3. Is Middle-Income Asia at Risk of a Sustained Growth Slowdown?

Slower growth in China, India, and Vietnam; prospects of persistently low growth in advanced economies; imminent demographic aging across large parts of East Asia—all have raised concerns in recent years about risks of a sustained growth slowdown in emerging Asia. In middle-income economies, fears of a "middle-income trap" have been growing.[1] And indeed, as highlighted in Chapter 1, although Asia's potential growth remains higher than that of other regions, various estimation techniques point to a reduction in trend growth since the 2008 global financial crisis.

This chapter examines the question further. It first identifies empirically the factors that induce sustained growth slowdowns and assesses whether and why middle-income economies may be more at risk than their low- and high-income counterparts. It then reviews the strengths and weaknesses of several emerging Asian economies relative to risks of a sustained slowdown and highlights the policy reforms needed to alleviate such risks. The main findings are the following:

- Taken at face value, economic history suggests that a number of emerging Asian economies run the risk of falling into a middle-income trap. The new estimates in this chapter suggest that the probability of a marked fall in growth that will last for at least a decade is indeed higher—about 1.5 times higher within a given five-year time span—for middle-income economies (MIEs) than for advanced

economies (AEs) or low-income countries (LICs).

- However, whether a country will experience a sustained growth slowdown depends on the quality of its policies and institutions as well as on a range of structural features of its economy. Middle-income Asian economies often compare favorably to their emerging market counterparts on many of these dimensions, such as the structure and intensity of their international trade, the quality of institutions or—for now—demographics. By contrast, some of them perform worse on infrastructure, which remains a key policy priority in a number of emerging market economies and LICs across the region. There remains also room for institutional—not least regulatory—reforms, as well as for fully mobilizing untapped pools of labor to cope with the challenge of an aging population. Reforms in these areas will help alleviate the middle-income trap. To various degrees and under different forms, these institutional reform priorities are also relevant for more advanced Asian economies, such as Japan and Korea.
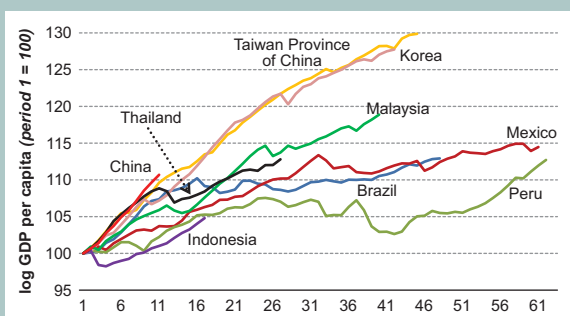
What Is a Sustained Growth Slowdown?

The middle-income trap is the phenomenon of hitherto rapidly growing economies stagnating at middle-income levels and failing to rise to the high-income levels of advanced economies. This has often happened as a result of a sharp and persistent slowdown after a period of relatively strong growth. For instance, several Latin American economies, such as Brazil, Mexico, and Peru, entered a long period of stagnation in relative living standards after growth durably slowed in the late 1970s and early 1980s

Figure 3.1

Past Growth Trajectories[1]

Source: Heston and others (2012); and IMF staff calculations.
[1] GDP per capita is in 2005 PPP adjusted terms. The slope of each series reflects the growth rate. Period = 1 defined as the year when GDP per capita for the country considered reached US$ 3,000 in PPP terms.
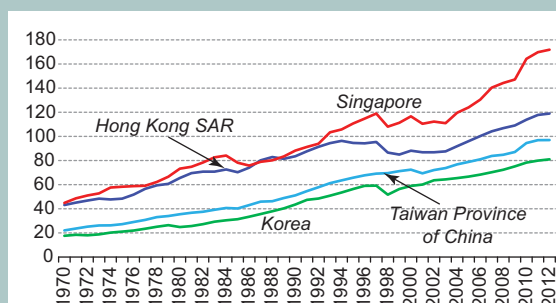
Figure 3.2

GDP per Capita Convergence in the Four Asian "Tigers"
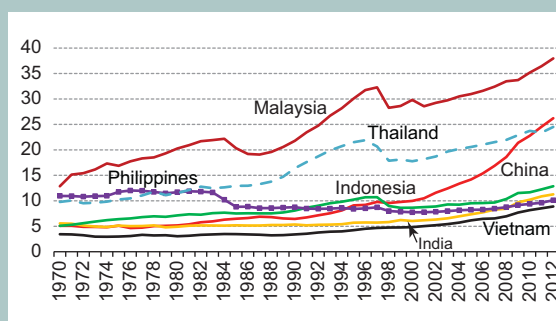*(PPP GDP per capita as percent of G7 average PPP GDP per capita)*

Source: Heston and others (2012); and IMF staff calculations.

