs from that taken by advanced countries.

The decision for a latecomer to create a new path that differs from that taken by the forerunner can be attributed to the nature of economic catch-up as a game of chasing a moving rather than a fixed target. Given that the target is constantly moving ahead, one can never overtake this target if they keep following in the footsteps of their forerunners. Therefore, one may start by imitating, following,

[19] This double focus is emphasized in Lee and Malerba (2018). In comparison, Xavier and Maloney (2017) focus on capability-building, setting aside the issue of specialization and choices over sectors, activities, or technologies. This difference comes partly from their book, which is more concerned with lower- or lower-middle-income economies.

and learning from their forerunners, but at some point on the road they must create a new path, shortcut, or detour to avoid colliding with the forerunners.

Whether a latecomer must "follow the similar path" of their forerunners or "create or take a different or new path" is among the most fundamental issues in the economics of catch-up introduced in my earlier book. Traditional and early studies have observed that latecomers try to catch up with advanced countries by assimilating and adapting the more-or-less obsolete technology of the incumbents. In one of the early articles, I argue that latecomers do not simply follow the advanced countries' path of technological development; they sometimes skip certain stages or even create their own path, which differs from that taken by the forerunners.[20] For instance, one of the reasons why Korean consumer electronics, led by Samsung, were able to take over the Japanese incumbent Sony was that the former leapfrogged into digital technologies ahead of the latter, which used to be the lead in the manufacturing of analogue products. From a Schumpeterian perspective, I argue in my previous book that the successful catching-up economies of Korea and Taiwan went through a different path by specializing in sectors with "short-cycle" technologies in contrast to advanced economies that specialize in "long-cycle" technology-based sectors.

Korea and Taiwan reached the middle-income stage by the mid-1980s, and then decided to upgrade their industrial structure to match that of emerging or close-to-frontier sectors, or the so-called high-tech sectors. However, when moving into these sectors, their latecomer firms engaged in a direct competition with companies that are at the technological frontier of other countries and that have a much greater amount of experience in a specific field. To overcome this situation, or MIT, these indigenous firms chose those sectors/products that are based on short-cycle technologies, such as the information technology sector where specific knowledge and technologies tend to be outdated

[20] This idea, introduced in Lee and Lim (2001), stands in contrast to the traditional view proposed by Lall (2000), Kim (1980), and Hobday (1995).