Figure 3.3

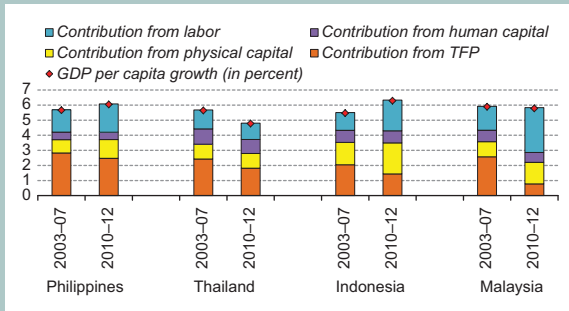**GDP per Capita Convergence in Seven Emerging Asian Economies**
(PPP GDP per capita as percent of G7 average PPP GDP per capita)

Source: Heston and others (2012); and IMF staff calculations.

(Figure 3.1).[2] By contrast, the four Asian Tigers (Hong Kong SAR, Korea, Singapore, and Taiwan Province of China) continued to grow rapidly after attaining middle-income status and thereby reached income levels comparable to those of advanced countries (Figures 3.1 and 3.2). However, over the past two decades, the experience of several other Asian MIEs has been more mixed, reflecting in part the transitory but large effect on living standards of the Asian crisis of the late 1990s. Malaysia has been more successful than Indonesia, with Thailand falling in between, but in all three cases convergence to living standards in advanced economies stalled for a decade after the Asian crisis, regaining momentum only in recent years. China's trajectory has so far outstripped even that of the earlier East Asian success stories, but the Chinese economy is still at a rather early stage of its convergence process. With their income per capita currently standing at 10 percent to 40 percent of average G-7 levels, China, India, Indonesia, Malaysia, the Philippines, Thailand, and Vietnam all face the challenge of sustaining their convergence process (Figure 3.3).

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[2] Figure 3.1 shows GDP per capita—as a logarithm so that the slope can be read as the growth rate—once it has reached $3,000 in 2005 international dollars (data from Heston, Summers, and Alen, 2012). The $3,000 level is chosen as an illustrative threshold for middle-income countries; the analysis elaborates on the definition of a middle-income country more carefully.

The main proximate driver of a sustained slowdown in growth has often been a persistent decline in the growth of total factor productivity (TFP), a crude measure of technological progress. TFP growth can be calculated in various ways; here, contributions to GDP growth are calculated for physical capital, human capital, working-age population, and the residual is called TFP growth (for details, see Aiyar and others, 2013). Growth slowdowns have indeed been concomitant with a fall in TFP growth in, for example, selected Latin American economies in the 1970s and 1980s and, to a lesser extent, in the ASEAN-4 countries (Indonesia, Malaysia, the Philippines, and Thailand) in the aftermath of the Asian crisis. To sum up,

Figure 3.4

Contributions to ASEAN Growth before and after the Global Financial Crisis[1]
(In percentage points of GDP)

Source: IMF staff calculations.
[1] Calculations rely on specific methodological assumptions and are subject to limitations, e.g., they do not account for hours worked. See Aiyar and others (2013) for details.

Figure 3.5

Frequency of Past Sustained Growth Slowdown Episodes by Region
(In percent)

Source: IMF staff calculations. See Aiyar and others (2013) for details.
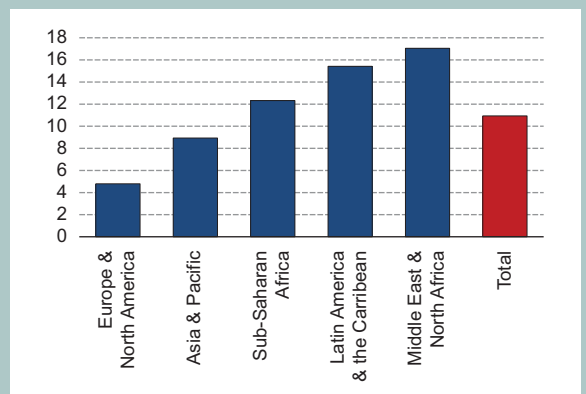
even though physical capital, human capital, and employment are key drivers of economic growth, they matter less for sustained *slowdowns* in growth, which seem to coincide primarily with lower TFP growth. In the ASEAN-4 countries in recent years, TFP gains have been fairly solid but still smaller than before the global financial crisis (Figure 3.4), and therefore the risk of a TFP-driven growth slowdown remains a relevant policy concern.

Are Middle-Income Economies Different?

The focus of the remainder of this chapter is on sizable and sustained slowdowns in growth in Asian MIEs, which here are China, India, Indonesia, Malaysia, the Philippines, Thailand, and Vietnam.[3] The methodology used to identify sustained slowdowns in growth is described in Box 3.1. Although the methodology captures, as expected, several slowdown episodes in ASEAN economies in the late 1990s, overall the frequency of growth slowdowns has been lower in Asia than in any other region over the past five decades (Figure 3.5).

There seems to be a middle-income trap, as MIEs turn out to be disproportionately likely to experience growth slowdowns (Figure 3.6). Indeed the probability of an MIE experiencing such an episode within a given five-year time span is about 1.5 times greater than for low- or high-income countries, and this ratio is greater the longer the time horizon considered. This finding is illustrated here assuming a GDP per capita threshold for low-income economies of $2,000 (2005 PPP) or

Figure 3.6

There Seems to Be a Middle-Income Trap[1]
(In percent)

Source: IMF staff calculations. See Aiyar and others (2013) for details.
[1] The figure considers a low income threshold of US$2,000 and a high income threshold of US$15,000 in PPP terms, but is robust to a range of alternative thresholds.

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[3] These countries all have GDP per capita above the $2,000 threshold (2005 PPP), used here to discriminate between low- and middle-income economies.
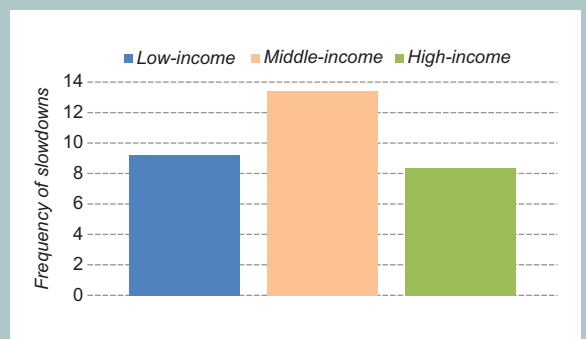
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Box 3.1

Identifying Sustained Slowdowns in Growth

So-called conditional convergence growth theory predicts that economies should gradually slow down as they converge to their steady-state GDP per capita path, which in turn depends on a range of country-specific factors including, inter alia, rates of investment in physical and human capital. To rule out such gradual, expected slowdowns from the analysis, and also to focus more clearly on TFP-driven shifts in the growth of per capita income, episodes of sizable and sustained slowdowns are identified for a sample of 138 countries over 11 five-year periods (1955–2009) as follows. First, following a conditional convergence framework, per capita GDP growth is regressed on the lagged income level and standard measures of physical and human capital; for any country at any given point in time, the estimated relationship yields a predicted rate of growth, conditional on its level of income and factor endowments. Second, residuals are computed as actual minus predicted rates of growth; a positive (negative) residual means that the country is growing faster (slower) than expected. Third, and finally, country i is identified as experiencing a growth slowdown in period t if the following two conditions hold:

$$residual_t^i - residual_{t-1}^i < p(0.20) \tag{1}$$

$$residual_{t+1}^i - residual_{t-1}^i < p(0.20) \tag{2}$$

Here p (0.20) denotes the 20th percentile of the empirical distribution of *differences* in residuals from one time period to another. Condition (1) defines a growth slowdown: it says that between periods $t-1$ and t the country's performance relative to the expected pattern deteriorated sufficiently to place the country-period observation in the bottom quintile of changes in the residual between successive time periods. Condition (2) defines a *sustained* slowdown: by examining the difference in residuals between periods $t-1$ and $t+1$, that is, over a 10-year period, it rules out episodes in which growth slows down in the current period only to recover in the next.

The growth slowdown episodes identified via this conditional convergence framework overlap to a large extent with those that would be derived from an absolute convergence approach under which per capita GDP growth would be regressed only on the lagged income level in the first stage; in fact, the correlation coefficient between both sets of episodes is 0.97. This suggests that when it comes to sustained shifts away from the convergence path, growth slowdowns are largely synonymous with TFP slowdowns. This might be because slowdowns in factor accumulation have been either more gradual (e.g., human capital accumulation) than, or concomitant with (e.g., physical capital accumulation) TFP slowdowns.

Note: The main author of this box is Romain Duval.

less and a threshold for high-income economies of $15,000 or more, as these particular cut-off points generate a country classification that is close to the World Bank's gross national income (GNI) per capita classification.[4] However, it is robust to a wide

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[4] The most recent World Bank classification with data for 2010 is as follows in terms of GNI per capita: *low income*, $1,005 or less; *lower middle income*, between $1,006 and $3,975; *upper middle income*, between $3,976 and $12,275; and *high income*, $12,276 or more. Applying this classification to the sample and comparing it with the $2,000/$15,000 thresholds used in this chapter yields an overlap of 97 percent between the two methodologies; only eight countries are classified differently.

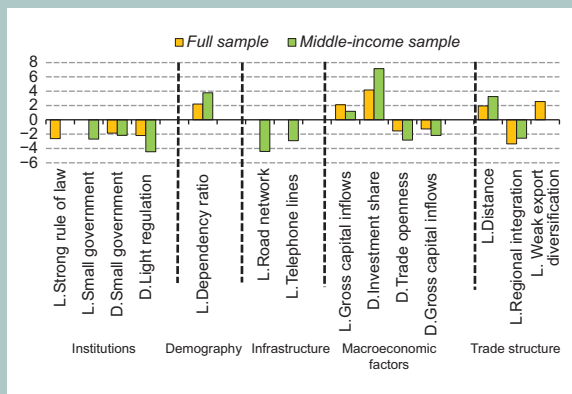range of alternative income thresholds for defining middle income (see Aiyar and others, 2013).

What Explains the Likelihood of Getting Trapped?

In order to identify the drivers of growth slowdowns, new empirical analysis is performed over a sample of 138 countries covering in some cases 11 five-year periods (1955–2010). Probit regressions are run to estimate the impact on the likelihood of a sustained slowdown of a wide range of structural, policy, and institutional factors which have been identified as potential

Figure 3.7

The Impact of Changes in Fundamentals on the Probability of a Sustained Slowdown[1]
(In percent; shift from median to 75th percentile of distribution of explanatory variable)

Source: IMF staff calculations. See Aiyar and others (2013) for details.
[1] L. stands for the lagged level while D. stands for the lagged difference of the explanatory variable.

drivers of economic growth in previous literature.[5] Extensive robustness checks for the results are then performed by means of Bayesian averaging techniques.[6] Figure 3.7 lists, for the full and MIEs samples, the main explanatory variables found to have a statistically significant and robust impact in the exercise and also reports their impact on the likelihood of a growth slowdown.[7] In general, consistent with the focus on the determinants of sustained *slowdowns*, it is a *deterioration* in fundamentals that matters. However, the levels of

explanatory variables are also influential in some cases, pointing to threshold effects—that is, certain fundamentals matter only when they are either very weak or very strong, such as infrastructure.

In a nutshell, sound economic institutions (strong rule of law, limited government involvement in the economy, avoidance of overly stringent regulation of product, labor, and credit markets) as well as favorable demographics (low old-age dependency ratio, in particular, possibly reflecting its impact on aggregate saving and/ or productivity) and trade structure (exports diversification, regional trade integration, proximity to larger markets) can all reduce the likelihood of a growth slowdown. By contrast, strong capital inflows as well as investment booms, while good for growth, also entail risks of bust further down the road;[8] because boom-bust cycles can have long-lasting adverse effects on living standards, avoiding them can support trend growth.

The same factors matter for MIEs, but with notable specificities. Reducing government involvement in the economy and easing stringent regulations both matter disproportionately once middle-income status is reached. This may be because they facilitate private sector development and encourage innovation over absorption of existing technology, both of which are key to graduating into the ranks of high-income economies. Likewise, insufficient road and telecommunication infrastructure emerges as a potential risk factor for growth, suggesting that infrastructure development matters more once the low-income stage of development has been passed.
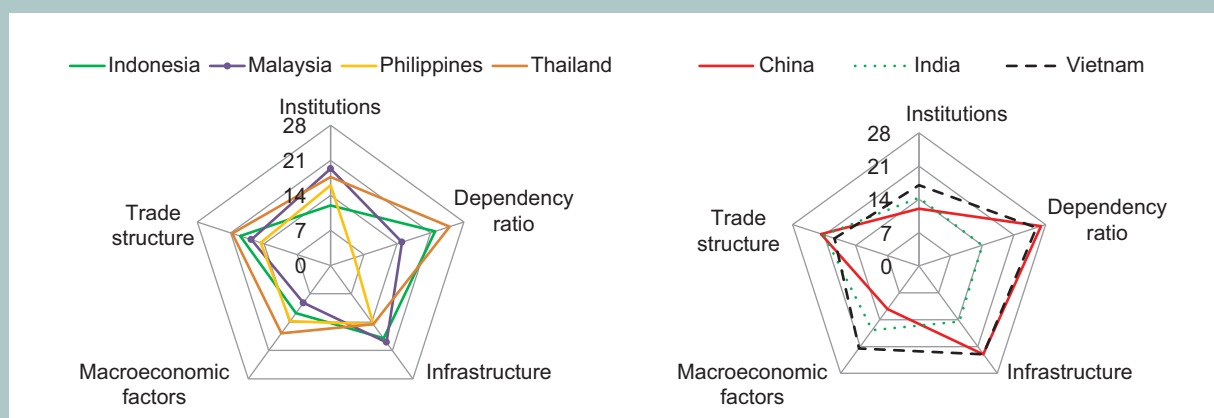
Are Middle-Income Asian Economies at Risk of a Sustained Growth Slowdown?

The results from the empirical analysis can be used to assess the relative strengths and weaknesses of

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[5] Due to the poor quality or coverage of certain data, a few potential drivers of growth slowdowns could not be tested with a reasonable degree of confidence. One example is income inequality and the broader issue of whether more inclusive growth is likely to be more sustainable, especially in MIEs.

[6] Two approaches are considered, namely the weighted average least squares (WALS) methodology developed by Magnus, Powell, and Prüfer (2010) and the more standard Bayesian model averaging (BMA) developed by Leamer (1978) and popularized by Sala-i-Martin, Doppelhoffer, and Miller (2004).

[7] More precisely, Figure 3.7 reports the impact on the likelihood of a growth slowdown from a shift in the value of each explanatory variable from the median to the 75th percentile of the (latest available) cross-country distribution of that variable.

[8] For similar reasons, a high and growing share of manufacturing in the economy is also found to increase slowdown risks (result not reported here).

Figure 3.8

Strengths and Weaknesses of Asian MIEs[1]

Source: IMF staff calculations. For details on underlying statistics and data sources, see Aiyar and others (2013).
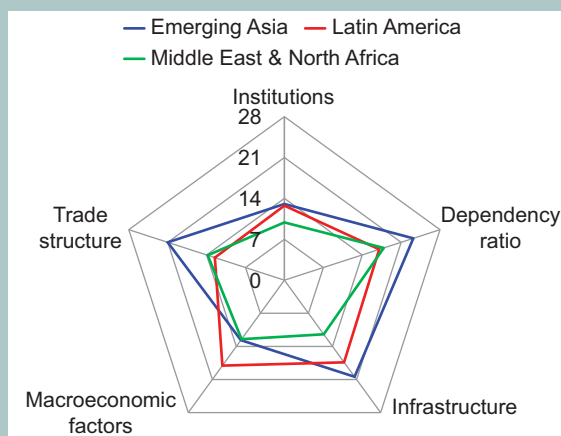[1] Latest available observations on each individual variable, with the exception of dependency ratios, which are projected 2020 values. See Aiyar and others (2013) for details. *Institutions* includes small government involvement in the economy, strong rule of law, and light regulation; *infrastructure* includes telephone lines and road networks; *macroeconomic factors* includes low gross capital inflows, the change over 2008–12 in capital inflows and trade openness, and the (negative of the) change in the investment-to-GDP ratio; *trade structure* includes strong regional integration and low GDP-weighted distance. Numbers in the panels represent a simple average of the rankings along each individual variable.

each Asian MIE in terms of its exposure to risks of a sustained growth slowdown. As an illustration, Figure 3.8 ranks each of the 28 MIEs in the sample, including seven in Asia (China, India, Indonesia, Malaysia, the Philippines, Thailand, and Vietnam), along five broad categories: economic institutions, trade structure, infrastructure, demographics (old-age dependency ratio, as projected by 2020), and macroeconomic factors (investment, capital inflows). In each category, rankings are computed for simplicity as simple averages of the rankings on the variables belonging to this category. The results are shown in the form of "spider webs:" the larger the area within each country's "spider web," the better its current settings in the dimension considered.[9]

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[9] Figures 3.8 and 3.9 are qualitatively consistent with, but do not strictly follow, the empirical analysis. First, with the exception of the "macroeconomic factors" category, only the levels of the explanatory variables are used for the computation of rankings, while the empirical analysis identifies a mix of levels and differences as drivers of slowdown probabilities. Second, in each category, the overall ranking is computed as a simple average of rankings on the variables belonging to this category, implicitly assigning them equal weights. Third, they exclude some variables from consideration.

Figure 3.9

Strengths and Weaknesses of Asian MIEs Relative to Other Emerging Regions

Source: IMF staff calculations. See Aiyar and others (2013) for details.
Note: For definition of variables, see note to Figure 3.8.

Figure 3.9 averages country rankings across each of the Asia, Latin America, and Middle East and North Africa (MENA) regions so as to compare these regions as a whole.

Asian MIEs appear to differ in their risk factors (Figure 3.8). Compared with others in the region,

India, the Philippines, and Thailand are exposed to a larger risk of growth slowdown stemming from subpar infrastructure. Improving economic institutions is a further challenge for India and the Philippines, as well as for China and Indonesia. China's relative risk factors also relate to its post-crisis increase in investment, while Malaysia's include its strong capital inflows—both, which are captured here in the macroeconomic factors category, have supported growth but also involve potential vulnerabilities.
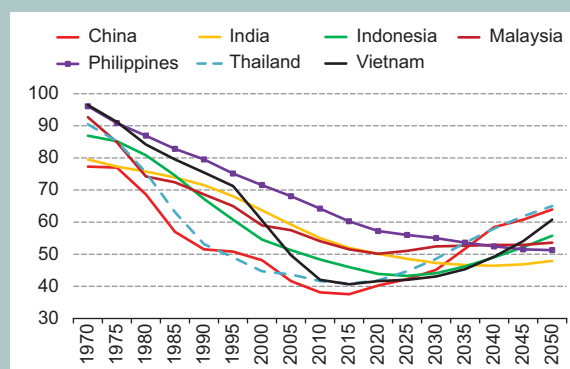
On average, MIEs in Asia are less exposed to the risk of a sustained growth slowdown than MIEs in other regions (Figure 3.9). However, their relative performance is weaker on institutions. Indeed there remains ample room for easing stringent regulations in product and, in some cases, labor markets. On infrastructure, middle-income Asia fares, on average, somewhat better than other regions, but there is wide cross-country heterogeneity, and the particular indicators selected by the empirical analysis cover only road transport—an area in which Asian MIEs do reasonably well in international comparison—and telecommunications. In practice, several countries in the region need to develop new infrastructure and upgrade existing infrastructure in energy, public transit systems, freight, and ports. On macroeconomic factors, while Asia's recent growth has typically benefited from its comparatively strong capital inflows and increased investment rates, these also come with risks. In order to continue making the most of these growth factors, as the Asian Tigers did in the past, economic rebalancing—primarily in China—as well as prudential regulation to limit the build-up of excessive capital inflows and cushion the impact of any sudden stop, should remain high on the region's policy agenda (as highlighted in Chapter 1).

Other dimensions appear to be relative strengths. In particular, regional integration and vertical supply chains in Asian MIEs compare favorably with Latin American and MENA economies. Even India and Indonesia, which in this category lag behind the other Asian economies considered, are well situated compared to the broader sample.

Figure 3.10

Overall Dependency Ratios[1]
(Ratio of population aged 0–14 and 65+ to aged 15–64; in percent)

Sources: U.N. Population Database; and IMF staff calculations.
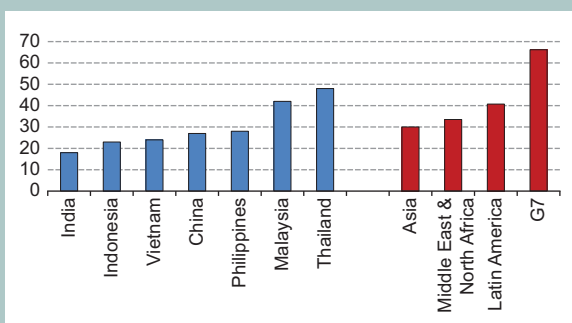[1] Dependency ratio projected using the U.N. medium fertility scenario.

Can Emerging Asia Get Old before It Gets Rich?

On demographics, the picture is mixed. Until now, dependency ratios have been typically low in Asian MIEs, including compared with their Latin American and MENA counterparts. However, working-age population growth is already slowing down across the region, and dependency ratios are projected to rise sharply, albeit to varying degrees and at different horizons (Figure 3.10). Over the next decade, only China, Thailand, and Vietnam are expected to experience some pickup in the ratio, while India, the Philippines—where dependency ratios remain comparatively high but are coming down rapidly—and to a lesser extent Indonesia will see a decline in the ratio as they enjoy a "demographic dividend." Beyond the 10-year horizon, with the notable exception of India and the Philippines, a generalized deterioration is foreseen, with China and Thailand being hardest hit. Government policies will have to adapt by building "aging proof" pension systems, under which effective retirement ages adjust to increases in life expectancy. They will also need to facilitate greater female participation in the labor force and fully mobilize untapped pools of labor resources in informal sectors.

Figure 3.11

Tertiary Education Enrollment[1]
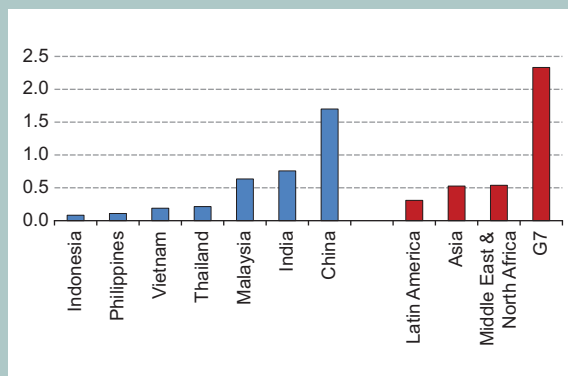*(In percent of eligible age group)*

Sources: UNESCO database.
[1] Tertiary education enrollment is classfied as total enrollment in ISCED 5 and 6 regardless of age. Eligible population is the 5-year age group starting from the official secondary school graduation age. China, Thailand, and Vietnam data are as of 2011; India, Indonesia, and Malaysia, 2010; the Philippines, 2009; Latin America, 2005-11; Middle East and North Africa, 2008-11; G7 (excluding Germany), 2009–10.

Figure 3.12

Research and Development Expenditure[1]
(In percent of GDP)

Sources: World Bank, *World Development Indicators*; UNESCO database; and country authorities.
[1] Latest available data: Malaysia, 2006; India, the Philippines, and Thailand, 2007; China and Indonesia, 2009; Vietnam, 2010; Latin America, 2006–10; Middle East and North Africa, 2009–11; G7, 2009–10.

Catching up to advanced economies' living standards will ultimately require shifting from a development model based on technology absorption to one that fosters innovation. Indeed, consistent with their current development stage, most Asian MIEs are lagging behind advanced economies on various innovation indicators such as the number of patents per capita or the degree of sophistication of their exports. Many of the areas for further reform highlighted above— for example, improving infrastructure, easing stringent product and labor market regulations, further deepening trade integration—will help on this front, but other policies can also help output move up the value chain. In particular, as Asian MIEs continue to develop, their governments will have a role to play in raising R&D spending and tertiary education attainment, two key areas for innovation outcomes (for their empirical relevance for the middle-income trap, see Eichengreen,

Park, and Shin, 2013). There usually remains significant room for improvement on both fronts, although China appears to outperform regional peers in the innovation area[10] and is also catching up rapidly on tertiary education enrollment (Figures 3.11 and 3.12).

Finally, good policies are helpful not only to avoid the middle-income trap, but also in advancing growth elsewhere in Asia. Improvements in infrastructure, regulation, trade openness, and education are all needed to deliver and sustain strong growth in LICs. Likewise, in higher-income economies like Japan and Korea, increasing competition in product markets, improving innovation policies, reducing labor market dualism through job protection reform, and addressing the demographic aging challenge by fostering greater female participation in the labor force are all key challenges to raise trend growth.

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[10] In this area, China's performance now compares with some of the advanced economies in terms of both inputs (e.g., R&D spending) and outcomes (e.g., number of triadic patents—those filed simultaneously in Europe, Japan, and the United States—per capita).